Additions to Westwood Elementary

Calcasieu Parish School System

Project documents obtained from www.CentralBidding.com
12-Apr-2026 04:56:16 PM

SPECIFICATIONS FOR:

ADDITIONS TO WESTWOOD ELEMENTARY
WESTLAKE, LOUISIANA

PROJECT NO. 1619D1

FEBRUARY 2026

KING
ARCHITECTS, INC.

1312 SAMPSON STREET WESTLAKE, LOUISIANA 70669 337.494.0806 kingarchitects.net

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ADDITIONS TO WESTWOOD ELEMENTARY

1900 SAMPSON STREET
WESTLAKE, LOUISIANA 70669

KAI Project No. 1619D1

Project Manual

FEBRUARY 2026

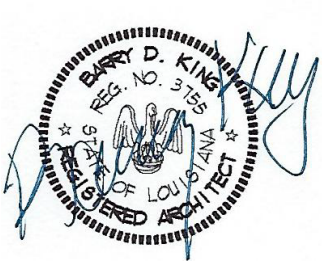
KING
ARCHITECTS, INC.

KING ARCHITECTS, INC **SECTION 00 01 07**

PROJECT NAME AND ADDRESS:	ADDITIONS TO WESTWOOD ELEMENTARY 11900 SAMPSON STREET WESTLAKE, LOUISIANA 70669
PROJECT NUMBER:	1619D1
DATE OF DRAWINGS AND SPECIFICATIONS	February 2026

We hereby certify these plans and specifications were prepared by us or under our direct personal supervision and that we are duly licensed professionals in our specific scope of licensure under the laws of the State of Louisiana.

ARCHITECT



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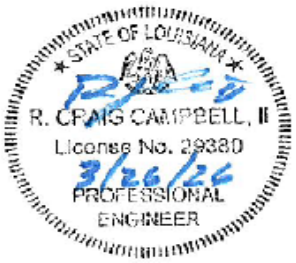

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MEP

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The Owner reserves the right to reject all bids for just cause as permitted by LA. R.S. 38:2214 (B). The ability of an entity to reject any bid is applicable only when administered in accordance with the Public Bid Law. In accordance with LA. R.S. 38:2212 (B) (1), the provisions and requirements of this section, and those stated in the Bidding Documents shall not be waived by any public entity.

A fee may be required for the Bidding Documents in accordance with LA. R.S. 38:2212 (D).

Dr. Jason VanMetre, Secretary
Calcasieu Parish School Board

Pc: Bourne, Brown Architect or Designer, State License Board for Contractors, Daily Journal of Commerce, F. W. Dodge, File

Publish in the American Press Newspaper **March 27th April 3rd and April 10th.**

Calcasieu Parish School Board

BUILDING FOUNDATIONS FOR THE FUTURE

Dr. Jason VanMetre, Superintendent

NOTICE TO BIDDERS

The Calcasieu Parish School Board will receive sealed bids before **April 29 2:00 P.M.** at the **Calcasieu Parish School Board, Planning & Construction Department, Chennault Facilities, 3800 Mallard Cove Drive, P.B. #506, Lake Charles, Louisiana 70615 Additions to Westwood Elementary SD # 23 Bond Funds Bid # 2026-04PC** Complete plans, and specifications may be obtained from **King Architect, Inc. 1312 Sampson Street, Westlake, La.70669**

No Bid shall be considered or accepted unless the bid is accompanied by bid security in an amount not less than five percent (5%) of the Base Bid and all Additive Alternates. The bid security shall be in the form of certified check or cashier's check drawn on a bank insured by the FDIC, or Calcasieu Parish School Board Bid Bond Form contained in the Front End Documents written by a surety company licensed to do business in Louisiana with a A.M. Best rating of "A" or better, countersigned by a person who is under contract with the surety company or bond insurer as a licensed agent .
Bids shall be accepted only from contractors who are licensed under LS R.S. 37:2150-2163 for the classification of Building Construction. No bid may be withdrawn for a period of thirty (30) days after receipt of bids, except under the provisions of LA. R.S. 38:2214. Evidence of authority to submit the bid shall be required in accordance with LA. R.S. 38:2212 (B) (2), (5) and/or LA. R.S. 39:1594 (C) (4).

Mandatory Pre-Bid April 14 at 10:00 A.M. Location:1900 Sampson St. Westlake La.70669

Each bid must be placed in an envelope, sealed, and marked on the outside, "**Additions to Westwood Elementary Sd # 23 Bond Funds, bid # 2026-04PC at the Calcasieu Parish School Board, Planning & Construction Department, Chennault Facilities, P.B. #506, Lake Charles, Louisiana 70615".**

Bid may also be submitted by electronic means security/password protected to this location, ensuring the following information is included on all pages of all correspondence: www.centralauctionhouse.com.

ARTICLE 1 - DEFINITIONS

1.1 The Bidding Documents include the following:

Title Page
Seals Page
Table of Contents
List of Drawings
Advertisement for Bids
Instruction to Bidders
Scope of Work
Pre-Bid Meeting Form
Geotechnical Data, if applicable
Louisiana Public Work Bid Form
Louisiana Public Work Unit Prices Form, if applicable
Bid Bond
Allowance Form, if applicable
Substitution Request Form (During Procurement)
Proposed Subcontractor Listing Form
Non-Collusion Affidavit of Prime Bidder
Affidavit (R.S. 38:2224 2190 2290-2296)
Attestation Form
Resolution Form (if needed)
Roofing Warranty & Inspection Letter, if applicable
Approved Applicator Letter, if applicable
Notice of Award Form
Contract Between Owner and Contractor & Performance and Payment Bond
Notice to Proceed Form
Submittal Transmittal Form
Application for Payment Form
Sales Tax Exemption Certificate (LDR Form R1020)
Request for Information (RFI) Form
Change Order Request Form
Change Order Form
Recommendation of Acceptance
Beneficial Occupancy
General Conditions (A201-2017)
Supplementary Conditions
Specifications, Divisions 01 – 35 dated FEBRUARY 2026
Drawings Sheets Numbered G-001 thru E4.1 , dated FEBRUARY 2026
Any Addenda Issued during the bid period and acknowledged in the Bid Form.

1.1.1 **Forms turned in with bid.** The Louisiana Uniform Public Work Bid Form (Section 00 41 13), Unit Prices Form (if applicable), Bid Bond Form (Section 00 43 13), and a Corporate Resolution (Section 00 45 43) or written evidence of the authority of the person signing the bid are the only forms that are turned in by the date and time specified.

1.1.2 **Forms turned in within ten (10) days after the bid opening.** The Subcontractor's Listing (Section 00 43 36), the Non-Collusion Affidavit of Prime Bidder (Section 00 45 19), the Affidavit (LA-R.S. 38:2224 2190 2290-2296) (Section 00 45 19.13), Attestation Affidavit Form (R.S. 38:2227 and R.S. 38:2212.10) (Section 00 45 19.16), the Roofing Manufacturing Warranty Letter (Section 00 45 63) and Approved Applicator Letter (Section 00 45 63.13), if applicable.

1.2 All definitions set forth in the General Conditions of the Contract for Construction, A.I.A. Document A201, or in other Contract Documents are applicable to the Bidding Documents.

1.3 Addenda are written on graphic instruments issued by the Architect prior to the opening of bids which modify or interpret the bidding documents by additions, deletions, clarifications, corrections, and prior approvals.

1.4 A Bid is a complete and properly signed proposal to do the work or designated portion thereof for the sums stipulated therein supported by data called for by the Bidding Documents.

1.5 Base Bid is the sum stated in the Bid for which the Bidder offers to perform the work described as the Base, to which work may be added for sums stated in Alternate Bids.

1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or subtracted from the amount of the base bid if the corresponding change in project scope or materials or methods of construction described in the Bidding Documents is accepted.

1.7 A Bidder is one who submits a bid for a prime contract with the Owner for the work described in the proposed contract documents.

1.8 A Subbidder is one who submits a bid to a Bidder for materials and/or labor for a portion of the work.

1.9 Where the word “Architect” is used in any of the Documents, it shall refer to the Prime Designer of the project, an Architect, Engineer or Landscape Architect.

ARTICLE 2 - BIDDER’S REPRESENTATION

2.1 Each Bidder by making his bid represents that:

2.1.1 He has read and understands the Bidding Documents and his Bid is made in accordance therewith.

2.1.2 He has visited the site and has familiarized himself with the local conditions under which the work is to be performed.

2.1.3 His bid is based upon the materials, systems and equipment described in the Bidding Documents as advertised and as modified by Addenda.

2.2 The Bidder must be fully qualified under any state or local licensing law for Contractors in effect at the time and at the location of the work before submitting his bid. In the State of Louisiana, Revised Statutes 37:2150, et seq. will be considered, if applicable. The Contractor shall be responsible for determining that all of his Subbidders or prospective Subcontractors are duly licensed in accordance with law.

ARTICLE 3 - BIDDING DOCUMENTS

3.1 Copies

3.1.1 Bidding Documents may be obtained from the Architect as stated in the Advertisement for Bids.

3.1.2 Complete sets of Bidding Documents shall be used in preparing bids; neither the Owner nor the Architect assumes any responsibility for errors or misinterpretation resulting from the use of incomplete sets of Bidding Documents.

3.1.3 The Owner or Architect in making copies of the 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.

3.2 Interpretation or correction of Bidding Documents.

3.2.1 Bidders shall promptly notify the Architect of any ambiguity, inconsistency, or error which they may discover upon examination of the Bidding Documents or of the site and local conditions.

3.2.2 Bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to the Architect, to reach him at least seven days prior to the date of receipt of bids.

3.2.3 Any interpretation, correction or change of the Bidding Documents will be made by Addendum. Interpretations, corrections, or changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections and changes.

3.3 Substitutions

3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function,

dimension, appearance, and quality to be met by any proposed substitution.

3.3.2 No substitution will be considered unless written request for approval has been submitted by the Proposer and has been received by the Architect at least ten (10) days prior to the date for receipt of bids. Each such request shall be submitted on required form and include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including model numbers, drawings, cuts, performance and test data and other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or work that incorporation of the substitute would require shall be included. The burden of proof of the merit of the proposed substitute is upon the Proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

3.3.3 If the Architect approves any proposed substitution, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

3.4 Addenda

3.4.1 Addenda will be mailed or delivered to all who are known by the Architect to have received a complete set of Bidding Documents.

3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

3.4.3 Addenda shall not be issued within a period of seventy-two (72) hours prior to the advertised time for the opening bids, excluding Saturdays, Sundays, and any other legal holidays; however, if the necessity arises to issue an addendum modifying plans and specifications within the seventy-two hour (72) period prior to the advertised time for the opening of bids, then the opening of bids shall be extended exactly one week, without the requirement of re-advertising. The Owner shall be consulted prior to issuance of such an Addendum and shall approve such issuance.

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

ARTICLE 4 - BIDDING PROCEDURE

4.1 Form and Style of Bids.

4.1.1 Bids shall be submitted on the form provided by the Architect.

4.1.2 All blanks on the Bid Form shall be filled in by the typewriter or manually in ink or electronically, if requested.

4.1.3 Where so indicated by the makeup of the Bid Form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the written words shall govern.

4.1.4 Any interlineations, alteration or erasure must be initialed by the signer of the Bid or his authorized representative.

4.1.5 Bidders are cautioned to complete all Alternates should such be required in the Bid Form. Failure to submit alternate prices will render the Proposal informal and may cause its rejection.

4.1.6 Bidder shall make no additional stipulation on the Bid Form nor qualify his Bid in any other manner.

4.1.7 The bidding documents shall only require the following information at the time designated in the advertisement for bid opening: Bid Security or Bid Bond, Acknowledgment of Addenda, Base Bid, Alternates, Signature of Bidder, Name, Title and Address of Bidder, Name of Firm or Joint Venture, Corporate Resolution or written evidence of the authority of the person signing the bid and Louisiana Contractors License Number, and unit price information on public works projects where required. Written evidence of the authority of the person signing the bid for public works shall be submitted at the time of bidding. Written evidence of authority and all supporting documents detailed in R.S. 38:2212 (5).

4.1.8 On any Bid in excess of fifty thousand dollars ($50,000.00), the Contractor shall certify that he is licensed under R.S. 37:2150-2163 and show his license number on the Bid above his signature or his duly authorized representative.

4.2 Bid Security

4.2.1 No Bid shall be considered or accepted unless the bid is accompanied by bid security in an amount of not less than five percent (5%) of the Base Bid and all additive Alternates. The bid security shall be in the form of a certified check or cashier's check drawn on a bank insured by the Federal Deposit Insurance Corporation, or a bid bond written by a surety company licensed to do business in Louisiana and with an A.M. Best rating of "A" or better, countersigned by a person who is under contract with the surety company or bond insurer as a licensed agent in this state and who is residing in this state and accompanied by appropriate Power of Attorney in fact or of the State of Louisiana.

Bid security furnished by the Contractor shall guarantee that the Contractor will, if awarded the work according to the terms of his proposal, enter into the Contract and furnish Performance and Payment Bonds as required by these Contract Documents, within ten (10) days after written notice that the instrument is ready for his signature.

Should the Bidder refuse to enter into such Contract or fail to furnish such bonds, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as penalty.

4.2.2 The Owner will have the right to retain the bid security of Bidders until either (a) the Contract has been executed and bonds have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn, or (c) all bids have been rejected.

4.3 Submission of Bids

4.3.1 Electronic Submission. In accordance with LA-R.S. 38:2212 E., Public entities shall provide, as an additional bidding option, a uniform and secure electronic interactive system for the submittal of bids for public works requiring competitive bidding. The Owner has implemented the procedures related to this requirement that electronic bidding be an option for contractors to submit bids on their projects: www.centralauctionhouse.com.

4.3.2 Bids shall be sealed in an opaque envelope and will be received until the time specified and at the place specified in the Advertisement for Bids. It shall be the specific responsibility of the Bidder to deliver his sealed bid to Calcasieu Parish School Board, Planning & Construction Department and prior to the announced time for the opening of bids. Later delivery of a bid for any reason, including late delivery by United States Mail, or express delivery, shall disqualify the bid. The bid envelope shall be identified on the outside, "Additions to Westlake High School, SD #23 – Bond Funds, Bid No. 2022-07PC, to be opened at 2:00 PM., March 30, 2022, at the Calcasieu Parish School Board, Planning & Construction Department, Chennault Facilities, P.B. #506, Lake Charles, Louisiana 70615", along with the name, address, and license number of the Bidder as required by R.S. 37:2163. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "Bid Enclosed" on the face thereof. Such bids shall be sent by Registered or Certified Mail, Return Receipt Requested, addressed to: Calcasieu Parish School Board, Planning & Construction Department, Chennault Facilities, PO Box 800, Lake Charles, Louisiana 70602.

Bids shall be deposited at the designated location prior to the time on the date for receipt of bids indicated in the Advertisement for Bids, or an extension thereof made by Addendum. Bids received after the time and date for receipt of bids will be returned unopened.

Bidder shall assume full responsibility for timely delivery at location designated for receipt of bids.

4.3.4 Oral, telephonic, or telegraphic bids or modifications to bids, with the exception of the electronic procedures provided for herein, are invalid and will not receive consideration. Owner will not consider notation written on outside of Bid Envelope which have the effect of amending the Bid.

4.4 Modification or Withdrawal of Bid

4.4.1 A bid may not be modified, withdrawn or canceled by the Bidder during the time stipulated in the Advertisement for Bids, for the period following the time and bid date designated for the receipt of bids, and the Bidder so agrees in submitting his bid, except in accordance with LA-R.S. 38:2214 C., 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 hours of the bid opening excluding Saturdays, Sundays and legal holidays".

4.4.2 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.

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

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

ARTICLE 5 - CONSIDERATION OF BIDS

5.1 Opening of Bids.

5.1.1 The properly identified bids received on time will be opened publicly and will be read aloud, and a tabulation abstract of the amounts of the Base Bids and Alternates, if any, will be made available to Bidders.

5.2 Rejection of Bids

5.2.1 The Owner reserves the right to reject any and all bids for just cause as permitted by LA R.S. 38:2214 (B). The ability of an entity to reject any bid is applicable only when administered in accordance with the Public Bid Law. In accordance with LA-R.S. 38:2212 (B)(1), the provisions and requirements of this section and those stated in the Bidding Documents shall not be waived by any entity. The Owner shall have the right to reject any or all bids and in particular to reject a bid not accompanied by any required bid security or data required by the Bidding Documents or a Bid in any way incomplete or irregular.

5.3 Acceptance of Bid

5.3.1 Any bid shall include no more than three alternates. Alternates, if accepted, shall be accepted in the order in which they are listed on the bid form. Determination of the low bidder shall be on the basis of the sum of the base bid and any alternates accepted. However, the Owner shall reserve the right to accept alternates in any order which does not affect determination of the low bidder. LA-R.S. 38:2212 (A) (3) (e); Act 868.

5.3.2 It is the intent of the Owner to award a contract to the lowest responsible Bidder in accordance with the requirements of the Bidding Documents, and if the bid does not exceed the funds available.

ARTICLE 6 - POST BID INFORMATION

6.1 Proposed list of subcontractors, materials suppliers, and superintendents.

6.1.1 Within 24 hours after bids are opened, the Contractor, identified as the apparent low bidder, will make the following submittals to the Architect. A tentative list of all Subcontractors or other persons or organizations (including those who are to furnish materials or equipment fabricated to special design) proposed for principal portions of the work, as well as the proposed Superintendent. Also provide a designation of the work to be performed by the Contractor with his own forces. No bids shall be received within 24 hours before a weekend or legal holiday, unless deemed necessary by the Owner.

It is recognized that the acceptance or rejection of alternates contained in the bid proposal may ultimately determine the low bidder on the project. In the event a Contractor, other than the Contractor identified as the apparent low bidder at the bid opening, becomes the low bidder as a result of such selection of alternates, this Contractor shall make the submittals required by this section within 24 hours after notification by the Owner.

6.1.2 The Contractor will be required to establish to the satisfaction of the Architect and the Owner the reliability and responsibility of the proposed subcontractors to furnish and perform the work described in the section of the specifications pertaining to such proposed Subcontractors' respective trades.

6.1.3 The Architect will notify the Contractor if the Owner, after due investigation, has reasonable and substantial objection to any person or organization on the Contractor's list of proposed Subcontractors. If there are objections the Contractor shall submit alternative Subcontractor(s) for their approval.

6.1.4 Subcontractors and other persons and organizations proposed by the Bidder and accepted by the Owner and the Architect upon the awarding of a contract must be used on the work for which they were proposed and accepted and shall not be changed except upon the recommendation of the Architect and approved by the Owner in the form of a change order. Any changes on the tentative 24-hour list submitted by the Contractor prior to the awarding of the contract must be requested in writing to the Architect with proper justification. Any change in the tentative List of Subcontractors will require recommendation from the Architect to the Owner. The recommendation and approval of the Owner must be made in writing.

6.1.5 The lowest responsible bidder shall submit to the Architect and the Owner prior to award of the contract a letter from the manufacturer that the manufacturer will issue the roof system and include the name of the applicator acceptable to the manufacturer for installing the specified roof system. This manufacturer shall be one that has received prior approval or is named in the specifications.

6.1.6 The awarded bidder on this project shall execute a Non-Collusion Affidavit of Prime Bidder which is found within this bid package. The Non-Collusion Affidavit form shall be submitted to the Owner through the Architect ten (10) days after the opening of bids.

6.1.7 In accordance with LA-R.S. 38:2224 2190 2290-2296, the awarded bidder on this project shall execute an Affidavit which is found within this bid package. The Affidavit form shall be submitted to the Owner through the Architect ten (10) days after the opening of bids.

6.1.8 In accordance with LA-R.S. 38:2227 and 38:2212.10, the awarded bidder on this project shall execute an Attestation Affidavit (Past Criminal Convictions of Bidders) and E-Verify form found within this bid package. The Attestation Affidavit form shall be submitted to the Owner through the Architect ten (10) days after the opening of bids.

6.2 Additional Submissions

6.2.1 A breakdown of the contract into the 32 Divisions of the C.S.I. shall be provided to the Architect (Schedule of Values). No payments will be made to the Contractor until this is received.

6.2.2 A copy of applicable state, parish, or municipal licenses legally required for General Contractor and subcontractors shall be provided to the Architect. No payments will be made to the Contractor until this is received.

6.2.3 Federal and state tax identification numbers on General Contractors and subcontractors shall be provided to the Architect. NO payments will be made to the Contractor until this is received.

ARTICLE 7 - PERFORMANCE AND PAYMENT BOND

7.1 Bond Required.

7.1.1 The Contractor shall furnish and pay for a Performance and Payment Bond written by a company licensed to do business in Louisiana, which shall be countersigned by a person who is contracted with the surety company or bond issuer as an agent of the company or issuer, and who is licensed as an insurance agent in this State, and who is residing in this State, in an amount equal to the 100% of the Contract amount. By issuing such Performance and Payment Bond, the surety acknowledges they are on the current U.S. Department of the Treasury Financial Management Service List of approved bonding companies and complies with all other provisions of R.S. 38:2219.

7.2 Time of Delivery and Form of Bond.

7.2.1 The Bidder shall deliver the required bond to the Owner simultaneous with the execution of the Contract.

7.2.2 Bond shall be in the form furnished by the Contractor, entitled Contract Between Owner and Contractor and Performance and Payment Bond, a copy of which is included in the Contract Documents.

7.2.3 The Bidder shall require the Attorney-In-Fact who executes the required bond on behalf of the surety to affix thereto a certified and current copy of his power of attorney.

ARTICLE 8 - FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

8.1 Form to be Used.

8.1.1 Form of the Contract to be used shall be furnished by the Owner, a copy of which is bound in the Bidding Documents (Section 00 52 00).

8.2 Award

8.2.1 In accordance with Louisiana Law, if the Contractor is awarded to the Bidder, he shall at the time of the signing of the Contract execute the Non-collusion Affidavit included in the Contract Documents.

8.2.2 Before award of the contract, the successful Bidders shall furnish to the Owner a certified copy of the minutes of the corporation or partnership meeting which authorized the party executing the Bid to sign on behalf of the Contractor.

ARTICLE 9 - COMPLETION TIME AND LIQUIDATED DAMAGES

9.1 The Bidder shall agree to fully complete the contract within **540** consecutive calendar days, subject to such extensions as may be granted under Section 4.3.7.1.1 of Supplementary Conditions, Delays and Extensions of Time: in the General Conditions and the Supplementary Conditions, and acknowledges that this construction time will start on or before the date specified in the written Notice to Proceed or the Contractor will be subject to pay to the Owner Liquidated Damages in the amount of **Five Hundred Dollars ($500.00)** per day for each day of delay beyond the period indicated provided extension has not been granted as indicated in the contract documents.

ARTICLE 10 - BUILDING MATERIAL EXCLUSIONS

10.1 All building materials shall be free of asbestos.

10.2 All plumbing materials shall be free of lead.

10.3 All paints shall be free of lead.

10.4 All contractors should use the least hazardous materials on all jobs. Material Safety Data Sheets (MSDS) shall be given to the owner on all materials used.

ARTICLE 11 - PRE-BID CONFERENCE

11.1 A Pre-Bid Conference shall be held at the project site at least 10 days before the date for receipt for bids. The Architect shall coordinate the setting of the date, time and place for the Pre-Bid Conference and shall invite in writing the Owner, and all who have received sets of the Bidding Documents to attend. The purpose of the Pre-Bid Conference is to familiarize Bidders with the requirements of the Project and the intent of the Contract Documents, and to receive comments and information from interested Bidders.

11.2 Any revision of the Bidding Documents made as a result of the Pre-Bid Conference shall not be valid unless included in an Addendum issued in accordance with Paragraph 3.4 of the Instructions to Bidders.

11.3 A Mandatory Pre-bid Conference (for General Contractors Only) will be held at the project site, on **Monday, March 23, 2026, at 10:00 am.**

ARTICLE 12 - APPLICABILITY

12.1 Any article located in the Instructions to Bidders found to be in conflict with the General Conditions and/or Supplementary Conditions will take precedence over the latter two set of Articles.

ARTICLE 14 - MISCELLANEOUS PROVISIONS

14.1 The General Contractor shall repair, replace, or pay for the relocation of telephones and wiring, fire alarms, intercoms, bells, TV cable, security system wiring and equipment, and any other cable type installation that may be damaged, cut or removed during

the construction.

14.2 The General Contractor will be responsible for the removal and relocation of any playground equipment that needs to be moved due to construction.

14.3 The Owner is hereby recognized as a statutory employer of Contractor's employees, including but not limited to Contractor's direct employees, immediate employees, and statutory employees. This contract recognizes the existence of a statutory employer relationship between the Owner and Contractor in accord with Act 315 of 1997.

ARTICLE 15 - SALES and USE TAX EXEMPTION

15.1 In accord with applicable rules adapted and promulgated by the Louisiana Department of Revenue, the Owner shall designate the Contractor and all Subcontractors as its agents for the purchase and lease of materials, supplies, or equipment for the project. The Contractor and all Subcontractors shall accept the agency designation. The designation and acceptance thereof shall be made on the form prescribed by the Louisiana Department of Revenue which form shall be part of the contract between the Owner and the Contractor. A copy of this form is available at the Architect's office or in the Bidding Documents (Section 00 62 76.13) and shall be completed as much as possible by the Contractor and Subcontractors, then submitted to the Architect to forward to Owner for execution. .

The agency relationship between the Owner and the Contractor and all Subcontractors shall relieve the Contractor and Subcontractors (1) from paying any state or local sales or state or local use taxes on materials, supplies or equipment which is affixed to and/or made a part of the real estate of the project or work or which is permanently incorporated into the project or work and, (2) from paying and state or local use taxes on any materials, supplies or equipment which are leased and used exclusively for the project or work. Accordingly, in preparing their bids and computing costs the Contractor and Subcontractors shall not consider sales and/ or use taxes which would otherwise be due.

The Owner will furnish to the Contractor and Subcontractors its Certificate of Sales/Use Tax Exemption/ Exclusion on the form prescribed by the Louisiana Department of Revenue, a copy of which is in the Bidding Documents. The Contractor and Sub-contractors shall furnish a copy of such certificate to all vendors or suppliers of any of the materials, supplies, or equipment described above.

The Contractor and Subcontractors shall make all purchases and leases on behalf of and as the agent of the Owner.

Rules and regulations of the Louisiana Department of Revenue shall prevail over any conflicting provisions or specifications of the contract.

END OF SECTION 00 21 13

SCOPE OF WORK

The Project entails furnishing labor, materials, tools and equipment necessary to provide the following at Westwood Elementary School. The installation of all new materials shall be performed in strict accordance with the Manufacturer's written installation instructions, and in accordance with all approved shop drawings.

PRE-BID MEETING AND SITE INSPECTION - MANDATORY ATTENDANCE

1. A Pre-Bid Meeting and Site Inspection will be held on Tuesday, April 14th, 2026 at 10:00 am.

2. The purpose is to provide Bidders an opportunity to familiarize themselves with the Work and with existing conditions.

3. Attendance for the entire time and the place specified is **mandatory** for all General Contractors and is a condition of Contract Award. Major subcontractors are strongly advised to attend. Others are invited to attend.

REPORT OF GEOTECHNICAL CONSULTING SERVICES

4 Westlake Schools - Westwood Elementary School
Westlake, LA 70669

Calcasieu Parish School Board

Thompson Engineering Project No.: 20-1116-0002

March 12, 2021

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ENGINEERING

March 12, 2021

Calcasieu Parish School Board
3800 Mallard Cove Dr.
Lake Charles, LA 70615

Attention: **Mr. Harold Heath – Planning & Construction Manager**

Subject: **Report of Geotechnical Consulting Services**
Westwood Elementary School
Westlake, LA
Thompson Project No.: 20-1116-0002

Dear Mr. Heath:

Thompson Engineering (Thompson) is pleased to transmit this geotechnical report for the proposed improvements at Westwood Elementary School in Westlake, Louisiana. This report has been prepared following the scope of services presented in Thompson's proposal, dated, July 29, 2020. Authorization for our services was made by Calcasieu Parish School Board, dated August 6, 2020.

This document constitutes the design-level geotechnical report, which may be used in support of project design and construction activities. Details on exploration protocols and technical matters are presented in the **Report Text** and **Appendices**.

We appreciate the opportunity to continue to assist Michael Baker International with project-related geotechnical matters. Please do not hesitate to contact our office with any questions concerning this submittal.

Respectfully,

THOMPSON ENGINEERING, INC

Zhen Liu, Ph.D., P.E.
Project Geotechnical Engineer
Louisiana Registration No. 43570

Cameron L. Crigler, P.E.
Senior Geotechnical Engineer
Louisiana Registration No. 41403

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Appendices:

A. Tests Location Plan
B. Records of Soil Borings
C. Laboratory Test Results

1.0 INTRODUCTION

Thompson has completed the geotechnical engineering services for the proposed improvements at Westwood Elementary School in Westlake, Louisiana, in general accordance with the contracted scope of work between Calcasieu Parish School Board and Thompson.

The geotechnical exploration program summarized in this document was performed following generally accepted local soil and geotechnical engineering practices.

This report presents the results of the geotechnical field exploration program, provides relevant technical discussions, and provides recommendations for geotechnical site preparation and foundation design/construction of proposed structures.

2.0 OBJECTIVES

Thompson was commissioned for the engineering evaluation of geotechnical matters associated with the proposed improvements at Westwood Elementary School. To satisfy the stated objective, the following tasks were undertaken:

- Explore the prevailing subsurface soil conditions in the general area of the proposed development.
- Utilize the collected subsurface data to classify and stratify the prevailing site soils and assign relevant soil strength and engineering properties.
- Evaluate the subsurface soil response to anticipated foundation loadings.
- Present a discussion of geotechnical matters deemed relevant and those with potential impact on the proposed engineering design and construction, as well as provide engineering conclusions and recommendations.

3.0 SCOPE OF SERVICES

The scope of geotechnical services deemed appropriate for this study, in light of the project requirements, our understanding of the project as summarized herein, and with reliance on our knowledge of the local geology and our experience at the vicinity of this project site and with similar project parameters, included the following:

- Perform one (1) soil boring to a depth of 30 ft. below the existing grade, one (1) soil boring to a depth of 35 ft. below the existing grade, and two (2) soil borings to a depth of 40 ft. below the existing grade within the project areas.
- Interpretation of SPT data to determine site soil conditions and assessment of groundwater conditions.
- Engineering evaluations and recommendations for support of the design and construction of the planned structures.

4.0 PROJECT DESCRIPTION

Relevant project information, provided by Calcasieu Parish School Board, included the location of the project site. We understand that current project plans include a new Gym and demolishing and remolding a classroom building at Westwood Elementary School.

Plate 1 below presents the site plan for the proposed impovements at Westwood Elementary School. We understand that the existing classroom building (as shown in **Plate 1**) will be demolished before remolding at Westwood Elementary School.

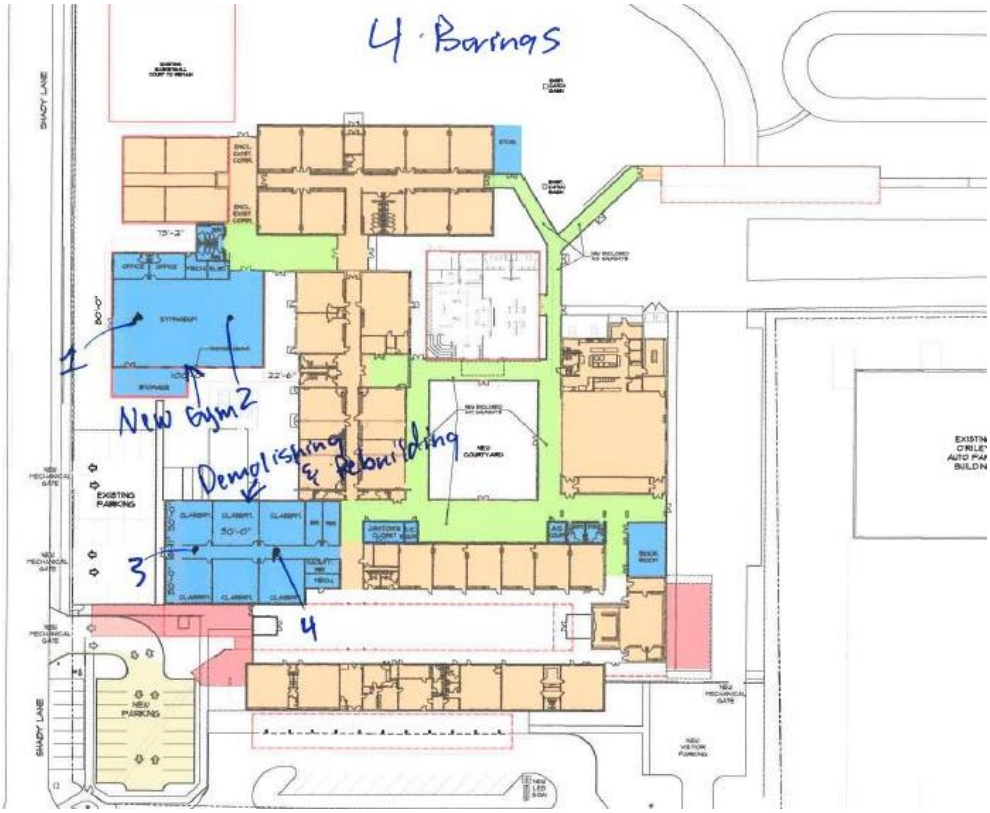


Plate 1 – Site plan of Westwood Elementary School

Detailed structural information and information regarding site grading were not provided at the time of this report. It is assumed that the planned foundations will be grade-supported slabs with isolated column footings. For the purposes of our report, a maximum column load of 50 kips and wall loads of 3 kips/linear foot for the one-story classroom building were assumed during the settlement analysis. Slab live loads of less than 200 psf and elevated fill thicknesses of less than 18 inches above current grades have also been assumed.

If fill thicknesses or actual foundation loads differ or exceed those described above, Thompson should be contacted to confirm the validity of the recommendations presented herein, as excessive structure settlement could occur.

5.0 OBSERVED SITE CONDITIONS

The project site was visited by Thompson personnel during site exploration and the field data collection activities. The site is relatively flat with minor changes in elevation. The surface area of the project site is mostly concrete-covered or grassed.

6.0 SUBSURFACE EXPLORATION PROGRAM

Thompson geotechnical drilling crews performed four (4) soil borings and sampling operations, between August 18 and August 23, 2020. A CME 550x drill rig, equipped with an automatic standard penetration test hammer, was utilized to advance the soil borings using mud rotary drilling techniques. One (1) soil boring was advanced to a depth of 30 ft. below the existing site grades, one (1) soil boring was advanced to a depth of 35 ft. below the existing site grades, and two (2) soil borings were advanced to a depth of 40 ft. below existing site grades. The boreholes were grouted upon fieldwork completion. The test locations are presented in the "Tests Location Plan" attached in **Appendix A**.

The overall intent of the subsurface exploration program was to establish a site-specific subsurface conditions database. Standard Penetration Test (SPT) borings were performed in general accordance with ASTM D1586 guidelines. Recovered samples were initially examined and visually classified in the field by Thompson personnel. Samples were returned to Thompson's geotechnical laboratory for review by a Geotechnical Engineer and for additional laboratory testing. The results of the classification and stratification are shown on the appended Records of Test Borings in **Appendix B**.

7.0 LABORATORY SOIL TESTING PROGRAM

The soil samples were visually classified in general accordance with the guidelines of ASTM D-2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System) and ASTM D-2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). The quantity and type of laboratory tests performed for this geotechnical study were determined and adjusted by Thompson's engineering personnel based on the uniformity and character of the subsurface soil conditions encountered and our experience and knowledge of local soil conditions.

Laboratory soil tests were performed to aid in the classification of the soils, and to help in the evaluation of engineering characteristics of the soils. Representative soil samples recovered from the soil test borings were selected for moisture content, percent finer than #200 sieve, and Atterberg Limits Tests. UU tests were also performed on selected undisturbed Shelby tube samples. Test protocols were in accordance with ASTM Procedures. The soil test results are provided on the respective test result columns of borings logs presented in **Appendix B**. The UU test results are provided in **Appendix C**.

8.0 SUBSURFACE FINDINGS

While the establishment of generalized subsurface conditions is useful for the geotechnical engineering evaluation process, such generalizations should be reviewed with caution as they promote extrapolation of recovered data between soil test sounding locations. The subsurface findings for this project are summarized below.

8.1 Subsurface Conditions

Our assessment of the subsurface conditions is based on established correlations of SPT data to soil type behavior. The following generalized subsurface soil conditions have been identified at the project site:

- Approximately 4 ½ inches of concrete and asphalt were encountered in boring WWE-3 (7).
- From existing grade to an approximate depth of 17 feet, medium dense silty sands (SM) and medium stiff to very stiff sandy silts (ML) and clays (CL, CH) were typically encountered.
- From a depth of 17 feet to 32 feet, very soft to soft clays (CL) were typically encountered.
- From a depth of 32 to the maximum explored depth of 40 feet, medium stiff to very stiff clays (CL) were typically encountered.

8.2 Groundwater Level

Groundwater was observed at a depth of 6.30 ft for Westwood Elementary School at the end of drilling or after 24 hours. It should be noted that the near surface clay soils will support “perched” groundwater conditions. Fluctuations of the groundwater level on this project may be expected to occur seasonally as a result of rainfall, surface runoff, and immediate area construction activities. Elevated groundwater levels can be anticipated especially following heavy rainfall or during the wet season.

9.0 SHALLOW FOUNDATION SYSTEM EVALUATIONS

9.1 Settlement

A requirement of a shallow foundation system is the ability of the structure to tolerate the predicted settlements. Among others, the following parameters are necessary in order to estimate settlement: structural loads, bearing pressures, stress reduction factors, the thickness of each compressible underlying soil stratum, modulus of the bearing soil strata, foundation dimensions, and foundation bearing elevations.

Settlement was evaluated using the Roc Science Settle 3D program. In addition, the provided footing size described in the project description above was analyzed during evaluation. Foundation was analyzed with an embedment depth of 2 feet below existing site grades.

Figure 1 below presents the estimated settlement associated with bearing pressures varying from 750 psf to 2,000 psf applied to the planned shallow foundation size. **Figure 1** presents the total settlement for stand-alone foundations that are constructed directly on prepared soils using the recommended geotechnical site preparation activities and do not include the influence of the loadings from adjacent grade supported structures. Thompson should be contacted to revise the settlement estimates if these individual footings or strip footings are located adjacent to any grade supported structures.

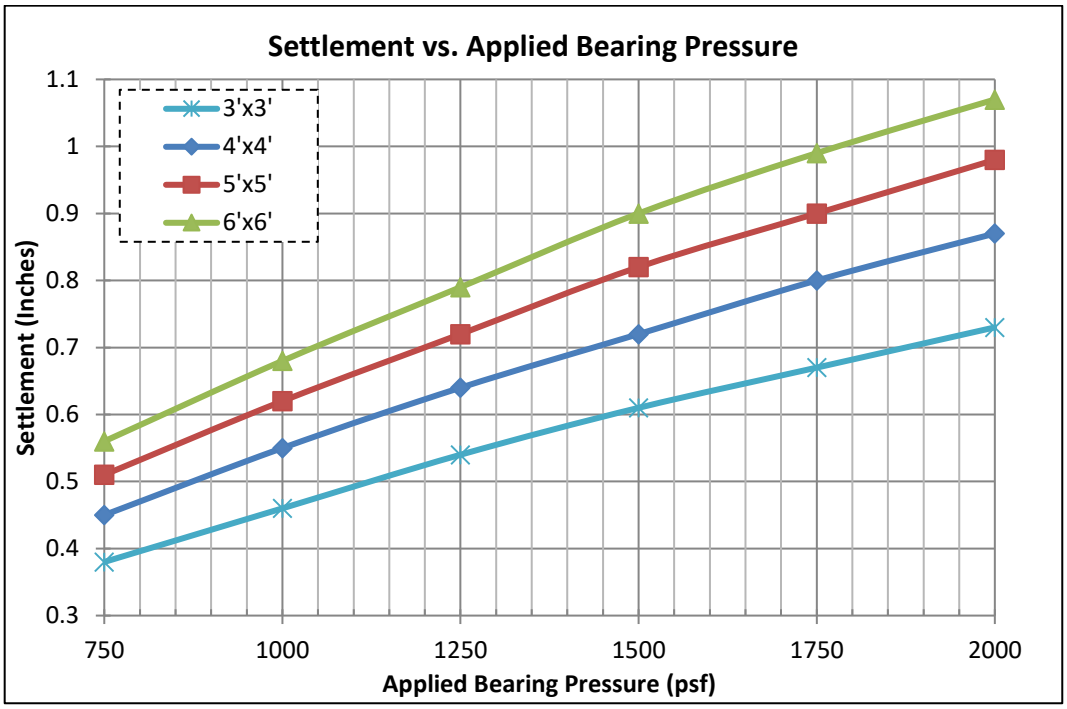


Figure 1: Shallow Foundation Settlement vs. Applied Bearing Pressure

9.2 Bearing Capacity

The bearing capacity of a soil is the ability of the soil to carry a load without failure within the soil matrix. Bearing capacity failure occurs usually as a shear failure of the soil supporting the shallow foundation. Bearing capacity failures are usually sudden and catastrophic. Foundation allowable bearing pressures and bearing elevations must be adjusted so as to provide appropriate margins of safety against bearing capacity failure.

We recommend foundation design for sustained loads consider a maximum allowable net soil bearing pressure of 2,000 psf under code dead and live loads, with minimum depth of embedment (bottom of footing below adjacent exterior finished grade) of 24 inches. While this maximum bearing capacity is based upon the foundation size, depth of embedment, and implementation of the site preparation recommendations provided later in this report, it may be that the potential foundation settlements presented in the previous section govern the selection of foundation sizes.

10.0 SHALLOW FOUNDATION RECOMMENDATIONS

The recommendations provided below are based on the project information described herein, the available subsurface data, our engineering evaluation of geotechnical matters, and our past experience. If project information or design concepts change, we should be advised of these changes in writing and provided with an opportunity to review our recommendations as presented in this geotechnical report in light of the new design information.

We request the opportunity to revisit and supplement, as necessary, our recommendations as provided in this geotechnical report if in fact our assumptions or understandings are incorrect or inaccurate. In such a case, we should be provided with appropriate foundation plans and sections, and system installation procedures for our review and use.

10.1 Groundwater Control

Some fluctuations of the shallow groundwater levels should be expected seasonally depending upon local rainfall, immediate area construction, and other factors. Due to the potential for high groundwater conditions at this project site, temporary dewatering will be required, particularly for the installation/construction of underground utility structures, foundation systems, and below grade structures.

Typically, temporary dewatering measures are determined by the contractor but may consist of perimeter ditches and interior ditches, as necessary, which are graded to sumps so the groundwater can be pumped away from the excavated construction areas. Alternatively, a wellpoint dewatering system may be designed to satisfy site dewatering requirements if deep excavations below the water table are necessary during the construction process.

10.2 Stormwater Runoff Control

We recommend positive drainage measures be established and maintained on the project site during construction. We further recommend permanent measures be implemented to maintain positive drainage on the project parcel throughout the life of the project. Runoff should be directed away from the foundation or pavement areas.

10.3 Geotechnical Site Preparation

Locations of any existing underground utility and service lines/conduits within the project construction areas should be established. Provisions should then be made to relocate interfering utilities to appropriate locations. It should be noted that if underground pipes are not properly removed or plugged, they might serve as conduits for subsurface erosion, which may subsequently lead to excessive settlement of the overlying structures.

1. Clear and grub the building/ grade supported structure footprint and extending 5 feet beyond the perimeter to expose the underlying subgrade soils. Undocumented fill soils, old pavements, foundation systems, concrete flatwork, above-grade structures, debris, and any buried service lines and structures should be removed in their entirety from beneath the building/ grade supported structure footprint. Clearing and grubbing operations should be observed and documented by a qualified Geotechnical Engineer or his representative.

2. Undercutting within the entire building footprint shall be performed to a minimum depth of 18 inches below the footing bearing level. The extents of the undercut should extend out 1 ft. for every 1 ft. of depth below the footing. Care should be taken so as not to undermine existing foundations.

3. A qualified Soils Technician should inspect and probe the slab and footing undercut surfaces for zones of soft or very loose soils. Additional undercutting, if deemed necessary, shall be directed by the Project Geotechnical Engineer of Record. Backfill materials beneath the footings shall adhere to material recommendations found in the following report section.

4. Prior to beginning backfill operations, the exposed subgrade (undercut surface) shall be compacted to a minimum of 95 percent of the materials Standard Proctor Density as per

ASTM D-698 at a minimum depth of 12 inches. If compaction of the undercut surface can not be performed due to high moisture conditions, lime stabilization using a minimum of 6% lime by weight should should be performed for a minimum depth of 8 inches. Backfilling should then proceed using the fill materials specified below.

10.4 Structural Fill

1. "Structural Fill" shall be a locally available soil material herein defined as clayey sand or clay soil free of organics, debris, and otherwise deleterious materials with Liquid Limit of less than 40 and a Plasticity Index between 10 and 20. The effective diameter of clay clods should not be larger than 3 inches. Fill soils should be placed with loose lift thicknesses of not more than 6 to 8 inches. The moisture content of the fill soils should be within 3% of the optimum moisture content based on ASTM D-698.

2. Fill and subgrade (undercut surface) compaction efforts should be performed with a compactor of appropriate type, size, weight, and/or modulation rate. The fill areas should be subjected to several overlapping passes of the compaction equipment to achieve compact standards and completeness of the lift.

3. Prior to initiating fill/grading activities, representative samples of the fill soils and planned subgrade soils should be collected for classification and Proctor testing. The maximum dry density, optimum moisture content, gradation, and plasticity should be determined for each type of soil. These laboratory tests are needed for quality control during the fill and subgrade compaction.

4. All fill soils should be compacted to 95 percent of the soils Standard Proctor maximum dry density (ASTM D-698).

5. Field density tests should be performed on the compacted fill soils. At a minimum, one test should be performed for each lift of fill soils for a 2,000 sq. ft. area.

6. The involvement of Thompson geotechnical engineering personnel during site work activities will help to verify that procedures and results are as specified and as anticipated. Issues identified during this process should be addressed by the Geotechnical Engineer.

10.5 Shallow Foundation Systems

1. Shallow foundation construction should proceed following the completion of all geotechnical site preparation, site grading, and fill placement and compaction activities.

2. Footings should bear directly and continuously on the prepared soils.

3. Individual footings should be designed with a minimum depth of embedment of 24 inches.

4. The Geotechnical Engineer should observe and document the foundation excavation process and soil bearing conditions, and address any unusual or unanticipated conditions identified during this process, such as unstable ground surface or groundwater pumping.

5. Foundation bearing surfaces should be level or suitably benched, and free of any loose soils that have been disturbed by seepage or the construction process. Loosened bearing

soils should be recompacted prior to the placement of reinforcing steel. The foundation bearing surfaces should be stable under the weight of construction equipment and personnel.

6. Shallow foundation construction should occur in the dry. Foundation excavations should be cut to final grade and footings constructed as soon as possible to minimize potential damage to bearing soils as a result of exposure to the environment.

7. Shallow foundations may be cast directly against the exposed, vertical and horizontal, excavation faces.

8. Excavations within compacted fill soils should be expected to remain vertical and stable while open only for short periods of time. Excavation collapse due to rainfall or other on-site activities should be repaired to design bearing level prior to reinforcing steel placement.

11.0 CONSTRUCTION RELATED GEOTECHNICAL SERVICES

To provide continuity between the geotechnical design and construction phases of the project and to assure conformance to design specifications, Thompson should be retained to provide supporting consulting and quality assurance services, during the earthwork and foundation construction phases of the project.

12.0 REPORT LIMITATIONS

This report is prepared for the exclusive use by Calcasieu Parish School Board and is prepared in accordance with the Standard of Care reasonably expected of similar geotechnical engineers, providing similar services in a similar locale. No warranty is expressed or implied and all such warranties are disclaimed. This report is prepared for a limited purpose as further detailed by the objectives and/or scope work identified herein.

The evaluation and recommendations submitted in this geotechnical report are based in part upon the data obtained from the field exploration program. The nature or extent of variations throughout the subsurface profile may not become evident until the time of construction. If variations then appear evident, it may be necessary to reevaluate our recommendations as provided in this geotechnical report. Furthermore, the recovered samples were not examined, either visually or analytically, for chemical composition or environmental hazards.

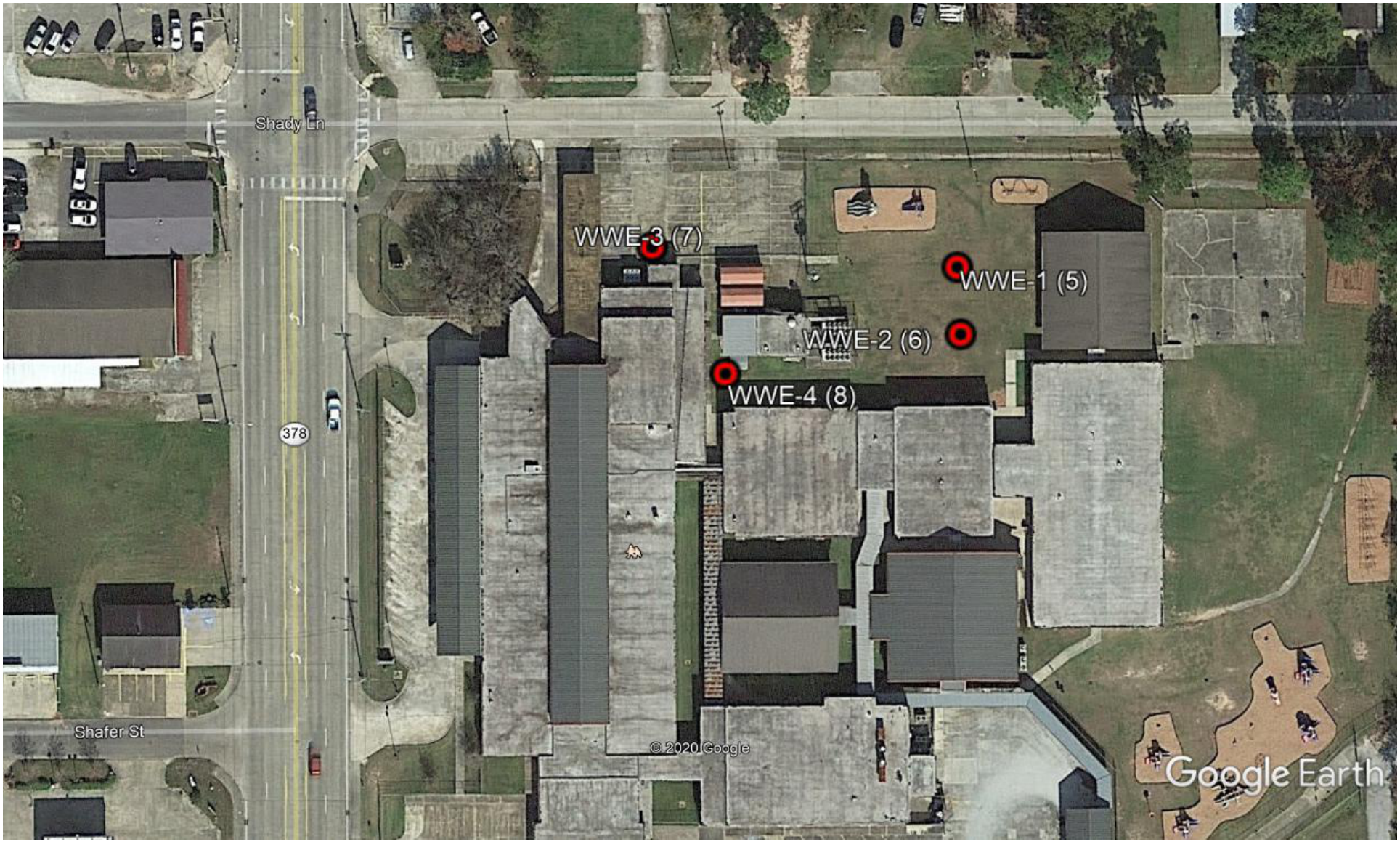
The soil borings or other subsurface tests presented in this report were performed in support of the geotechnical analyses and recommendations as defined by the scope of services and not for determining the presence or extent of any subsurface debris which may exist at the site. Depending on project location, subsurface conditions, and the history of the site, buried debris, environmental contamination, or other soil types and conditions not identified may be encountered during construction. It should be noted that the project site is or may be located on a site with prior construction or other activity on the site.

We recommend Thompson be retained to review final foundation and earthwork specifications and drawings, in order to ascertain whether our recommendations contained in this report have been properly interpreted and implemented.

This report has not been prepared as, and should not be used as, a design or specification document to be directly implemented by the Contractor. In addition, this report was not prepared for the purposes of bid development and the accuracy of this report is limited. If included as part of a bid package, it is for informational purposes only, and it shall remain the Contractor's responsibility to retain and confer with a geotechnical engineer to obtain specific types of information the Contractor or others may need or prefer to interpret this report, or perform additional geotechnical testing prior to bidding and construction.

APPENDIX A

Tests Location Plan



4 Westlake Schools - Westwood Elementary School
Westlake, LA 70669

thompson
ENGINEERING

TEST LOCATION PLAN

Project No. 20-1116-0002

DATE: September 3, 2020

APPENDIX B

Records of Soil Borings

RECORD OF TEST BORING

thompson ENGINEERING

BORING NO.: WWE-1 (5)

PROJECT: 4 Westlake Schools
CLIENT: Calcasieu Parish School Board
PROJECT NO.: 20-1116-0002
SAMPLE METHOD: Standard
TYPE BORING: Mud Rotary
PAGE: 1 OF 2
LOCATION: Refer to Boring Location Plan
DRILLER: Randall Odom
LAT.: 30.25648596
STATION:
DRILL RIG: CME 550x (2)
LONG.: -93.25684682
GWL:
ENGINEER: Randall Odom
DATE: 8/20/20
GWL AT 24 HRS.: 6.30 ft
WEATHER:
ELEVATION:

DEPTH/ ELEV. (FT)	SYMBOL	SAMPLER	SPT BLOWS	SAMPLE I.D.NO.	MAJOR SOIL COMPONENT	OTHER COMPONENTS	SPT N/ (REC%)	% F	MC	LL	PI	UW (pcf)	OC (%)	UU (psf)	UC (psf)	PP (psf)	VS (psf)	FS (psf)
			5 8 8	S-01	**SANDY SILT (ML)**	Very stiff, gray, moist, with roots, Topsoil	16	53.0										
			2 2 3	S-02	**SANDY LEAN CLAY (CL)**	Medium stiff, brown, moist	5	74.2										
			2 2 4	S-03		Medium stiff	6											
5			5 6 6	S-04		Stiff	12	64.3	26	47	32							
			2 3 4	S-05		Medium stiff, wet	7											
			2 2 3	S-06		Medium stiff	5		23	33	17							
10																		
			2 3 4	S-07		Medium stiff, moist	7											
15																		
			1 2 2	S-08	**LEAN CLAY (CL)**	Soft, gray, wet	4											
20																		
			1 2 2	S-09		Soft	4											
25																		
			1 2 2	S-10		Soft	4											
30																		
			4 7 10	S-11		Very stiff, moist	17											

Refer to Notes and Legend on separate sheet for additional information. This Record of Test Boring is part of the project Geotechnical Report.
Actual strata changes may be gradual over depth.

(Continued Next Page)

THOMPSON - ONSHORE BOREHOLE - DF STD US LAB.GDT - 9/9/20 14:49 - L:\GINT PROJECTS\2020\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS.GPJ

RECORD OF TEST BORING

thompson ENGINEERING

BORING NO.: WWE-1 (5)

PROJECT: 4 Westlake Schools **CLIENT:** Calcasieu Parish School Board **PROJECT NO.:** 20-1116-0002

DEPTH/ ELEV. (FT)	SYMBOL	SAMPLER	SPT BLOWS	SAMPLE I.D.NO.	MAJOR SOIL COMPONENT	OTHER COMPONENTS	SPT N/ (REC%)	% F	MC	LL	PI	UW (pcf)	OC (%)	UU (psf)	UC (psf)	PP (psf)	VS (psf)	FS (psf)
					LEAN CLAY (CL) ***(continued)***													
			4 8 9	S-12		Very stiff, light gray	17											
40						Bottom of borehole at 40.0 feet.													

Refer to Notes and Legend on separate sheet for additional information. This Record of Test Boring is part of the project Geotechnical Report.
Actual strata changes may be gradual over depth.

THOMPSON - ONSHORE BOREHOLE - DF STD US LAB.GDT - 9/9/20 14:49 - L:\GINT PROJECTS\2020\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS.GPJ

RECORD OF TEST BORING

thompson ENGINEERING

BORING NO.: WWE-2 (6)

PROJECT: 4 Westlake Schools
CLIENT: Calcasieu Parish School Board
PROJECT NO.: 20-1116-0002
SAMPLE METHOD: Standard
TYPE BORING: Mud Rotary
PAGE: 1 OF 2
LOCATION: Refer to Boring Location Plan
DRILLER: Randall Odom
LAT.: 30.25651179
STATION:
DRILL RIG: CME 550x (2)
LONG.: -93.25687352
GWL: not encountered
ENGINEER: Randall Odom
DATE: 8/19/20
GWL AT 24 HRS.:
WEATHER: Sunny
ELEVATION:

DEPTH/ ELEV. (FT)	SYMBOL	SAMPLER	SPT BLOWS	SAMPLE I.D.NO.	MAJOR SOIL COMPONENT	OTHER COMPONENTS	SPT N/ (REC%)	% F	MC	LL	PI	UW (pcf)	OC (%)	UU (psf)	UC (psf)	PP (psf)	VS (psf)	FS (psf)
			12 14 12	S-01	**SANDY SILT (ML)**	Very stiff, gray, moist, with roots, Topsoil	26	58.8										
			9 7 5	S-02	**SANDY LEAN CLAY (CL)**	Stiff, gray, moist	12											
			2 2 3	S-03	**LEAN CLAY (CH)**	Medium stiff, reddish brown	5		26	78	60							
5				T-1	**CLAY (CH)**	Gray, red, and light brown, moist	(45%)	86.0	47	77	56			1174.8				
			2 3 4	S-04		Medium stiff, reddish brown	7											
			2 2 3	S-05		Medium stiff	5											
10																		
			1 2 4	S-06		Medium stiff, reddish brown and gray	6											
15																		
			2 1 2	S-07		Soft, wet	3											
20					**LEAN CLAY (CL)**													
			WOH WOH WOH	S-08		Very soft	0	64.3										
25														1259.4				
				T-2		Gray, moist, with sand lenses	(100%)											
30																		
			4 3 4	S-09		Medium stiff, gray, moist	7	84.9	28	49	25							

Refer to Notes and Legend on separate sheet for additional information. This Record of Test Boring is part of the project Geotechnical Report.
Actual strata changes may be gradual over depth.

(Continued Next Page)

THOMPSON - ONSHORE BOREHOLE - DF STD US LAB.GDT - 9/9/20 14:49 - L:\GINT PROJECTS\2020\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS.GPJ

RECORD OF TEST BORING

thompson ENGINEERING

BORING NO.: WWE-2 (6)

PROJECT: 4 Westlake Schools **CLIENT:** Calcasieu Parish School Board **PROJECT NO.:** 20-1116-0002

DEPTH/ ELEV. (FT)	SYMBOL	SAMPLER	SPT BLOWS	SAMPLE I.D.NO.	MAJOR SOIL COMPONENT	OTHER COMPONENTS	SPT N/ (REC%)	% F	MC	LL	PI	UW (pcf)	OC (%)	UU (psf)	UC (psf)	PP (psf)	VS (psf)	FS (psf)
					LEAN CLAY (CL) ***(continued)***													
			4 5 7	S-10		Stiff	12											
40						Bottom of borehole at 40.0 feet.												

Refer to Notes and Legend on separate sheet for additional information. This Record of Test Boring is part of the project Geotechnical Report.
Actual strata changes may be gradual over depth.

THOMPSON - ONSHORE BOREHOLE - DF STD US LAB.GDT - 9/9/20 14:49 - L:\GINT PROJECTS\2020\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS.GPJ

RECORD OF TEST BORING

thompson ENGINEERING

BORING NO.: WWE-3 (7)

PROJECT: 4 Westlake Schools
CLIENT: Calcasieu Parish School Board
PROJECT NO.: 20-1116-0002
SAMPLE METHOD: Standard
TYPE BORING: Mud Rotary
PAGE: 1 OF 1
LOCATION: Refer to Boring Location Plan
DRILLER: Randall Odom
LAT.: 30.25665595
STATION: 3.5" of concrete on top of 1" of asphalt
DRILL RIG: CME 550x (2)
LONG.: -93.25742675
GWL:
ENGINEER: Randall Odom
DATE: 8/20/20
GWL AT 24 HRS.:
WEATHER:
ELEVATION:

DEPTH/ ELEV. (FT)	SYMBOL	SAMPLER	SPT BLOWS	SAMPLE I.D.NO.	MAJOR SOIL COMPONENT	OTHER COMPONENTS	SPT N/ (REC%)	% F	MC	LL	PI	UW (pcf)	OC (%)	UU (psf)	UC (psf)	PP (psf)	VS (psf)	FS (psf)
			15 7 9	S-01	**SILTY SAND (SM)**	Medium dense, fine grained, gray, moist, Topsoil	16											
			2 1 2	S-02		Soft, gray, moist	3											
			1 2 2	S-03		Soft	4											
5			1 2 2	S-04		Soft, brown	4											
			2 3 5	S-05		Medium stiff, wet	8	81.1	22	38	25							
			3 2 4	S-06		Medium stiff, red and brown	6											
10																		
			2 2 4	S-07		Medium stiff	6											
15					**LEAN CLAY (CL)**													
			WOH 1 2	S-08		Soft, brown	3											
20																		
			2 2 2	S-09		Soft	4											
25																		
			1 2 2	S-10		Soft	4											
30						Bottom of borehole at 30.0 feet.												

Refer to Notes and Legend on separate sheet for additional information. This Record of Test Boring is part of the project Geotechnical Report.
Actual strata changes may be gradual over depth.

THOMPSON - ONSHORE BOREHOLE - DF STD US LAB.GDT - 9/9/20 14:49 - L:\GINT PROJECTS\2020\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS.GPJ

RECORD OF TEST BORING

thompson ENGINEERING

BORING NO.: WWE-4 (8)

PROJECT: 4 Westlake Schools
CLIENT: Calcasieu Parish School Board
PROJECT NO.: 20-1116-0002
SAMPLE METHOD: Standard
TYPE BORING: Mud Rotary
PAGE: 1 OF 2
LOCATION: Refer to Boring Location Plan
DRILLER: Randall Odom
LAT.: 30.25647865
STATION:
DRILL RIG: CME 550x (2)
LONG.: -93.25726744
GWL:
ENGINEER: Randall Odom
DATE:
GWL AT 24 HRS.:
WEATHER: Sunny
ELEVATION:

DEPTH/ ELEV. (FT)	SYMBOL	SAMPLER	SPT BLOWS	SAMPLE I.D.NO.	MAJOR SOIL COMPONENT	OTHER COMPONENTS	SPT N/ (REC%)	% F	MC	LL	PI	UW (pcf)	OC (%)	UU (psf)	UC (psf)	PP (psf)	VS (psf)	FS (psf)
			1 3 2	S-01	**SANDY LEAN CLAY (CL)**	Medium stiff, dark gray, moist, with roots, Topsoil	5											
			3 2 1	S-02		Soft, wet	3											
			1 1 2	S-03		Soft	3											
5			3 3 4	S-04		Medium stiff, moist	7											
			1 2 3	S-05		Medium stiff	5											
			2 3 3	S-06		Medium stiff, red and brown, wet	6											
10																		
			2 2 3	S-07		Medium stiff, moist	5											
15					**LEAN CLAY (CL)**													
			1 1 1	S-08		Soft, gray, wet	2											
20																		
			WOH WOH WOH	S-09		Very soft	0											
25																		
			1 2 2	S-10		Soft	4											

Refer to Notes and Legend on separate sheet for additional information. This Record of Test Boring is part of the project Geotechnical Report.
Actual strata changes may be gradual over depth.

(Continued Next Page)

THOMPSON - ONSHORE BOREHOLE - DF STD US LAB.GDT - 9/9/20 14:49 - L:\GINT PROJECTS\2020\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS.GPJ

RECORD OF TEST BORING

thompson ENGINEERING

BORING NO.: WWE-4 (8)

PROJECT: 4 Westlake Schools **CLIENT:** Calcasieu Parish School Board **PROJECT NO.:** 20-1116-0002

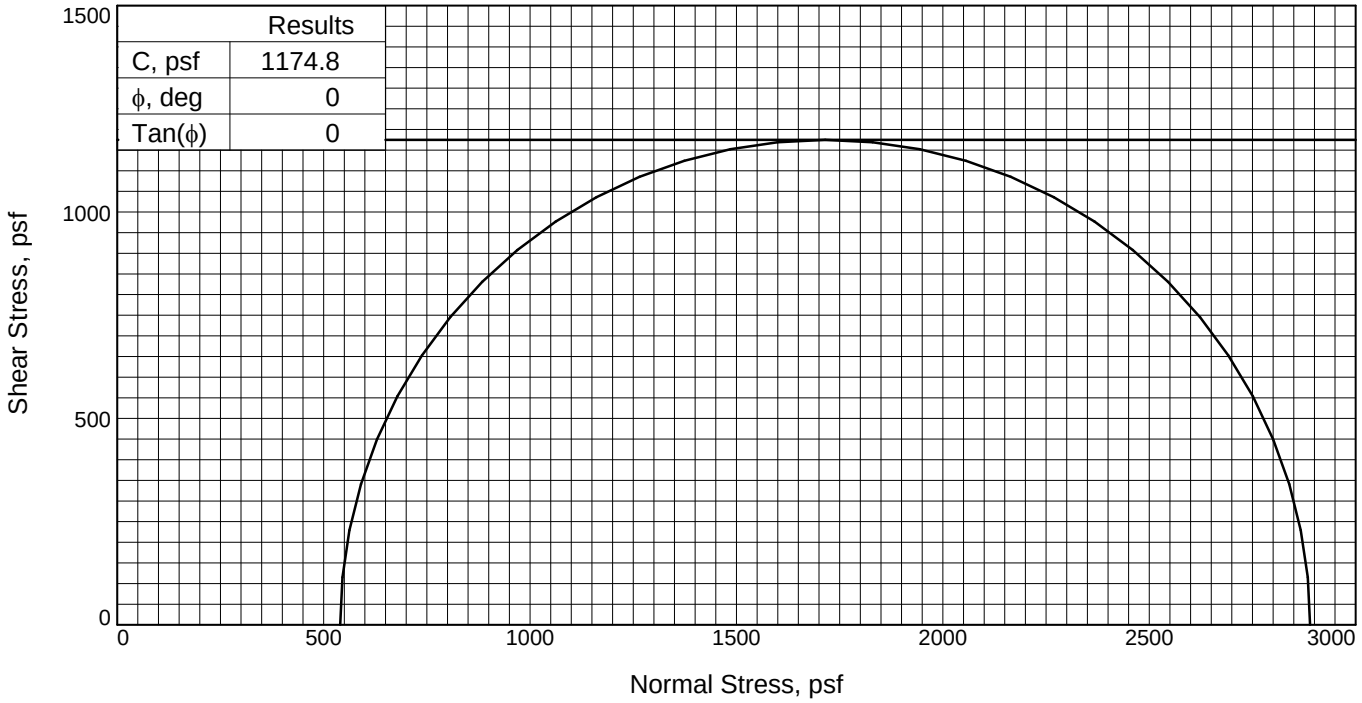
DEPTH/ ELEV. (FT)	SYMBOL	SAMPLER	SPT BLOWS	SAMPLE I.D.NO.	MAJOR SOIL COMPONENT	OTHER COMPONENTS	SPT N/ (REC%)	% F	MC	LL	PI	UW (pcf)	OC (%)	UU (psf)	UC (psf)	PP (psf)	VS (psf)	FS (psf)
					LEAN CLAY (CL) ***(continued)***													
35			1 3 4	S-11		Medium stiff, moist	7											
						Bottom of borehole at 35.0 feet.												

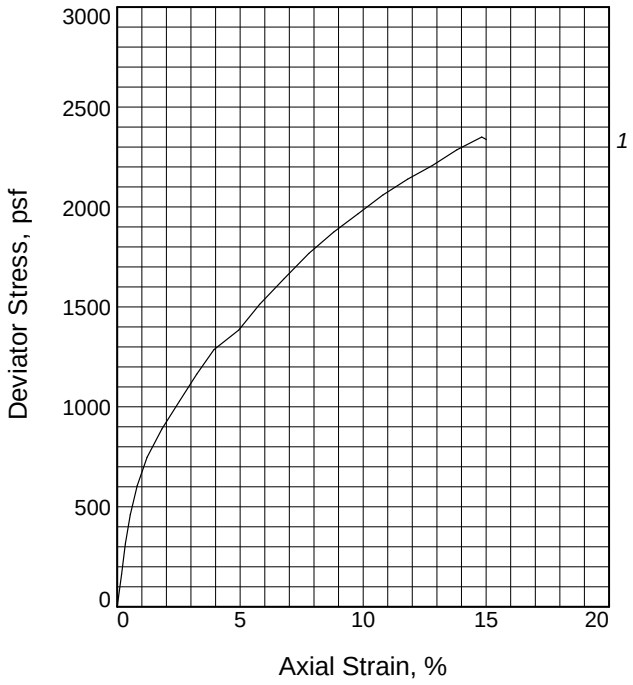
Refer to Notes and Legend on separate sheet for additional information. This Record of Test Boring is part of the project Geotechnical Report.
Actual strata changes may be gradual over depth.

THOMPSON - ONSHORE BOREHOLE - DF STD US LAB.GDT - 9/9/20 14:49 - L:\GINT PROJECTS\2020\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS\20-1116-0002 - CALCASIEU 4 WESTLAKE SCHOOLS.GPJ

APPENDIX C

Laboratory Test Results





Specimen No.		1
Initial	Water Content, %	29.8
	Dry Density, pcf	99.3
	Saturation, %	117.8
	Void Ratio	0.6719
	Diameter, in.	2.854
	Height, in.	5.062
At Test	Water Content, %	22.2
	Dry Density, pcf	99.3
	Saturation, %	87.7
	Void Ratio	0.6719
	Diameter, in.	2.854
	Height, in.	5.062
Strain at peak, %		14.8
Back Pressure, psf		0.0
Cell Pressure, psf		540.0
Fail. Stress, psf		2349.5
Strain, %		14.8
Ult. Stress, psf		2349.5
Strain, %		14.8
σ_1 Failure, psf		2889.5
σ_3 Failure, psf		540.0

Type of Test:
Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: Gray, red, and light brown, CLAY

Assumed Specific Gravity= 2.66

Remarks: Compression Failure Mode: Symmetrical Bulge

Figure _____

Client: Calcasieu Parish School Board

Project: 4 Westlake Schools

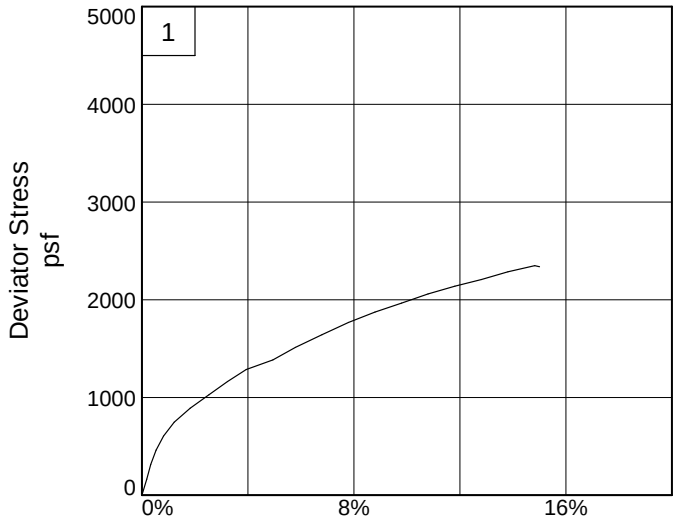
Source of Sample: Lab #8759 **Depth:** 4.5'-6.5'

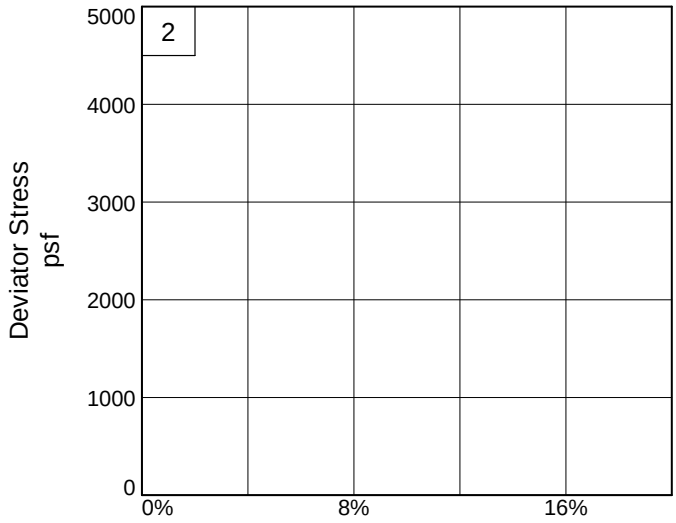
Sample Number: WWE-2 PH04 B06 T-1

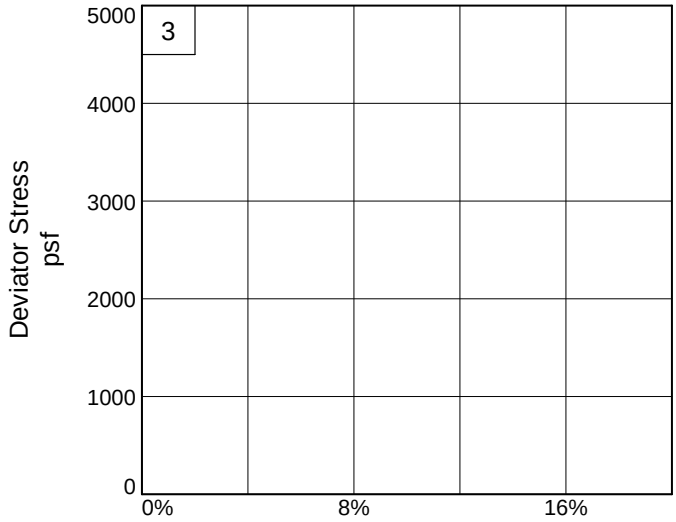
Proj. No.: 2021160002 **Date Sampled:**

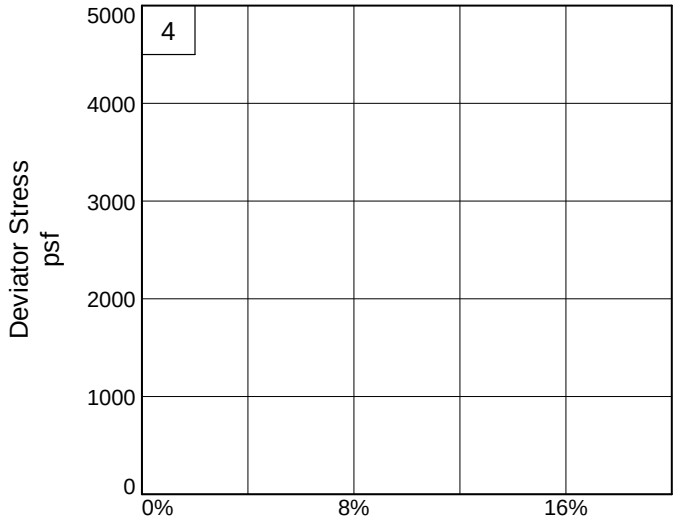
TRIAXIAL SHEAR TEST REPORT

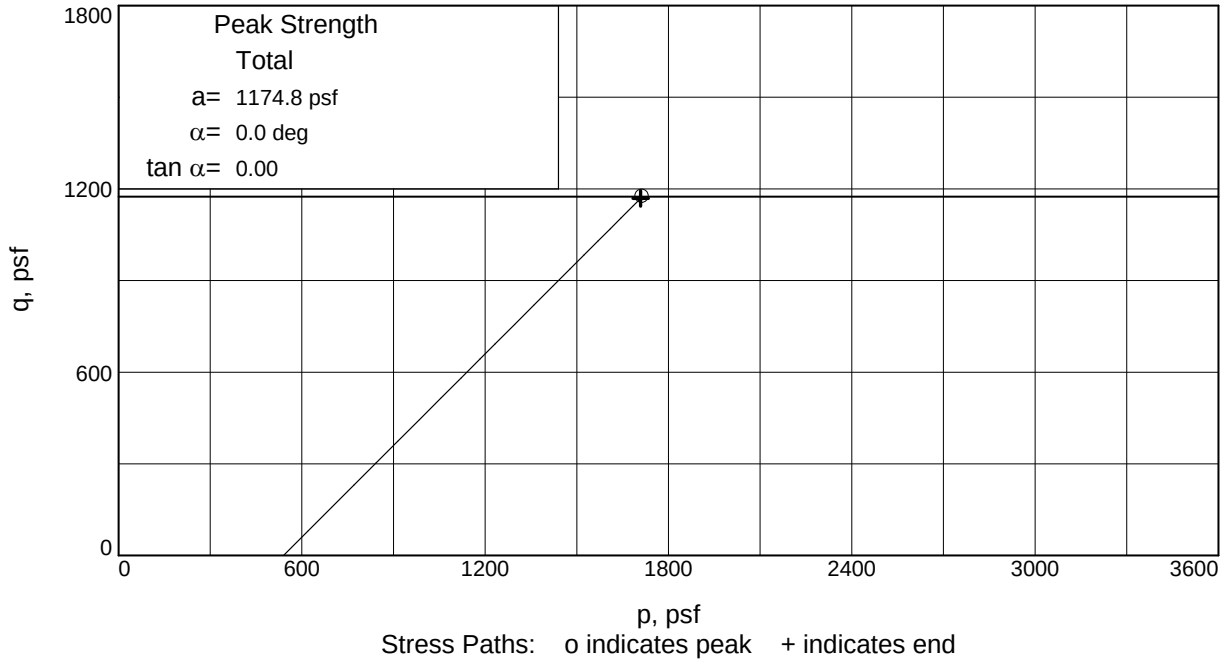
Thompson Engineering
Mobile, Alabama











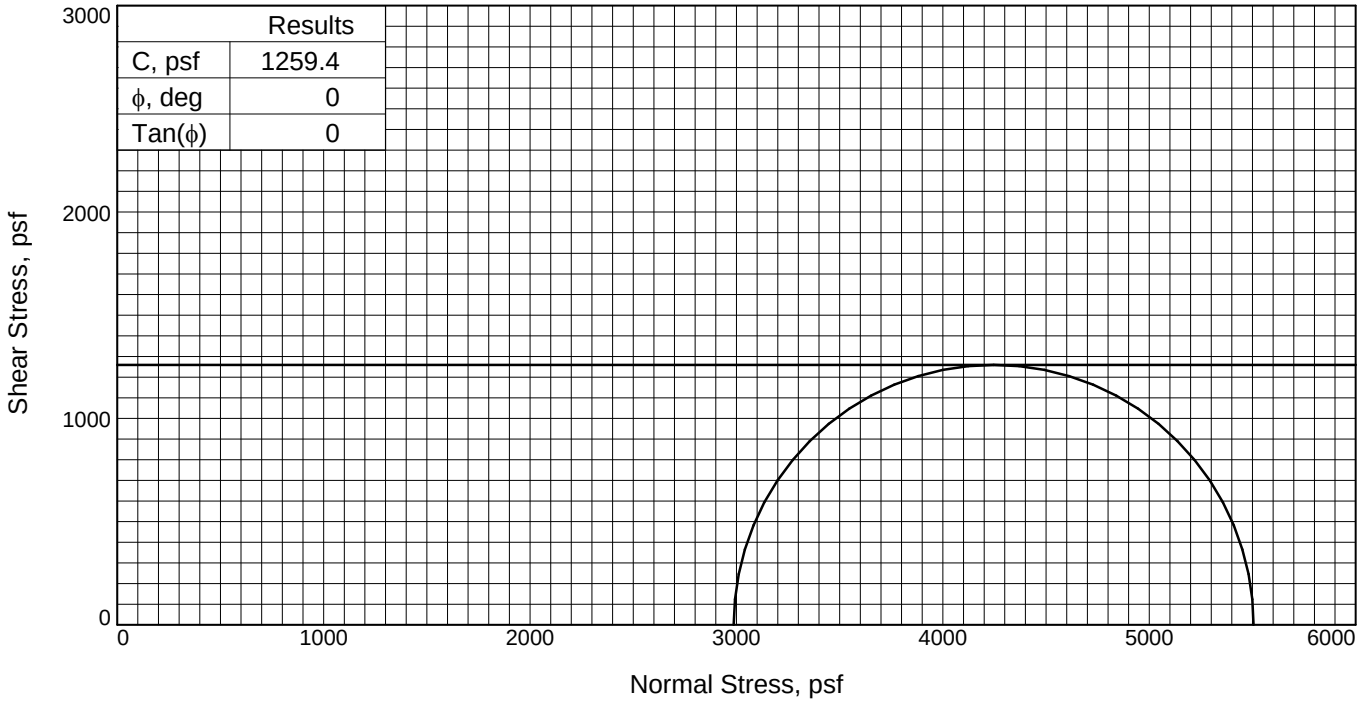
Client: Calcasieu Parish School Board

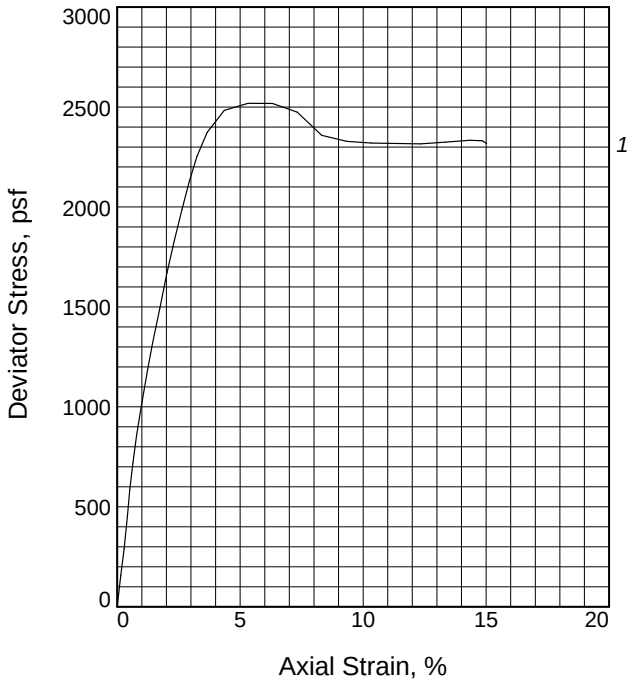
Project: 4 Westlake Schools

Source of Sample: Lab #8759 **Depth:** 4.5'-6.5' **Sample Number:** WWE-2 PH04 B06 T-1

Project No.: 2021160002 **Figure** _____

Thompson Engineering





Specimen No.		1
Initial	Water Content, %	29.5
	Dry Density, pcf	88.2
	Saturation, %	88.8
	Void Ratio	0.8830
	Diameter, in.	2.877
	Height, in.	5.405
At Test	Water Content, %	32.3
	Dry Density, pcf	88.2
	Saturation, %	97.3
	Void Ratio	0.8830
	Diameter, in.	2.877
	Height, in.	5.405
Strain at peak, %		5.3
Back Pressure, psf		0.0
Cell Pressure, psf		2986.6
Fail. Stress, psf		2518.7
Strain, %		5.3
Ult. Stress, psf		2518.7
Strain, %		5.3
σ_1 Failure, psf		5505.3
σ_3 Failure, psf		2986.6

Type of Test:
Unconsolidated Undrained

Sample Type: 3-in. Shelby Tube

Description: Gray, CLAY

Assumed Specific Gravity= 2.66

Remarks: Compression Failure Mode: Asymmetrical Shear Plane

Figure _____

Client: Calcasieu Parish School Board

Project: 4 Westlake Schools

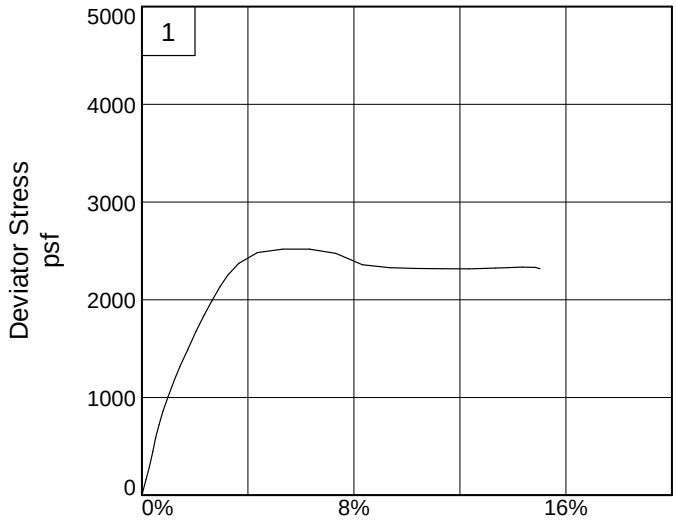
Source of Sample: Lab #8759 **Depth:** 28.0'-30.0'

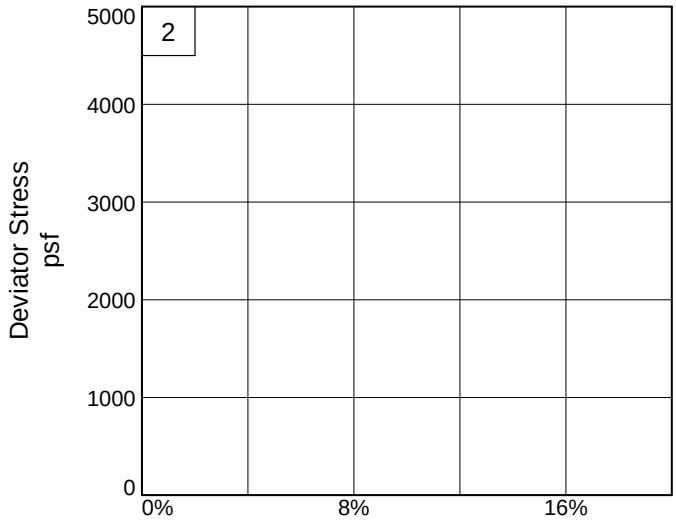
Sample Number: WWE-2 PH04 B06 T-2

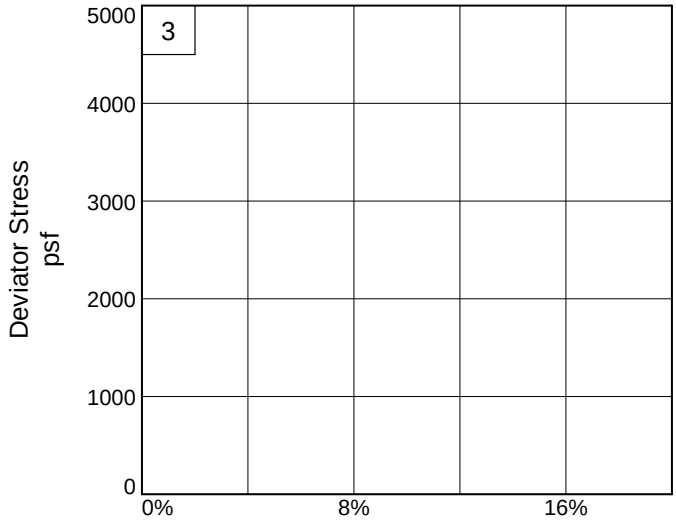
Proj. No.: 2021160002 **Date Sampled:**

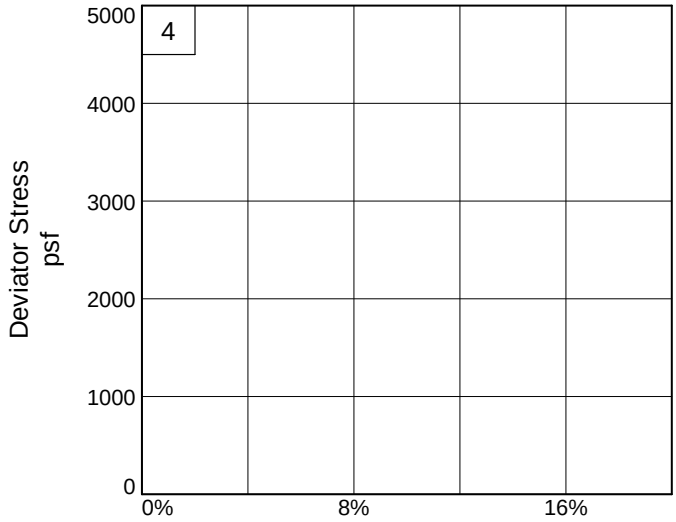
TRIAXIAL SHEAR TEST REPORT

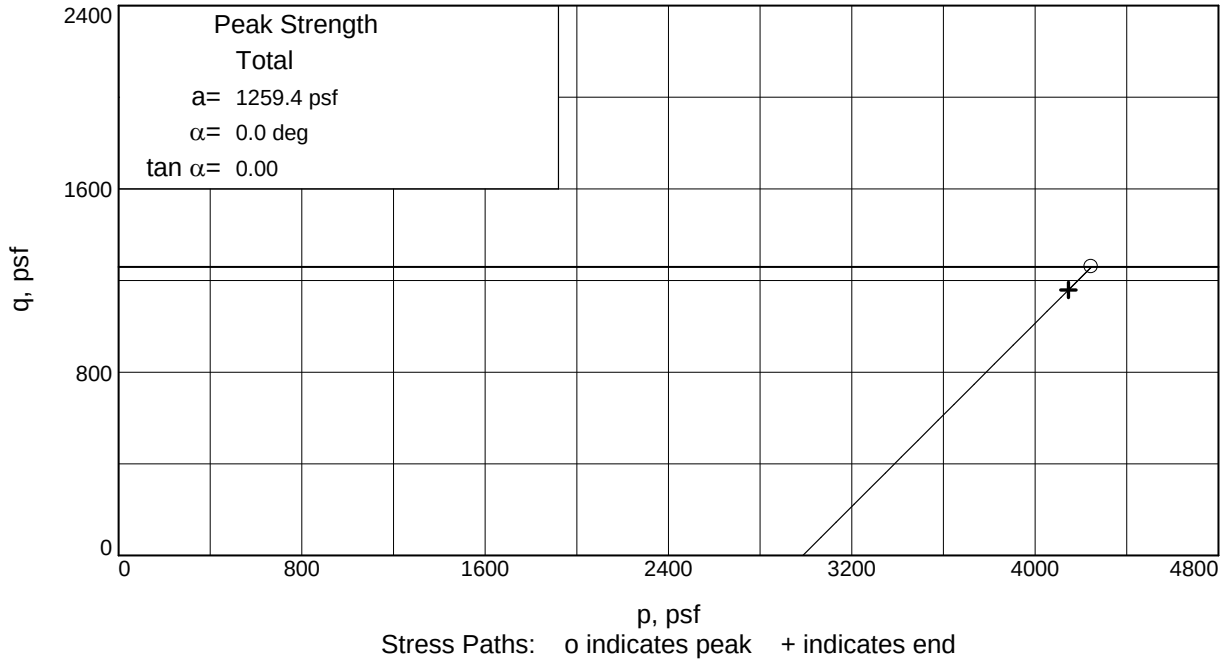
Thompson Engineering
Mobile, Alabama











Client: Calcasieu Parish School Board

Project: 4 Westlake Schools

Source of Sample: Lab #8759 **Depth:** 28.0'-30.0' **Sample Number:** WWE-2 PH04 B06 T-2

Project No.: 2021160002 **Figure** _____

Thompson Engineering

BID DATE: March 30th, 2026 at 2:00 PM

TO: Calcasieu Parish School Board
P. O. Box 800
Lake Charles, Louisiana 70602

PROPOSAL FOR: ADDITIONS TO WESTWOOD ELEMENTARY

PROJECT NO.: 1619D1

THE BIDDER: _____

acknowledges receipt of the following

ADDENDA: No._____ Dated:_____ No._____ Dated:_____
No._____ Dated:_____ No._____ Dated:_____
No._____ Dated:_____ No._____ Dated:_____

BID SECURITY: Attached in the sum of (5% of total base bid and all alternates)_____

_____Dollars ($_____)

is to become the property of the Owner in the event the Contract and Bond are not executed within the time set forth, as Liquidated Damages for the delay and additional work caused thereby.

If the bid security attached to this proposal is a bond, then such bond shall be submitted on the Bid Bond Form included in the specifications, identified at the bottom of the page as "BB-1". Any bond submitted other than on this bond form shall cause the bid to be rejected.

THE BIDDER: hereby declares and represents that he:

a) has carefully examined the Bidding Documents,
b) has a clear understanding of the Bidding Documents,
c) has not received, relied on, or based his bid on any verbal instructions contrary to the Contract Documents or any addenda,
d) 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 workman like manner, all work and services for the construction and completion of aforereferenced project, all in accordance with the Contract Documents as prepared by:

King Architects, Inc.
1312 Sampson Street
Westlake, Louisiana 70669

Dated:

*BASE BID: For all work required by the Contract Documents (except Alternates) the lump sum of:

_____

_____

_____DOLLARS ($_____)

ALTERNATE NO. 1:

_____

_____

_____DOLLARS ($_____)

**COMPLETION TIME: The Bidder hereby agrees to commence work under this Contract on a date specified in a written "Notice to Proceed" by the Owner and to fully complete the project within _____consecutive calendar days thereafter, or within the time as may be extended as stipulated in the Contract Documents. The Bidder acknowledges that time is of the essence in the completion of this project.

LIQUIDATED DAMAGES: The Bidder hereby also agrees to pay as Liquidated Damages the sum of _____ for each consecutive calendar day which the work is not complete beginning with the first day beyond the completion time stated above.

AWARD AND EXECUTION OF CONTRACT: If the Bidder is notified of the acceptance of the bid within thirty (30) days of the opening of bids, he agrees to execute a Contract for the work accepted, in the Standard Contract form currently used by the Owner, within ten (10) days after notice from the Owner that the instrument is ready for signature.

If awarded the Contract, the Bidder agrees to execute and deliver to the Owner the "Contract Between Owner and Contractor and Performance and Payment Bond", a copy of which is bound in the Contract Documents.

* Architect to Provide Base Bid and Alternates.
** Appropriate Time Determined by Architect and Owner.

REJECTION OF BIDS: The Bidder understands that the Owner reserves the right to reject any or all bids for just cause as provided by LA. R.S. 38:2214. In accordance with LA. R.S. 38:2212 (A) (1) (b), the provisions and requirements of this Section, those stated in the advertisement for bids, and those required on the bid form shall not be waived by any public entity.

WITHDRAWAL OF BIDS: The Bidder agrees that this Bid shall be good and may not be withdrawn for a period of thirty (30) calendar days after the scheduled closing time for receiving bids except in accordance with the provisions of La. R.S. 38:2214. This Bid may be withdrawn at any time prior to the scheduled time for the opening of bids or any authorized postponement thereof.

LICENSE CERTIFICATION: The Bidder certifies that he meets all licensing requirements of this State and is duly and currently licensed under R. S. 37:2151-2163 of the State of Louisiana, and that his Louisiana Contractors License Number is _____. (The name of the Bidder shown below shall correspond with the official name on the license.)

NAME OF BIDDER: _____

BY: _____

TITLE: _____

ADDRESS: _____

_____

DATED: _____

NOTE: If bidder is a corporation, write State of Incorporation under signature and if partnership give full names of all partners.

SPECIAL NOTE: If the Bid Security (See Section 4.2 of Instructions to Bidders) attached to this proposal is a bid bond, then such bond shall be prepared in the exact format as that attached hereto.

KING ARCHITECTS, INC.

BID BOND

DATE:_____

KNOW ALL MEN BY THESE PRESENTS:
THAT_____
Of _____
As Principal, and _____
As Surety, are held and firmly bound unto the 'Calcasieu Parish School Board, in the full and just sum of **five (5%) percent of the total amount of this proposal, including all alternates,** lawful money of the Unites States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by those presents.

Surety represents that it is listed on the current U.S. Department of the Treasury Financial Management Service list of approved bonding companies and that it is listed thereon as approved for an amount equal to or greater than the amount for which it obligates itself in this instrument, that surety currently is licensed to do business in the State of Louisiana, and that this bond is countersigned by a person who is under contract with the surety as a licensed agent in this state and who is residing in this state.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas said Principal is herewith submitting its proposal to the oblige on a Contract for: _____
_____
_____

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the oblige, then this obligation shall be void; otherwise the obligation shall become due and payable.

BOND CERTIFICATION: The Principal certifies that he meets all bonding requirements of the Calcasieu Parish School Board as set forth in paragraph 4.2.1 of the Instructions to bidders found in the General Guide for Front End Documents for Calcasieu Parish School Board.

_____
, Principal

_____
, Surety

SUBSTITUTION REQUEST FORM (During Procurement)

IDENTIFICATION:

Owner: Calcasieu Parish School Board
Architect: King Architects, Inc
Contractor:
Project Name Additions to Westwood Elementary
Project Number: 1619D1 Date: _____

REFERENCE:

Specification Title: _____
Specification No.: _____ Page: _____ Article/Paragraph: _____

DESCRIPTION:

Manufacturer's Name: _____ Model No.: _____
Trade Name: _____
Proposed Substitution General Description: _____

CERTIFICATION:

The Undersigned certifies:

- Proposed substitution has been investigated and determined that it meets or exceeds the quality level of the specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance servie and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing and construction costs caused by the substitution.

Submitted and Signed by: _____
Name Title

Firm: _____
Address: _____
Telephone: _____

ATTACHED SUPPORTING DATA:

☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

ARCHITECT'S REVIEW AND ACTION:

☐ Substitution approved - Make submittals in accordance with Specification Section
☐ Substitution approved as noted - Make submittals in accordance with Specification Section
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed By: _____
Name Title Date

WORK DESCRIPTION	SUBCONTRACTOR	LICENSE NUMBER	FEDERAL ID NUMBER

STATE OF LOUISIANA **PARISH OF CALCASIEU**

_____, being first duly sworn, deposed and says that:

(1) He is _____of _____
the Bidder that has submitted the attached Bid:

(2) He is fully informed respecting the preparations and content of the attached Bid and of all pertinent circumstances respecting such Bid:

(3) Such Bid is genuine and is not a collusive or sham Bid:

(4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with such Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner; directly or indirectly, sought by agreement or collusion or communications or conference with any other Bidder or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through the collusion, conspiracy, connivance or unlawful agreement any advantage against the or any person interested in the proposed Contract; and

5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees or parties in interest, including this affidavit.

_____
COMPANY

_____
BY

_____
TITLE

Sworn to and Subscribed Before Me This _____day of _____, 20_____.

_____
NOTARY PUBLIC

My Commission expires:_____

THIS FORM MUST BE SUBMITTED TO THE PROJECT ARCHITECT WITHIN TEN (10) DAYS AFTER THE BID HAS BEEN OPENED.

KING ARCHITECTS, INC. **AFFIDAVIT**

STATE OF LOUISIANA PARISH OF CALCASIEU

PROJECT NAME: ADDITIONS TO WESTWOOD ELEMENTARY

PROJECT NO: 1619D1

LOCATION: WESTLAKE, LOUISIANA

Before me, the undersigned authority, duly commissioned and qualified within and for the state and parish aforesaid, personally came and appeared _____ representing _____ who, being by me first duly sworn deposed and said that he has read this affidavit and does hereby agree under oath to comply with all provisions herein as follows:

PART I

Section 2224 of Part I of Chapter 10 of Title 38 of the La. Revised Statutes of 1950 as Amended.

(1) That affiant 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 affiant 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 affiant; and

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

PART II

Section 2190 of Part I of Chapter 10 of Title 38 of the Louisiana Revised Statues of 1950 as amended.

That affiant, if he be an architect or engineer, or representative thereof, does not own a substantial financial interest, either directly or indirectly, in any corporation, firm, partnership, or other organization which supplies materials for the construction of a public building or project when the architect or engineer has performed architectural or engineering services, either directly or indirectly, in connection with the public building or project for which the materials are being supplied.

For the purposes of this section, a "substantial financial interest" shall exclude any interest in stock being traded on the American Stock Exchange of the New York Stock Exchange.

That affiant, if subject to the provisions of this section, does hereby agree to be subject to the penalties involved for the violation of this section.

PART III

That affiant does hereby state that he has read and agrees to comply with and be subject to the provisions of Part V of Chapter 10 of Title 38 of the Louisiana Revised Statutes of 1950, being Sections 2290 through 2296 of Title 38 as amended.

_____
Name

_____
Company

Sworn to and Subscribed Before Me This _____ day of _____, 200___.

.

_____
Notary Public

ATTESTATION - PAST CRIMINAL CONVICTIONS OF BIDDERS

PROJECT NAME AND ADDRESS: Additions to Westwood Elementary
1900 Sampson Street
Westlake, Louisiana 70669

PROJECT NO: 1619D1

Appearer, as a Bidder on the above-entitled Project, does hereby attest that: In accordance with the requirements of **Louisiana Revised Statute 38:2227**:

(A) No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who ha 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 hasentered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or excution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statues:

(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)

_____ _____
NAME IF BIDDER NAME OF AUTHORIZED SIGNATORY OF BIDDER

_____ _____
DATE TITLE OF AUTHORIZED SIGNATORY OF BIDDER

_____
SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER

SWORN TO AND SUBSCRIBE before me this _____ day of _____ 20 _____,

in _____, _____
CITY STATE

_____
NOTARY PUBLIC

My Commission Expires _____

THIS FORM MUST BE SUBMITTED TO THE PROJECT ARCHITECT WITHIN TEN (10) CALENDAR DAYS AFTER THE BID HAS BEEN OPENED.

RESOLUTION

BE IT RESOLVED that _____

Officer/Owner of _____

is hereby authorized to sign any contract or document on

behalf of _____

_____
Officer/Owner

_____
Signature Officer/Owner

SWORN TO AND SUBSCRIBED before me this _____ day of

_____, 20___, in Lake Charles, Louisiana.

_____
NOTARY PUBLIC

ROOFING MANUFACTURER'S WARRANTY AND INSPECTION LETTER

PROJECT NAME AND ADDRESS: Additions to Westwood Elementary
1900 Sampson Street
Westlake, Louisiana 70669

PROJECT NO: 1619D1

The undersigned Roofing System Manufacturer acknowledges that they have inspected the job site for the above referenced project; read the specifications in their entirety; that they approve the installation of their roofing system as specified over the existing sub-strate conditions; and will provide a _____ warranty as specified in Section _____ of the Specifications/Project Manual.

The undersigned also agrees that the Manufacturer will provide ay no charge to the Owner, daily job site inspections during construction; and provide, at the annual request of the Owner, annual inspections for the duration of the warranty period as specified in Section _____ of the Specifications/Project Manual. These inspections shall be by only full-time employees of the Manufacturer.

I, _____ , certify that I am the _____
NAME TITLE

of the below named Corporation.

_____
NAME OF ROOFING SYSTEM MANUFACTURER

_____
SIGNATURE

_____
DATE

(AFFIX CORPORATE SEAL)

THIS FORM MUST BE SUBMITTED TO THE PROJECT ARCHITECT WITHIN TEN (10) DAYS AFTER THE BID HAS BEEN OPENED.

APPROVED APPLICATOR LETTER

PROJECT NAME AND ADDRESS: Additions to Westwood Elementary
1900 Sampson Street
Westlake, Louisiana 70669

PROJECT NO: 1619D1

This letter of approval is to certify that _____ Roofing Contractor,

is currently an approved applicator of _____ Roofing Systems,

and is authorized to install our Roofing System on the above referenced project.

_____
NAME OF ROOFING SYSTEM MANUFACTURER

_____
BY

_____
SIGNATURE

_____
TITLE

_____
DATE

THIS FORM MUST BE SUBMITTED TO THE PROJECT ARCHITECT WITHIN TEN (10) DAYS AFTER THE BID HAS BEEN OPENED.

KING
ARCHITECTS, INC

NOTICE OF AWARD

DATE OF ISSUANCE: _____ **PROJECT NO:** 1619D1

PROJECT NAME: Additions to Westwood Elementary
1900 Sampson Street
Westlake, Louisiana 70669

OWNER:
Calcasieu Parish School Board
3310 Broad Street
Lake Charles, Louisiana 70615

ARCHITECT:
King Architects, Inc
1312 Sampson Street
Westlake, Louisiana 70669

TO CONTRACTOR:

You are hereby notified that your Bid dated _____ for the above referenced Contract has been considered. You are the apparent Successful Bidder and have been awarded a Contract for your Bid totaling:

DOLLARS ($)

One (1) digital copy of **executable contract documents** accompany this Notice of Award.

You must comply with the following conditions precedent **within ten (10) days** of the date you receive this Notice of Award.

1. Deliver to Architect _____ counterparts of the Document 00 52 00 (Contract Agreement), fully executed by Bidder.
2. Deliver with the executed Agreements the Contract security (e.g., performance and payment bonds) and insurance documentation as specified in the Instructions to Bidders and General Conditions.
2. Deliver with the executed Contract Agreements one original set of insurance certificates with endorsements required under Section 00 72 13 (General Conditions) and Section 00 73 00 (Supplementary Conditions).
3. Other conditions precedent (if any):

Failure to comply with these conditions within the time specified will entitle the Owner to consider you in default, annul this Notice of Award and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, the Architect will return to you two fully executed counterparts of the Agreement. One copy is for your records and one is for you to file with the Calcasieu parish Clerk of Court.

Authorized By: (Architect) Barry King, AIA for King Architects, Inc

Authorized Signature: _____

Title: President

ACCETANCE OF AWARD

Receipt of the above Notice of Award is hereby acknowledged this _____ day of _____,2022.

Accepted By: (Contractor) _____

Authorized Signature: _____

Title: _____

CONTRACT BETWEEN OWNER AND CONTRACTOR AND PERFORMANCE AND PAYMENT BOND

This agreement entered into this _____day of _____, 20 ___, _____

_____

hereinafter call the "Contractor", whose business address is_____

_____

and the Calcasieu Parish School Board, herein represented by the contracting officer executing this contract, hereinafter called the "Owner".

Witnesseth that the Contractor and the Owner, in consideration of premises and the mutual covenants; consideration and agreement herein contained, agree as follows:

Statement of work: The Contractor shall furnish all labor and materials and perform all of the work required to build, construct and complete in a thorough and workmanlike manner:

ADDITIONS TO WESTWOOD ELEMENTARY
CALCASIEU PARISH SCHOOL BOARD, SCHOOL DISTRICT #23 - BOND ISSUE
BID NUMBER

In strict accordance with Contract Documents prepared by:

KING ARCHITECTS, INC.

It is recognized by the parties herein that said Contract Documents including by way of example and not of limitation, the Drawings and Specifications dated February 2026, Addenda number(s)_____, the Instructions to bidders, Bid Form, general Conditions, Supplementary Conditions, any Addenda thereto, impose duties and obligations upon the parties herein, and said parties thereby agree that they shall be bound by said duties and obligations. For these purposes, all of the provisions contained in the aforementioned Construction Documents are incorporated herein, and said parties thereby agree that they shall be bound by said duties and obligations. For these purposes, all of the provisions contained in the aforementioned Construction Documents are incorporated herein by reference with the same force and affect as though and Construction Documents are incorporated herein by reference with the same force and effect as though said Construction Documents were herein set out in full.

Time for Completion: The work shall be commenced on a date to be specified in a written order of the Owner and shall be completed within 540 consecutive calendar days from and after the said date. Time is of the essence.

Compensation to be Paid to the Contractor: The Owner will pay and the Contractor will accept in full consideration of the performance of the contract the sum of _____

_____

_____DOLLARS ($ _____), which sum represents the Base Bid plus Alternates _____.

Performance and Payment Bond: To these presents personally came and intervened _____ herein acting for _____, a corporation organized and existing under the laws of the State of _____, and duly authorized to transact business in the State of Louisiana, as surety, who declared that have taken cognizance of this contract and of the Construction Documents mentioned herein, he hereby in his capacity as its

Attorney in Fact obligates his said company, as Surety for the said contractor, unto the said Owner, up to the sum of _ _____.

The condition of this performance and payment bond shall be that should Contractor herein not perform the contract in accordance with the terms and contractor not fully indemnify and save harmless the Owner, from non-performance or should said Contractor not pay all persons who have and fulfill obligations to perform labor and/or furnish materials in the prosecution of the work provided for herein, including by way of example workmen, laborers, mechanics, and furnishers of materials, machinery, equipment and fixtures, then said surety agrees and is bound to so perform the contract and make said payment(s).

Provided, that any alterations which may be made in the terms, of the contract or in the work to be done under it, or the giving by the Owner of any extensions of time for the performance of the contract, or any other forbearance on the part of either the Owner of the Contractor to the other shall not in any way release the Contractor or the Surety from their liability hereunder, notice to the Surety of any such alterations, extensions or other forbearance being hereby waived.

In Witness whereof, the parties herein on the day and year first above written have executed this agreement in 6 counterparts, each of which shall, without proof or accountancy for the other counterparts, be deemed an original thereof.

WITNESSES:

_____	_____ CONTRACTOR
_____	BY: _____ _____ TITLE
_____	Calcasieu Parish School Board OWNER
_____	BY: _____ _____ TITLE
_____	_____ SURETY
_____	_____ ATTORNEY IN FACT

KING

ARCHITECTS, INC

NOTICE TO PROCEED

PROJECT NO: 1619D1

PROJECT NAME: Additions to Westwood Elementary
1900 Sampson Street
Westlake, Louisiana 70669

CONTRACT INFORMATION:
Contract For: General Construction
Contract Date:

OTHER INFORMATION:
Date:
Project Number:

OWNER:
Calcasieu Parish School Board
3310 Broad Street
Lake Charles, Louisiana 70615

ARCHITECT:
King Architects, Inc
1312 Sampson Street
Westlake, LA 70669

TO CONTRACTOR:

You are hereby notified that the Contract Times stated for the Project will commence on
On that date, start performing the obligations required by the Contract Documents. You are to fully complete the work within consecutive calendar days in accordance with your Contract Completion Date of

Before commencing Work at the Project Site, deliver the certificates of insurance to the Architect as required by the Contract Documents.

Also before commencing Work at the Project Site, perform:

Authorized By: (Architect) Barry D King, AIA of King Architects, Inc

Authorized Signature:

Title: President

Date:

Accepted By: (Contractor)

Authorized Signature:

Title:

Date:

SUBMITTAL TRANSMITTAL FORM

DATE: _____ **SUBMITTAL NO:** _____

☐ original submittal ☐ resubmittal

PROJECT NO: 1619D1
PROJECT NAME: Additions to Westwood Elementary
1900 Sampson Street
Westlake, Louisiana 70669

TO (Architect):

King Architects, Inc
1312 Sampson Street
Westlake, Louisiana 70669

FROM (General Contractor):

Per the Contract Documents, contractor shall use this transmittal form for submittal of submittals, shop drawings, testing reports, and product information. The procedure for submitting these items is located in the Contract Documents.

Contractor shall follow all specifications. Failure to follow requirements included in the Contract Documents and Specifications will constitute as reason for the return of the submittal for an additional re-submittal. Contractor is to number each submittal.

Submittal Name/Description: _____

Specification Section No: _____

Contractor: _____

Subcontractor/Supplier: _____

Submittal Type: ☐ Shop Drawing ☐ Sample(s) ☐ Product Data ☐ Other: _____

Notes/Comments: _____

Contractor hereby certifies that (i) CONTRACTOR has complied with the requirements of the Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

CONTRACTOR **SIGNATURE** **PRINT** **DATE**

R-1020 (4/12)

LDR
Contributing to a better quality of life

Designation of Construction Contractor as Agent of a Governmental Entity Sales Tax Exemption Certificate

_____ , an agency of the United
Legal Name of Governmental Entity

States government, or an agency, board, commission, or instrumentality of the State of Louisiana or its political subdivisions, including parishes, municipalities and school boards, does hereby designate the following contractor as its agent for the purpose of making sales tax exempt purchases on behalf of the governmental body:

Name of Contractor		
Address		
City	State	ZIP

This designation of agency shall be effective for purchases of component construction materials, taxable services and leases and rentals of tangible personal property for the following named construction project:

Construction Project	Contract Number

This designation and acceptance of agency is effective for the period

Beginning Date *(mm/dd/yyyy)*	End Date *(mm/dd/yyyy)*

Purchases for the named project during this period by the designated contractor shall be considered as the legal equivalent of purchases directly by the governmental body. Any materials purchased by this agent shall immediately, upon the vendor's delivery to the agent, become the property of this government entity. This government entity, as principal, assumes direct liability to the vendor for the payment of any property, services, leases, or rentals made by this designated agent. This agreement does not void or supersede the obligations of any party created under any construction contract related to this project, including specifically any contractual obligation of the construction contractor to submit payment to the vendors of materials or services for the project.

This contractor-agent is not authorized to delegate this purchasing agency to others; separate designations of agency by this governmental entity are required for each contractor or sub-contractor who is to purchase on behalf of this governmental entity. The undersigned hereby certify that this designation is the entirety of the agency designation agreement between them. In order for a purchase for an eligible governmental entity through a designated agent to be eligible for sales tax exemption, the designation of agency must be made, accepted, and disclosed to the vendor before or at the time of the purchase transaction.

Designation of Agency		
Signature of Authorized Designator		Date *(mm/dd/yyyy)*
Name of Authorized Designator		
Name of Governmental Entity		
Address		
City	State	ZIP

Acceptance of Agency		
Signature of Contractor or Subcontractor Authorized Acceptor		Date *(mm/dd/yyyy)*
Name of Contractor's or Subcontractor's Acceptor		
Name of Contractor		
Address		
City	State	ZIP

This designation of agency form, when properly executed by both the contractor and the governmental entity, shall serve as evidence of the sales tax exempt status that has been conferred onto the contractor. No other exemption certificate form is necessary to claim exemption from sales taxes. The agency agreement evidenced by this sales tax exemption certificate must be implemented at the time of contract execution with the governmental entity. The contract between the governmental entity and his agent must contain provisions to authenticate the conferment of agency.

KING

ARCHITECTS, INC

REQUEST FOR INFORMATION (RFI)

PROJECT NO: 1619D1

PROJECT NAME AND ADDRESS: Additions to Westwood Elementary
1900 Sampson Street
Westlake, Louisiana 70669

RFI No: _____ **Issue Date:** _____

CONTRACTOR:

RFI DESCRIPTION:

REFERENCES/ATTACHMENTS:

Specifications Drawings Other

CONTRACTOR'S RECOMMENDATION:

ARCHITECT'S RESPONSE:

Architect's Name and Title: _____ Date: _____

☐ 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.

CHANGE ORDER REQUEST

PROJECT NAME: Additions to Westwood Elementary
1900 Sampson Street
Westlake, Louisiana 70669

PROJECT NO: 1619D1

CONTRACT INFORMATION:
Contract For: General Construction
Contract Date:

Architect's Project Number: 1619D1
CO Request Date:
Change Order Request No.:

OWNER:
Calcasieu Parish School Board
3310 Broad Street
Lake Charles, Louisiana 70605

ARCHITECT:
King Architects, Inc
1312 Sampson Street
Westlake, Louisiana 70669

CONTRACTOR:

Description of the Work:

G/L	W/C	SUTA	FUTA	FICA	Medicare	Total Labor Burden
9.86%	13.50%	2.39%	0.60%	6.20%	1.45%	34.00%

LABOR COSTS

Name	Craft	# of Hours ST	# of Hours OT	Direct Pay	ST Costs	OT Costs	Total Direct Costs	Perdiem Rate/Day	Perdiem # of Days	
					$0.00	$0.00	$0.00			$0.00
					$0.00	$0.00	$0.00			$0.00
					$0.00	$0.00	$0.00			$0.00
					$0.00	$0.00	$0.00			$0.00
				$0.00	$0.00	$0.00	$0.00			$0.00
				$0.00	$0.00	$0.00	$0.00			$0.00
				$0.00	$0.00	$0.00	$0.00			$0.00
						Subtotal	$0.00		Subtotal	$0.00
					Mark-up	15.00%	$0.00	Mark-up	15.00%	$0.00
						Total	**$0.00**		**Total**	**$0.00**

Direct Labor Burden Costs	$0.00	34.00%
Mark-up	$0.00	15.00%
Total Labor	$0.00	

CONTRACTOR EQUIPMENT COSTS:

Equipment Description	Hours	Rate / HR	Total Costs
		$0.00	$0.00
		$0.00	$0.00
		$0.00	$0.00
		$0.00	$0.00
		$0.00	$0.00
		$0.00	$0.00
		$0.00	$0.00
Total Costs			**$0.00**

MATERIAL COSTS:

Vendor		Delivered Costs
	Subtotal	$0.00
Mark-up	15.00%	0.00
	Total	**$0.00**

SUBCONTRACTORS:

	Costs	10.00% Mark-up	Total Costs
		$0.00	$0.00
		$0.00	$0.00
		$0.00	$0.00
		$0.00	$0.00
		$0.00	$0.00
		$0.00	$0.00
		$0.00	$0.00
		$0.00	$0.00
			$0.00

Insurance Costs: Rate / $1,000

GL Rate - Subcontractors	3.672%	$0.00
Mark-up	15.00%	$0.00
Total Subcontractor Costs		**$0.00**

EQUIPMENT COSTS:

3rd Party Rentals	Vendor	Rate/ Day	Days	Total	Delivery Cost	15.00% Mark-Up	Total Cost
				$0.00		$0.00	$0.00
				$0.00		$0.00	$0.00
				$0.00		$0.00	$0.00
				$0.00		$0.00	$0.00
				$0.00		$0.00	$0.00
				$0.00		$0.00	$0.00
				$0.00		$0.00	$0.00
						Sub-Total	**$0.00**

Change Order Subtotal Amount **$0.00** Total Change Order Costs **$0.00**

Insurance Cost	**Rate / $1,000**	**Cost**
Builder Risk	$0.00	$0.00
Bond Premium	$0.00	$0.00
Sub-Total		$0.00
Mark-Up	15.00%	$0.00
Total Insurance Cost		**$0.00**

AMOUNT OF CALENDAR DAYS REQUESTED TO BE ADDED TO CONTRACT TIME FOR THIS CHANGE _____

THIS IS NOT A CHANGE ORDER, A CONSTRUCTION CHANGE DIRECTIVE OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

REQUESTED BY:

SIGNED

PRINTED NAME AND TITLE

COMPANY

CHANGE ORDER

PROJECT NAME AND ADDRESS
Additions to Westwood Elementary
1900 Sampson Street
Westlake, Louisiana 70669

CONTRACT INFORMATION:
Contract For: General Construction
Contract Date:

CHANGE ORDER INFORMATION:
Change Order Date:
Change Order Number:
CO Request Number:

OWNER:
Calcasieu Parish School Board
3310 Broad Street
Lake Charles, Lousiana 70605

ARCHITECT:
King Architects, Inc
1312 Sampson Street
Westlake, Louisiana 70669

CONTRACTOR:

THE CONTRACT IS CHANGED AS FOLLOWS:
(Insert a detailed description of the change(s) and attach the itemized breakdown.)

ORIGINAL CONTRACT SUM	$
NET CHANGES BY PREVIOUS CHANGE ORDERS	$
CONTRACT SUM PRIOR TO THIS CHANGE ORDER	$
CONTRACT SUM WILL BE **INCREASED/DECREASED** BY THIS CHANGE ORDER - DETAILS ATTACHED	$
NEW CONTRACT SUM INCLUDING THIS CHANGE ORDER	$

CONTRACT TIME WILL BE **INCREASED** BY _____ DAYS.

REVISED CONTRACT COMPLETION DATE: _____

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

RECOMMENDED:	**ACCEPTED:**	**APPROVED:**
ARCHITECT	CONTRACTOR	OWNER
Barry King, AIA King Architects, Inc.		Calcasieu Parish School Board
By:	By:	By:
Dated:	Dated:	Dated:

DATE:

PROJECT NAME ADDRESS: ADDITIONS TO WESTWOOD ELEMENTARY
1900 Sampson Street
Westlake, Louisiana 70669

ARCHITECT: KING ARCHITECTS, INC
1312 Sampson Street
Westlake, Louisiana 70669

CONTRACTOR:

OWNER: CALCASIEU PARISH SCHOOL BOARD
3310 Broad Street
Lake Charles, Louisiana 70605

I certify that, to the best of my knowledge and belief, this project is complete or substantially complete in accordance with the Drawings and Project Manual to the point where it can be used for the purpose in which was intended. It is recommendaed that it be accepted.

DATE OF ACCEPTANCE: _____

CONTRACT DATE OF COMPLETION: _____

NUMBER OF DAYS (Overrun) (Underrun) _____
(As of Acceptance Date):

LIQUIDATED DAMAGES PER DAY (STIMPULATED IN CONTRACT): $ _____

VALUE OF PUNCH LIST: $ _____
(Attach Itemized List)

Was part of the Project occupied prior to Acceptance: _____

PORTION OCCUPIED: _____
(Attach Beneficial Occupancy forms)

_____
Barry King, AIA for King Architects, Inc

For Use of Owner:
I concur in the Acceptance of this Project: _____

NOT FOR RECORDATION

Date:

Project Number: 1619D1

Project Name: ADDITIONS TO WESTWOOD ELEMENTARY

Architect: KING ARCHITECTS, INC.

Contractor:

Owner: CALCASIEU PARISH SCHOOL BOARD

The below described portion of subject project is, to the best of my knowledge and belief, complete to a point where the User desires to use in according with the Contract Documents.

DATE OCCUPIED: _____
WARRANTY items covered by Occupancy. (See Attached List).

_____
ARCHITECT - KING ARCHITECTS, INC.

DATE: _____

_____
CONTRACTOR

DATE: _____

_____
OWNER -CALCASIEU PARISH SCHOOL BOARD

DATE: _____

PUNCH LIST See Attached List

NOT FOR RECORDATION PURPOSES

SECTION 00 65 36 – ROOFING GUARANTEE(RG-2)

OWNER: CALCASIEU PARISH SCHOOL BOARD

ADDRESS: PO Box 800, Lake Charles, LA 70602

WHEREAS _____

Address _____

Telephone (_____) _____herein called the "Roofing Contractor", has performed roofing and flashing in accordance with the Contract Documents for Project No. _____, hereinafter called the "Work") under a subcontract with _____ _____ General Contractor on the following Project:

Name of Project: _____

Location/Address: _____

_____

Name and Type of Building(s): _____

_____

Type(s) of Roof Deck(s): _____

_____

Total Roof Area: _____ SF

Flashing – Edge: _____ LF Base: _____LF

Date of Acceptance: _____ Guarantee Period: 2 Years

Date of Expiration: _____

AND WHEREAS the Roofing Contractor has contracted to guarantee said work against water entry from faulty or defectivematerials and workmanship for the designated Guarantee period;

NOW THEREFORE the Roofing Contractor as the General Contractor guarantees, subject to the terms and conditions hereinset forth, that during the Guarantee Period they will at their own cost and expense, make or cause to be made with approvedprocedures and materials such repairs to or replacements of said work resulting from water entry or faults or defects of saidWork as are necessary to correct faulty and defective work and as are necessary to maintain said Work in watertight conditionsand further to respond on or within two (2) working days upon written notification of leaks or defects by the Calcasieu ParishSchool Board. Furthermore, they will at their own cost or expense maintain the roof for (2) years after acceptance, in accordance with the current edition of the Roof Maintenance Manual published by the Roofing Industry Educational Institute.The roof shall be inspected a minimum of twice each year, and a report prepared documenting the conditions observed at each inspection. These inspections shall be made once during the months of April or May and once during the months of September and October. Two copies of each report shall be forwarded to the Calcasieu Parish School Board.

This Guarantee is made subject to the following terms and conditions:

1. Specifically excluded from this guarantee are damages to the Work, other parts of the building and buildingcontents caused by:
   a. Lightning, windstorm (includes hurricanes and tornados), hailstorm, earthquakes and other unusual phenomena of the elements;

b. Fire; and

c. Structural failures causing excessive roof deck, edgings and related roof components movement. Whenthe Work has been damaged by any of the foregoing causes, the Guarantee will be null and void untilsuch damage has been repaired by the Roofing Contractor, and until the cost and expense thereof has been paid by the Owner or another responsible party so designated.

2. During the Guarantee Period, if the Calcasieu Parish School Board allows alteration of the Work by anyoneother than a Contractor approved in writing by the Roofing Subcontractor, General Contractor, and RoofingMaterial Manufacturer prior to the work being performed, including cutting, patching and maintenance inconnection with penetrations, attachment of other work, and positioning of anything on the roof, this Guarantee shall become null and void upon the date of said alterations. If the Calcasieu Parish School Boardengages the Roofing Contractor to perform said alterations, the Guarantee shall not become null and void,unless the Roofing Contractor, prior to proceeding with said work, shall have notified the Calcasieu ParishSchool Board in writing, showing reasonable cause for claim that said alterations would likely damage ordeteriorate the Work, thereby reasonably justifying a termination of this Guarantee.

3. During the Guarantee Period, if the original use of the roof is changed and it becomes used for, but for whichit was not originally designed or specified, as a promenade, work deck, spray-cooled surface, flooded basin,or other use of service more severe than originally specified, this Guarantee shall become null and void uponthe date of said change.

4. During the Guarantee Period, if any building or area of a building is changed to uses creating extremes ofinterior temperature and/or humidity, but for which it was not originally designed and specified, without provisions and alterations made to the building which effectively contain or control these conditions, this Guarantee shall become null and void upon the date of said change.

5. The Calcasieu Parish School Board shall promptly notify the Roofing Contractor in writing of observed, known or suspected leaks, defects or deterioration and shall afford reasonable opportunity for the Roofing Contractor to inspect the Work, and to examine the evidence of such leaks, defects, or deterioration.

6. This Guarantee is recognized to be the only guarantee of the General and Roofing Contractor on said work,and shall not operate to restrict or cut off the Owner from other remedies and recourses lawfully available to him in case of roofing failure. Specially, this Guarantee shall not operate to relieve the Roofing Contractor of his responsibility for performance of the original work, regardless of whether the Contract was a Contract directly with the Owner or a Subcontract with the Owner's General Contractor.

IN WITNESS THEREOF, this instrument has been duly executed this _____
day of _____, 20_____.

Roofing Contractor's Signature: _____

Typed Name: _____

Representing: _____

Telephone Number: _____

WITNESS _____

_____

NOT FOR RECORDATION

DATE:

PROJECT NO: 1619D1
PROJECT NAME AND ADDRESS: Additions to Westwood Elementary
1900 Sampson Street
Westlake, Louisiana 70669

The below described portion of subject project is, to the best of my knowledge and belief, complete to a point where the User desires to use in according with the Contract Documents.

DATE OCCUPIED: _____
WARRANTY items covered by Occupancy.
(See Attached List.)

ARCHITECT:	**CONTRACTOR:**	**OWNER:**
KING ARCHITECTS, INC 1312 SAMPSON ST. WESTLAKE, LA 70669		Calcasieu Parish School Board 3310 Broad Street Lake Charles, Louisiana 70605
BY	BY	BY
PRINT NAME	PRINT NAME	PRINT NAME
DATE	DATE	DATE

PUNCH LIST
Attached ☐
None ☐
Other ☐ _____

NOT FOR RECORDATION PURPOSES

AIA® Document A201® – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)
Additions to Westwood Elementary
1900 Sampson Street
Westlake, Louisiana 70669

THE OWNER:
(Name, legal status and address)
Calcasieu Parish School Board
3310 Broad Street
Lake Charles, Louisiana 70615

THE ARCHITECT:
(Name, legal status and address)
King Architects, Inc
1312 Sampson Street
Westlake, Louisiana 70669

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

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

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Init.
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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

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

§ 1.1.2 THE CONTRACT

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

§ 1.1.3 THE WORK

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

§ 1.1.4 THE PROJECT

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

§ 1.1.5 THE DRAWINGS

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

§ 1.1.6 THE SPECIFICATIONS

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

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

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

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

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

§ 1.3 CAPITALIZATION

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

§ 1.4 INTERPRETATION

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

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

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

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

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

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the

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portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

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

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

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

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

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

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

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

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

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

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§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

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

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

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

§ 3.4 LABOR AND MATERIALS

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

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§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

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

§ 3.5 WARRANTY

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

§ 3.6 TAXES

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

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

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

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall

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continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

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

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

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

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

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

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required

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submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

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

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

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

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

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

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop

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Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

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

§ 3.15 CLEANING UP

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

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

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

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

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

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a

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party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

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

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

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

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

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

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

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

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed.

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However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

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

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

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

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

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

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

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

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

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

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

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

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

§ 5.3 SUBCONTRACTUAL RELATIONS

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

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

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

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

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

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

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

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

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

§ 6.2 MUTUAL RESPONSIBILITY

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

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

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

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

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

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§ 6.3 OWNER'S RIGHT TO CLEAN UP

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

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

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

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

§ 7.2 CHANGE ORDERS

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

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

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

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

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

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

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.7.

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

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

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

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;

.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

.5 Additional costs of supervision and field office personnel directly attributable to the change.

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

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

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

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

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

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

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§ 8.2 PROGRESS AND COMPLETION

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

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

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

§ 8.3 DELAYS AND EXTENSIONS OF TIME

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

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

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

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

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

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon

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compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

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

§ 9.4 CERTIFICATES FOR PAYMENT

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

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

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

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

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

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

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the

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Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

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

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

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

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

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

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

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

§ 9.7 FAILURE OF PAYMENT

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

§ 9.8 SUBSTANTIAL COMPLETION

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

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

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

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

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

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

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

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

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract

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Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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

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

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

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

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

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

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

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

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in

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whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

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

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

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

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

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

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§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

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

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

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

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

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional

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insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

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

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

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

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

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

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

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

§ 11.3.2 BOILER AND MACHINERY INSURANCE

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

§ 11.3.3 LOSS OF USE INSURANCE

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

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

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

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

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

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

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

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

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

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

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

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

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

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

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

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

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

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

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

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

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

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

§ 13.3 WRITTEN NOTICE

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

§ 13.4 RIGHTS AND REMEDIES

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

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

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

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

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

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

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

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

§ 13.6 INTEREST

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

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

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

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

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

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

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§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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

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

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

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

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

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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

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

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

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

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

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

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

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

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ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

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

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

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

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

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

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

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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

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

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

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

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

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

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

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AIA® Document A201® – 2007

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PAGE 1

Additions to Westwood Elementary
1900 Sampson Street
Westlake, Louisiana 70669

...

(Name, legal status and address)
Calcasieu Parish School Board
3310 Broad Street
Lake Charles, Louisiana 70615

...

(Name, legal status and address)
King Architects, Inc
1312 Sampson Street
Westlake, Louisiana 70669

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I, Barry D. King, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 17:52:33 ET on 03/26/2026 under Order No. 500038838 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2007, General Conditions of the Contract for Construction, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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KING ARCHITECTS, INC.

SUPPLEMENTARY CONDITIONS (October 1999)

These supplementary conditions modify, change, delete from or add to the General Conditions of the Contract for Construction AIA Document A201-2007. When any article of the General Conditions is modified or any paragraph, subparagraph or clause thereof is modified or deleted by this supplement, the unaltered provisions of that article, paragraph, subparagraph or clause shall remain in effect.

Article, paragraphs, subparagraphs or clauses modified or deleted have the same numerical designation as those occurring in the General Conditions.

ARTICLE 1 - GENERAL PROVISIONS

1.1 Basic Definitions

1.1.1 The Contract Documents

In subsection 1.1.1 delete the third sentence, and add the following sentence.)

"The Contract Documents shall include the bidding documents as listed in the Instruction to Bidders and any modifications made thereto by Addenda."

ARTICLE 2 - OWNER

2.2 Information And Services Required Of The Owner

2.2.4 (Add the following sentence to the end of Subsection 2.2.4)

"The Owner shall not be responsible for any explanation or interpretation of the Contract Documents."

(Delete subsection 2.2.5 and add the following new subsection.)

2.2.5 Unless otherwise provided in the Contract documents, The Architect will furnish to the Contractor, free of charge, up to twenty-five (25) copies of Contract Documents. Additional copies may be purchased by the Contractor by paying actual printing and mailing costs."

(Add the following section.)

2.5 Owner's Right of Partial Occupancy

2.5.1 The Owner shall have the right to use any and all portions of the building that have reached such a stage of completion as to permit occupancy or use provided that such occupancy or use does not hamper the Contractor or prevent his efficient completion of the Contract. Use form provided in the Contract Documents entitled "Beneficial Occupancy".

ARTICLE 3- CONTRACTOR

3.8 Allowances

(Delete subsections 3.8.1, 3.8.2 and 3.8.3 and add the following new subsection 3.8.1.)

"No cash allowances shall be made on any item."

3.9 Superintendent

(Add the following)

3.9.2 If, in the opinion of the Owner and the Architect, such superintendent or any of his assistants are either negligent or unqualified to perform their duties, they shall be replaced promptly."

ARTICLE 4 - ADMINISTRATION OF THE CONTRACT

4.1 Architect

(Delete the entire paragraph and substitute the following)

4.1.1 The term Architect, when used in the Contract Documents, shall mean the prime designer (Architect, Professional Engineer or Landscape Architect), or his authorized representative, lawfully licensed to practice architecture, engineering or landscape architecture in the state of Louisiana, identified as such in the Owner-Contractor Agreement, and is referred to throughout the Contract Documents as if singular in number and masculine in gender.

4.3.7 Claims for Additional Time

(Add the following subsection.)

4.3.7.1.1 "The following days are considered reasonable anticipated days of adverse weather on a monthly basis:

January 11 days
February 10 days
March 8 days
April 7 days
May 5 days
June 6 days
July 6 days
August 5 days
September 4 days
October 3 days
November 5 days
December 8 days

Note: Agreement is on a calendar day basis,

4.6 Arbitration
(Delete subsections 4.6.1, 4.6.2, 4.6.3, 4.6.4, 4.6.5 and 4.6.7 and add the following)

4.6.1 All claims, disputes and other matters in question between the parties to this Agreement under Ten Thousand Dollars and no cents ($10,000.00) arising out of, or relating to this agreement or the breach thereof, shall be decided by arbitration under the following rules of arbitration. All claims, disputes and other matters over Ten Thousand dollars and no cents ($10,000.00) may be decided by mutual of the parties to this agreement. Notice of the demand for

arbitration shall be filed in writing with the other party of the agreement. The demand for arbitration shall be made within the time limits specified in paragraph 4.3.2 of AIA Document A201, 1997 edition. Any such arbitration proceeding shall, at the option of the Owner, be consolidated with or joined to other arbitration proceedings between the Owner and other persons or entities under contract with the School Board for the construction, repair or alterations of the project in question.

4.6.2 All claims by the Contractor shall first be submitted to the Architect in accordance with paragraph 4.4.1 of the General Conditions. In the event that the Contractor does not receive a decision from the Architect in accordance with the provisions of 4.4.1, the Contractor shall demand arbitration not later than forty (40) days from the date of submission to the Architect or else the Contractor expressly agrees that the claim is waived.

4.6.3 The parties hereby agree that the locale of the arbitration proceedings shall be in Louisiana and that all legal issues shall be governed by Louisiana Law. The Louisiana state courts shall have sole jurisdiction in any court proceedings.

4.6.4 There shall be full right of discovery in arbitration to the extent permitted by the Louisiana Code of Civil Procedure for court suits.

4.6.5 The right of AAA to make administrative appointments or appoint arbitrators is revoked. The Contractor and the Owner shall select arbitrators as follows:

1. After demand has been made to arbitrate, each party shall within (15) days name their respective arbitrator.

2. The two arbitrators named by each party shall meet and jointly name the third arbitrator within the next fifteen (15) days.

3. Arbitration proceedings must be commenced no later than forty (40) days after the initial demand to arbitrate has been made.

4. Arbitrators must reach a decision within fifteen (15) days after the arbitration hearings are complete.

5. No more than one item shall be arbitrated at one time unless agreed upon by both parties. In the event it is agreed by both parties that more than one item is to be arbitrated by one panel of arbitrators, each item must be arbitrated separately and only after a decision has been reached by the panel on the proceeding item can the second item be arbitrated.

6. The decision of the arbitrators shall be in writing and shall be final.

4.6.6 This agreement to arbitrate shall be specifically enforceable under provisions of R.S. 9:4201 et seq.

4.6.7 Unless otherwise agreed in writing, the Contractor shall carry on the Work and maintain progress during any arbitration proceeding, and the Owner shall continue to make payments in accordance with the Agreement.

ARTICLE 5 - SUBCONTRACTORS

5.2.3 (Completely delete subsection 5.2.3)

ARTICLE 7 - CHANGES IN THE WORK

7.2 Change Orders

(Delete subsection 7.2.2 and substitute the following:)

7.2.2 "The cost to the Owner resulting from the change in the work shall be the sum of:

1. Contractor's material and labor cost.
2. Subcontractor's (as defined in Article 5.1.1) material and labor cost.
3. Overhead and Profit.

The credit to the Owner resulting from a change in the work shall be the sum of:
1. Contractor's material and labor cost.
2. Subcontractor's material and labor cost.
3. Credit will not be required for overhead and profit.

7.2.3 Before a change order is prepared, the Contractor shall provide and deliver to the Architect the following information, not subject to waiver, within ten (10) days after being notified to prepare said change order:

1. An itemized list of material and labor cost for each subcontractor's work including quantities and unit costs for each item of labor and each item of material.
2. An itemized list of material and labor costs for Contractor's work including quantities and unit costs for each item of labor and each item of material.
3. Overhead and profit shall be computed by one of the following methods: (not to exceed 25% on any portion of work).
    a. When all of the work is Contractor's work; 15% of the cost of the work as defined hereafter.
    b. When the work is all Subcontract work; 15% of the cost of the work for Subcontractor's overhead and profit plus 10% of the cost of the work for Contractor's overhead and profit.
    c. When the work is a combination of Contractor's work and Subcontractor's work; 15% of the cost of the work for Subcontractor's overhead and profit plus 10% of the cost of the work for Contractor's overhead and profit plus 15% of the cost of the Contractor's work for Contractor's overhead and profit.

7.2.4 The Contractor shall include extensions of time if any with the change order request and shall submit substantiation for such extension of time.

7.2.5 Cost of the work for the purpose of change orders shall be costs necessarily incurred in performance of the work and paid by the contractor which shall consist of:

1. Wages paid
2. Cost of all materials and supplies.
3. Cost of necessary machinery and equipment.
4. Cost of applicable taxes, insurance, fringe benefits, unemployment compensation, social security, old age and bond premiums.
5. Any other documents costs.

7.2.6 Subcontractor's cost shall consist of items in 7.2.5 above plus overhead and profit as defined in 7.2.3.

7.2.7 Cost of the work whether Contractor's Cost or Subcontractor's cost shall not apply the following:
1. Salaries or other compensation of the Contractor's personnel at the Contractor's principal office and branch

offices.

2. Expenses of the Contractor's principal offices, branch offices and the field office.
3. Any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the work.
4. Overhead and general expenses of any kind or the cost of any items not specifically and expressly included above in Cost of the Work.
5. Costs due to the negligence of the Contractor, any Subcontractor, anyone directly employed by any of them, or for whose acts any of them may be liable, including but not limited to the correction of defective or nonconforming work, disposal of material and equipment wrongly supplied, or making good any damage to property.

7.2.8 When applicable, as provided by the Agreement, the Cost to the Owner for change orders shall be determined by quantities and unit prices. The quantity of any item shall be as submitted by the Contractor and approved by the Architect. Unit prices shall cover cost of material, labor, equipment, overhead and profit.

7.3 Construction Change Directives

7.3.1 Delete the second sentence of paragraph 7.3.1.

(Delete 7.3.2, 7.3.3, 7.3.4, 7.3.5, 7.3.6, 7.3.7, 7.3.8 and 7.3.9)

7.4 Minor Changes in the Work

(Add the following after the last sentence of subsection 7.4.1)

7.4.1 "However, any changes which effects a reduction in quantity or quality of materials or equipment shall not be made without the written approval of the Owner."

ARTICLE 8 - TIME

8.1 Definitions

8.1.2 (In subsection 8.1.2 change the words "in the agreement" to read "by the written notice to proceed").

(Add new subsection)

8.1.5 "The date of Beneficial Occupancy shall be the date when a certain portion or portions of a project are complete to a point where they can be occupied by the Owner."

8.2 Progress and Completion

(Delete subsection 8.2.1 and substitute the following:)

8.2.1 "Time is of the essence and completion of the work must be within the time stated in the Agreement, subject to such extensions as may be granted under section 8.3 The Contractor agrees to commence work not later than fourteen days after the transmittal date of written notice to proceed from the Owner and to substantially complete the project within the time stated in the Agreement. The Owner will suffer financial loss if the project is not substantially complete in the time set forth in the Contract Documents. The Contractor and his surety shall be liable for and shall pay to the Owner the sum stated in the Contract Documents as fixed, agreed and liquidated damages for each

consecutive calendar day (Saturday, Sunday and holidays included) of delay until the Work is substantially complete."

8.3 Delays and Extensions of Time

8.3.1 Change the words "by change order for such reasonable time as the Architect may determine" to read "as recommended by the Architect, subject to Owner's approval of the change order".

(Delete subsection 8.3.3.)

ARTICLE 9 - PAYMENTS AND COMPLETION

9.2 Schedule of Values

(Delete subsection 9.2.1 and substitute the following)

9.2.1 "At the preconstruction conference, the Contractor shall submit to the Owner and the Architect a schedule of values prepared as follows:

1. The Schedule of Values Form as submittal shall be on continuation sheet of application certificate for payment, AIA Documents G702-G702A.
2. Use the index (table of contents) of the specifications as a basis for format for listing costs of work for sections under Division 1 through 16. Use each section number under each division for subtitles. Each section shall be subdivided into separate line items for the total cost (with overhead and profit) of separate items in sections.
3. The total of all items shall equal the total Contract Sum."

9.3 Applications for Payment

(Delete 9.3.1 and substitute the following).

9.3.1 "Monthly, the Contractor shall submit to the Architect an itemized Application of Certificate for Payment, notarized if required, supported by such data substantiating the right to payment as the Owner or the Architect may require. Application for payment shall be submitted on or about the first of each month for the value of labor and materials incorporated in the work and of material suitable stored at the site as of the twenty-fifth day of the proceeding month, less normal retainage as follows:

1. Project with Contract Sum of less than $500,000.00-10% of the Contract Sum.

2. Project with Contract Sum of more than $500,000.00 -5% of the Contract Sum.

9.3.1.1 Delete this subsection.

9.6 Progress Payments

(Delete 9.6.1 and substitute the following).

9.6.1 "After the Architect has issued a certificate for payment, the Owner shall make payment within twenty days."

9.8 Substantial Completion

9.8.2.1 Delete the words "or a portion thereof which the Owner agrees to accept separately" where they appear in 9.8.2.

9.8.5 (Delete the second and third sentences of paragraph 9.8.5 and substitute the following)

"The normal retainage shall not be due the Contractor until expiration of the forty-five day lien period and submission to the Architect of a clear lien certificate and invoice for same".

(Add the following subsection 9.8.6, 9.8.7, and 9.8.8).

9.8.6 Delete the words "or designated portion thereof" wherever they appear in subsections 9.8.1, 9.8.2, and 9.8.3 above.

9.8.7 "Upon the recommendation of the Architect, the Owner will issue and record with the Clerk of Courts a Notice of Acceptance of Building Contract."

9.8.8 A "Punch List" of "exceptions" and the dollar value related thereto will be prepared. A monetary value will be assigned to each item so that a "special" retainage can be withheld for exceptions to acceptance in addition to the "normal" retainage. This monetary value shall be based on the estimated actual value of each item multiplied by Two."

9.9 Partial Occupancy or Use

(Delete section 9.9)

9.10 Final Completion and Final Payment

9.10.2 (Completely delete that part of the sentence following (5) and substitute the following)

"The Owner shall record the acceptance for the Work that has been performed and the Contractor shall furnish a clear lien certificate from the Clerk of Courts not less than forty-five (45) days after the recordation of acceptance. The cost of recordation shall be the responsibility of the Contractor.

ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

10.4.1 "All Contractors should use the least hazardous materials on all jobs. Material safety data sheets (MSDS shall be given to the Owner on all materials used).

ARTICLE 11 - INSURANCE AND BONDS

11.1 Contractor's Liability Insurance

(Delete subsection 11.1.2 and substitute the following)

11.1.2 "The Contractor shall, before commencing any work to be conducted under this Agreement, procure Workmen's

Compensation and Employer's Liability Insurance with an insurance company authorized to write such policies of insurance in the state of Louisiana. It shall be the further responsibility of the Contractor to require that all Subcontractors have in full force and effect a policy of Workmen's Compensation and Employer's Liability Insurance before proceeding with any of the Work required under this Agreement. The Contractor shall procure and maintain, during the life of this agreement, such public liability and property damage insurance, including the operation of motor vehicles, with limits as hereinafter provided which will cover the Contractor's legal liability arising out of the Work performed by the Contractor any Subcontractor, and by anyone directly or indirectly employed by either of them for claims for damages for bodily injury, including accidental death, as well as claims for property damages, which may arise from operations under this contract.

Insurance coverage specified in the General Conditions (AIA Document A201) to be provided by the Contractor, and any other insurance described below shall be furnished with the following minimum limits:

11.1.2.1 Workmen's Compensation (Clause 11.1.1.1):

1.	Applicable State	Standard Louisiana
2.	Employer's Liability	$500,000.00

11.1.2.1.1 Contractor's Liability Insurance (Clause 11.1.1.2, 11.1.1.3, 11.1.1.4) including contractual liability (Subparagraph 11.1.3): Form of insurance shall be Comprehensive General Liability including Broad Form CGL and the Contractor shall furnish a certificate naming the Calcasieu Parish School Board as an additional insured:

	Coverage required for Projects: <$1,000,000	>$1,000,000
1. Bodily injury and Property damage Combined Single Limit (CSL)-Includes products and completed operations and contractual liability		
Each Occurrence	500,000 (CSL)	1,000,000 (CSL)
Aggregate	500,000 (CSL)	1,000,000 (CSL)
2. Personal Injury Combined Single Limit (CSL) (Aggregate Limits) -Including products and completed Operations and contractual liability		
Each Person Aggregate	500,000(CSL)	1,000,000 (CSL)
General Aggregate	500,000(CSL)	1,000,000 (CSL)
3. Automobile Liability Combined Single Limit (CSL)-Owner, Non-owned and hired car bodily injury and property damage	300,000 (CSL)	500,000 (CSL)
4. XCU Coverage		

5. Umbrella Policy - The Contractor shall procure and maintain during the life of this agreement an Umbrella Policy in the amount of $1,000,000 in excess of all other insurance requirements.

11.2 Owner's Liability Insurance

(Delete subsection 11.2.1 and substitute the following)

11.2.1 Owner's and Contractor's Protective Liability Insurance shall be furnished by the Contractor naming the Calcasieu Parish School Board as an additional insured.

	Coverage required for Projects:	
	<$1,000,000	>$1,000,000

1. Bodily injury and Property damage

Combined Single Limit (CSL) - Includes products and completed operations and contractual liability		
Each Occurrence	500,000 (CSL)	1,000,000 (CSL)
Aggregate	500,000 (CSL)	1,000,000 (CSL)

11.3 Project Management Protective Liability Insurance

(Delete section 11.3 in its entirety.)

11.4 Property Insurance

(Delete subsection 11.4.1 and substitute the following)

11.4.1 "Unless otherwise provided, the Contractor shall purchase and maintain property insurance upon the entire work at the site to the full insurable value equal to the Contract Sum.

The Contractor is to provide "Builder's Risk Insurance" to protect the Owner, Contractor and their Subcontractors as their interests may appear.

The policy insures against "All Risk" of direct physical loss or damage subject to certain exclusions and limitations.

If not covered under the insurance provided in the Contract Documents, the Contractor shall effect and maintain similar property Insurance for portions of the Work stored off site or in transit when such portions of the Work are to be included in an application for payment under subparagraph 9.3.2.

(Delete section 11.4.4, 11.4.5, and 11.4.6)

ARTICLE 13 - MISCELLANEOUS PROVISIONS

13.2 Successors and Assigns

13.2.1 (Eliminate the second sentence and substitute the following):

"There shall be no assignment of the Contract."

(Delete section 13.2.2 in its entirety.)

(Delete section 13.7 in its entirety).

(Add the following section 13.8).

13.8 Recordation of Contract and Bond

13.8.1 "The Owner shall record the Agreement between the Owner and Contractor and Performance and Payment Bond with the Clerk of Court in the parish in which the work is to be performed. The cost of recordation shall be the responsibility of the Contractor.

ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT

14.2 Termination by the Owner for Cause

14.2.5 (Add the following subsection):

"If an agreed sum of liquidated damages has been established, termination by the Owner under this Article will not relieve the Contractor of his obligations under the liquidated damages provisions and the Contractor shall be liable the Owner for per diem liquidated damages."

ARTICLE 15 - EQUAL OPPORTUNITY

15.1 The Contractor and all Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, color, sex or national origin. Such action shall include, but not limited to the following: "employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth in policies of non-discrimination.

15.2 The Contractor and all Subcontractors shall, in all solicitations or advertisements for employees place by them on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.

ARTICLE 16 - SHOP DRAWINGS

16.1 Follow all provisions of General Conditions regarding shop drawings and samples.

16.2 Shop drawings must be submitted in quadruplicate.

16.3 No shop drawings will be allowed at the construction site which do not bear the Architect's stamp "Reviewed for field use."

16.4 The Contractor shall furnish the Director of Planning and Construction for Calcasieu Parish School Board with two sets of complete shop and working drawings of all apparatus, equipment, controls, etc. to be provided in the said project. These drawings shall give dimensions, weights, mounting data, locations, ratings and other pertinent information. No separate items will be accepted.

ARTICLE 17 - COMPLIANCE WITH LOUISIANA LICENSING LAW

17.1 The Contractor must be fully qualified under state or local licensing law for "General Contractors" in effect and at the location of the Work before submitting his bid. For projects in the state of Louisiana, Contractors and Subcontractors must be licensed under Louisiana Revised Statutes 37:2151, et. seq. For projects requiring licensing in accordance with law. The Contractor shall state his license number with his bid and be responsible for determining that all Subcontractors and prospective Subcontractors are duly licensed.

ARTICLE 18 - CONSTRUCTION SIGN

18.1 The Contractor shall erect a sign at the project site in accordance with the sample drawing included in the specifications. Sign shall be erected as soon as practical after commencement of the Work. Location of sign shall be as directed. Sign shall be maintained in good condition until completion of project.

ARTICLE 19 - COORDINATION OF TRADES

19.1 The contract documents are intended to produce a piece of work complete in every respect and the Contractor shall furnish all things necessary to complete the Work within the meaning and intent of said documents. It shall be the responsibility of the Contractor to provide everything necessary to complete the Work.

19.2 If installation of conduits, piping and ductwork become a problem, it will be expected that the various Subcontractors with the General Contractor will coordinate their cork to complete the installation at no additional cost to the Owner. Attention is called to the priority list for as enumerated here:

1. Sanitary drain and waste.
2. Storm drain and sewer.
3. Acids waste.
4. Steam supply.
5. Heating hot water.
6. Chilled water.
7. Clinical gases.
8. Air conditioning supply duct.
9. Sprinkler system.
10. Natural gas.
11. Domestic hot water.
12. Domestic cold water.
13. Electric conduit.

Items not required will be deleted, but adjusted sequence will remain.

19.3 It will be the responsibility of the Contractor and all Subcontractors to review all architectural, structural, mechanical and electrical plans and call discrepancies in coordination to the attention of the Architect for addendum items. After the contract is signed, it will be the responsibility of the Contractor and all Subcontractors to provide necessary rough-in and connection, mechanical and electrical, to all items and equipment necessary to place this unit or equipment in complete operating condition. If item is shown on any one segment (architectural, structural, mechanical or electrical), it shall be considered as being required by all and will be provided with all utility hook-up at

no additional cost to the Owner, unless specifically noted otherwise.

19.4 Electrical panel locations shall be reviewed and locations adjusted for reasonable access by conduits within walls. If structure interferes with access to panels, the panel will be relocated at no cost to the Owner. Further, if the electrical panels cannot be flush mounted two options remain:

1. If the space is 1/2" or less from the wall, provide a finished wood trim filler at the perimeter of panel 2-1/2" wide with mitered corners.
2. Subcontractor shall arrange with the General Contractor to provide an increase in wall thickness so that the panel may be flush mounted with no additional cost the Owner.

19.5 Plans will generally be complete with regard to pipe chases and furred areas. If additional furring is required, this should be called to the attention of the Architect for an addendum. After the contract is signed it will be the responsibility of the Contractor to provide all pipe chases, increases in wall dimension and other furring necessary to complete the project with required finishes at no additional cost to the Owner. No exposed piping or conduit will be permitted.

ARTICLE 20 - DOCUMENT INTENT

20.1 The Contract Documents are intended to produce a piece of work complete in every respect and the Contractor shall furnish all things necessary to complete the work within the meaning and intent of the said documents. It shall be the responsibility of the Contractor to provide everything necessary to complete the Work as enumerated in these Supplementary Conditions.

ARTICLE 21 - PRODUCT AND COLOR SELECTIONS

21.1 Although one carpet, vinyl wall covering, paint and/or other similar items are specified and scheduled, it is not the intent of the documents to use a single selection for all such scheduled areas.

ARTICLE 22 - AS-BUILD DOCUMENTS (OWNER'S OPTION)

22.1 The Contractor will be furnished one (1) complete set of contract documents at the end of the contract period. On these documents will be entered any changes from the original documents for "As-Built" documents submitted to the Architect for the use of the Owner. Final acceptance shall not be issued until the Architect receives these "As-Built" documents for submittal to the Owner. If required, the cost will be negotiated between Owner and Architect.

ARTICLE 23 - OPEN WALL AND CEILING INSPECTION

23.1 No finish material or construction will be issued on walls, partitions and ceilings until a representative of the Architect in the presence of the General Contractor and his Subcontractors make an open wall inspection of all plumbing piping, fixtures, supports, electrical conduit wall bracing, duct work and support, etc. Contractor will notify Architect forty-eight (48) hours prior to requested inspection.

INSPECTION PROCEDURES
DISCREPANCY WITH PLANS AND SPECIFICATIONS

1. The Calcasieu Parish School Board inspector shall notify the job superintendent immediately upon the discovery of a discovery of a discrepancy. The superintendent will be expected to bring the project into compliance with plans and specs. If necessary the inspector may halt the defined work area in question.

2. The Calcasieu Parish School Board inspector shall notify the project architect immediately and solicit his assistance in determining an acceptable solution.

3. The Coordinator of Planning and Construction shall be notified as soon as possible.

4. Whenever a job change is requested in the plans and specifications by the contractor, **the architect shall be the only person authorized to approve such a change. Any approved change shall be in the form of a field order or change order.** A copy of any approved change shall be forwarded to the Coordinator of Planning and Construction. If applicable, a credit should be given to Calcasieu Parish School Board.

5. If the Architect approves a job change he shall provide a “Red Line” drawing showing the approved change has been covered with roofing insulation, earth, concrete, walls, ceilings or concealed areas. A change in the written specifications should accompany the “Red Line” drawing, if applicable.

6. If the plans and specifications were not followed and prior written approval for the deviation was not given by the project architect then the contractor shall be required to bring the work into compliance with plans and specifications with no expense to Calcasieu Parish School Board.

7. Documentation of any discrepancies shall be kept on file with copies to all concerned parties. The concerned parties shall be defined as:
   a. Calcasieu Parish School Board
      Coordinator of Planning and Construction
   b. Project Architect or Engineer
   c. General Contractor/Sub-contractor
   d. Manufacturer, if warranty could be affected

SECTION 01 10 00 – SUMMARY OF WORK

GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work by Owner.
5. Work under separate contracts.
6. Future work.
7. Purchase contracts
8. Salvage requirements.
9. Owner-furnished products.
10. Contractor-furnished, Owner-installed products.
11. Access to site.
12. Coordination with occupants.
13. Work restrictions.
14. Specification and drawing conventions.
15. Miscellaneous provisions.

1.3 PROJECT INFORMATION

A. Project Identification: **ADDITIONS TO WESTWOOD ELEMENTARY**, Project number 1619D1.

1. Project Location:

1900 Sampson Street
Westlake, Louisiana 70669

B. Owner: **CALCASIEU PARISH SCHOOL BOARD**.

1. Owner's Representative:

Calcasieu Parish School Board
Dr. Jason VanMetre, Superintendent
3310 Broad Street
Lake Charles, Louisiana 70615
337.217.4000

C. Architect: **KING ARCHITECTS, INC.**

1. Project Architect:

Barry King, AIA
1312 Sampson Street
Westlake, Louisiana 70669
337.494.0806
office@kingarchitects.net
www.kingarchitects.net

D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. CIVIL ENGINEER:
Christopher M White
Wynn L White Consulting Engineers, Inc
P O Box 83527
Baton Rouge Louisiana 70884
225.761.9141
cwhite@wynnwhite.com
www.wynnwhite.com

2. STRUCTURAL ENGINEER:
Jason Duhon, PE
Duhon & Pleasant Consulting Engineers, LLC
5393 Big Lake Road
Lake Charles, Louisiana 70605
337.564.5918
jason@dandpengineers.com
www.dandpengineers.com

3. MECHANICAL ENGINEER:
Craig Campbell, PE
ADG Engineering (Associated Design Group, Inc)
3909 West Congress Street, Suite 201
Lafayette, Louisiana 70508
337.234.5710
ccampbell@adginc.org
www.adginc.org

4. ELECTRICAL ENGINEER:
David Stelly, PE
ADG Engineering (Associated Design Group, Inc)
3909 West Congress Street, Suite 201
Lafayette, Louisiana 70508
337.234.5710
dstelly@adginc.org
www.adginc.org

E. Contractor: Unknown at the time of execution of this Project Manual. The Procurement Phase will occur in order for the Owner to decide the General Contractor for this Project.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. The project entails furnishing labor, materials, tools and equipment necessary to provide the following at Westwood Elementary School. The installation of all new materials shall be performed in strict accordance with the manufacturer's written installation instructions, and in accordance with the approved shop drawings.

a. Occupancy Type: Assembly, Group A3
b. Construction Type: V-B/V(000) (non-rated wood)
c. Square Footage:

Area 1	191 sf
Area 2	2,153 sf
Area 3	305 sf
Area 4	6,981 sf
New Sprinkler Area	45,586 sf

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 SALVAGE REQUIREMENT

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

ACCESS TO SITE

A. Site Utilization Plan: Prepare and submit a site utilization plan demonstrating the requirements provided by the Owner's Project representative. Do not commence mobilization on the Project site prior to written approval of the site utilization plan.

1. Driveways, walkways and entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
   a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
   b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.7 COORDINATION WITH OCCUPANTS

A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
2. Provide not less than [14] <Fourteen> days' notice to Owner of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.
   1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
   1. Notify **Architect** not less than **14** days in advance of proposed utility interruptions.
   2. Obtain **Architect's** written permission before proceeding with utility interruptions.
C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
   1. Notify **Architect** not less than **14** days in advance of proposed disruptive operations.
   2. Obtain **Architect's** written permission before proceeding with disruptive operations.
D. Controlled Substances: Use of controlled substances is similarly prohibited.
E. Contractor Identification: Owner will provide identification tags for Contractor personnel working on Project site. Require Personnel to use identification tags at all times.
   1. All Contractor and subcontractor personnel must wear company badges, uniform shirts, and/or similar apparel that identifies their employer while on Project Site.
   2. Contractor and subcontractor will be required to submit list of personnel and digital photos of each for Owner (CPSB) to create badges that must be worn while on Project Site.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations [**published as part of the U.S. National CAD Standard**] [**and**] [**scheduled on Drawings**].
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers and titles found in this Project Manual.

1.10 MISCELLANEOUS PROVISIONS: Without force and effect on requirements of Contract Documents, the description of the work of the Contract can be summarized as follows:

A. The Contract documents and applicable design drawings describe all architectural, electrical, mechanical, and structural work required for the construction of this project.

B. Contractor will be responsible for obtaining and abiding by any and all City, Parish, and other applicable permits, and requirements for demolition. All work shall comply with OSHA and all other applicable Federal, State and Local codes.

C. This work will be accomplished in an operating manufacturing facility planned, scheduled, organized, and coordinated in such a manner that operations will not be restricted, disrupted, or hindered in any manner.

D. Maintain existing utilities indicated to remain, keep in service, and protect against damage during construction operation.

E. Conduct all construction operations to ensure minimum interference with roads, streets-walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, and other adjacent occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

F. Promptly repair damages caused to adjacent facilities by demolition operations at no cost to Owner.

G. Notify utility companies having jurisdiction to remove and relocate lines which may interfere with construction operation.
1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
2. Maintain, reroute, or extend as required, existing utility lines which pass through the work area.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

KING ARCHITECTS, INC **SECTION 01 21 00**

SECTION 01 23 00 - ALLOWANCES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to the Contrctor. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:

1. Unit-cost allowances.
2. Lump Sum Allowances.

C. Related Sections:

1. Divisions 32 Sections for items of Work covered by allowances.

1.03 SUBMITTALS

A. Submit reports from the Owner's Independent Testing Agency to document actual quatities of materials delivered to or removed from the site for use in fulfillment of each allowance.

1.04 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.05 UNIT-COST ALLOWANCES

A. Allowance shall include all costs to Contractor of specific products, materials and work under allowance and shall include taxes, freight, and delivery to Project Site.

PART 2 - PRODUCTS *(not applicable)*

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.02 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.03 SCHEDULE OF ALLOWANCES

A. Allowance No. One (1): Brick Masonry

1. **Allowance: $2,000.00 per door for ALL door hardware.**
2. The above allowance shall be included in the Base Bid.

END OF SECTION 01 23 00

SECTION 01 22 00 - UNIT PRICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Sections:
1. Section 01 21 00, "Allowances" for allowance quantities associated with the Unit Price to be included in the Base Bid.

1.03 DEFINITIONS

A. Unit Price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment or services, or a portion of the Work added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or allowance quantities of Work required by the Contract Documents are increased or decreased.

1.04 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead and profit.

B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS *(not applicable)*

PART 3 - EXECUTION

3.01 SCHEDULE OF UNIT PRICES

A. Unit Price No. One (1): Unit Price for Soil Stabilization
1. Purpose:

2. Refer to Section
3. Unit of measurement:
4. Include the following in the unit price:
a.

b.

c.

END OF SECTION 01 22 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:
1. Section 00 63 11 “Request for Information Form” for clarification and/or Project information.
2. Section 01 21 00 “Allowances” for products selected under an allowance.
3. Section 01 23 00 "Alternates" for products selected under an alternate.
4. Section 01 31 00 “Project Management & Coordination” for Requests for Information.
5. Section 01 33 00 “Submittal Procedures” for requirements for submitting comparable product submittals for products.
6. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.03 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms, change in performance data, product dimensions or other design criteria.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner. --No substitutions for convenience are allowed.

B. “Or Equal”: When a product, material or equipment specified by brand or trade name is followed by the words “or equal,” a substitution may be permitted if the substitution is equal to or superior to the first-named product, material or equipment in quality, utility and appearance, and if the substitution complies with all other requirements of the plans and specifications.

C. Procurement (Bidding) Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.

D. During Construction Substitution Requests: Not allowed.

1.04 ACTION SUBMITTALS

A. Substitution Requests: Submit to Architect. Substitution Request shall be made inwriting and in compliance with the following requirements. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Substitution Request Form: Use **form provided in Division 00 – Bidding & Contract Requirements, Sections 00 43 25 –Substitution Request Form.**
2. Requests for substitution of materials and equipment will be considered if received no later than **10 days** prior to date of bid opening.
3. Required Documentation: Show compliance with requirements for substitutions and the following, as applicable:
a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

4. Architect's Action During Bidding Phase: If necessary, Architect will request additional information or documentation for evaluation within **three (3)** days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within **seven (7)** days of receipt of request.
a. Forms of Acceptance: Addenda. Architect will notify all bidders of accepted substitution.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

B. Architect’s approval of substitute does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

C. Architect’s approval of a particular manufacturer does not suggest or imply any deviation from the Contract Documents. All products shall comply with the drawings and specifications. The Contractor shall note that prior approval will be by manufacturer’s name only. The Contractor shall ensure that the products used in preparation of proposal and proposed to be used on this project, is equivalent to that specified in all aspects. Any material, product, or component found to not be equivalent to that specified will be rejected. Approval of one manufacturer does not automatically approve any subsidiary, parent, and/or sister company, and their associated products.

1.05 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.07 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than **fifteen (15)** days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is **fully** documented and **properly** submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION

3.01 REQUESTING A SUBSTITUTION DURING BIDDING

A. In the event that a substitution is requested during the Bidding Phase, in order to be considered, the Contractor or Supplier shall submit it to the Architect no later than **ten (10)** days prior to bid opening. In general, this procedure shall be as follows:
1. Submit a Substitution Request form for each individual product.
2. Support your request with required documentation as previously addressed.

B. Requests for Substitutions submitted and approved during Bidding Phase shall be announced by the Architect by Addenda prior to the bid due date.

3.02 UNAUTHORIZED SUBSTITUTIONS

A. Any Contractor who substitutes products without proper authorization by the Architect will be required to immediately remove and replace the product and all costs required to conform to the Contract Documents shall be borne by the General Prime Contractor.

END OF SECTION 01 25 00

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications. Construction Manager shall develop and implement a system acceptable to Owner for the preparation, review and processing of Change Order Requests, contingency and allowance expenditure authorizations, Change Orders, and requests for information.

B. Related Requirements:

1. Section 01 25 13 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 14 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect on a Change Order Request Form.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 25 13 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Change Order Request Form: Use form provided by Architect. Sample copy is included in Division 00 – Bidding & Contract Requirements section of the Specifications.

1.4 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Contract Change Order for signatures of Owner and Contractor on Owner's standard form.

PART 2 - PRODUCTS *(Not Applicable)*

PART 3 - EXECUTION *(Not Applicable)*

END OF SECTION 01 26 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:
1. Section 01 21 00 "Allowances" for procedural requirements governing the handling and processing of allowances.
2. Section 01 22 00 "Unit Prices" for administrative requirements governing the use of unit prices.
3. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.3 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
a. Application for Payment forms with continuation sheets.
b. Submittal schedule.
c. Items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the schedule of values to Architect at earliest possible date, but no later than at the Pre-Construction Meeting
3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.

B. Format and Content: Use 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. Arrange schedule of values consistent with format of AIA Document G703.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment *and* progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
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.
a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
6. 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.

7. 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.
8. 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.
   a. Include each Change Order as a new line item.

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial 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 or on a monthly period basis.
   1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.

C. Application for Payment Forms: Use form AIA Document G702 for Applications for Payment.

D. 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 for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
   3. Include amounts of Change Orders completely executed before last day of construction period covered by application.
   4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
   1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
   2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
   3. Provide summary documentation for stored materials indicating the following:
      a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
      b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
      c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit **three (3)** signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours.
   1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. 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.
   2. Schedule of values.
   3. Contractor's construction schedule (preliminary if not final).
   4. Products list (preliminary if not final).
   5. Schedule of unit prices.

6. Submittal schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
9. Copies of building permits.
10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
11. Initial progress report.
12. Report of preconstruction conference.

H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, 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 Certificate(s) of Substantial Completion issued for Owner occupancy of designated portions of the Work.

I. Final Payment Application: After completing Project closeout requirements, 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. Punch List
5. AIA Document G704, "Certificate of Substantial Completion."
6. Clear Lien Certificate
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 3100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General coordination procedures.
   2. Coordination drawings.
   3. Requests for Information (RFIs).
   4. Project meetings.

1.3 DEFINITIONS

A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
   1. Name, address, and telephone number of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
   1. Post copies of list in in temporary field office or in life safety binder and by each temporary telephone. Always keep list current.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

B. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
   1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
   a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
   b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
   c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
   d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
   e. Indicate required installation sequences.
   f. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations shall not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
   a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
   b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
   c. Fire-rated enclosures around ductwork.
7. Electrical Work: Show the following:
   a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
   b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
   c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
   d. Location of pull boxes and junction boxes, dimensioned from column center lines.
8. Fire-Protection System: Show the following:
   a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.

2. File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.
3. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
    a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
    b. Contractor shall execute a data licensing agreement in the form of the Architect's In-house Digital Data Licensing Agreement.

1.7 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form that can be found in Section 00 63 13 – Request for Information Form.
1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
3. Submit RFI electronically via email to jack@kingarchitects.net or to electronic project management software/site acceptable to Architect specifically established for Project.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Found in Section 00 63 13 – Request for Information form.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.
2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.8 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting shall record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 7 days before commencement of construction.
1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Attendance is mandatory for authorized representatives of the Owner, Architect, and their appropriate consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:
a. Tentative construction schedule.
b. Phasing.
c. Critical work sequencing and long-lead items.
d. Designation of key personnel and their duties.
e. Lines of communications.
f. Procedures for processing field decisions and Change Orders.
g. Procedures for RFIs.
h. Quality control plan.
i. Procedures for testing and inspecting.
j. Procedures for processing Applications for Payment.
k. Distribution of the Contract Documents.
l. Submittal procedures.
m. Sustainable design requirements.
n. Preparation of record documents.
o. Site logistics plan.
p. Use of the premises.
q. Work restrictions.
r. Working hours.
s. Owner's occupancy requirements.
t. Responsibility for temporary facilities and controls.
u. Procedures for moisture and mold control.
v. Procedures for disruptions and shutdowns.
w. Construction waste management and recycling.
x. Parking availability.
y. Office, work, and storage areas.
z. Equipment deliveries and priorities.
aa. Site-specific safety plan.
bb. First aid.
cc. Security.
dd. Progress cleaning.
4. Minutes: Entity responsible for conducting meeting shall record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Submit proposed dates of preinstallation conferences for Owner's approval.
2. Submit a list of planned preinstallation conferences and list Work to be discussed by relevant specification section(s) to Owner and Architect.
3. Attendees: 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.
4. Advise Owner and Architect of scheduled meeting dates at least 7 days in advance.
5. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
   a. Contract Documents.
   b. Schedules
   c. Options.
   d. Related RFIs.
   e. Related Change Orders.
   f. Purchases.
   g. Deliveries.
   h. Submittals.
   i. Sustainable design requirements.
   j. Review of mockups.
   k. Coordination with other work
   l. Possible conflicts.
   m. Compatibility requirements.
   n. Weather limitations.
   o. Manufacturer's written instructions.
   p. Warranty requirements.
   q. Compatibility of materials.
   r. Acceptability of substrates.
   s. Temporary facilities and controls.
   t. Space and access limitations.
   u. Regulations of authorities having jurisdiction.
   v. Testing and inspecting requirements.
   w. Installation procedures.
   x. Required performance results.
   y. Protection of adjacent work.
   z. Protection of construction and personnel.
6. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
7. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
8. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Owner, Architect, Contractor Meetings: Conduct Owner, Architect, Contractor meetings at regular intervals.
1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous Owner, Architect, Contractor meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction 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.
      1) Review schedule for next period.
   b. Review present and future needs of each entity present, including the following:
      1) Interface requirements.

2) Sequence of operations.
3) Status of submittals.
4) Status of sustainable design documentation.
5) Deliveries.
6) Off-site fabrication.
7) Access.
8) Site utilization.
9) Temporary facilities and controls.
10) Progress cleaning.
11) Quality and work standards.
12) Status of correction of deficient items.
13) Field observations.
14) Status of RFIs.
15) Status of proposal requests.
16) Pending changes.
17) Status of Change Orders.
18) Pending claims and disputes.
19) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting shall record and distribute the meeting minutes to each party present and to parties requiring information.
   a. Schedule Updating: Revise Contractor's construction schedule after each Owner, Architect, Contractor meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 16 – CONSTRUCTION SCHEDULING

PART 1 – GENERAL

1.01 OVERVIEW

It is expressly understood and agreed by the Contractor that the rate of progress and the time of completion of the Work is of the essence for this Contract. The contractor shall execute the Work with such progress as required to prevent delay to Contract and to other contractors working on other contracts at Site.

The section includes preparation and submittal of Baseline Schedule, maintenance schedule during the execution of the Work, preparation and submittal of monthly schedule updates, and preparation and submittal of final As Delivered Schedule.

Baseline Schedule shall conform to time provisions specified in Contract Documents and to requirements of other specified work sequence constraints set forth in the Contract Documents. The contractor shall demonstrate its intent to safely execute the Work by preparing and submitting the Baseline Schedule and monthly schedule updates.

Develop Baseline Schedule to a reasonable level of detail and follow work breakdown structure and execution strategy correlating to the Schedule of Values (SOV). Maintain schedule according to instructions and requirements set forth in this Specification. Upon completion of the Work, the Contractor shall prepare and submit a final As Delivered Schedule.

1.02 PURPOSE

This Specification sets forth requirements and procedures for Baseline Schedule and related reports:

A. Purpose of Baseline Schedule is to allow Contractor to prepare an orderly plan of execution with logically sequenced activities to successfully accomplish timely completion of Project and to identify, via Critical Path Method, which chain of activities drives completion dateof Project.

B. Purpose of schedule and related reports is to:
   1. Ensure adequate planning and timely execution of the Work.
   2. Establish a Baseline Schedule to which subsequent monthly schedule updates shall be compared to determine overall progress and performance towards satisfactory completion of the Contract.
   3. Identify interdependencies and facilitate coordination of Contractor's work with others as needed.
   4. Assist the Architect and Owner Representative in monitoring progress.
   5. Evaluate proposed changes to the Contract and subsequent impacts to the schedule.
   6. Effectively determine impacts of time extensions and Change Order costs to overall Project completion.
   7. Identify and mitigate risks early in the Project's lifecycle and during each period of progress.

1.03 DEFINITIONS

The following definitions apply to this Specification:

A. Baseline Schedule: Accepted schedule for Contract, demonstrating planned activities, activity sequencing, and activity durations.

B. Project Critical Path: One or more continuous sequences of activities (Critical path shall not pass solely through any lag relationships) with zero total float, spanning a portion of, or entire remaining duration of Project, which ends at Project completion milestone and delineates remaining duration of Project.

C. Critical Path Method (CPM): Schedule development technique that starts with a network of work activities logically sequenced from beginning to end according to their interdependencies, followed by time-driven forward and backward pass calculation to establish Critical Path and Total Float.

D. Early Finish: Earliest a schedule activity is planned to finish based on its logical relationship to other activities in Project.

E. Early Start: Earliest a schedule activity is planned to start based on its logical relationship to other activities in Project.

F. Fragnet (Methodology): A template building utility that can be used to model work outside of a project and then plugged into the Project's logic network.

G. Free Float: Amount of time an activity can be delayed before it affects other activities in the schedule.

H. Late Finish: Latest a schedule activity can finish based on its logical relationship to other activities on Project and still permits the Project to be completed on time.

I. Late Start: Latest a schedule activity can start based on its logical relationship to other activities onProject and still permits the Project to be completed on time.

J. Milestone: A significant event that is important for timely completion of the Project. Milestones occur at a particular point in time. Milestones have no duration and do not contain work, cost loading, or resource loading.

K. Original Duration: Amount of time an activity was expected to take to complete at beginning of Project as shown on Baseline Schedule in calendar days or workdays depending upon software calendar assigned to a given task.

L. Recovery Schedule: When the Project is not meeting its planned goals and becomes necessary to re-arrange the remaining work to represent the Work more accurately and how the work will be performed. The method indicates how the Project will either get back on track to finish on time, or to depict a new project finish date.

M. Task: Element of the Work Breakdown Structure (WBS) that may represent a work package,assembly, sub-assembly, component, phase, or deliverable.

N. Time Impact Analysis: Analytical process of adding a Fragnet or similar method of adding activities within a Project's existing set of activities in a CPM schedule network with corresponding appropriate logical relationship ties to be used as an analytical tool to effectively assess the impact that a given event, series of events, or delay has had on a Project's critical path.

O. Total Float: Amount of time a given activity or path of activities may be delayed before it will affect the Project's completion date. Total Float is calculated as the difference between early and late dates.

P. Work Activity: Activity that requires time and resources to complete and shall be performed before the Contract is considered complete. Activities are the detailed steps necessary to complete or deliver a Task.

Q. Work Breakdown Structure (WBS): Hierarchical structure that decomposes and subdivides, into smaller and more manageable pieces, the Work required to deliver the scope of a Contract. Each descending level of the WBS represents an increasing level of detail of Project work. Typically, the lowest level WBS groups the Work activities of the Contract into tasks and subtasks, which may represent work packages, assemblies, subassemblies, components, phases, and deliverables. Workactivities are assigned to WBS elements. Guidance on development can be obtained from Project Management Institute Practice Standard for Work Breakdown Structures if needed.

1.04 PROJECT SCHEDULER QUALIFICATIONS

Employ or retain services of a qualified Scheduler.

A. Project Scheduler shall meet the following minimum requirements:

1. Understanding of construction process to the extent that a logical CPM schedule can be developed, maintained, and progressed which accurately represents the scope of work to be performed.
2. Must possess knowledge of the Critical Path Method of scheduling and the ability to analyze schedules for determining reasonable durations and logical relationships.

B. Project Scheduler shall attend meetings, including monthly progress and special meetings pertaining to scheduling of the Work. The project scheduler and the Contractor's management team are expected to collaborate closely with the Architect and Owner Representative to deliver acceptable products outlined in this section.

1.05 SOFTWARE

Prepare and maintain Project's schedule according to the following requirements:

A. Use Primavera Project Management version 19.1 (P6) or Microsoft Project version 2016 or the latest version of either software at the time of award of the Contract.

B. The Architect shall approve the contractor's use of alternative software.

1.06 SUBMITTALS

A. Submit electronic schedule files in PDF format and the native file format (Primavera Project Management or Microsoft Project file Format [.xer or .mpp]) for the chosen software platform in accordance with submittal specifications as specified herein. The Architect shall approve the contractor's use of alternative software.

1.07 BASIS OF PAYMENT

The schedule shall be utilized as the relative basis for progress payments:

A. The Contractor's first payment application will be processed when the initial Baseline Schedule has been submitted and accepted by the Architect.

B. If the Baseline Schedule has been submitted but has not been accepted at the time of the first payment application, only mobilization costs will be paid by the Owner, as established in the Contract Document, and to an extent otherwise supported by the Contractor.

C. The contractor's monthly progress payment applications shall not be accepted for payment without monthly schedule updates submitted in time and manner required by this specification and is accepted by the Architect.

D. Failure to maintain the schedule in an accepted status may result in the Owner withholding payment until the schedule is accepted.

PART 2 – PRODUCTS *not used*

PART 3 – EXECUTION

3.01 BASELINE SCHEDULE

A. Upon receipt of the Notice to Proceed, prepare and submit the Baseline Schedule for the Work included under the scope of Contract. Submittal of Baseline Schedule shall comply with the following requirements:

3.02 CRITICAL PATH METHOD

A. Use the Critical Path Method (CPM) scheduling technique as the basis for preparing schedules and for monitoring job progress.
B. Provide information concerning sequencing, logic, and duration of activities as well as providing the CPM logic network diagram and tabular schedule data.

3.03 INITIAL BASELINE SCHEDULE

A. Submit Initial Baseline Schedule in accordance with requirements of this section and Section 01 33 00, Submittals, ten (10) days before Preconstruction Conference.

B. Architect will schedule and conduct a Preconstruction Scheduling Meeting to initiate the development of the required Baseline Schedule. At the meeting, requirements will be reviewed with the Contractor. The Contractor shall present the proposed methodology utilized for the development of the Baseline Schedule, including the proposed methodology for sequencing, or segregating the work. Baseline Schedule shall comply with requirements set forth in these Specifications and in the rest of the Contract Documents.

C. Within ten (10) days after Notice to Proceed, submit Final Baseline Schedule. Submittal shall be accompanied by a narrative report describing general project execution strategy, perceived risks, and identification of coordination efforts with the Architect or third parties required to effectively deliver the Project on time.

D. Architect will accept or reject the Baseline Schedule within ten (10) days after receipt of the required information. If the Baseline Schedule is not accepted, Architect will provide comments to the Contractor stating reasons why the submission was not accepted.

E. Following receipt of the Architect's review comments, the Contractor shall correct the Baseline schedule to identify missing activities and relationships relevant to the scope of work; resubmit the Baseline Schedule within seven (7) days. Time extensions will not be granted to complete this process.

F. Comments made by Architect during review shall not relieve Contractor from compliance with requirements of the Contract Documents.

G. To the extent that there are any conflicts between the accepted Baseline Schedule and requirements of the Contract Documents, the Contract Documents shall prevail.

H. Once Baseline Schedule is accepted it becomes the schedule of record and basis for future schedule updates and performance metrics calculations. After acceptance of the Baseline Schedule, no changes shall be made therein without the approval of the Architect.

3.04 BASELINE SCHEDULE REQUIREMENTS

A. General Requirements:
1. Use software as prescribed within Section 1.05.
2. Do not use mandatory constraints in development and avoid, or minimize, use of other types of constraints within the schedule.
3. Demonstrate the final level of detail for each activity; include required relationships anddurations of each activity based on work quantities and planned resources to accomplish the Work.
4. Contain no changes or delays which may have been incurred during the Initial Baseline Schedule development period. At first schedule update after Baseline Schedule has been accepted, include changes which have been approved via Change Order.
5. Data date shall be Notice to Proceed date.
6. Indicate the longest critical path of activities from Notice to Proceed to the Contract completion date. The contractor shall provide a narrative defining the critical path and potential schedule risks to activity along the critical path.

B. Subcontractor Work:
   1. Collect information from Subcontractors, suppliers, and equipment manufacturers forincorporation into the Baseline Schedule, including the estimated durations for each separable work activity and material lead times.
   2. Coordinate with major lower-tier Subcontractors and with the Architect representative to comply with scheduling requirements.
   3. Major lower-tier Subcontractors shall provide schedule requirements specified herein to Contractor so that Contractor can prepare a fully coordinated Baseline Schedule.
   4. Submit certification that accepted Baseline Schedule has been reviewed and discussed with Subcontractors, Suppliers, and vendors as it relates to their work prior to commencement of their work.

C. Work Breakdown Structure:
   1. Develop the Baseline Schedule within a single project in Primavera P6 or Microsoft Project. The Project schedule shall only contain WBS elements that correspond to the scope of this Contract.
   2. The first level WBS node shall represent the appropriate lifecycle phase of the Project, such as Design, Procurement, or Construction.
   3. Other levels of the WBS below the first level may be used to group the Work in a logical way that represents lower-level phases, locations, deliverables, work packages, components, assemblies, or other scope elements.

D. Milestones:
   1. Milestone dates are defined in calendar days following the date set forth in Notice to Proceed or listed in the Contract Documents.
   2. Include as a minimum the following:
      a. Notice to Proceed
      b. Critical Submittals / Procurement
      c. Construction Start
      d. Substantial Completion
      e. Final Completion
      f. Specified Contract Milestones as identified in Contract Documents

E. Project Duration and Scheduled Project Completion
   1. Show sequence and interdependence of activities required for the complete performance of the Work, beginning with the date specified in Notice to Proceed and concluding with the date of Final Completion of the Contract:
      a. The schedule duration from the early start to late finish for a subphase, phase, or entire Project shall not exceed the Contract times specified.
      b. Lag durations shall not have a negative value unless specifically approved by the Architect.
      c. Project float, total float, slack time, or time contingency within schedule (i.e., the difference in time between projected early completion date and required Contractcompletion date), and free float or critical path float within the overall schedule is not for the exclusive use of Owner or Contractor but is jointly owned and is an expiring resource available to and shared by both as needed to meet Contract milestones and the Contract completion date.
   2. Comply with limits imposed by the scope of Work, with contractually specifiedintermediate milestones and completion dates, and with constraints, restraints, or sequences included in Contract Documents.

F. Project Calendar:
   1. Defined within schedule and accurately reflect the work plan.
   2. Each activity within the schedule shall possess an assigned calendar.
   3. Weather conditions shall be anticipated and planned.
   4. If work crews are to work a schedule different from the rest of the Project, then a separate calendar shall be defined for that work crew and the Work shall be scheduled utilizing that specific calendar.

5. Use of, or requirement for, special work schedules or calendars shall be communicated to Architect in Narrative Report as part of Baseline Schedule submission.

G. Activity Duration and Level of Detail:
1. Schedule shall include an appropriate level of detail. Failure to develop or update the Schedule shall result in nonacceptance of the Schedule.
2. The Work activities shall be of sufficient detail to ensure adequate planning and execution of the Work and provide a basis for forecasting, monitoring, and evaluating the progress of the Work.
3. Work activities shall conform to the following requirements:
   a. Describe Work activities using consistent terminology such that the Work is readily identifiable for assessment of completion. Activity descriptions shall be stand-alone and not rely on WBS or activity codes for identification.
   b. One day shall be the smallest time unit shown unless otherwise directed by Architect.
   c. Subdivide the Work into activities of duration no longer than twenty (20) working days, except as to non-construction activities (such as procurement of materials, delivery of materials, and delivery of equipment) and any other activities for which Architect may approve a longer duration.
   d. Activity descriptions shall be written in English, start with a verb, clearly describe the Work to be performed, and be used in a consistent manner throughout the Schedule.
4. Activity durations shall be appropriate for the Work to be performed by crew size and major equipment assigned to the tasks.

H. Procurement Activities and Submittals:
1. Prepare in chronological order of submittals. Show Specification section of submittal and submittal name. Include activities to cover the procurement process such as submittal preparation, review, approval, procurement, fabrication, delivery, permits, and similar preconstruction work. Submittal timeframes shall not be on the critical path, and sufficient time shall be included in the Schedule to allow for resubmittal if necessary.
2. Activity ID numbers for submittals shall be coded to clearly identify each submittal number. Submittals shall be appropriately tied in the logic of the Schedule. Resubmittalsshall be coded with the same Activity ID number as originally submitted submittal with the addition of one additional alpha character starting with the letter “A” and progressing subsequent letters for each resubmittal of the same submittal until approved to make each Activity ID unique.
3. Resubmitted submittals shall be logically tied to appropriate Activities in the network logic model.

I. Work Areas:
1. Code activities to show each major area of construction.
2. Activities shall not be allowed to span more than one work area.

J. Other Baseline Schedule Requirements:
1. Include the following items as appropriate to this Contract:
   a. Purchases, submittals, submittal reviews, fabrication, deliveries, manufacturer factory tests, field tests, readiness tests, and installation activities for materials and equipment for which Contractor intends to seek payment, including stored materials.
   b. Delivery, installation, check out/testing, and startup of Owner furnished equipment and materials in accordance with Schedule dates set forth in the Specifications or furnished by the Architect.
   c. Approvals required by regulatory agencies or other third parties.
   d. Connection to existing systems and equipment.
   e. Temporary utilities and construction.
   f. Interruption and shut down requests of facilities or utilities to allow for new connections.
   g. Start up, testing, training, and assistance required under Contract Documents.
   h. Contractor activities that will be coordinated with the Owner or Architect through ongoing activities.
   i. Contractor obtained permits.

j. Preparation of coordination and layout drawings.
k. Punchlists.
l. Final cleanup.
m. Monthly updating of Record Drawings and final submittal of as-built drawings atproject completion, or as directed by Architect.
n. Required inspections by Architect.
o. Other specific information required by Architect.

3.05 BASELINE SCHEDULE SUBMITTAL

Submit Baseline Schedule according to the following requirements:

A. Baseline Schedule Narrative Report:
1. Include the following information:
a. Transmittal letter.
b. Description of critical path as well as near critical paths with a total float of less than ten (10) days.
c. Listing of each Contract milestone showing its planned completion date.
d. Proposed number of working days per week for each calendar assigned within the Baseline Schedule.
e. Planned holidays to be observed during the life of the Contract (by day, month, and year).
f. Planned number of shifts per day.
g. Number of hours per shift.
h. Planned versus actual equipment productivity where applicable.
2. Failure to include this information will delay review of the Schedule until Architect is in receipt of sufficient detail to validate the intent.

B. Baseline Schedule Network Diagram:
1. Depict schedule network diagram in Gantt chart format, showing schedule activities grouped according to the WBS and sorted by start date. The diagram shall show activity relationships and be formatted for tabloid-size paper (11” x 17”).

C. Baseline Schedule
1. In accordance with Baseline Schedule Requirements.
2. Submit in XER or MPP format as well as PDF format; include transmittal letter, Baseline Schedule Narrative Report, and Baseline Schedule Network Diagram.

D. Accepted Baseline Schedule
1. Basis for progress and performance measurement. No changes shall be allowed to the accepted Baseline Schedule.

3.06 MONTHLY SCHEDULE UPDATES

Once the Baseline Schedule is accepted, prepare, and submit a Monthly Schedule Update in compliance with the following requirements:

A. Process for submittal of monthly schedule update:
1. Prepare and submit with accurate information on logic, status, physical percent complete, percent complete, actual start and finish dates, remaining duration changes, and related reports, diagrams, and schedules based on periodic progress payment cycle.
2. On date provided by Architect, meet with Architect to review monthly schedule update. The contractor and Architect will review the updated schedule and discuss the content of the Narrative Report.
3. Allow Architect seven (7) days after meeting to review and accept or reject schedule updates.

4. Rejected schedule updates shall be resubmitted to Architect within seven (7) days. Requestedchanges shall be included in resubmittal. Submittal of Monthly Schedule Update to Architect shall be a condition precedent to making of payments, which are due or may becomedue under terms of the Contract.
5. Subsequent Monthly Schedule Updates shall be compared to the accepted Baseline Schedule. In addition, each current monthly update shall be compared to last month's update. Each update shall be labeled by a period with a data date.

B. Monthly schedule update requirements:
Update schedule every month with accurate progress and status information. Updateaccording to the following requirements:
1. Updated Schedule Data Date
   a. Accurately portray the Work performed as of the last day of the month, which will be considered the monthly schedule update cutoff date unless otherwise specified by the Architect.
   b. Change Project's data date to correspond to Monthly Schedule Update cutoff date.
2. Updating Progress and Status Information
   a. Cutoff date to accurately reflect the Work performed during the month.
   b. Actual start and finish dates for activities that started or finished during the month.
   c. Activity remaining duration shall accurately reflect the time required to complete each activity.
3. Default Progress Data and Retroactive Changes Disallowed
   a. Default progress data provided from the scheduling system shall not be allowed.
   b. Actual start and finish dates shall not be automatically updated by default mechanisms that may be included in scheduling software.
   c. Ensure software settings prevent percent complete and remaining duration from being related so that Contractor evaluates activity remaining duration at each Monthly Schedule Update without affecting progress measurement.
   d. Do not retroactively change progress data provided on previous Monthly ScheduleUpdates including, but not limited to, actual start and finish dates, and percent complete.
4. Conditions Relating to Float
   a. Extensions of time for the performance required under Contract Documents pertaining to equitable time adjustment will be granted only to extent that equitable time adjustment exceeds total float in the activity or path of activities affected at time approval was issued for the change.
   b. Pursuant to float sharing requirements of the Contract, use of float suppression techniques such as preferential sequencing, special lead/lag logic restraints, extended activity times, or imposed dates shall be cause for rejection of schedule and revisions or updates.
   c. Owner initiated changes that extend or shorten Contract Times shall be the sole basis to adjust the Contract completion date. Delays in the critical path not associated with proper requests for time extensions in accordance with General Conditions and General Requirements shall be deemed to be the responsibility of the Contractor.
   d. Delays to early completion date shall be non-compensable and considered Project Float.
5. Out of Sequence Progress
   a. Defined as activities that have reported progress without predecessor activities being completed. Or in the case of Start-to-Start relationships, where predecessor activities have not begun.
   b. A written explanation of each out-of-sequence activity shall be described in the monthly Narrative Report update. The architect may direct changes in schedule logic be made to correct significant out-of-sequence Work.
6. Approval of Changes
   a. Execute the Work in accordance with the accepted Baseline Schedule.
   b. Only schedule changes that have been previously accepted by Architect through a Change Order shall be included in the Monthly Schedule Update. Narrative Report shall specifically reference on activity-by-activity basis changes made since previous period and relate each change to accepted Change Order.

c. Upon approval of change order request or issuance of a unilateral change order by Architect the agreed upon Change Order activities, activity duration, logic, and impacts shall be reflected in the next Monthly Schedule Update and in subsequent schedule updates.

d. No change to accepted activities, original activity durations, logic, interdependencies, resource loading of the Baseline Schedule shall be made without prior notification to and acceptance from the Architect.

e. If Contractor desires to make a change to accepted Baseline Schedule, request permission from Architect in writing stating reasons for change as well as specifics, such as the proposed changes in activities, original activity durations, logic, interdependencies, milestones, the planned sequence of operations of Baseline Schedule.

f. Architect will respond within seven (7) days after receipt of the request.

g. If Architect considers Baseline Schedule change requested to be a major change, Contractor may be required to submit a revised Baseline Schedule for acceptance, without additional cost to Owner, including reports deemed necessary by Architect to show the probable effect of change on Project.

h. Submit proposed schedule revision and required reports within seven (7) days after Architect notifies Contractor that requested revision is a major change.

i. Change shall be considered of a major nature if time estimated for activity or sequence of activities is varied from the original plan to the degree there is reasonabledoubt that Contract milestones will be met, or if the change impacts the Work of other lower-tier Subcontractors at Site.

j. Only upon acceptance of the requested change by the Architect shall it be reflected in the next scheduled update.

k. Changes to activities having adequate float shall be considered as minor changes, except that an accumulation of minor changes may be considered a major change when such changes affect the Contract Completion date or milestones.

l. Activity that is added or modified by Change Order shall be identified by Change Order code that changed the activity. Activities shall not belong to more than one Change Order. Scope introduced through change orders shall remain independent from the base contract scope.

m. Change order requests and Requests for Information shall reference which schedule activity they potentially impact to properly assess time impacts. A time impact analysis shall be required if requested by Architect.

7. Delays and Recovery

a. If the Architect determines the Contractor is not maintaining anticipated planned progress, the Architect may require a Recovery Schedule from the Contractor.

b. Failure to deliver an acceptable Recovery Schedule to the Architect within seven (7) days of written notification may result in Owner withholding progress payments until an acceptable Recovery Schedule is delivered.

c. Recovery Schedule is defined as a revised plan of execution supported by a revised schedule, workforce/staffing plan, project calendar, workweek requirements, andgraphic analysis that are required to recover from current deficient progress or schedule deficit.

d. Whenever it becomes apparent from the Monthly Schedule Update that milestones will not be met, take any or all the following actions:

1) Increase construction workforce in such quantities and crafts as shall eliminate the backlog of the Work.

2) Increase number of working hours per shift, shifts per day, workdays per week, or amount of construction equipment, or combination of foregoing sufficiently to eliminate Work backlog.

3) Reschedule work activities that were scheduled sequentially so that they occur in parallel.

e. Under no circumstances shall addition of equipment or construction forces, increasing working hours, or other methods, manner, or procedures shall be considered cause for Contract Modification or treated as acceleration.

f. Requests for contract timeline extensions due to adverse conditions, delays, events outside the control of Contractor, or for other reason shall be submitted within same pay period in which purported impact was incurred unless otherwisedirected by Architect.

3.07 MONTHLY SCHEDULE UPDATE SUBMITTAL

According to the following requirements:

A. Schedule Update Narrative Report:
1. Include the following:
a. Transmittal letter.
b. Listing of each activity on the schedule that was completed or in progress during the reporting period, as well as a list of activities scheduled for next reporting period.
c. Analysis, by critical path, of each negative path describing nature of critical path, its impact on other activities, milestones, and completion dates; and recommendations for recovery of delay.
d. Current and anticipated delays, including cause of delay, corrective action and schedule adjustments to correct delay, and impact of delay on other activities, milestones, and completion dates.
e. Description of significant changes in construction sequence, logic changes,relationship changes, or duration changes, and rationale associated with each change.
f. List of pending issues and their status including, but not limited to, permits, contract modifications, time extension requests, and long lead procurement items.
g. Listing of each Contract milestone showing its planned completion date according to the Baseline Schedule, its current planned completion date, and its status.

B. Updated Schedule Network Diagram
1. Depict the entire schedule network diagram in Gantt chart format, showing schedule activities grouped according to the WBS and sorted by start date. The diagram shall show activity relationships formatted for tabloid-size paper (11” x 17”).

C. Monthly Updated Schedule
1. In accordance with the section, Monthly Schedule Update Requirements.
2. Submit in XER or MPP format as well as PDF format; include transmittal letter, Monthly Update Schedule Narrative Report, Baseline Schedule Network.

3.08 SUBMITTAL OF FINAL AS DELIVERED SCHEDULE

A. As a condition precedent to release of retainage, the last update to schedule submitted shall be identified as the As-Delivered Schedule.

B. Reflect the manner in which Project was actually delivered, including start and finish dates.

C. Architect will have fourteen (14) days to accept or reject the As-Delivered Schedule. Schedule rejection will be accompanied by instructions on corrective action required for resubmittal.

END OF SECTION 01 32 16

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART ONE – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.03 GENERAL

A. General Provisions:
1. Provisions in this section are mandatory procedures for review, approval and submitting samples, shop drawings and product data in accordance with the General Conditions.
2. **Submittals which are received directly from sources other than through the General Contractor's office will be returned to the General Contractor "without action"**.
3. Job delays occasioned by requirement of re-submission of samples, shop drawings and product data not in accord with Contract Documents and/or submittals sequenced contrary to the agreed schedule are Contractor's responsibility and will not be considered valid justification for extension of contract time or increase in the contract sum.
4. **All submittals shall be electronic where possible**.

1.04 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. Submittals: General term including samples, shop drawings and product data, as applicable and as defined by the General Conditions.

D. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

E. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.05 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.

2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
   a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
   a. Scheduled date for first submittal.
   b. Specification Section number and title.
   c. Submittal category: Action; informational.
   d. Name of subcontractor.
   e. Description of the Work covered.
   f. Scheduled date for Architect's final release or approval.
   g. Scheduled date of fabrication.

1.06 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
   1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings via email for use in preparing Shop Drawings and Project record drawings.
      a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
      b. Digital Drawing Software Program: The Contract Drawings are available in .DWG format.
      c. Contractor shall execute a data licensing agreement in the form of the Architect's In-house Digital Data Licensing Agreement.
      d. The following digital data files will be furnished for each appropriate discipline:
         1) Floor plans.
         2) Reflected ceiling plans.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
   3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
   4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
      a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
   1. Initial Review: Allow **15** days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
   2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
   3. Resubmittal Review: Allow **15** days for review of each resubmittal.
   4. Consultant Review: Where the Contract Documents indicate that submittals may be transmitted to Architect's consultants via the Architect **ONLY (All submittals must be sent to the Architect; the Architect will in turn distribute to the consultant),** allow **15** days for review of each submittal. Submittal will be returned to Architect before being returned to the Contractor.

D. Paper Submittals: NOT ALLOWED.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into **one single** indexed PDF file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
   a. **File name shall use KAI project identifier and three-digit sequential number followed by a decimal point and then the Specification number (e.g., 2012-001.061000).**
      1) **Resubmittals shall include the letter "R" followed by the resubmittal number after another decimal point (e.g., 2012-001.061000.R1).**
      2) **Color samples of a given section shall include the letter "C" followed by the submittal number after another decimal point (e.g., 2012-001.061000.C1).**
3. Provide means for insertion to permanently record Contractor's review and approval markings.
4. Transmittal Form for Electronic Submittals: **Transmit each submittal using a PDF version of the transmittal form located in these specifications (Section 00 62 11),** containing the following filled in information**.**
   a. Project name.
   b. Date.
   c. Submittal Number, as described above.
   d. Name and address of Architect.
   e. Name of Contractor.
   f. Name of firm or entity that prepared submittal.
   g. Names of subcontractor.
   h. Category and type of submittal.
   i. Submittal purpose and description.
   j. Specification Section number and title.
   k. Drawing number and detail references, as appropriate.
   l. Location(s) where product is to be installed, as appropriate.
   m. Related physical samples submitted directly.
   n. Indication of full or partial submittal.
   o. Submittal and transmittal distribution record.
   p. Other necessary identification.
   q. Remarks

F. Options: Identify options requiring selection by Architect.

G. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
   1. Note date and content of previous submittal.
   2. Note date and content of revision in label or title block and clearly indicate extent of revision.
   3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 – PROCEDURES

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Post/submit electronic submittals as PDF electronic files via email to jack@kingarchitects.net or to electronic project management software/site acceptable to Architect specifically established for Project.
   a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
2. Action Submittals: Submit one electronic copy of each submittal unless otherwise indicated. Architect will return one copy.
3. Informational Submittals: Submit one electronic copy of each submittal unless otherwise indicated. Architect will not return copies.
4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
   a. Manufacturer's catalog cuts.
   b. Manufacturer's product specifications.
   c. Standard color charts.
   d. Statement of compliance with specified referenced standards.
   e. Testing by recognized testing agency.
   f. Application of testing agency labels and seals.
   g. Notation of coordination requirements.
   h. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
   a. Wiring diagrams showing factory-installed wiring.
   b. Printed performance curves.
   c. Operational range diagrams.
   d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:
   a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
   f. Relationship and attachment to adjoining construction clearly indicated.
   g. Seal and signature of professional engineer, if specified.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than 24 by 36 inches (610 by 915 mm).
3. Submit Shop Drawings in the following format:
   a. PDF electronic file.

1) If it is impracticable to submit a Shop Drawing in PDF format, paper format may be allowed. Submit three opaque copies of each submittal. Architect will retain one copy; remainder will be returned.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:
   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of applicable Specification Section.
3. Provide corresponding electronic submittal of Sample transmittal via email to jack@kingarchitects.net or to electronic project management software/site acceptable to Architect specifically established for Project, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured, and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
   a. Number of Samples: Submit **three (3)** sets of Samples. Architect will retain one Sample set; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
      1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Coordination Drawing Submittals: Comply with requirements specified in Section 01 31 00 "Project Management and Coordination."

F. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01 29 00 "Payment Procedures."

G. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 40 00 "Quality Requirements."

H. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01 77 00 "Closeout Procedures."

I. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

J. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

K. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

L. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

M. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

N. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

O. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

P. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

Q. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

R. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

S. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

T. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

U. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.02 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file of certificate, signed, and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 – EXECUTION

3.01 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01 77 00 "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.02 ARCHITECT'S ACTION

A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, or the action may be recorded in a separate transmittal.

B. Informational Submittals: Architect will review each submittal and will not return it or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals or submittals not following these guidelines are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 01 33 00

SECTION 01 41 26 – PERMIT REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Each project has varying requirements for permits, inspections, and fees based on scope, size, and location of the project.

B. The Owner is subject to all permits, inspections and associated fees for construction, demolition, utility connection, storm water management, and other similar requirements that may be required to complete the scope of work associated with these Contract Documents.

C. The General Contractor (GC) shall be responsible for obtaining all permits, inspections and paying for all associated fees unless specifically identified within this specification.

1.02 REFERENCES

A. The following references are not intended to be inclusive. It shall be the GC's responsibility to determine all requirements based on the scope of work in the Contract Documents.

B. Review all ordinances that may require a permit or fee that may related to a required permit. Contact the following agencies to determine that exact requirements during bidding:
1. Building Inspection
2. Zoning
3. Engineering
4. Water Utility
5. Traffic Engineering
6. Others as may be specified by the Contract Documents.

C. State Statues

D. Other Regulatory Regulations

E. Other agencies or companies that may have related requirements:
1. Sewage company
2. Local gas and electric utility companies
3. Other utility companies

1.03 GENERAL CONTRACTOR'S REQUIREMENTS

A. The GC shall be responsible for all the following:
1. Execute application for all required permits as may be required by the scope of work described within the Contract Documents.
2. Paying all fees associated with the application of any required permits. Exception: fees required for all permits issued by Owner agencies will be paid by internal payment by the Owner, if applicable.
3. Scheduling all required inspections that may be conditions of any required permits.

PART 2 – PRODUCTS *(not applicable)*
PART 3 – EXECUTION *(not applicable)*

END OF SECTION 01 41 26

SECTION 01 42 00 – REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," “accepted”, “approved”, "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar subsequent operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities, either exclusively or to be shared with separate Contractors, for performance of work. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

J. “Installer”: Entity *(firm or person)* engaged to install work by Contractor, Subcontractor, or Sub-subcontractor. Installers are required to be skilled and experienced in work they are engaged to install.

K. “Specification Text Format”: Underscoring facilitates scan reading, no other meaning. Imperative language is directed at Contractor, unless otherwise noted.

L. “Overlapping/Conflicting Requirements”: Most stringent (generally most costly) applies and will be enforced, unless more detailed language written directly into contract documents clearly indicates that a less stringent requirement is acceptable. Refer uncertainties to Architect/Engineer for decision before proceeding.

Where optional requirements are specified in a parallel manner, option is intended to be Contractor's unless otherwise indicated.

M. “Minimum Requirements”: Indicated requirements are for a specific minimum acceptable level of quality/quantity, as recognized in the industry. Actual work must comply within specified tolerance or may exceed minimums within reasonable limits. Refer uncertainties within reasonable limits. Refer uncertainties to Architect/ Engineer before proceeding.

N. “Abbreviations, Plural Words”: Abbreviations, where not defined in contract documents, will be interpreted to mean the normal construction industry terminology, determined by recognized grammatical rules, by the Architect/Engineer. Plural words will be interpreted as plural where applicable for context of contract documents.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents.
1. IBC 2018 / ASCE 7-16
2. IEBC 2018
3. IFC 2018
4. IPC 2021
5. IMC 2021
6. IFGC 2021
7. NFPA 101 2021

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICC	International Code Council www.iccsafe.org	(888) 422-7233
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

COE	Army Corps of Engineers www.usace.army.mil	(202) 761-0011
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce www.commerce.gov	(202) 482-2000
DOD	Department of Defense http://dodssp.daps.dla.mil	(215) 697-6257
DOE	Department of Energy www.energy.gov	(202) 586-9220

EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
FAA	Federal Aviation Administration www.faa.gov	(866) 835-5322
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	General Services Administration www.gsa.gov	(800) 488-3111
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-4000
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Buildings Service (See GSA)	
PHS	Office of Public Health and Science http://www.hhs.gov/ophs/	(202) 690-7694
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
SD	State Department www.state.gov	(202) 647-4000
TRB	Transportation Research Board http://gulliver.trb.org	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USP	U.S. Pharmacopeia www.usp.org	(800) 227-8772
USPS	Postal Service www.usps.com	(202) 268-2000
FEMA	Federal Emergency Management Agency www.fema.gov	(800)745-0243

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from U.S. Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil/	(215) 697-2664
	Available from Defense Standardization Program www.dsp.dla.mil	
	Available from General Services Administration www.gsa.gov	(202) 619-8925
	Available from National Institute of Building Sciences www.wbdg.org/ccb	(202) 289-7800
FTMS	Federal Test Method Standard (See FS)	
MIL	(See MILSPEC)	
MIL-STD	(See MILSPEC)	
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
ASCE	American Society of Civil Engineers www.asce.org	(800)548-2723
IBC	International Building Code www.codes.iccsafe.org	
IECC	International Energy Conservation Code	

www.codes.iccsafe.org

NEC National Electrical Code
www.nfpa.org

NFPA National Fire Protection Association (NFPA 101 Life Safety Code)) (800) 344-3555
www.nfpa.org

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

OSFM Office of State Fire Marshal
www.sfm.dps.louisiana.gov

LDH Louisiana Department of Health
www.ldh.la.gov

DEQ Louisiana Department of Environmental Quality
www.deq.louisiana.gov

LDI Louisiana Department of Insurance
www.ldi.state.la.gov

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 42 16 - DEFINITIONS AND STANDARDS

PART 1 - GENERAL

1.01 INDICATED: Shown on drawings by notes, graphics, or schedules, or written into other portions of contract documents. Terms such as *"shown," "noted," "scheduled,"* and *"specified"* have same meaning as "indicated" and are used to assist the reader in locating particular information.

1.02 DIRECTED, REQUESTED, APPROVED, ACCEPTED, ETC.: These terms imply *"by the Architect/Engineer",* unless otherwise indicated.

1.03 APPROVED BY ARCHITECT/ENGINEER: In no case releases Contract from responsibility to fulfill requirements of contract documents.

1.04 PROJECT SITE: Space available to Contractor at location of project, either exclusively or to be shared with separate Contractors, for performance of the work.

1.05 FURNISH: Supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar subsequent requirements.

1.06 INSTALL: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protection, cleaning, and similar requirements.

1.07 PROVIDE: Furnish and install, complete and ready for intended use.

1.08 INSTALLER: Entity *(firm or person)* engaged to install work by Contractor, Subcontractor, or Sub-subcontractor. Installers are required to be skilled and experienced in work they are engaged to install.

1.09 SPECIFICATION TEXT FORMAT: Underscoring facilitates scan reading, no other meaning. Imperative language is directed at Contractor, unless otherwise noted.

1.10 OVERLAPPING/CONFLICTING REQUIREMENTS: Most stringent *(generally most costly)* applies and will be enforced, unless more detailed language written directly into contract documents clearly indicates that a less stringent requirement is acceptable. Refer uncertainties to Architect/Engineer for decision before proceeding.

Where optional requirements are specified in a parallel manner, option is intended to be Contractor's unless otherwise indicated.

1.11 MINIMUM REQUIREMENTS: Indicated requirements are for a specific minimum acceptable level of quality/quantity, as recognized in the industry. Actual work must comply within specified tolerance, or may exceed minimums within reasonable limits. Refer uncertainties within reasonable limits. Refer uncertainties to Architect/ Engineer before proceeding.

1.12 ABBREVIATIONS, PLURAL WORDS: Abbreviations, where not defined in contract documents, will be interpreted to mean the normal construction industry terminology, determined by recognized grammatical rules, by the Architect/Engineer. Plural words will be interpreted as plural where applicable for context of contract documents.

PART 2 - PRODUCTS *(not applicable)*

PART 3 - EXECUTION *(not applicable)*

END OF SECTION 01 42 16

SECTION 01 45 00 – QUALITY CONTROL

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED:

A. General Quality Control

B. Mock-ups

C. Manufacturer's Field Services

D. Testing Laboratory

1.02 RELATED WORK

A. Requirements, abbreviations and acronyms for reference standard are defined in Division 01.

B. ASTM C945 - Test for Compressive Strength of Lightweight Insulating Concrete.

C. ASTM 329 - Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as used in construction.

1.03 QUALITY CONTROL, GENERAL

A. Maintain quality control over supplies, manufacturers, products, services, site conditions and workmanship to produce work of specified quality.

1.04 MOCK-UP

A. Erect field samples and mock-ups at project site in accordance with requirements of the applicable specification section.

1.05 MANUFACTURER'S FIELD SERVICES

A. When specified in respective specification sections, require supplier and/or manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable and to make appropriate recommendations.

PART 2 - TESTING LABORATORY

2.01 GENERAL REQUIREMENTS

A. An independent testing laboratory will be employed by Owner. Owner shall pay for laboratory services to perform specified testing.
   1. Contractor shall cooperate with the laboratory to facilitate the execution of its required services.
   2. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the work of the Contract.

2.02 QUALIFICATIONS OF LABORATORY

A. Laboratory shall meet "Recommended Requirements for Independent Laboratory Qualification", published by American Council of Independent Laboratories.

B. Laboratory shall be authorized to operate in the State of Louisiana.

2.03 LABORATORY DUTIES

A. Cooperate with Architect and Contractor. Provide qualified personnel after due notice.

B. Perform specified inspections, sampling and testing of materials and methods of construction:
   1. Comply with specified reference standards.
   2. Ascertain compliance of materials with requirements of contract documents.

C. Promptly notify Architect of observed irregularities or deficiencies of work.

D. Promptly submit four copies of written report of each test and inspection to Architect. Each report shall include:
   1. Date issued.
   2. Project title and number.
   3. Testing lab name, address and telephone number.
   4. Name and signature of laboratory inspector.
   5. Welder's identification number.
   6. Date and time of sampling or inspection.
   7. Record of temperature and weather conditions.
   8. Date of test.
   9. Identification of specification section.
   10. Location of sample or test in the project.
   11. Member tested for structural steel testing.
   12. Type of inspection or test
   13. Results of tests and compliance with contract documents.
   14. Interpretation of test results, when requested by Architect.
   15. Perform additional tests as required by Architect.

2.04 LIMITATION OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to release, revoke, alter or enlarge on requirements of contract documents.

B. Laboratory is not authorized to approve or accept any portion of the work.

C. Laboratory is not authorized to perform any duties of the Contractor.

2.05 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory personnel, provide access to the work.

B. Secure and deliver to the lab adequate quantities of representational samples of materials proposed to be used and which require testing.

C. Provide to the lab the design mix proposed to be used for concrete and other material mixes which require control by the testing laboratory.

D. Furnish incidental labor and facilities:
   1. To provide access to work to be tested.
   2. To obtain and handle samples at the project site.
   3. To facilitate inspections and tests.
   4. For storage and curing of test samples.

E. Notify laboratory 24 hours in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
   1. When test or inspections cannot be performed after such notice, Contractor shall notify the laboratory.
   2. If Contractor does not notify laboratory before laboratory personnel are scheduled for this work, Contractor shall reimburse Owner for laboratory personnel and travel expenses.

END OF SECTION 01 45 00

SECTION 01 45 13 - PROCEDURES AND CONTROLS

PART 1 - GENERAL

1.01 SUPERINTENDENT: Provide competent qualified supervision to expedite, coordinate and ensure quality in the work.

1.02 REPORTING ACCIDENTS: Prepare and submit reports of significant accidents at site and anywhere else where work is in progress. Record and document data and actions; comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury is sustained or property loss of substance is or where the event posed a significant threat of loss or personal injury.

1.03 TRADE PERSON AND WORKMANSHIP STANDARDS: Instigate and maintain procedure to ensure that persons performing work at site are skilled and knowledgeable in methods and craftsmanship needed to produce required quality levels for workmanship standards as specified and as recognized in the construction industry for applications indicated. Remove and replace other work damaged or deterioration by faulty workmanship or its replacement.

1.04 INSPECTION, TEST, AND REPORTS: Required inspection and testing services are intended to assist in determination of probable compliance of work with requirements, but do not relieve Contractor of responsibility for those compliance, or for general fulfillment or requirements of contract documents. Specified inspection and test are not intended to limit Contractor's quality control program. Afford reasonable access to agencies performing tests and inspection.

The Owner has as his option to retain qualified testing laboratory to perform sampling and testing during or after the placement of materials in order to determine the quality of the work. All tests to herein will be paid for by the Owner. All costs of testing, removal and replacement of materials which fail to meet or exceed the limits and a standard specified or referred to herein will be paid for by the Contractor.
The testing laboratory shall provide the Owner, Contractor, and Architect a copy of all test results as expediently as possible.

1.05 INSTALLER'S INSPECTION OF CONDITIONS: Require installer of each major unit of work to inspect substrate to receive work, and conditions under which work will be performed, and to report *(in writing to Contractor)* unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

1.06 MANUFACTURER'S INSTRUCTION: Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation to extent these are more explicit or more stringent than requirements indicated in contract documents.

1.07 INSPECT EACH ITEM of materials or equipment immediately prior to installation and reject damaged and defective items.

1.08 PROVIDE ATTACHMENT and connect devices and methods for securing work properly as it is installed; true to line and level, and within recognized industry tolerances if not otherwise indicated. Allow for expansions and building movements. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual-effect choices to Architect for final decision.

1.09 RECHECK MEASUREMENTS and dimensions of the work as in integral step of starting each installation.

1.10 INSTALL WORK DURING CONDITIONS of temperature, humidity, exposure, forecasted weather, and status of project completion which will ensure best possible results for each unit of work in coordination with entire work.
Isolate each unit of work from non-compatible work as required to prevent deterioration.

1.12 COORDINATE ENCLOSURE *(closing-in)* of work with required inspection and tests, so as to minimize necessity of uncovering work for that purpose.

1.13 MOUNTING HEIGHTS: Where mounting heights are not indicated, mount individual units of work at industry recognized standard mounting height choices to Architect/Engineer for final decision.

PART 2 - PRODUCTS *(not applicable)*

PART 3 - EXECUTION

3.01 STRUCTURAL WORK: Do not cut and patch structural work in a manner resulting in a reduction of load deflection ratio. Submit proposal and request and obtain Architect's/Engineer's approval before proceeding with cut and patch of structural.

3.02 OPERATION/SAFETY LIMITATIONS: Do not cut and patch operational elements and safety components in a manner resulting in a decreased performance, shortened useful or increased maintenance. Submit proposals and request and obtain Architect's approval before proceeding with cut and patch.

3.03 VISUAL/QUALITY LIMITATIONS: Do not cut and patch work exposed to view *(exterior and interior)* in a manner resulting in noticeable reduction of visual qualities and similar qualities as judged by Architect.

3.04 LIMITATIONS ON APPROVALS: Architect's/Engineer's approval to proceed with cutting and patching does not waive right to later require removal replacement of work found to be cut and patched in an unsatisfactory manner, as judged by Architect.

3.05 TEMPORARY SUPPORT AND PROTECTION: Provide adequate temporary support for work to be cut to prevent failure. Do not endanger other work. Provide adequate protection of other work during cutting and patching to prevent damage; and provide protection of the work from adverse weather exposure.

3.06 TREE AND PLANT PROTECTION: Install temporary fencing to protect vegetation from damage from construction operations. Protect tree root systems from damage.

3.07 CLEANING AND PROTECTION: During handling and installation of work at project site, clean and protect work in progress and adjoining work on a basis of perpetual maintenance. Apply suitable protective covering on newly installed work where reasonable required to ensure freedom from damage or deterioration at time of substantial completion; otherwise, clean and perform maintenance on new installed work as frequently as necessary through remainder of construction period. Adjust and lubricate operable components to ensure operation without damaging effects. To extent possible through reasonable control and protection methods, supervise performance of work in a manner and by means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure to include *(where applicable, but not by way of limitation)* static loading, dynamic loading, internal pressures, external pressures, high or low temperature, thermal shock, high or low humidity, air contamination or pollution, water, ice, solvents, chemicals, light, radiation, puncture, abrasion, heavy traffic, soiling.

END OF SECTION 01 45 13

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:
1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the General Conditions cost unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction. Per 3.3.I.1, Hoisting equipment and permanent elevators are exempted from this provision.

B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.

C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.

D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.

1.4 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

D. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
1. Locations of dust-control partitions at each phase of work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air-filtration system discharge.
4. Waste handling procedures.
5. Other dust-control measures.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the ADA.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, lockable entrances, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack and marker boards.
3. Keep in office at all times complete sets of Contract Documents and Architect reviewed submittals.
4. Drinking water and private toilet.
5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
6. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
1. Store combustible materials apart from building.
2. Provide weatherproof coverage for outdoor storage of materials and equipment needing only limited protection.
3. Shed may be open shelters or fully enclosed spaces.

2.2 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01 77 00 "Closeout Procedures".

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

D. First Aid Supplies: Comply with governing regulations.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
1. Locate facilities to limit site disturbance as specified in Section 01 10 00 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.
1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Use of building toilet, wash facilities and drinking water fixtures will not be permitted. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

H. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

I. Water Service:
1. Contractor shall provide piping, hoses, backflow preventers, valves, and other items necessary to conduct water from connection point to the construction location.
2. Contractor shall supervise use of water to prevent waste and prevent damage due to leaking and uncontrolled discharge.
3. Contractor shall provide sanitary drinking supply and paper cups for workers.

J. Lighting: Whenever natural light is inadequate and existing or new overhead lighting is not in operation, provide temporary lighting and local switching as necessary for operations under way.
1. Install and operate temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
2. Provide sufficient temporary lighting to ensure proper workmanship. Finishing work will not be permitted in areas which are not adequately lighted.
3. Provide and maintain lights and signs to prevent damage or injury. Keep safety lights burning from dusk to dawn.
4. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
5. Install lighting for Project identification sign.

K. Telephone Numbers:
1. Post a list of important telephone numbers.
a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Contractor's emergency after-hours telephone number.
e. Architect's office.
f. Engineers' offices.
g. Owner's office.
h. Principal subcontractors' field and home offices.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

C. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
1. Identification Signs: Provide Project identification signs as indicated in Specification Section 01 58 13.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
a. Provide temporary, directional signs for construction personnel and visitors.
3. Maintain and touchup signs so they are legible at all times.

F. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

G. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
1. Do not load elevators beyond their rated weight capacity.
2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.

H. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

I. Temporary Use of Permanent Stairs: Use of stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings, requirements of 2003 EPA Construction General Permit, or authorities having jurisdiction, whichever is more stringent.
1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Tree and Plant Protection: Install temporary fencing to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

G. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
1. Install a 6' tall temporary construction fence prior to beginning any work, encompassing the entire area of work from adjacent school facilities where students may be present. The fence shall be chain link (orange plastic fencing is not acceptable), free of openings or breaks, with fence posts at 8' O/C maximum. Gates are to be avoided if possible; if not they must be capable of being padlocked from school side. The fence shall be secured to withstand prevailing wind loads. The fence shall be maintained in place throughout the construction phase of the project.
a. If physical isolation from students of Work Area(s) by fencing is not attainable, Calcasieu Parish School Board badges must be obtained by Contractor prior to commencing work. For such projects, Contractor and subcontractors will be required to submit list of personnel along with a digital photo of each to Calcasieu Parish School Board (Owner) in order to create badges.

I. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

K. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
1. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
2. Protect air-handling equipment.
3. Provide walk-off mats at each entrance through temporary partition.

L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
   1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
   2. Keep interior spaces reasonably clean and protected from water damage.
   3. Periodically collect and remove waste containing cellulose or other organic matter.
   4. Discard or replace water-damaged material.
   5. Do not install material that is wet.
   6. Discard, replace, or clean stored or installed material that begins to grow mold.
   7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
   1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
   2. Use permanent HVAC system to control humidity.
   3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
      a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
      b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
      c. Remove materials that can not be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.
   1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
   2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 56 26 – TEMPORARY FENCING

1.01 TEMPORARY FENCING

Install a 6’ tall temporary construction fence prior to beginning any work., encompassing the entire area of work from adjacent school facilities where students may be present. The fence shall be chain link (orange plastic fencing is not acceptable), free of openings or breaks, with fence posts at 8’ O/C maximum. Gates are to be avoided if possible; if not they must be capable of being padlocked from school side. The fence shall be secured to withstand prevailing wind loads. The fence shall be maintained in place throughout the construction phase of the project.

If physical isolation from students of Work Area(s) by fencing is not attainable, Calcasieu Parish School Board badges must be obtained by Contractor prior to commencing work. For such projects, Contractor and subcontractors will be required to submit list of personnel along with a digital photo of each to Calcasieu Parish School Board (Owner) in order to create badges.

SECTION 01 57 19 – TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Contractor shall provide environmental controls consistent with regulatory requirements throughout the duration of the Project.

B. Full compensation for required compliance and cooperation is considered subsidiary to other items of Work, and no additional compensation will be allowed.

1.02 SUBMITTALS

A. Dust control agents other than water must be approved by Architect prior to use.

B. Plan for water control, if requested, prior to beginning any Work.

C. Stormwater quality management measures, Stormwater Management Plan (SWMP) and methods proposed by Contractor must be in conformance with all applicable permits and approved by Architect prior to installation and prior to moving onto the construction site.

1. Submit the initial phase SWMP at the preconstruction conference. Submit plans for future phases of construction a minimum of 28 days before start of that construction phase to allow review and resubmittal, if necessary.

D. Prepare schedules to implement stormwater management features, including but not limited to erosion and sediment control work, and submit for acceptance at preconstruction conference.

1. Schedules shall incorporate construction activities, haul roads, borrow pits, storage and plant sites, and the plan for disposal of waste material.
2. Work shall not start until the Architect has approved these schedules.

1.03 RELATED SECTIONS

A. The following is a list of Specifications, which may be related to this section:

1. Section 00 73 00, Supplementary Conditions
2. Section 00 73 00. Supplementary Conditions, Article 90, Permits.

PART 2 PRODUCTS – *(Not Applicable)*

PART 3 EXECUTION

3.01 DUST CONTROL

A. Contractor shall minimize dust from construction operations.

B. During the performance of the Work, whether on right-of-way provided by Owner or elsewhere, Contractor shall furnish labor, equipment, and materials to control dust at all times, including evenings, holidays, and weekends.

C. Contractor shall be liable for any damage resulting from dust originating from Contractor's operations.

3.02 HOUSEKEEPING

A. Contractor shall keep the Project neat, orderly, and in a safe condition at all times, and shall store and use equipment, tools, and materials in a manner that does not present a hazard.

B. Contractor shall provide on-site containers for collection of rubbish and construction waste and dispose of it at frequent intervals during the progress of Work, and whenever directed by Architect.

C. Contractor shall be responsible for conforming will all elements of the SWMP and other Louisiana DEQ permits, including any requirements addressing storage and disposal of potential stormwater pollutants.

3.03 DISPOSAL

A. Contractor shall legally dispose of waste materials and materials determined by Architect to be waste in an approved disposal site in a manner meeting all federal, state, local, and Project regulations.

B. Contractor shall not bury waste unless authorized by the Owner and the Architect.

C. All costs related to disposal, including but not limited to dump fees, permits, etc., will be the responsibility of Contractor.

D. Excess excavation shall become the property of Contractor (unless otherwise specified) and be legally disposed of by Contractor outside the limits of construction in an approved disposal site.

E. Excess excavated material suitable for backfill shall not be disposed of until all backfill operations are complete.

F. Contractor shall immediately inform Architect of any hazardous materials encountered during construction and legally dispose of such hazardous materials at an approved disposal site.

G. All debris shall be removed from site and/or burned in accordance with Louisiana DEQ guidelines and procedures.

3.04 WATER CONTROL

A. Periodic Flooding:

1. The Project may be subject to periodic flooding as a result of rainfall and snowmelt, reservoir or pond releases, flows from adjacent developed areas and stormwater pipes, and groundwater flows from saturated soils or other groundwater sources.

B. Until final acceptance of the Project by Owner, Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part thereof from any cause, including surface and subsurface water, whether arising from the execution or from non-execution of the Work.

C. Contractor shall rebuild, repair, restore, and make good injuries or damages to any portion of the Work because of causes beyond the control of and without the fault of negligence of Contractor, including but not restricted to high water, floods, or acts of God, of the public enemy, or of governmental authorities.

D. Contractor shall be responsible for the Project and shall take such precautions as may be necessary to construct the Project in a dry condition and provide for drainage, dewatering, and control of surface and subsurface water and shall erect any necessary temporary structures or other facilities at Contractor's expense.

E. Contractor is advised that the Work may occur in a river or drainage channel subject to intermittent and extensive runoff conditions such that, unless the construction area is properly protected, localized flooding and extensive soil erosion may occur.

F. Owner, at Owner's option, may require Contractor to update the water control plan.

G. Contractor, at Contractor's expense, shall furnish necessary equipment and materials required to control surface and subsurface water in all areas from start of Work through the completion of the Project. Applicable permits related to specific controls shall be obtained by Contractor and all associated fees shall be borne by the Contractor.

H. Contractor is responsible for furnishing; transporting; and installing all materials and equipment, well points, pumping, channelization, diversion, damming, or other means of controlling surface water, groundwater, runoff from other drainage tributaries, and pipe effluent as necessary to complete all of the Work in accordance with the Contract

Documents.

3.05 WATER QUALITY CONTROL

A. Contractor shall comply with the "Louisiana Water Quality Control Regulations", promulgated, certifications issued, and the construction requirements listed below.

1. In the event of conflicts between Federal and State water quality control laws, rules, or regulations, the more restrictive laws, rules, or regulations shall apply.

B. This Work shall consist of measures needed for the purpose of minimizing water pollution, erosion, and sedimentation during the length of the construction activity.

C. This Specification shall be followed to minimize the pollution of any watercourse, wetland, or water impoundment area.

D. Stormwater Management Plan (SWMP):

1. If a SWMP is provided in the Drawings and Specifications, it shall be used by Contractor as a guideline only. The Contractor shall be responsible for the development and implementation of the SWMP.
2. Contractor shall submit SWMP for review by Owner in accordance with the submittal requirements defined in these Specifications. Adjustments to the approved plan may be required by Owner based on actual construction operations. Changes to the plan shall only be made with the written approval of the Owner.
3. The SWMP may include measures for the control of erosion and sedimentation, and measures for stormwater quality management.
4. Contractor shall take the necessary steps to comply with the intent of Owner's SWMP guidance, if it is provided in the Drawings and Specifications, and other applicable standards, permit conditions, and regulations of appropriate agencies.

E. Contractor shall construct, operate, maintain, and remove in a safe manner temporary erosion and sediment control features described in Owner's SWMP guidance, if it is provided in the Drawings and Specifications.

F. Contractor shall conduct the Work in such a manner to prevent contamination of adjacent watercourses, wetlands, or water impoundment areas.

G. Diversion or Bypass around Erosion Control Facilities:
1. Any diversion from, or bypass of water around facilities necessary to maintain compliance with the terms and conditions contained in SWMP is prohibited except:
   a. Where unavoidable to prevent loss of life or severe property damage.
   b. Where excessive storm drainage or runoff would damage the facilities.
2. If diversion or bypass of water around the facilities occurs, Contractor shall immediately notify Owner of the occurrence.
3. Contractor, at Contractor's expense, shall repair the breached or bypassed facilities and shall be responsible for the restoration of site drainage to conform to the requirements of the approved SWMP.

H. Contractor shall provide design and implementation methods for overall site stormwater quality management to prevent contaminated surface runoff from entering the waters of the State and of erosion and sediment control measures for the purpose of correcting conditions unforeseen during the design of the Project, or for emergency situations that develop during construction.

I. Contractor shall include temporary erosion and sediment control features for construction work outside the right-of-way that is necessary for borrow pits, haul roads, and equipment and material storage sites.
1. Should the inclusion of these additional work areas cause the Project to be subject to Stormwater Discharge Permit(s), it shall be Contractor's responsibility to obtain the necessary permit(s).

J. Contractor shall continuously maintain stormwater management features from start of Work through the completion of the Project, ensuring proper functionality.

K. Contractor is responsible for the removal and storage and/or disposal of accumulated sediment.

L. Any construction waste or salvageable material, excavation excess material, fill material, construction equipment, toxins, fuels, lubricants, and other petroleum distillates shall not be stored or stockpiled within fifty (50) feet of the ordinary high water line of any watercourse, wetland, or water impoundment area or other sensitive areas as identified by the Architect.

M. Equipment servicing shall occur within Architect approved designated areas.

N. Spill prevention and containment measures as proposed by Contractor and approved by Architect shall be used at all storage sites.

3.06 NOISE CONTROL

A. Mechanical equipment shall be equipped with the best available mufflers to reduce noise.

B. Contractor shall be responsible for obtaining any necessary permits and shall limit noise to the levels established in the permit and in local jurisdiction noise control ordinances, if applicable.

C. Contractor shall perform noise level monitoring as necessary, or as requested by the Owner, to show that permitted noise levels are not exceeded.

D. During the performance of the Work, whether on right-of-way provided by Owner or elsewhere, Contractor shall furnish all the labor, equipment, and materials required to reduce the noise nuisance.

END OF SECTION 01 57 19

SECTION 01 58 13 – TEMPORARY PROJECT SIGNAGE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Official Project Identification Sign.

B. Project informational signs.

1.3 SUMARRY

A. The Contractor shall install an official Project Identification Sign at a location, constructed and with the graphic content as directed by the Architect.

B. The Project Identification Sign shall show the name of the Project, the names of the Owner, Architect, Engineers and General Contractor.

C. Project informational signs maybe required in order to direct traffic.

D. Excepting for required signage, no additional Contractor, Subcontractor, or supplier signs may be installed on the site without prior authorization. It is the intent of the Owner to not allow signs that advertise for the Architect, Contractor, Subcontractors or Suppliers.

1.4 QUALITY ASSURANCE

A. Sign Manufacturer to have experience in manufacturing signage with references on similar projects.

B. Finishes, (Vinyl): Adequate to withstand weathering, fading, and chipping for duration of construction project.

C. Excepting for required signage, no additional Contractor, Subcontractor, or supplier signs may be installed on the site without prior authorization. It is the intent of the Owner to not allow signs that advertise for the Architect, Contractor, Subcontractors or Suppliers.

1.5 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures.

B. Shop Drawing: Show content, layout, lettering styles, color choices, foundation, structure, sizes, and grades of members.

PART 2 – PRODUCTS

2.1 SIGN MATERIALS

A. Structure and Framing: New, wood, structurally adequate.

B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum ¾“ thick, standard large sixes to minimum joints.

C. Rough Hardware: Galvanized.

D. Material: As selected by Architect.

E. Background: As selected by Architect.

F. Lettering: As selected by Architect.

2.2 PROJECT IDENTIFICATION SIGN

A. One graphic sign, 4’ x 8’, in the location, constructed and with the graphic content as directed by the Architect.

B. Graphic Design, Colors, Style of Lettering: Designated by Architect.

2.3 PROJECT INFORMATIONAL SIGNS

A. Vinyl informational signs with size lettering to provide legibility at 100-foot distance.

B. Provide at field office, and directional signs to direct traffic into and within the site. Relocate as Work progress requires.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install project identifications sign within 14 days after date fixed by Notice to Proceed.

B. Erect at designated location, as directed by Architect.

C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.

D. Install sign surface plumb and level. Anchor securely.

E. Exposed surfaces of sign, supports and, framing to be treated lumber.

3.2 MAINTENANCE

A. Maintain sign and supports clean, repair deterioration and damage.

3.3 REMOVAL

A. Remove sign, framing, supports, and foundations at completion of Project and restore area.

END OF SECTION 01 58 13

SECTION 01 60 00 – PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:
1. Section 01 21 00 "Allowances" for products selected under an allowance.
2. Section 01 23 00 "Alternates" for products selected under an alternate.
3. Section 01 25 00 "Product Substitution Procedures" for requests for substitutions.
4. Section 01 42 00 "References Standards" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles. Note that no substitutions for convenience are allowed per Section 01 25 00.
1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
a. Form of Approval: As specified in Section 01 33 00 "Submittal Procedures."
b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:
1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:
   a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
4. Manufacturers:
   a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers and/or products, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
   1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Product Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. Note that substitutions for convenience are not allowed per Section 01 25 00. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
   1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
   2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
   3. Evidence that proposed product provides specified warranty.
   4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
   5. Samples, if requested.

PART 3 - EXECUTION *(Not Applicable)*

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.
9. Correction of the Work.

B. Related Requirements:
1. Section 01 10 00 "Summary" for limits on use of Project site.
2. Section 01 33 00 "Submittal Procedures" for submitting surveys.
3. Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
4. Section 02 41 19 "Selective Structure Demolition" for demolition and removal of selected portions of the building.
5. Section 07 84 13 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor.

B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

D. Certified Surveys: Submit two copies signed by land surveyor.

E. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.5 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
   a. Primary operational systems and equipment.
   b. Fire separation assemblies.
   c. Air or smoke barriers.
   d. Fire-suppression systems.
   e. Mechanical systems piping and ducts.
   f. Control systems.
   g. Communication systems.
   h. Fire-detection and -alarm systems.
   i. Conveying systems.
   j. Electrical wiring systems.
   k. Operating systems of special construction.
3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
   a. Water, moisture, or vapor barriers.
   b. Membranes and flashings.
   c. Exterior curtain-wall construction.
   d. Sprayed fire-resistive material.
   e. Equipment supports.
   f. Piping, ductwork, vessels, and equipment.
   g. Noise- and vibration-control elements and systems.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: 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, mechanical and electrical systems, and other construction affecting the Work.
   1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
   2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
   1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
   2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
   3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
   1. Description of the Work.
   2. List of detrimental conditions, including substrates.
   3. List of unacceptable installation tolerances.
   4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
   1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
   2. Establish limits on use of Project site.
   3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
   4. Inform installers of lines and levels to which they must comply.
   5. Check the location, level and plumb, of every major element as the Work progresses.
   6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
   7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect or Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect and Construction Manager before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

D. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
   a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
   b. Restore damaged pipe covering to its original condition.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
   a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
   a. Use containers intended for holding waste materials of type to be stored.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 73 29 – CUTTING AND PATCHING

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

A. Requirements for Structural work: Do not cut and patch structural work in a manner that would result in a reduction of load carrying capacity or load deflection ratio.

B. Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in manner that would result in a reduction in their capacity to perform in the manner intended.

C. Visual Requirements: Do not cut and patch work exposed on building's exterior or in its occupied spaces in a manner that would, in the architect's opinion, result in lessening the building's aesthetic qualities.

1.02 SUBMITTALS

A. Procedural Proposal for Cutting and Patching: For prior approval where cutting and patching is required, submit proposed procedures for this work well in advance of the time work will be performed and request approval to proceed from the Architect.

PART 2 - PRODUCTS

2.01 MATERIALS

General: Except as otherwise indicated or as directed by the Architect. Use materials for cutting and patching that are identical to existing materials.

PART 3 - EXECUTION

3.01 CLEANING

A. Thoroughly clean areas and spaces where work is performed or used as access to work.

END OF SECTION 01 73 29

SECTION 01 74 19 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes administrative and procedural requirements for the following:
1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:
1. Section 02 41 19 "Selective Structure Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements, and for disposition of hazardous waste.
2. Section 04 20 00 "Unit Masonry" for disposal requirements for masonry waste.
3. Section 04 43 13.13 "Stone Masonry" for disposal requirements for excess stone and stone waste.
4. Section 31 11 00 "Site Clearing and Grubbing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.03 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.04 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:
1. Demolition Waste:
a. Asphalt paving.
b. Concrete.
c. Concrete reinforcing steel.
d. Brick.
e. Concrete masonry units.
f. Wood studs.

g. Wood joists.
h. Plywood and oriented strand board.
i. Wood paneling.
j. Wood trim.
k. Structural and miscellaneous steel.
l. Rough hardware.
m. Roofing.
n. Insulation.
o. Doors and frames.
p. Door hardware.
q. Windows.
r. Glazing.
s. Metal studs.
t. Gypsum board.
u. Acoustical tile and panels.
v. Carpet.
w. Carpet pad.
x. Demountable partitions.
y. Equipment.
z. Cabinets.
aa. Plumbing fixtures.
bb. Piping.
cc. Supports and hangers.
dd. Valves.
ee. Sprinklers.
ff. Mechanical equipment.
gg. Refrigerants.
hh. Electrical conduit.
ii. Copper wiring.
jj. Lighting fixtures.
kk. Lamps.
ll. Ballasts.
mm. Electrical devices.
nn. Switchgear and panelboards.
oo. Transformers

2. Construction Waste:
   a. Masonry and CMU.
   b. Lumber.
   c. Wood sheet materials.
   d. Wood trim.
   e. Metals.
   f. Roofing.
   g. Insulation.
   h. Carpet and pad.
   i. Gypsum board.
   j. Piping.
   k. Electrical conduit.
   l. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
      1) Paper.
      2) Cardboard.
      3) Boxes.
      4) Plastic sheet and film.
      5) Polystyrene packaging.
      6) Wood crates.
      7) Plastic pails.

1.05 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 30 days of date established for the Notice to Proceed.

1.06 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:
   1. Material category.
   2. Generation point of waste.
   3. Total quantity of waste in tons (tonnes).
   4. Quantity of waste salvaged, both estimated and actual in tons (tonnes).
   5. Quantity of waste recycled, both estimated and actual in tons (tonnes).
   6. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes).
   7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.07 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements.

B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

1.08 WASTE MANAGEMENT PLAN

Retain option in “General” Paragraph below if Project requires selective demolition or building demolition.

A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. [**Distinguish between demolition and construction waste.**] Indicate quantities by weight or volume but use same units of measure throughout waste management plan.

Select option “site-clearing” below if there is work in the Project.

B. Waste Identification: Indicate anticipated types and quantities of demolition [**site-clearing**] and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
1. Total quantity of waste.
2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
3. Total cost of disposal (with no waste management).
4. Revenue from salvaged materials.
5. Revenue from recycled materials.
6. Savings in hauling and tipping fees by donating materials.
7. Savings in hauling and tipping fees that are avoided.
8. Handling and transportation costs. Include cost of collection containers for each type of waste.
9. Net additional cost or net savings from waste management plan.

PART 2 – PRODUCTS *(not applicable)*

PART 3 – EXECUTION

3.01 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract."
1. Comply with operation, termination, and removal requirements in Section 01 50 00 "Temporary Facilities and Controls."

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. [**Coordinator shall be present at Project site full time for duration of Project.**]

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
   2. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.02 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
   3. Store items in a secure area until installation.
   4. Protect items from damage during transport and storage.
   5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: Not permitted on Project site.

C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner's storage area designated by Owner.
   5. Protect items from damage during transport and storage.

D. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

E. Plumbing Fixtures: Separate by type and size.

F. Lighting Fixtures: Separate lamps by type and protect from breakage.

G. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.03 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall be shared equally by Owner and Contractor.

C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
   1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.04 RECYCLING DEMOLITION WASTE

A. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.

B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
1. Pulverize concrete to maximum 4-inch (100-mm) size.

C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
1. Pulverize masonry to maximum 4-inch (100-mm) size.
2. Clean and stack undamaged, whole masonry units on wood pallets.

D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

E. Metals: Separate metals by type.
1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

F. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

G. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

H. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

I. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.

J. Carpet: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
1. Store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

K. Carpet Tile: Remove debris, trash, and adhesive.
1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

L. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

M. Conduit: Reduce conduit to straight lengths and store by type and size.

3.05 RECYCLING CONSTRUCTION WASTE

A. Packaging:
1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.

3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:
1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

3.06 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Recommendation of Acceptance (Substantial Completion) procedures.
   2. Final completion procedures.
   3. Warranties.
   4. Final cleaning.
   5. Repair of the Work.

B. Related Requirements:
   1. Division 01 Specification Sections

1.3 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Recommendation of Acceptance (Substantial Completion).

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS (ATTIC STOCK)

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections. Schedule shall include part/product number, manufacturer, contact info, and current cost.

1.6 RECOMMENDATION OF ACCEPTANCE (SUBSTANTIAL COMPLETION) PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Recommendation of Acceptance (Substantial Completion): Complete the following a minimum of 10 days prior to requesting inspection for determining date of Recommendation of Acceptance (Substantial Completion). List items below that are incomplete at time of request.
   1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
   3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
   a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
5. Submit test/adjust/balance records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Recommendation of Acceptance (Substantial Completion): Complete the following a minimum of 10 days prior to requesting inspection for determining date of Recommendation of Acceptance (Substantial Completion). List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Recommendation of Acceptance (Substantial Completion).
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Recommendation of Acceptance (Substantial Completion) a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Recommendation of Acceptance (Substantial Completion) form after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 01 29 00 "Payment Procedures."
2. Punch List: Submit Recommendation of Acceptance (Substantial Completion) and inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
a. Project name.
b. Date.
c. Name of Architect.
d. Name of Contractor.
e. Page number.
4. Submit list of incomplete items in the following format:
a. MS Excel electronic file. Architect will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Recommendation of Acceptance (Substantial Completion) is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. **Must provide a scanned or digitally generated copy of the binder in PDF format on medium acceptable to the Owner.**

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Recommendation of Acceptance (Substantial Completion) for entire Project or for a designated portion of Project:
   a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
   b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
   c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
   d. Remove tools, construction equipment, machinery, and surplus material from Project site.
   e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
   f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
   g. Sweep concrete floors broom clean in unoccupied spaces.
   h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
   i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
   j. Remove labels that are not permanent.
   k. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
   l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
   m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
   n. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
      1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
   o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
   p. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Recommendation of Acceptance (Substantial Completion).

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
   1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
   2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
      a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
   3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
   4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 77 00

SECTION 01 78 39 – PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Maintain at the site for the Owner one record copy of **(ALL of which are to be in both physical and locked .pdf formats)**:

1. Drawings (one complete set of stamped prints).
2. Specifications.
3. Addenda, Change Orders and other modifications to the contract.
4. Architect's written instructions.
5. Approved shop drawings, product data and samples.
6. Field test reports.
7. Construction photographs, if applicable.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction.

1. Provide locked cabinet or secure storage space for storage of samples.
2. File samples in accordance with the numbering system used for specifications.

B. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.

C. Make documents and samples available at all times for inspection by Architect and Building Official.

1.03 MARKING DEVICES

A. Label each document "Project Record" in neat large printed letters.

B. Record information concurrently with construction progress.

1. Do not conceal any work until the required information is recorded.
2. Project record documents shall be jointly inspected for accuracy and completeness by Architect and Contractor prior to submission of each monthly request for partial payment.

C. Drawings: Legibly mark the drawings to record actual construction.

1. Indicate depths of various elements of foundation in relation to finish first floor datum.
2. Indicate horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Indicate location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
4. Indicate field changes of dimension and detail.
5. Indicate changes made by Change Order.
6. Indicate details not on original contract drawings.

D. Specifications and Addenda: Legibly mark each section to record.

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
2. Changes made by Field Order or by Change Order.

1.04 REVIEWS AND SUBMITTALS

A. Architect and Contractor shall jointly review Project Record Documents for accuracy and completeness prior to

submission of each monthly partial payment request.

1. Before final application for payment is submitted, deliver the completed project record documents to Architect upon completion and acceptance of the work and deliver one copy of the project record documents to the Owner.

B. Accompany the submittal with transmittal letter in duplicate containing:

1. Date
2. Project title and number
3. Contractor's name and address
4. Title and number of each Record Document
5. Signature of Contractor or his authorized representative

1.06 ORIGINAL DOCUMENTS

A. There are to be four originals (for the Architect, the Owner (2), and the General Contractor) of the following:

1. Applications for Payment

B. There are to be six originals of the following;

1. 10-day Forms
2. Change Orders
3. Recommendation of Acceptance (and Punch List)

END OF SECTION 01 78 39

SECTION 02 41 00 – DEMOLITION WORK

PART 1 - GENERAL

1.01 SCOPE

A. This section together with the contract documents and applicable design drawings covers all architectural, electrical, mechanical, and structural demolition.

B. Contractor will be responsible for obtaining and abiding by any and all City, Parish, and other applicable permits, and requirements for demolition. All work shall comply with OSHA and all other applicable Federal, State and Local codes.

1.02 OPERATIONS

A. This work shall be planned, scheduled, organized, and coordinated in such a manner that owner's operations will not be restricted, disrupted, or hindered in any manner. Refer to Project Manual Section 01 10 00 – Summary of Work for more details.

B. Do not interfere with use of adjacent spaces. Maintain free and safe passage to and from the adjacent spaces.

1.03 UTILITY SERVICES

A. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.

1.04 TRAFFIC

A. Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

1.05 PROTECTIONS

A. Ensure safe passage of persons around area of demolition. Conduct operation to prevent injury to adjacent buildings, structures, other facilities, and persons. Erect temporary covered passageways as required by authorities having jurisdiction. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

1.06 DAMAGES

A. Promptly repair damages caused to adjacent facilities by demolition operations at no cost to Owner.

B. Prevent movement or settlement of structure (s). Provide and place bracing or shoring and be responsible for safety and support of structure. Assume liability for such movement, settlement, damage, or injury.

C. Cease operations and notify the Architect immediately if safety of structure appears to be endangered. Take precautions to properly support structure. Do not resume operations until safety is restored.

D. Be responsible for initiating, maintaining, and supervising all safety precautions and programs as required by applicable regulatory advisory to protect occupants of building and workers.

1.07 EXISTING UTILITY SERVICES

A. Before starting excavation, establish location and extent of underground utilities occurring in work area.

B. Notify utility companies having jurisdiction to remove and relocate lines which are in the way of excavation.

C. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

D. Maintain, reroute, or extend as required, existing utility lines to remain which pass through work area.

E. Protect active utility services uncovered by excavation.

F. Remove abandoned utility service lines from areas of excavation. Cap, plug, or seal such lines and identify at grade.

G. Accurately locate and record abandoned, and active utility lines re-routed or extended, on project record documents.

1.08 MATERIALS

A. Except where noted otherwise, maintain possession of materials being demolished. Immediately remove from site and store as directed by Owner.

B. Items Required for Reinstallation:

1. Carefully remove, store, and protect materials and equipment scheduled for reinstallation.

C. The User Agency shall have priority for the selection of salvaged equipment and materials.

D. Items to be retained by User Agency:

1. Carefully remove materials and equipment to be retained by the User Agency. Deliver and store where directed by User Agency. All items not retained by the User Agency shall be legally disposed of by the Contractor.
2. User Agency shall maintain possession of all existing materials, equipment, etc. at the site; unless the Contractor is directed by the User Agency or Architect to legally dispose of such items or materials.

1.09 ASBESTOS

A. Should the Contractor discover what appears to be asbestos or asbestos-containing material on the Project, he shall cease work immediately in the area where this material is found and notify the Architect as soon as possible, after which the following steps will be taken.

1. The Owner will employ a testing company to determine if the suspect material contains asbestos.
2. If the testing company determines that the material is asbestos and must be removed, the Owner will select an asbestos abatement company to remove the material.
3. The abatement company will be paid by the Contractor, and a Change Order will be issued to add the cost of the abatement to the Contract, or
4. The Owner will directly contract with the abatement company.

NOTE: At its option, the Owner, may declare the material as asbestos without testing and proceed as noted in parts 1.05.A.2.a. and b. above.

1.10 DEMOLITION WORK

A. Architectural and Structural Demolition must be closely coordinated with Electrical and mechanical demolition to ensure that power and all other services are de-energized and locked out and that all items requiring removal or relocation including, but not limited to, wall switches, outlets, panels, control devices, security, and alarm devices, lighting, grounding fixtures, HVAC components, thermostats, plumbing fixtures, vents and the like, are removed, relocated, tied in, tested and placed back in service as required, all in a timely manner and appropriate sequence.

B. Carry out demolition work to cause as little inconvenience to adjacent occupied building areas as possible.

C. Demolish in an orderly and careful manner as required to accommodate new work including that required for connection to the existing building. Protect existing foundations and supporting structural members.

D. Burning of materials on site is not permitted.

E. Remove from site, without delay, all contaminated, vermin infested, and dangerous materials encountered and dispose of by safe means so as not to endanger health of workers and public.

F. Remove demolished materials, tools, and equipment from site on a regular basis. Do not allow them to accumulate. Upon completion of work leave building and site in a condition acceptable to the Architect.

G. Contractor is to remove any debris, organic matter, frozen material that would not be considered good subsurface material. This determination would be made by the Architect.

H. Contractor is to refer to the proposed finish grade contours on plans. When excavation extends into the limits of the proposed finish grade, Contractor shall place and compact fills to rough grade elevations.

1.11 RESTORATION

A. Repair all demolition performed in excess of that required or where limits of demolition will be exposed at no cost to the Owner. Leave in as good condition as existing before commencement of work.

1. Materials and workmanship used in restoring work shall conform in type and quality to that of original existing construction except as otherwise shown or specified.

1.12 TEMPORARY PARTITIONS

A. Erect weatherproof closures for exterior openings. Maintain exit requirements.

B. Erect and maintain noise abatement and dustproof partitions as required in order to suppress noise and spread of dust, fumes, and smoke to other parts of the building. Upon completion, remove partitions and repair damaged surfaces to match adjacent surfaces.

1. Minimum construction of dust partitions: 4 mil polyethylene film full height on one side of 2 x 4 wood studs full height of space being closed off. Studs to be 48" o.c. with 2 x 4 horizontal block-in at third points between every stud. Secure polyethylene film to top and bottom plates with 1 x 2 wood strips nailed 16" o. c. Back partition with fiberglass batt insulation for noise abatement as required.
2. Dust partitions shall be maintained "puncture-free" for duration of construction.

1.13 TERMITE DAMAGE

A. If Contractor finds evidence of existing termite infestation or damage, he shall notify Architect as soon as possible.

END OF SECTION 02 41 00

SECTION 02 80 10 - SUMMARY OF THE WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The contract and other Division 2 sections apply to this section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Work areas are shown on the project plans.
Contractor shall handle and dispose of as Regulated Asbestos Containing Materials (RACM) all vinyl wall base, floor tile/mastic, roof decking, transite, spandrel window panels, thermal system insulation, and window caulking/glazing.

The works areas shown may contain multiple layers of flooring, adhesive, and floor tile/mastic. Contractor shall remove and dispose of as regulated asbestos containing materials floor tile/mastic, adhesive, and floor patch/filler to the substrate. Glove bagging shall only be done inside a full negative pressure enclosure with decontamination unit. Contractor shall include all exploratory demolition to access ACM in his bid.

Contractor shall perform all waste characterization testing as required to classify debris/waste materials prior to disposal. Contractor shall include waste characterization testing and analysis in his bid. Contractor shall coordinate waste characterization testing with Owner's representative.

Demolition activities will disturb materials containing lead, asbestos, polychlorinated biphenyls, mercury, or other environmental hazards. Contractor shall clean and decontaminate all work areas. Contractor shall comply with all applicable local, state, and federal regulations.

Owner: Calcasieu Parish School Board

B. **Contract Documents**, dated June 2025 were prepared by Wynn L. White Consulting Engineers, Inc., 17485 Opportunity Drive, Baton Rouge, LA 70817.

1.3 ASBESTOS CONTAINING MATERIALS:

A. **The Work** of this contract involves activities that will disturb asbestos. The location of these materials known to be present at the worksite is set forth in the contract documents. If any other of these materials is found, notify the Owner and Engineer about the location and quantity of these materials within 24 hours of the discovery.

1.4 ASBESTOS HEALTH RISK:

A. The disturbance or dislocation of ACM may cause asbestos fibers to be released into the building's atmosphere, thereby creating a potential health risk to workers and building occupants. Apprise all workers, supervisory personnel, subcontractors and consultants who will be at the job site of the seriousness of the risk and of proper work procedures that must be followed.

B. Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified ACM, take appropriate continuous measures as necessary to protect all building occupants from the risk of exposure to airborne asbestos. Such measures shall include the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.

1.5 CONTRACTOR USE OF PREMISES

A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.

1. **Owner Occupancy:** Coordinate with Owner to allow for Owner occupancy of areas not involved in the work under this contract, or work areas under this contract that have been completed and are ready for release to the Owner.

2. **Driveways and Entrances:** Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Coordinate use of these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment onsite.

B. Use of the Existing Building: Maintain the existing building and jobsite in a secure condition throughout the construction period. Take all precautions necessary to secure the existing building and jobsite during the construction period.

1. **Smoking:** Smoking or open fires will not be permitted within the building enclosure or on the premises.

2. **Toilet Rooms:** Use of existing toilets within the building, by the Contractor's personnel, will not be permitted.

1.6 OCCUPANCY REQUIREMENTS

A. Partial Owner Occupancy: The Owner reserves the right to occupy completed areas of the site prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work. Coordinate with Owner.

1.7 AIR MONITORING BY THE OWNER:

A. The Owner shall contract for air monitoring. Air monitoring shall be conducted both outside and inside of the work area during the work, and for clearance sampling at the end of the project

1. **Outside of the Work Area:** The Owner's air monitoring firm may sample air outside of the work area to detect faults in the work area isolation such as:
   a. Contamination of the building outside of the work area with airborne asbestos fibers.

b. Failure of filtration or rupture in the differential pressure system,
c. Contamination of air outside the building envelope with airborne asbestos fibers.

2. **Inside the Work Area:** The Owner's air monitoring firm may monitor airborne fiber counts in the Work Area. The purpose of this air monitoring is to detect airborne asbestos concentrations that may challenge the ability of the Work Area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.

B. Work area clearance: Clearance air sampling by the Owner's air monitoring firm at the completion of asbestos abatement work is described in Section "Project Decontamination".

C. Air monitoring required by OSHA is work of the Contractor and is not covered in this section.

1.8 SCHEDULE OF AIR SAMPLES BY OWNER:

A. Sample cassettes: Samples will be collected on 25 mm. cassettes as follows:

1. **PCM:** 0.8 micrometer mixed cellulose ester.
2. **TEM:** 0.45 micrometer mixed cellulose ester or 0.40 micrometer polycarbonate, with 5.0 micron mixed cellulose ester backing filter.

B. Number and Volume of Samples: The number and volume of air samples given in the schedules is approximate. The exact number and volume of samples collected by the Owner may vary depending upon job conditions and the analytical method used.

C. Sample Volume and Sensitivity:

1. **PCM:** The sample volumes collected by the Owner's air monitoring firm will be determined by the following formula:

$$Volume = \frac{\left(\frac{Number\ of\ Fibers}{Area\ of\ 100\ fields}\right) X\ Total\ Filter\ Area}{\left(\frac{Limit\ Value}{4}\right)}$$

Where:
Number of fibers = 5 fibers/100 fields, based on a limit of detection (LOD) of 7 fibers/mm^2 on the filter
Area of 100 fields = 0.785mm^2
Total Filter Area = 385mm^2
Limit Value = as specified in the schedules of samples below

a. For purposes of this specification, the sample volume calculated above will be considered to be of sufficient size so that there is a 95% level of confidence that the value measured by each individual sample at the limit of detection (LOD) is less than or equal to the limit values specified below.

b. For purposes of this specification, the Limit of Detection (LOD) is defined as 7 fibers/mm^2 on the filter or 5 fibers/100 fields.
c. For purposes of this specification overloaded samples will be considered as exceeding the applicable limit value.

2. **TEM:** Analytical Sensitivity of 0.005 structures/cc as set forth in the AHERA regulation.

D. Not Used

E. Daily:

1. **From start of work** of Section "Temporary Enclosures" through the work of Section "Project Decontamination", the Owner may take samples.

2. **Sample volume and sensitivity:** inside the work area may vary depending upon conditions in the work area. If samples are overloaded at the sample volume required for a limit value equal to the "Stop Action Levels" or "Immediate Stop Action Levels" given later in this section, the level is considered to have been exceeded.

3. **PCM Samples:**

Location Sampled	Number of Samples	Limit Value (Fibers/cc)	Approx. Volume (Liters)	Rate (LPM)
Each Work Area	1	0.1	100	1-10
Outside Each Work Area at Critical Barrier	1	0.01	1,000	1-10
Clean Room	1	0.01	1,000	1-10
Equipment Decon	1	0.01	1,000	1-10
Outside Building	1	0.01	1,000	1-10
Output of Pressure Differential System	1	0.01	1,000	1-10

F. Additional samples may be taken at Owner's or Designer's discretion. If airborne fiber counts exceed allowed limits additional samples may be taken as necessary to monitor fiber levels.

1.9 ANALYTICAL METHODS USED BY THE OWNER:

A. The following methods will be used by The Owner in analyzing filters used to collect air samples. Sampling rates may be varied from printed standards to allow for high volume

sampling.

1. Phase Contrast Microscopy (PCM) will be performed using the NIOSH 7400 method.
2. Transmission Electron Microscopy (TEM) will be performed using the analysis method set forth in the AHERA regulation 40 CFR Part 763 Appendix A.

1.10 LABORATORY TESTING BY OWNER:

A. **The services of a testing laboratory** will be employed by the Owner to perform laboratory analyses of the air samples. A microscope and technician will be set up at the job site, or samples will be sent overnight on a daily basis, so that verbal reports on air samples can be obtained within 24 hours. If on-site analysis is performed, the air sampling and analysis firm employed by the Owner shall participate in the Proficiency Analytical Testing (PAT) program administered by the American Industrial Hygiene Association (AIHA).

B. **The Contractor will have access** to all air monitoring tests and results upon written request.

C. **Written Reports:** of all air monitoring tests will be made available to the Contractor upon written request.

1.11 FIBERS AND STRUCTURES

A. **Fibers Counted:** The following procedure will be used to resolve any disputes regarding fiber types when a project has been stopped due to excessive airborne fiber counts.

1. **Large Fibers:** "Airborne Fibers" referred to above include all fibers regardless of composition as counted by phase contrast microscopy (PCM), unless additional analysis by transmission or scanning electron microscopy demonstrates to the satisfaction of the Designer that non-asbestos fibers are being counted. "Airborne Fibers" counted in samples analyzed by transmission electron microscopy shall be asbestos fibers, greater than 5 microns in length. For purposes of stop action levels, subsequent to analysis by electron microscopy, the number of "Airborne Fibers" shall be determined by multiplying the number of fibers, regardless of composition, counted by PCM by the proportion of fibers that are asbestos as determined by TEM (a number equal to, asbestos fibers counted, divided by all fibers counted in the electron microscopy analysis).

2. **Small Structures:** "Airborne Fibers" referred to above include asbestos structures (fibers, bundles, clusters or matrices) of any diameter and any length greater than 0.5 microns.

1.12 ADDITIONAL TESTING:

A. **The Contractor may conduct** air monitoring and laboratory testing. If he elects to do this the cost of such air monitoring and laboratory testing shall be at no additional cost to the Owner.

1.13 PERSONAL MONITORING:

A. **Owner will not perform** air monitoring for the Contractor to meet Contractor's OSHA requirements for personal sampling or any other purpose.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 STOP ACTION LEVELS:

B. **Asbestos samples Inside Work Area:** Maintain an average airborne count in the work area of less than the Stop Action Level given below for the type of respiratory protection in use. If the fiber counts rise above this figure for any sample taken, revise work procedures to lower fiber counts. If the Time Weighted Average (TWA) fiber count for any work shift or 8 hour period exceeds the Stop Action Level, stop all work except corrective action, leave pressure differential and air circulation system in operation and notify Designer. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by Designer.

STOP ACTION LEVEL (f/cc)	IMMEDIATELY STOP LEVEL (f/cc)	MINIMUM RESPIRATOR REQUIRED	PROTECTION FACTOR
0.1	0.5	Half face	10
0.5	2.5	PAPR	50
1.0	5.0	Supplied Air Pressure Demand	100

1. If airborne fiber counts exceed Immediate Stop Level given above for type of respiratory protection in use for any period of time cease all work except corrective action. Notify Designer. Do not recommence work until fiber counts fall below Stop Action Level given above for the type of respiratory protection in use. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by Designer.

B. **Outside Work Area:** If any air sample taken outside of the Work Area exceeds 0.01 f/cc, immediately and automatically stop all work except corrective action. The Designer will determine the source of the high reading and so notify the Contractor in writing.

1. If the high reading was the result of a failure of Work Area isolation measures initiate the following actions:

   a. Immediately erect new critical barriers as set forth in Section “Temporary Enclosures” to isolate the affected area from the balance of the building. Erect Critical Barriers at the next existing structural isolation of the involved

space (e.g. wall, ceiling, floor).

b. Decontaminate the affected area in accordance with Section “Project Decontamination”.

c. Require that respiratory protection as set forth in Section “Respiratory Protection” be worn in affected area until area is cleared for re-occupancy in accordance with Section “Project Decontamination”.

d. Leave Critical Barriers in place until completion of work and ensure that the operation of the pressure differential system in the Work Area results in a flow of air from the balance of the building into the affected area.

e. If the exit from the clean room of the personnel decontamination unit enters the affected area, establish a decontamination facility consisting of a Shower Room and Changing Room as set forth in Section “Decontamination Units” at entry point to affected area.

f. After Certification of Visual Inspection in the Work Area remove critical barriers separating the work area from the affected area. Final air samples will be taken within the entire area as set forth in Section “Project Decontamination”.

2. If the high reading was the result of other causes initiate corrective action as determined by the Designer.

C. Effect on Contract Sum: Complete corrective work with no change in the Contract Sum if high airborne fiber counts were caused by Contractor's activities. The Contract Sum and schedule will be adjusted for additional work caused by high airborne fiber counts beyond the Contractor's control.

3.2 STOP WORK:

A. If the Owner, Designer, or Project Administrator presents a written stop work order, immediately and automatically conforms to that stop work order, while maintaining temporary enclosures and pressure differential. Do not recommence abatement work until authorized in writing by Owner, Designer or Project Administrator.

B. Immediately initiate the following actions: After being presented with a stop work order immediately:

1. Cease all asbestos removal activities, or any other activities that disturbs ACM.
2. Repair any fallen, ripped or otherwise failed work area isolation measures.
3. Maintain in operation all work area isolation measures including those required by Sections “Temporary Enclosures,” “Temporary Pressure Differential & Air Circulation System,” “Decontamination Units.”
4. Maintain all worker protections including those required by Sections “Worker Protection - Asbestos Abatement,” and “Respiratory Protection.”
5. Fog the air in the work area with a mist of amended water to reduce airborne fiber levels.

C. **Do not recommence work** until authorized in writing by the Owner or Designer.

END OF SECTION – 02 80 10

SECTION 02 80 15 - COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section includes** administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Plan of Action.
4. Contingency Plan.
5. Project Directory.
6. Notifications.
7. Pre-Construction Inspection.
8. Contractor's Construction Schedule.
9. Administrative and supervisory personnel.
10. Pre-Construction Conference
11. Progress Meetings
12. Coordination meetings.
13. Record Keeping.
14. Special Reports.

B. **Related Sections:** The following Sections contain requirements that relate to this Section:

1. "Section Submittals - Asbestos Abatement" for administrative procedures regarding submittals.
2. "Section Materials and Equipment - Asbestos Abatement" for coordinating general installation.
3. "Section Project Closeout - Asbestos Abatement" for coordinating contract closeout.

1.3 COORDINATION

A. **Owner Occupancy:** Coordinate construction operations and scheduling with partial occupancy requirements of the Owner and the Owner's use of utilities.

B. **Coordinate construction operations** included in various Sections of these Specifications to assure efficient and orderly completion of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in the sequence required to obtain the best results where execution of one part of the Work depends on execution of other components, before or after its own execution.
2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
3. Make provisions to accommodate items scheduled for later installation.

C. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

D. **Administrative Procedures:** Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure 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 closeout activities.

E. **Conservation:** Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.4 PLAN OF ACTION:

A. **Prepare a detailed plan** of the procedures proposed for use in complying with the requirements of this specification. Include in the plan the location and layout of decontamination areas, the sequencing of asbestos work, the interface of trades involved in the performance of work, methods to be used to assure the safety of building occupants and visitors to the site, disposal plan including location of approved disposal site, and a detailed description of the methods to be employed to control pollution. Expand upon the use of portable HEPA ventilation system, method of removal to prohibit visible emissions, and packaging of removed asbestos debris.

1. Submit the Plan of Action to the Designer for information only, prior to the start of work.

1.5 CONTINGENCY PLAN:

A. **Contingency Plan:** Prepare a contingency plan for emergencies or any other event that may require breaching of work area containment or modification or abridgement of decontamination or work area isolation procedures. Include in this plan procedures for performing electrical and mechanical repairs inside containment after abatement work

has begun. Include in plan specific procedures for decontamination or work area isolation. Include in plan measures to comply with Interim Life Safety Measures listed below. Note that nothing in this specification should impede safe exiting or providing of adequate medical attention in the event of an emergency. Items to be addressed in the plan include, but are not limited to the following:

1. Fire
2. Accident
3. Life threatening injury
4. Non life threatening injury
5. Rescue
6. Power Failure
7. Pressure differential system failure
8. Breach of containment
9. Electrical faults or shock
10. Excessive heat / cold (if/when such limits are specified)
11. Supplied air system failure
12. Water leaks
13. Waste spills
14. Unauthorized entry into work area
15. Elevated air samples outside of containment
16. Repairs inside containment
17. Toxic releases

INTERIM LIFE SAFETY MEASURES:

1. Contractor shall ensure exits provide free and unobstructed egress. Personnel shall receive training if alternate exits must be designated.

2. Contractor shall ensure free and unobstructed access to emergency department/services and for emergency forces.

3. Contractor shall ensure fire alarm detection and suppression systems are not impaired. A temporary, equivalent, system shall be provided when any fire system is impaired. Temporary system must be inspected and tested monthly.

4. Contractor shall ensure temporary construction partitions are smoke tight and built of noncombustible materials.

5. Contractor shall provide additional fire fighting equipment and use training for personnel.

6. No smoking within the building is allowed by contractors.

7. Contractor shall develop and enforce storage, housekeeping and debris removal procedures that reduce the flammable and combustible fire load to the lowest level necessary for daily operations.

8. Contractor shall conduct minimum of two (2) fire drills per shift per quarter in the affected areas.

9. Contractor shall increase surveillance hazard of buildings, grounds and equipment with special attention construction areas, construction storage and excavations.
10. Contractor shall train personnel when structural or compartmentation features of fire safety are compromised.

11. Contractor shall conduct organization-wide safety education programs to ensure awareness of any *life safety code* deficiencies and construction hazards for the interim life safety measures.

1.6 PROJECT DIRECTORY

A. **Develop a directory** of all entities involved in the project. Include the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site. Identify individuals, their duties and responsibilities. List business name, contact person, normal business and emergency telephone, pager and fax numbers and addresses of:

1. Owner, Designer, and Project Administrator
2. Contractor's General Superintendent, supervisory personnel and Contractor's home office
3. Emergency services including but not limited to fire, ambulance, doctor, hospital, police, power company, telephone company.
4. Local, state, and federal agencies with jurisdiction over the project.

B. **Post:** Post copies of the Project Directory in the project meeting room, the temporary field office, each temporary telephone, and at entrance to clean room of Personnel Decontamination Unit.

1.7 NOTIFICATIONS

A. **Notify other entities** at the job site of the nature of the asbestos abatement activities, location of asbestos-containing materials (ACM), requirements relative to asbestos set forth in these specifications and applicable regulations. Advance notification will be made to:

1. Owners of the building/facility;
2. Employees who will perform asbestos abatement work or related activities, or who will be in the work area during the course of the work of this contract.
3. Employers of employees who work and/or will be working in adjacent areas during the course of the work of this contract.

B. **Notify emergency service agencies** including fire, ambulance, police or other agency that may service the abatement work site in case of an emergency. Notification is to include methods of entering work area, emergency entry and exit locations, modifications to fire notification or fire fighting equipment, and other information needed by agencies providing emergency services.

C. **Notifications of Emergency:** Any individual at the job site may notify emergency service agencies if necessary without effect on this Contract or the Contract Sum.

1.8 PRE-CONSTRUCTION INSPECTION:

A. **Inspect areas** in which work will be performed, prior to commencement of work. Prepare a listing of damage to structure, surfaces, equipment or of surrounding properties which could be misconstrued as damage resulting from the work. Photograph or videotape existing conditions as necessary to document conditions. Submit to Designer for record purposes prior to starting work.

1.9 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. **Bar-Chart Schedule:** Prepare a fully developed, horizontal bar-chart-type, contractor's construction schedule. Submit within 3 days after the date established for "Commencement of the Work."

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.
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, of 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 Clearance of each Work Area in advance of the dates established for Clearance. Allow time for testing and other Designer's procedures necessary for certification of Clearance.
7. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Designer's procedures necessary for certification of Substantial Completion.
8. Indicate completion and Clearance of each Work Area in advance of the date established for Substantial Completion. Allow time for testing and other Designer's procedures necessary for certification of Clearance and Substantial Completion.

B. **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.

C. **Work Stages:** Indicate important stages of construction for each major portion of the Work, including submittal review, testing, and installation.
1. Non-asbestos demolitions.
2. Preparation of the Work Area.
3. Asbestos removal.

4. Clearance testing.
5. Substantial Completion.

D. **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.

E. **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.

F. **Distribution:** Following response to the initial submittal, print and distribute copies to the Designer, 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.

G. **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.

1.10 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. Project Supervisor: Provide a full-time Project Supervisor at the work site who is experienced in administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, project scheduling, management, etc. This person is the Contractor's Representative, and will function as the 'competent person' at the work site responsible for compliance with all applicable federal, state and local regulations, particularly those relating to ACM.

1. Training: The General Superintendent must have a current certification from a state approved trainer for a course that meets the requirements of the EPA Model Accreditation Plan for asbestos abatement contractor/supervisor (40 CFR part 763, Subpart E, Appendix C).

2. Experience: The General Superintendent must have demonstrable experience in the successful management of asbestos abatement projects that are similar to the work of this contract.

   a. The General Superintendent must have a minimum of two (2) years' experience in the on-site management of asbestos abatement projects.
   b. The General Superintendent must have had responsible charge of a minimum of ten (10) asbestos abatement projects similar in size and type to the work of this contract.

3. Competent Person: The General Superintendent is to be a Competent Person as required by OSHA in 29 CFR 1926.

B. Supervisors / Forepersons: Provide full-time Supervisors / Forepersons who are experienced in the supervision of asbestos abatement work areas including work practices, building and personnel, disposal practices, etc. These persons are contractor employees directly responsible to the General Superintendent.

C. Accreditation: The General Superintendent, Supervisors and Forepersons are to be accredited as an Asbestos Abatement Supervisor in accordance with the AHERA regulation 40 CFR Part 763, Subpart E, Appendix C.

1.11 PRE-CONSTRUCTION CONFERENCE:

A. **An initial progress meeting**, recognized as "Pre-Construction Conference" will be convened by the Designer prior to start of any work. The preconstruction conference will be scheduled before start of construction, at a time convenient to the Owner and the Designer. Meet at the project site, or as otherwise directed, with General Superintendent, Owner, Designer, Project Administrator, and other entities concerned with the asbestos abatement work.

B. **Attendees:** Authorized representatives of the Owner, Designer, and their consultants will be in attendance. An authorized representative of the Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

1. 72 hours advance notice will be provided to all participants prior to convening Pre-Construction Conference.

C. **Agenda:** This is an organizational meeting, to review responsibilities and personnel assignments, to locate regulated areas and temporary facilities including power, light, water, etc. Items of significance that could affect progress will be discussed, including the following:

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 of Shop Drawings, Product Data, and Samples.
8. Preparation of record documents.
9. Use of the premises.
10. Parking availability.
11. Office, work, and storage areas.
12. Equipment deliveries and priorities.
13. Safety procedures.
14. First aid.
15. Security.
16. Housekeeping.
17. Working hours.

1.12 PROGRESS MEETINGS:

A. General: In addition to specific coordination and pre-installation meetings for each element of work, and other regular project meetings held for other purposes, the Designer will hold general progress meetings as required. These meeting will be scheduled, where possible, at time of preparation of payment request.

B. Attendees: Representatives of the Owner and Designer will attend these meetings. In addition to representatives of the Contractor, 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. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the work. Require each entity then involved in planning, coordination or performance of work to be properly represented at each meeting.

C. Agenda: Be prepared to discuss the following items at the progress meetings. Review other items of significance that could affect progress.

1. 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 insure that current and subsequent activities will be completed within the Contract Time.

2. Review the present and future needs of each entity present, including the following:

- **a.** Interface requirements.
- **b.** Time.
- **c.** Sequences.
- **d.** Status of submittals.
- **e.** Deliveries.
- **f.** Access.
- **g.** Site utilization.
- **h.** Temporary facilities and services.
- **i.** Hours of work.
- **j.** Hazards and risks.
- **k.** Housekeeping.
- **l.** Quality and work standards.
- **m.** Change Orders.
- **n.** Documentation of information for payment requests.

D. Reporting: Revise the Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule no later than 3 days after each meeting. Include a brief summary, in narrative form, of progress since the previous meeting and report.

1.13 COORDINATION MEETINGS

A. **Attend project coordination meetings** that will be conducted as required by the Designer at regular intervals convenient for all parties involved. Project coordination meetings are intended to coordinate the work of all contractors performing work on the site, and are in addition to specific meetings held for other purposes, such as regular progress meetings.

1.14 RECORD KEEPING:

A. **Daily Log:** Maintain a Daily Log (in an area accessible to the Owner, Designer and Project Administrator) as a bound, sequential, hand-written record carefully prepared daily that documents but is not limited to the following items:

1. Meetings; purpose, attendees, brief discussion

2. Special or unusual events, i.e. barrier breeching, equipment failures, accidents

3. Documentation of Contractor's completion of the following:

a. Inspection of work area preparation prior to start of removal and daily thereafter.
b. Removal of any sheet plastic barriers.
c. Contractor's inspections prior to spray back, lock back, encapsulation, enclosure or any other operation that will conceal the condition of ACM or the substrate from which such materials have been removed.
d. Removal of waste materials from work area.
e. Decontamination of equipment (list items).
f. Contractors final inspection/final air test analysis.

B. **Entry/Exit Log:** Maintain within the Decontamination Unit a daily log documenting the dates and time of but not limited to, the following items:

1. Visitations; authorized and unauthorized with the following information
a. Name
b. Organization
c. Entry time
d. Exit Time
e. Respiratory protection

2. Personnel, by name, entering and leaving the work area with the following information
a. Printed Name
b. Identification Number
c. Entry Time
d. Exit Time
e. Respiratory Protection

C. **Air Monitoring Results:** Post personnel and area air monitoring results in Decontamination Unit within 24 hours of sample collection. Post the respiratory protection requirements for the work in progress.

D. Records in Decontamination Unit: Maintain the following documentation in the Decontamination Unit, in a location accessible to workers.

1. Documentation of inspections by OSHA, EPA or local authority
2. Respiratory Protection Program.

E. Other records: Maintain other documentation in a location that is accessible to the Owner, Designer, and Project Administrator including:

1. Waste Manifests and shipping records
2. Landfill receipts.
3. Accident reports.

1.15 SPECIAL REPORTS:

A. General: Except as otherwise indicated, submit special reports directly to Owner within one day of occurrence requiring special report, with copy to Designer and others affected by occurrence.

B. Reporting Unusual Events: When an event of unusual and significant nature occurs at site (examples: failure of pressure differential system, rupture of temporary enclosures), prepare and submit report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. When such events are known or predictable in advance, advise Owner in advance at earliest possible date.

C. Reporting Accidents: Prepare and submit reports of significant accidents, at site and anywhere else work is in progress. Record and document data and actions; comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury is sustained, property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury, or where work was stopped for over four hours during a scheduled shift.

D. Report Discovered Conditions: When an unusual condition of the building is discovered during the work (e.g. leaks, termites, corrosion) prepare and submit a special report indication condition discovered.

1.16 SUBMITTALS

A. Before the Start of Work: Submit the following to the Designer in the same manner as product data. Do not begin work until these submittals are returned with designer's action stamp indicating that all submittals have been "received-not reviewed".

1. Plan of Action.
2. Contingency Plans.
3. Project Directory.
4. Notifications: copy of notification sent to other entities at the work site, notification sent to Louisiana Department of Environmental Quality, emergency service agencies, and all other notifications as directed by the Owner or Owner's Representative.

5. Pre-Construction Inspection: Report on inspection carried out as required by this section. Include copies of all photographs, video tapes, etc.
6. Contractor's Construction Schedule.
7. Accreditation: Submit evidence in the form of training course certificates for the General Superintendent, Supervisors, and Forepersons as asbestos abatement supervisors in accordance with AHERA requirements. Submit evidence in the form of training course certificates that each worker is trained as an asbestos abatement worker in accordance with AHERA requirements.
8. Resume: Submit resume of General Superintendent

B. Submit daily: Provide two (2) copies for information purposes of all documents indicated in the following sub-sections to Project Administrator by end of the next working day after the day they are received by Contractor.

1. Section on Record Keeping.
2. Section on Special Reports.

C. Project Close-out: Submit two (2) copies for information purposes of all documents indicated in the following sections at final closeout of project as a project close-out submittal.

1. Section on Record Keeping.
2. Section on Special Reports.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION – 02 80 15

SECTION 02 80 21 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. **General:** Basic contract definitions are included in the Conditions of the Contract.

1. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited.

2. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Designer, requested by the Designer, and similar phrases.

3. "Approved": The term "approved," when used in conjunction with the Designer's action on the Contractor's submittals, applications, and requests, is limited to the Designer's duties and responsibilities as stated in the Conditions of the Contract.

4. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

5. "Furnish": The term "furnish" means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.

6. "Install": The term "install" describes operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

7. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

8. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.

a. The term "experienced," when used with the term "installer," means having a minimum of 5 previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of authorities having jurisdiction.

b. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades persons of the corresponding generic name.

c. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.

1) This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.

9. "Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

10. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

11. "Designer": This is the entity described as the "Architect" in AIA Document A201 "General Conditions of the Contract for Construction," or is the entity described as "Engineer" in Engineers Joint Contract Document Committee (EJCDC) Document 1910-8 "Standard General Conditions of the Construction Contract." All references to Architect or Engineer in the Contract Documents in all cases refer to the Designer. The Designer will represent the Owner during construction and until final payment is due. The Designer will advise and consult with the Owner. The Owner's instructions to the Contractor will be forwarded through the Designer.

12. "Project Administrator": This is the entity described as the "Project Representative" in AIA Document A201 "General Conditions of the Contract for Construction," or is the entity described as "Engineer" in Engineers Joint Contract Document Committee (EJCDC) Document 1910-8 "Standard General Conditions of the Construction Contract." The Project Administrator is a full time representative of the Owner at the job site with authority to stop the work upon written or verbal order if requirements of the Contract Documents are not met, or if in the sole judgement of the Project Administrator, Designer, or Owner, the interests of the Owner, safety of any person or the Owner's property are jeopardized by the work.

13. “Stop Work Order”: is a written order to cease work activities. The Contractor must maintain work area isolation during the period that a Stop Work Order is in affect.

14. "General Superintendent": This is the Contractor's Representative at the work site. This person must be a Competent Person as defined by OSHA in 29 CFR 1926.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on CSI 2004 MasterFormat's numbering system.

B. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Streamlined Language: The Specifications generally use the imperative mood and streamlined language. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.

1.4 INDUSTRY STANDARDS

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with 2 or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer to the Designer before proceeding for a decision on requirements that are different but apparently equal, and where it is uncertain which requirement is the most stringent.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum acceptable. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Designer for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research Co.'s "Encyclopedia of Associations," available in most libraries.

1. ACI American Concrete Institute
   P.O. Box 19150
   Detroit, MI 48219 (313) 532-2600

2. ACIL American Council of Independent Laboratories
   1629 K St., NW
   Washington, DC 20006 (202) 887-5872

3. ACPA American Concrete Pipe Assoc.
   8300 Boone Blvd., Suite 400
   Vienna, VA 22182 (703) 821-1990

4. ACGIH American Conference of Governmental Industrial Hygienists
   1330 Kemper Meadow Dr.
   Cincinnati, OH 45240 (513) 742-2020

5. AIA The American Institute of Architects
   1735 New York Ave., NW
   Washington, DC 20006 (202) 626-7300

6. AIHA American Industrial Hygiene Assoc.
   2700 Prosperity Ave., Suite 250
   Fairfax, VA 22031(703) 849-8888

7. ANSI American National Standards Institute
   11 West 42nd St., 13th Floor
   New York, NY 10036 (212) 642-4900

8. ASHRAE American Society of Heating,
   Refrigerating and Air-Conditioning Engineers
   1791 Tullie Circle, NE
   Atlanta, GA 30329 (404) 636-8400

9. ASME American Society of Mechanical Engineers
   345 East 47th St.
   New York, NY 10017 (212) 705-7722

10. ASPE American Society of Plumbing Engineers
3617 Thousand Oaks Blvd., Suite 210
Westlake, CA 91362 (805) 495-7120

11. ASTM American Society for Testing and Materials
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959 (610) 832-9585

12. CGA Compressed Gas Assoc.
1725 Jefferson Davis Highway, Suite 1004
Arlington, VA 22202-4100 (703) 412-0900

13. FM Factory Mutual Systems
1151 Boston-Providence Turnpike
P.O. Box 9102
Norwood, MA 02062 (617) 762-4300

14. GA Gypsum Association
810 First St., NE, Suite 510
Washington, DC 20002 (202) 289-5440

15. IEEE Institute of Electrical and Electronic Engineers
345 E. 47th St.
New York, NY 10017 (212) 705-7900

16. IETA International Electrical Testing Assoc.
P.O. Box 687
Morrison, CO 80465 (303) 697-8441

17. IRI Industrial Risk Insurers
P.O. Box 5010
85 Woodland St.
Hartford, CT 06102-5010 (203) 520-7300

18. ISA Instrument Society of America
P.O. Box 12277
67 Alexander Dr.
Research Triangle Park, NC 27709 (919) 549-8411

19. ISO International Standards Organization

20. NEC National Electrical Code (from NFPA)

21. NECA National Electrical Contractors Assoc.
3 Bethesda Metro Center, Suite 1100
Bethesda, MD 20814 (301) 657-3110

22. NEMA National Electrical Manufacturers Assoc.
2101 L St., NW, Suite 300
Washington, DC 20037 (202) 457-8400

23. NFPA National Fire Protection Assoc.
One Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101 (617) 770-3000 (800) 344-3555

24. NRCA National Roofing Contractors Assoc.
10255 W. Higgins Rd., Suite 600
Rosemont, IL 60018-5607 (708) 299-9070

25. RFCI Resilient Floor Covering Institute
966 Hungerford Dr., Suite 12-B
Rockville, MD 20805 (301) 340-8580

26. UL Underwriters Laboratories
333 Pfingsten Rd.
Northbrook, IL 60062 (708) 272-8800

27. White Lung Association
PO Box 1483
Baltimore, MD 21203

E. Federal Government Agencies: Names and titles of federal government standard- or Specification-producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard- or Specification-producing agencies of the federal government. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.

1. CE Corps of Engineers
(U.S. Department of the Army)
Chief of Engineers - Referral
Washington, DC 20314 (202) 272-0660

2. CFR Code of Federal Regulations
(Available from the Government Printing Office)
N. Capitol St. between G and H St., NW
Washington, DC 20402 (202) 783-3238
(Material is usually first published in the "Federal Register")

3. CPSC Consumer Product Safety Commission
5401 Westbard Ave.
Bethesda, MD 20207 (800) 638-2772

4. CS Commercial Standard
(U.S. Department of Commerce)
Government Printing Office
Washington, DC 20402 (202) 783-3238

5. DOC Department of Commerce
14th St. and Constitution Ave., NW
Washington, DC 20230 (202) 482-2000

6. DOT Department of Transportation
400 Seventh St., SW
Washington, DC 20590 (202) 366-4000

7. EPA Environmental Protection Agency
401 M St., SW
Washington, DC 20460 (202) 260-2090

8. FS Federal Specification (from GSA)
Specifications Unit (WFSIS)
7th and D St., SW
Washington, DC 20407 (202) 708-9205

9. GSA General Services Administration
F St. and 18th St., NW
Washington, DC 20405 (202) 708-5082

10. MIL Military Standardization Documents
(U.S. Department of Defense)
Naval Publications and Forms Center
5801 Tabor Ave.
Philadelphia, PA 19120

11. NIST National Institute of Standards and Technology
(U.S. Department of Commerce)
Gaithersburg, MD 20899 (301) 975-2000

12. OSHA Occupational Safety and Health Administration
(U.S. Department of Labor)
200 Constitution Ave., NW
Washington, DC 20210 (202) 219-6091

13. PS Product Standard of NBS
(U.S. Department of Commerce)
Government Printing Office
Washington, DC 20402 (202) 783-3238

14. USPS U.S. Postal Service
475 L'Enfant Plaza, SW
Washington, DC 20260-0010 (202) 268-2000

15. Louisiana Department of Environmental Quality
Office of Environmental Compliance
P.O. Box 82215
Baton Rouge, La. 70884-2215 (225) 765-0634

F. Trade Union Jurisdictions: The Contractor shall maintain, and require subcontractors to maintain, complete current information on jurisdictional matters, regulations and pending actions, as applicable to construction activities. The manner in which Contract Documents have been organized and subdivided is not intended to be indicative of trade union or jurisdictional agreements.

1. Discuss new developments at project meetings at the earliest feasible dates. Record relevant information and actions agreed upon.

2. Assign and subcontract construction activities, and employ tradesmen and laborers in a manner that will not unduly risk jurisdictional disputes that could result in conflicts, delays, claims and losses.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 02 80 21

SECTION 02 80 22 - CODES, REGULATIONS AND STANDARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this section.

1.2 SUMMARY

A. This section sets forth governmental regulations which are included and incorporated herein by reference and made a part of the specification. This section also sets forth those notices and permits which are known to the Owner and which either must be applied for and received, or which must be given to governmental agencies before start of work.

1. Requirements include adherence to work practices and procedures set forth in applicable codes, regulations and standards.

2. Requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with codes, regulations, and standards.

1.3 CODES, REGULATIONS AND STANDARDS

A. **General Applicability of Codes, Regulations and Standards:** Except to the extent that more explicit or more stringent requirements are written directly into the Contract Documents, all applicable codes and regulations have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the Contract Documents, or as if published copies are bound herewith.

B. **Contractor Responsibility:** The Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State, and local regulations. The Contractor shall hold the Owner and Designer harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of the contractor, the contractor's employees, or subcontractors.

C. **Federal Requirements:** which govern renovation work or hauling and disposal of waste materials include but are not limited to the following:

1. **OSHA:** U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA), including but not limited to:

a. Respiratory Protection
Title 29, Part 1910, Section 134 of the Code of Federal Regulations
Title 29, Part 1926, Section 103 of the Code of Federal Regulations

b. Personal Protective Equipment for General Industry
Title 29, Part 1910, Section 132 of the Code of Federal Regulations
Title 29, Part 1926, Sections 95 - 107 of the Code of Federal Regulations

c. Access to Employee Exposure and Medical Records
Title 29, Part 1926, Section 33 of the Code of Federal Regulations

d. Hazard Communication
Title 29, Part 1926, Section 59 of the Code of Federal Regulations

e. Specifications for Accident Prevention Signs and Tags
Title 29, Part 1910, Section 145 of the Code of Federal Regulations

f. Permit Required Confined Space
Title 29, Part 1910, Section 146 of the Code of Federal Regulations

g. Construction Industry
Title 29, Part 1910, Section 1001 of the Code of Federal Regulations
Title 29, Part 1926, Section 1101 of the Code of Federal Regulations

h. Construction Industry - General Duty Standards
Title 29, Part 1926, Sections 20 through 35 of the Code of Federal Regulations

i. Shipyard Industry
Title 29 Part 1915 Section 1001 of the Code of Federal Regulations

2. DOT: U. S. Department of Transportation, including but not limited to:

a. Hazardous Substances
Title 49, Part 171 and 172 of the Code of Federal Regulations

b. Hazardous Material Regulations
General Awareness and Training Requirements for Handlers, Loaders and Drivers
Title 49, Parts 171-180 of the Code of Federal Regulations

c. Hazardous Material Regulations
Editorial and Technical Revisions
Title 49, Parts 171-180 of the Code of Federal Regulations

3. EPA: U. S. Environmental Protection Agency (EPA), including but not limited to:

a. National Emission Standard for Hazardous Air Pollutants (NESHAP)
National Emission Standard for Asbestos
Title 40, Part 61, Sub-part A, and Sub-part M (Revised Sub-part B) of the Code of Federal Regulations

D. **State Requirements:** which govern work or hauling and disposal of asbestos waste materials include but are not limited to the following: LAC 33:III:51.
Abide by all local requirements which govern renovation work or hauling and disposal of waste materials.

1.4 PERMITS:

Contractor is responsible for obtaining any demolition, building, renovation or other permits, and for paying application fees, if any, where required by State or Local jurisdictions.

1.5 LICENSES:

A. Licenses: Maintain current licenses as required by applicable state or local jurisdictions for the removal, transporting, disposal or other regulated activity relative to the work of this contract.

1.6 POSTING AND FILING OF REGULATIONS

A. **Posting and Filing of Regulations:** Post all notices required by applicable federal, state and local regulations. Maintain two (2) copies of applicable federal, state and local regulations and standard. Maintain one copy of each at job site. Keep on file in Contractor's office one copy of each.

1.7 SUBMITTALS:

A. **Before Start of Work:** Submit the following to the Designer for review. No work shall begin until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use.

1. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work including:

a. State and Local Regulations: Submit copies of codes and regulations applicable to the work.

2. Notices: Submit notices required by federal, state and local regulations together with proof of timely transmittal to agency requiring the notice.

3. Permits: Submit copies of current valid permits required by state and local regulations.

4. Licenses: Submit copies of all State and local licenses and permits necessary to carry out the work of this contract.

PART 2 - PRODUCTS (Not Applicable)
PART 3 - EXECUTION (Not Applicable)

END OF SECTION – 02 80 22

SECTION 02 80 30 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:

1. Submittal schedule.
2. Daily construction reports.
3. Shop Drawings.
4. Product Data.
5. Samples.
6. Quality Assurance Submittals

B. Administrative Submittals: Refer to other Division 2 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:

1. Permits
2. List of Subcontractors

C. RELATED SECTIONS

1. The following Sections contain requirements that relate to this Section:

a. Section "Coordination" specifies requirements governing submittal and distribution of meeting and conference minutes.

b. Section "Project Closeout" specifies requirements for submittal of Project Record Documents and warranties at project closeout.

1.3 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.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

a. The Designer reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.

B. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.

No extension of Contract Time will be authorized because of failure to transmit submittals to the Designer sufficiently in advance of the Work to permit processing.

C. 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. Contractor may elect to prepare and transmit all submittals electronically, provided the submittals are in PDF file format and convey information as required by these specifications.

1. Provide a space approximately 4 by 5 inches (100 by 125 mm) on the label or beside the title block on Shop Drawings to record the Contractor's review and approval 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 Designer.
d. Name and address of the Contractor.
e. Name and address of the supplier.
f. Name of the manufacturer.
g. Number and title of appropriate Specification Section.
h. Drawing number and detail references, as appropriate.

3. 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.

4. Contractor shall transmit all closeout submittals in electronic format (email to Designer or via CD-ROM). Contractor shall use latest version of Microsoft Word or Excel file formats for submittal preparation.

D. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Designer using a transmittal form. The Designer 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.

E. Transmittal Form: Use AIA Document G810.

1.4 SUBMITTAL SCHEDULE

A. Submittal Schedule: After development and acceptance of the Contractor's Construction Schedule, prepare a complete schedule of submittals.

1. Coordinate Submittal Schedule with the list of products as well as the Contractor's Construction Schedule.

2. Prepare the schedule in chronological order. Provide the following information:
- a. Scheduled date for the first submittal.
- b. Related Section number.
- c. Submittal category (Shop Drawings, Product Data, or Samples).
- d. Description of the part of the Work covered.
- e. Scheduled date for resubmittal.
- f. Scheduled date for the Designer's final release or approval.

B. Distribution: Following response to the initial submittal, print and distribute copies to the Designer, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies at the jobsite.

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.

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

1.5 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. 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.

C. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 36 by 48 inches (890 by 1220 mm).

D. Initial Submittal: Submit one correctable, translucent, reproducible print and one blue- or black-line print for the Designer's review. The Designer will return the reproducible print.

E. **Final Submittal:** Submit 3 blue- or black-line prints; submit 5 prints where required for maintenance manuals. The Designer will retain 2 prints and return the remainder.

F. **Final Submittal:** Submit 3 blue- or black-line prints and 2 additional prints where required for maintenance manuals, plus the number of prints needed by the Designer for distribution. The Designer will retain 2 prints and return the remainder.

1. One of the prints returned shall be marked up and maintained as a "Record Document."
2. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

1.6 PRODUCT DATA

A. **Collect Product Data into a single submittal.** Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."

1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:

a. Manufacturer's printed recommendations.
b. Compliance with recognized 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. **Preliminary Submittal:** Submit a preliminary single-copy of Product Data where selection of options is required.

C. **Submittals:** Submit 3 copies of each required submittal. The Designer will retain two, and will return the one marked 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.

D. **Distribution:** Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.

1. Do not proceed with installation until a final submittal is in the installer's possession.
2. Do not permit use of unmarked copies of Product Data in connection with construction.

1.7 SAMPLES

A. **Submit full-size, fully fabricated Samples** cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.

1. Mount or display Samples in the manner to facilitate review of qualities indicated. Prepare Samples to match the Designer's sample. Include the following:

a. Specification Section number and reference.
b. Generic description of the Sample.
c. Sample source.
d. Product name or name of the manufacturer.
e. Compliance with recognized standards.
f. Availability and delivery time.

2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.

a. 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.

3. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

B. **Submittals:** Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit 3 sets. The Designer will return one set marked with the action taken.

1. Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.
2. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

3. Sample sets may be used to obtain final acceptance of the construction associated with each set.

C. **Distribution of Samples:** Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.

1. Field samples are full-size examples erected on-site to illustrate finishes, coatings, or finish materials and to establish the Project standard.
a. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.8 QUALITY ASSURANCE SUBMITTALS

A. **Submit quality-control submittals,** including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.

B. **Certifications:** Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.

1. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.

1.9 MISCELLANEOUS SUBMITTALS:

A. **Material Safety Data Sheets:** Process material safety data sheets as “product data.” These are submitted for information purposes only, they will be returned with the action stamp, “Received - Not Reviewed.”

B. **Inspection and Test Reports:** Classify each inspection and test report as being either "shop drawings" or "product data" depending on whether the report is specially prepared for the project, or a standard publication of workmanship control testing at the point of production. Process inspection and test reports accordingly.

C. **Worker Identification and Accreditation:** Provide legally recognized identification of contractor personnel (such as valid driver’s license from any of the fifty states of the United States of America or territories, or valid photographic ID from any of the fifty states of the United States of America or territories) as well as required drug screening and employee background information.

D. **Project Photographs:** Furnish 2 prints each of 3 project photographs at monthly intervals. Comply with Designer's direction concerning desired vantage points for shots.

E. **Records of Actual Work:** Furnish 4 copies of records of actual work, one of which will be returned for inclusion in the record documents as specified in section "Project Closeout".

F. **Standards:** Where submittal of a copy of standards is indicated, and except where copies of standards are specified as an integral part of a "Product Data" submittal, submit a single copy of standards for the Designer's use. Where workmanship, whether at the project site or elsewhere is governed by a standard, furnish additional copies of the standard to fabricators, installers and others involved in the performance of the work.

G. **Closeout Submittals:** Refer to section "Project Closeout" and to individual sections of these specifications for specific submittal requirements of project closeout information.

H. **Record Documents:** Furnish set of original documents as maintained on the project site. Along with original marked-up record drawings provide 2 photographic copies of marked-up drawings, which, at the Contractor's option, may be reduced to not less than half size.

1.10 DESIGNER'S ACTION

A. Except for submittals for the record or information, where action and return is required, the Designer will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is the Contractor's responsibility.

B. **Action Label:** The Designer will label each submittal with a uniform, action label. The Designer will mark the label appropriately to indicate the action taken, as follows:

1. Final Unrestricted Release: When the Designer marks a submittal "Approved," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.

2. Final-But-Restricted Release: When the Designer marks a submittal "Approved as Noted," 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 payment depends on that compliance.

3. Returned for Resubmittal: When the Designer marks a submittal "Not Approved, Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.

a. Do not use, or allow others to use, submittals marked "Not Approved, Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.

4. Received - Not Reviewed: When the Designer marks a submittal "Received - Not Reviewed" this acknowledges that the submittal has been received. This action applies to materials that are to be submitted for information purposes only, and where no review or action by the Designer is required.

5. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the Designer will return the submittal marked "Action Not Required."

C. **Unsolicited Submittals:** The Designer will return unsolicited submittals to the sender without action.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 02 80 30

SECTION 02 80 40 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and other Division 1 & 2 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section includes requirements** for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection where required.

B. **Temporary utilities include**, but are not limited to, the following:

1. Water service and distribution.
2. Temporary electric power and light.
3. Temporary heat.
4. Ventilation.
5. Telephone service.
5. Sanitary facilities, including drinking water.
6. Storm and sanitary sewer.

C. **Support facilities include**, but are not limited to, the following:

1. Temporary enclosures.
2. Hoists.

D. **Security and protection facilities include**, but are not limited to, the following:

1. Temporary fire protection.
2. Barricades, warning signs, and lights.

1.3 DESCRIPTION OF REQUIREMENTS:

A. **General:** Provide temporary connection to existing building utilities or provide temporary facilities as required herein or as necessary to carry out the work.

1.4 SUBMITTALS

A. **Before the Start of Work:** Submit the following to the Designer for review. Begin no work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use. Only submit data on items listed below that are required for use on this project.

1. Water heater: Submit manufacturers name, model number, size in gallons (liters), heating capacity, power requirements.

2. Decontamination Unit Sub-panel: Submit product data.
3. Ground Fault Circuit Interrupters (GFCI): Submit product data.
4. Lamps and Light Fixtures: Submit product data.
5. Temporary Heating Units: Provide product data.
6. Temporary Cooling Units: Provide product data and installation instructions.
7. Self-Contained Toilet Units: Provide product data and name of sub-contractor to be used for servicing self-contained toilets. Submit method to use for servicing.
8. Fire Extinguishers: Provide product data. Submit schedule indicating location at job site and compliance with NFPA 10 and NFPA 241.
9. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
10. Implementation and Termination Schedule: Within 15 days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.

1.5 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:

1. Building code requirements.
2. Health and safety regulations.
3. Utility company regulations.
4. Police, fire department, and rescue squad rules.
5. Environmental protection regulations.

B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, 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 NFPA 70 "National Electric Code."

D. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.

B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. General: Provide new materials and equipment. If acceptable to the Designer, the Contractor may use undamaged, previously used materials and equipment in serviceable condition. Provide materials and equipment suitable for use intended.

B. Lumber and Plywood:

1. For job-built temporary offices, shops, and sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding.
2. For fences and vision barriers, provide minimum 3/8-inch- (9.5mm) thick exterior plywood.

C. Scaffolding: Provide scaffolding, ladders and/or staging, etc. as necessary to accomplish the work of this contract. Scaffolding may be of suspension type or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of scaffolding shall comply with applicable OSHA provisions.

1. Equip rungs of metal ladders, etc. with an abrasive non-slip surface.
2. Provide a nonskid surface on scaffold surfaces subject to foot traffic.

2.2 WATER SERVICE

A. Water: Provide potable water approved by local health authorities.

B. Temporary Water Service Connection: Connections to the Owner's water system shall include backflow protection. Valves shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall be piped to the nearest drain or located over an existing sink or grade where water will not damage existing finishes or equipment. Provide separate hoses and/or/ pumps for shower water and amended water, without the possibility of cross connection.

C. Water Hoses: Provide heavy-duty, abrasion-resistant, flexible hoses in diameters and lengths necessary to adequately serve temporary facilities, and with a pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

1. Provide water into each work area and to each Decontamination Unit. Provide fittings as required to allow for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping, showers, shut-off nozzles and equipment.

D. **Water Heater:** Provide UL rated minimum 40 gallon (150 liters) electric water heater to supply hot water for the Decontamination Unit shower. Activate from 30-amp circuit breaker located within the Decontamination Unit subpanel. Provide with relief valve compatible with water heater operation; pipe relief valve down to drip pan on floor with type L copper. Drip pans shall consist of a 12" X 12" X 6" (30 cm. X 30 cm. X 15 cm) deep pan, made of 19-gauge galvanized steel, with handles. A 3-quart (3 liter) kitchen saucepan may be substituted for this purpose. Drip pan shall be securely fastened to the water heater with bailing wire or similar material. Wiring of the hot water heater shall be in compliance with NEMA, NECA, and UL standards.

E. **Hot Water:** may be secured from the building hot water system, provided backflow protection is installed at point of connection as described in this section under Temporary Water Service connection, and if authorized in writing by the Designer.

2.3 ELECTRICAL SERVICE:

A. **General:** Comply with applicable NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service.

B. **Temporary Power:** Provide service to Decontamination Unit subpanel with minimum 60 amp, 2 pole circuit breaker or fused disconnect connected to the building's main distribution panel. Subpanel and disconnect shall be sized and equipped to accommodate electrical equipment required for completion of the work.

1. Connection to the building's main distribution panel is to be made by a licensed electrician

C. **Voltage Differences:** Provide identification warning signs at power outlets which are other than 110–120-volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets. Dry type transformers shall be provided where required to provide voltages necessary for work operations.

D. **Electrical Outlets:** Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters (GFCI), reset button, and pilot light for connection of power tools and equipment.

1. Locate GFCI's exterior to Work Area so that circuits are protected prior to entry to Work Area. Provide circuit breaker type ground fault circuit interrupters (GFCI) equipped with test button and reset switch for circuits to be used for any purpose in work area, decontamination units, exterior, or as otherwise required by national electrical code, OSHA or other authority. Locate in panel exterior to Work Area.

E. **Electrical Power Cords:** Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

F. **Lamps and Light Fixtures:** Provide general service incandescent lamps or fluorescent lamps of wattage indicated or required for adequate illumination as required by the work or this section. Protect lamps with guard cages or tempered glass enclosures, where fixtures are exposed to breakage by construction operations. Provide vapor tight fixtures in work area and decontamination units. Provide exterior fixtures where fixtures are exposed to the weather or moisture.

2.4 TEMPORARY HEAT:

A. **Heating Units:** Provide temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the fuel being consumed. Use steam or hot water radiant heat where available, and where not available use electric resistant fin radiation supplied from a branch circuit with ground fault circuit interrupter.

2.5 TEMPORARY COOLING:

A. **Cooling Units:** Provide temporary cooling units consisting of a fan coil unit inside the work area with a compressor and heat rejection coil outside.

2.6 TEMPORARY STRUCTURES

A. **Temporary Toilet Units:** Provide self-contained, single-occupant toilet units of the chemical or aerated recirculation type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

2.7 FIRST AID

A. **First Aid Supplies:** Comply with governing regulations and recognized recommendations within the construction industry.

2.8 FIRE EXTINGUISHERS:

A. **Fire Extinguishers:** Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

B. **Comply with NFPA 10 and NFPA 241** for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. **General:** Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. **Provide** each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

C. **Require** that personnel accomplishing this work be licensed as required by local authority for the work performed.

D. **Relocate**, modify and extend services and facilities as required during the course of work so as to accommodate the entire work of the project.

3.2 SCAFFOLDING:

A. **During the erection and/or moving** of scaffolding, care must be exercised so that the polyethylene floor covering is not damaged.

B. **Clean** as necessary debris from non-slip surfaces.

C. **At the completion of abatement work** clean construction aids within the work area, wrap in one layer of 6 mil (0.15 mm) polyethylene sheet and seal before removal from the Work Area.

3.3 TEMPORARY UTILITY INSTALLATION

A. **General:** Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.

1. Arrange with company and existing users for a time when service can be interrupted, if 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. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Designer. Neither the Owner nor Designer will accept cost or use charges as a basis of claims for Change Orders.

B. **Water Service:**

1. Water connection (without charge) to Owner's existing potable water system is limited to one 3/4" (19 mm) pipe-size connection, and a maximum flow of 10 g.p.m. (38 liters / minute) each to hot and cold-water supply. Install using vacuum breakers or other backflow preventer as required by local authority. Hot water shall be supplied at a minimum temperature of 100 degrees F (35 degrees C). Supply hot and cold water to the Decontamination Unit in accordance with Section 01563.

a. Maintain hose connections and outlet valves in leakproof condition. Where finish work below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize the possibility of water damage. Drain water promptly from pans as it accumulates.

2. Sterilization: Sterilize temporary water piping prior to use.

C. Electrical Service:

1. Lock out: Lock out all existing power to or through the work area as described below. Unless specifically noted otherwise existing power and lighting circuits to the Work Area are not to be used. All power and lighting to the Work Area and Decontamination facilities are to be provided from temporary electrical panel described below.

a. Comply with requirements to OSHA 29 CFR 1910.147 the control of hazardous energy lock out/tag out.
b. Lock out power to Work Area by switching off breakers serving power or lighting circuits in work area. Tagout breakers with notation "DANGER circuit being worked on". Lock panel and have all keys under control of authorized person who has locked pane.
c. Lock out power to circuits running through Work Area wherever possible by switching off and locking all breakers serving these circuits. Tag out breakers with notation "DANGER circuit being worked on". Sign and date danger tag. Lock panel and supply keys to authorized person who has applied locks. If circuits cannot be shut down for any reason, label at intervals of 4-feet" (1.25 meter) on center with signs reading, "DANGER live electric circuit. Electrocution hazard." All asbestos abatement work in the vicinity of the live circuit is to be performed dry. All necessary notifications and procedures for dry removal are to be followed.
d. Lock out power to electrical equipment located in the work area, and to any fans or other equipment that is going to be worked on.

2. Temporary Electrical Panel: Provide temporary electrical panel sized and equipped to accommodate electrical equipment and lighting required by the work. Connect temporary panel to existing building electrical system. Protect with circuit breaker or fused disconnect. Locate temporary panel as directed by Owner or Designer. Panel is to be installed by a licensed electrician.

3. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.

4. Circuit Protection: Protect each circuit with a ground fault circuit interrupter (GFCI) of proper size located in the temporary panel. Do not use outlet type GFCI devices.

5. Temporary Wiring: in the Work Area shall be type UF non-metallic sheathed cable located overhead and exposed for surveillance. Do not wire temporary lighting with plain, exposed (insulated) electrical conductors. Provide liquid tight enclosures or boxes for wiring devices.

6. Number of Branch Circuits: Provide sufficient branch circuits as required by the work. Branch circuits are to originate at temporary electrical panel. At minimum provide the following:

a. One Circuit for each HEPA filtered fan unit
b. For power tools and task lighting, provide one temporary 4-gang outlet in the following locations. Provide a separate 110-120 Volt, 20 Amp circuit for each 4-gang outlet (4 outlets per circuit).

c. One outlet in the work area for each 2500 square feet (225 square meters) of work area
d. One outlet at each decontamination unit, located in equipment room

7. 110–120-volt 20-amp branch circuits with 4-gang outlet for Owner's exclusive use while conducting visual inspection and air sampling during the work as follows:

a. One in each work area
b. One at clean side of each Decontamination Unit.
c. One at each exhaust location for HEPA filtered fan units

8. 110–120-volt 20-amp branch circuits with 4-gang outlet for Owner's exclusive use for conducting visual inspection and final air sampling as set forth in Section 01711 Project Decontamination as follows:

a. Five inside work area
b. Two outside work area in location designated by Designer

D. Temporary Lighting:

1. Lock out: Lock out existing power to lighting circuits in Work Area as described in section "Temporary Enclosures". Unless specifically noted otherwise existing lighting circuits to the Work Area are not to be used. All lighting to the Work Area and Decontamination facilities is to be provided from temporary electrical panel described above.

2. Provide the following or equivalent where natural lighting or existing building lighting does not meet the required light level:

a. One 200-watt incandescent lamp per 1000 square feet (92.9 square meters) of floor area, uniformly distributed, for general construction lighting, or equivalent illumination of a similar nature. In corridors and similar traffic areas provide one 100-watt incandescent lamp every 50 feet (15.2 meters). In stair ways and at ladder runs, provide one lamp minimum per story, located to illuminate each landing and flight. Provide sufficient temporary lighting to ensure proper workmanship everywhere; by combined use of daylight, general lighting, and portable plug-in task lighting.
b. Provide lighting in areas where work is being performed as required to supply a 100-foot candle (1,076 lumens/sq meter) minimum light level.
c. Provide lighting in any area being subjected to a visual inspection as required to supply a 100-foot candle (1,076 lumens/sq meter) minimum light level.
d. Provide lighting in the Decontamination Unit as required to supply a 50-foot candle (538 lumens/sq meter) minimum light level.

3. Number of Lighting Circuits: Provide sufficient lighting circuits as required by the work. Lighting circuits are to originate at temporary electrical panel.

4. Circuit Protection: Protect each circuit with a ground fault circuit interrupter (GFCI) of proper size located in the temporary panel.

E. Temporary Heat:

1. **General:** Provide temporary heat were indicated or needed for performance of the Work.
2. Heating Facilities: Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP-gas or fuel-oil heaters with individual space thermostatic control.

    a. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.

3. Maintain a minimum temperature of 70 degrees F (21 degrees C). Where finished work has been installed.
4. Maintain a minimum temperature of 75 degrees F (24 degrees C).in the shower of the decontamination unit.
5. Maintain a minimum temperature of 65 degrees F (18 degrees C) in the Work Area at all times that work is going on. At all other times and at completion of removal work, but before start of reconstruction work, maintain a minimum temperature of 50 degrees F (10 degrees C).
6. Maintain a minimum temperature of 50 degrees F (10 degrees C) in the Work Area at all times during and after removal work.

F. Temporary Cooling:

1. Required Cooling: Provide units sufficient to supply 20,000 BTU/hr (5,862 w) of cooling per 8,000 cubic feet (225 cubic meters) of work area.

G. Temporary Utilities

1. Temporary Telephones: Provide temporary telephone service throughout the construction period for personnel engaged in construction activities. Install telephone on a separate line for each temporary office and first-aid station.
2. Separate Telephone Lines: Provide additional telephone lines for the following:

    a. Where an office has more than 2 occupants, install a telephone for each additional occupant or pair of occupants.
    b. Provide a dedicated telephone line for a fax machine in the field office.
    c. Provide a separate line for the Owner's use.
    d. At each telephone, post a list of emergency telephone numbers.

H. Sanitary Facilities:

1. 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.

    a. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.

2. Toilets: Use of the Owner's existing toilet facilities will not be permitted.
3. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.
4. Provide separate facilities for male and female personnel.
5. 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.
6. Drinking-Water Facilities: Provide containerized, tap-dispenser, bottled-water drinking-water units, including paper supply.

    a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7.2 to 12.8 deg C).

7. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.

    a. Filter out excessive amounts of soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
    b. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.

3.4 NOT USED.

3.5 FIRE PROTECTION FACILITIES INSTALLATION

A. **Except for use of permanent fire protection** as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Designer.

B. **Temporary Fire Protection**: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."
1. 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.
2. Store combustible materials in containers in fire-safe locations.
3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires.
4. Prohibit smoking within any building, structure, other enclosures or in hazardous fire-exposure areas.
5. Prohibit smoking in hazardous fire-exposure areas.

6. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

C. **Permanent Fire Protection**: At the earliest feasible date in each area of the Project, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

D. **Barricades, Warning Signs, and Lights:** Comply with standards and code requirements for erection of structurally adequate barricades. 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.

Temporary Fencing: Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch-(3.76-mm-) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch-(73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails.

E. **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 that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. **Supervision:** Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. **Maintenance:** Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. **Termination and Removal:** Unless the Designer requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.

END OF SECTION 02 80 40

SECTION 02 80 41 - TEMPORARY PRESSURE DIFFERENTIAL AND AIR CIRCULATION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-2 Specification Sections, apply to work of this section.

1.2 RELATED SECTIONS

A. **Heating and cooling requirements** are set forth in Section "Temporary Facilities - Asbestos Abatement".

1.3 MONITORING

A. **Continuously monitor** and record the pressure differential between the Work Area and the building outside of the Work Area with a monitoring device incorporating a continuous recorder (e.g. strip chart).

1.4 SUBMITTALS

A. **Before Start of Work:** Submit design of pressure differential system to the Designer for review. Do not begin work until submittal is returned with the Designer's action stamp indicating that the submittal is returned for unrestricted use. Include in the submittal at a minimum:

1. Number of HEPA filtered fan units required and the calculations necessary to determine the number of machines
2. Description of projected air flow within Work Area and methods required to provide adequate air flow in all portions of the work area
3. Anticipated pressure differential across Work Area enclosures
4. Description of methods of testing for correct air flow and pressure differentials
5. Manufacturer's product data on the HEPA filtered fan units to be used
6. Location of the machines in the Work Area
7. Method of supplying adequate power to the machines and designation of building electrical panel(s) which will be supplying the power.
8. Description of work practices to insure that airborne fibers travel away from workers
9. Manufacturer's product data on equipment used to monitor pressure differential between inside and outside of Work Area.
10. Manufacturer's product data on auxiliary generator to be used
11. Manufacturer's product data on auxiliary power switch to be used
12. Schematic diagram of power and auxiliary power supply to HEPA filtered fan units

B. On a weekly basis: Submit printout from pressure differential monitoring equipment. Mark printout with date and start of time for each day. Use printout paper that indicates elapsed time in intervals no greater than hours. Indicate on each day's record times of starting and stopping abatement work, type of work in progress, breaks for lunch or other purposes, periods of stop work, and filter changes. Cut printout into segments by day, attach to 8 ½" by 11" paper. Label with project name, contractors name and date.

1.5 QUALITY ASSURANCE:

A. Monitor pressure differential at Personnel and Equipment Decontamination Units with a differential pressure meter equipped with a continuous recorder. Meter shall be equipped with a warning buzzer which will sound if pressure differential drops below 0.02 inch [0.5 mm] of water.

PART 2 - PRODUCTS

2.1 HEPA FILTERED FAN UNITS:

A. General: Supply the required number of HEPA filtered fan units to the site in accordance with these specifications. Use units that meet the following requirements.

B. Cabinet: Constructed of durable materials able to withstand damage from rough handling and transportation. The width of the cabinet should be less than 30 inches [0.76 meters] to fit through standard-size doorways. Provide units whose cabinets are:

1. Factory-sealed to prevent asbestos-containing dust from being released during use, transport, or maintenance
2. Arranged to provide access to and replacement of all air filters from intake end
3. Mounted on casters or wheels

C. Fans: Rate capacity of fan according to usable air-moving capacity under actual operating conditions.

D. HEPA Filters: Provide units whose final filter is the HEPA type with the filter media (folded into closely pleated panels) completely sealed on all edges with a structurally rigid frame.

1. Provide units with a continuous rubber gasket located between the filter and the filter housing to form a tight seal.
2. Provide HEPA filters that are individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 um dioctylphthalate (DOP) particles when tested in accordance with Military Standard Number 282 and Army Instruction Manual 136-300-175A. Provide filters that bear a UL586 label to indicate ability to perform under specified conditions.
3. Provide filters that are marked with: the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of test air flow.
4. Pre-filters, which protect the final filter by removing the larger particles, are required to prolong the operating life of the HEPA filter. Two stages of pre-filtration are required. Provide units with the following pre-filters:

a. First-stage pre-filter: low-efficiency type (e.g., for particles 100 um and larger)
b. Second-stage (or intermediate) filter: medium efficiency (eg., effective for particles down to 5 um)
c. Provide units with pre-filters and intermediate filters installed either on or in the intake grid of the unit and held in place with special housings or clamps.

E. Instrumentation: Provide units equipped with:

1. Magnehelic gauge or manometer to measure the pressure drop across filters and indicate when filters have become loaded and need to be changed

2. A table indicating the usable air-handling capacity for various static pressure readings on the Magnehelic gauge affixed near the gauge for reference, or the Magnehelic reading indicating at what point the filters should be changed, noting Cubic Feet per Minute (CFM) (Liters / Second (LPS)) air delivery at that point

3. Elapsed time meter to show the total accumulated hours of operation

F. Safety and Warning Devices: Provide units with the following safety and warning devices:

1. Electrical (or mechanical) lockout to prevent fan from operating without a HEPA filter

2. Automatic shutdown system to stop fan in the event of a rupture in the HEPA filter or blocked air discharge

3. Warning lights to indicate normal operation (green), too high a pressure drop across the filters (i.e., filter overloading) (yellow), and too low of a pressure drop (i.e., rupture in HEPA filter or obstructed discharge) (red)

4. Audible alarm if unit shuts down due to operation of safety systems

G. Electrical components: Provide units with electrical components approved by the National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL). Each unit is to be equipped with overload protection sized for the equipment. The motor, fan, fan housing, and cabinet are to be grounded.

H. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

I. Manufacturer: Subject to compliance with requirements, provide products of the following:

1. HEPA filtered Fan Units: The following machines are standard 2000 CFM machines used in typical asbestos abatement jobs.

Aerospace America, Inc.
900 Truman Parkway
P.O. Box 189
Bay City, Michigan 48707
(517) 684-2121
"Aero-Clean 2000"

Abatement Technologies
3305 Breckinridge Blvd. #118
Deluth, GA 30136
(800) 634-9091 or (404) 925-2761
"HEPA-AIRE 1990 and HEPA-AIRE 2000"

Global Consumer Services, Inc.
4615-1U E. Industrial St.
Sims Valley, CA 93063
(805) 579-0230

M-Tec Corp.
1300 W. Steel Rd.
Unit #2
Morrisville, PA 19067
(215) 295-8208
Micro-Trap
Alumina II

2. **Large Capacity:** The following are large capacity 5000-6000 CFM machines used on large asbestos abatement jobs.

Abatement Technologies
3305 Breckinridge Blvd. #118
Deluth, GA 30136
(800) 634-9091 or (404) 925-2761
"HEPA-AIRE 5000"
model H5000C

3. **Hazardous Locations:** The following are pneumatically powered machines for use in asbestos abatement jobs in hazardous locations where electric motors are prohibited.

Abatement Technologies
3305 Breckinridge Blvd. #118
Deluth, GA 30136
(800) 634-9091 or (404) 925-2761
"HEPA-AIRE PNEUMATIC"
model H2000P

2.2 AUXILIARY GENERATOR:

A. **Auxiliary Generator:** Provide a gasoline-powered self-starting generator with a capacity adequate to power a minimum of 50% of the HEPA filtered fan units in operation at any time during the work.

2.3 AUXILIARY POWER SWITCH:

A. **Auxiliary Power Switch:** Provide a switching relay which will automatically start auxiliary generator and switch over power supplied to HEPA filtered fan units to auxiliary generator.

PART 3 - EXECUTION

3.1 PRESSURE DIFFERENTIAL ISOLATION

A. **Isolate the Work Area** from all adjacent areas or systems of the building with a Pressure Differential that will cause a movement of air from outside to inside at any breach in the physical isolation of the Work Area.

B. **Relative Pressure in Work Area:** Continuously maintain the work area at an air pressure that is lower than that in any surrounding space in the building, or at any location in the immediate proximity outside of the building envelope. This pressure differential when measured across any physical or critical barrier must equal or exceed a static pressure of: 0.02 inches (0 .5 mm) of water.

C. **Accomplish the pressure differential by exhausting** a sufficient number of HEPA filtered fan units from the work area. The number of units required will depend on machine characteristics, the seal at barriers, and required air circulation. The number of units will increase with increased make-up air or leaks into the Work Area. Determine the number of units required for pressure isolation by the following procedure:

1. Establish required air circulation in the work area, personnel and equipment decontamination units.

2. Establish isolation by increased pressure in adjacent areas or as part of seals where required.

3. Exhaust a sufficient number of units from the work area to develop the required pressure differential.

4. The required number of units is the number determined above plus one additional unit.

5. Vent HEPA filtered fan units to outside of building unless authorized in writing by Designer.

6. Vent each HEPA filtered fan unit to inlet of second unit. Vent second unit to a controlled area in the building. Insure that controlled area is isolated from balance of building by critical barriers at all times that units are in operation.

7. Mount units to exhaust directly or through disposable ductwork.

8. Use only new ductwork except for sheet metal connections and elbows.

9. Use ductwork and fittings of same diameter or larger than discharge connection on fan unit.

10. Use inflatable, disposable plastic ductwork in lengths not greater than 100 feet (30 meters).
11. Use spiral wire-reinforced flex duct in lengths not greater than 50 feet (15 meters).

12. Arrange exhaust as required to inflate duct to a rigidity sufficient to prevent flapping.

13. If direction of discharge from fan unit is not aligned with duct use sheet metal elbow to change direction. Use six feet (2 meters) of spiral wire reinforced flex duct after direction change.

D. **Isolation of elevators, stair towers, and return air intakes:** Erect seals with an air space at doors to elevators and stair towers. Pressurize this space with HEPA-filtered air so that it is at a pressure greater than either the Work Area elevator shaft or stair tower.

1. Fabricate seal by first sealing door with duct tape and 6 mil polyethylene. Construct a barrier from ½" (13 mm) gypsum board supported by 3-5/8" (92 mm) x 25-gauge metal studs at 16" (410 mm) on centers. Space face of barrier a minimum of 3" (76 mm) from face of door. Seal barrier with 6 mil (0.15 mm) sheet plastic and duct tape.

2. Fabricate seal by first sealing door with duct tape and 6 mil (0.15 mm) polyethylene. Construct a barrier from ½" (13mm) CDX plywood supported by 2" X 4" (51 mm x 102 mm) wood studs at 16" (410 mm) on centers. Space face of barrier a minimum of 3" (76 mm) from face of door. Seal barrier with 6 mil (0.15 mm) sheet plastic and duct tape.

3. Use plywood and framing lumber that is treated to be fire resistant.

4. Pressurize space with exhaust from HEPA filtered fan unit. Continuously maintain a pressure differential with this space a minimum of 0.02 inches (0.5 mm) of water higher in static pressure than any adjacent space.

5. Locate HEPA filtered fan unit outside of work area. Fabricate a manifold as required to distribute air to individual spaces to be isolated. Provide relief venting at unit as required to prevent shut down due to low air flow while still maintaining required air pressure.

E. **Isolation of chases and enclosed stairs:** Pressurize chases and enclosed stairs with HEPA filtered air so that it is at a pressure greater than any adjacent work area.

1. Pressurize space with exhaust from HEPA filtered fan unit. Continuously maintain a pressure differential with this space a minimum of 0.02 (.5 mm) inches of water higher in static pressure than any adjacent work area.

2. Pressurize space with centrifugal-type fans. Axial type fans are not to be used for this purpose. Continuously maintain a pressure differential in this space a minimum of 0.02 inches (0.5 mm) of water higher in static pressure than any adjacent work area.

F. **Isolation of return air ductwork:** Return air duct work which must be kept operating is located in the Work Area. This duct work is to be isolated from the Work Area by an enclosure forming an annular space around the duct which is positively pressurized with HEPA filtered air.

1. Wrap the duct with 6 mil (0.15 mm) polyethylene. Seal all polyethylene seams with spray glue and duct tape.

2. Enclose wrapped duct with two layers of polyethylene. Fabricate inner layer from 6 mil (0.15 mm) polyethylene with all seams sealed with spray glue and duct tape. Arrange outer layer to support inner layer. Fabricate out of reinforced sheet plastic with seams sealed with spray glue and duct tape and reinforced with staples. Support outer layer with a frame work fabricated from 2" x 4"s (51 mm x 102 mm) at 24" (610 mm) on center. Enclosures less than 2'-6' in diameter may be reinforced with box strapping in lieu of wood framing.

3.2 AUXILIARY GENERATOR

A. **Provide auxiliary gasoline-powered generator** located outside of the building in a location protected from the weather. Install the generator in a location so that the exhaust from the generator does not flow to any building ventilation or supplied air intakes. Arrange so that if a power failure occurs the generator automatically starts and supplies power to a minimum of 50% of the HEPA filtered fan units in operation.

3.3 AIR CIRCULATION IN THE WORK AREA:

A. **Air Circulation:** For purposes of this section air circulation refers to either the introduction of outside air to the Work Area or the circulation and cleaning of air within the Work Area. Maintain the Work Area and all adjacent areas or systems of the Work Area with a Pressure Differential as specified in this section that will cause a movement of outside work area to inside work area. Contractor shall continuously monitor and record the pressure differential between the Work Area and the building outside of the Work Area with a monitoring device incorporating a continuous recorder (e.g. strip chart).

B. **Air circulation in the Work Area** is a minimum requirement intended to help maintain airborne fiber counts at a level that does not significantly challenge the work area isolation measures. The Contractor may also use this air circulation as part of the engineering controls in the worker protection program.

C. **Determining the Air circulation Requirements:** The air flow volume (cubic meters per minute) exhausted (removed) from the workplace must exceed the amount of makeup air supplied to the enclosure. Provide a fully operational air circulation system supplying a minimum of the following air circulation rate: 4 air changes per hour

D. Determine Number of Units needed to achieve required air circulation according to the

following procedure:

1. Determine the volume in cubic feet of the work area by multiplying floor area by ceiling height. Determine total air circulation requirement in cubic feet per minute (CFM) for the work area by dividing this volume by 60 and multiplying by the air change rate.

2. Air Circulation Required in Cubic Feet of Air per Minute (CFM) =

$$\frac{\text{Volume of work area (cu. ft.)}}{\text{60 (minutes per hour)}} \times \text{Number of air changes per hour}$$

3. Divide the air circulation requirement (CFM) above by capacity of HEPA filtered fan unit(s) used. Capacity of a unit for purposes of this section is the capacity in cubic feet per minute with fully loaded filters (pressure differential which causes loaded filter warning light to come on) in the machine's labeled operating characteristics.

4. Number of Units Needed =

$$\frac{\text{Air circulation Requirement (CFM)}}{\text{Capacity of Unit with Loaded Filters (CFM)}}$$

5. Add one (1) additional unit as a backup in case of equipment failure or machine shutdown for filter changing.

3.4 EXHAUST SYSTEM:

A. **Pressure differential isolation and air circulation** and pressure differential in the Work Area are to be accomplished by an exhaust system as described below.

1. Exhaust all units from the Work Area to meet air circulation requirement of this section.

2. Location of HEPA Filtered Fan Units: Locate fan unit(s) so that makeup air enters work area primarily through decontamination facilities and traverses Work Area as much as possible. This may be accomplished by positioning the HEPA filtered fan unit(s) at a maximum distance from the worker access opening or other makeup air sources.

3. The end of the unit or its exhaust duct should be placed through an opening in the plastic barrier or wall covering. Seal plastic around the unit or duct with tape.

4. Vent to Outside of Building, unless authorized in writing by the Designer.

5. Air Handling Unit Exhaust: The exhaust plume from air handling units should be located away from adjacent personnel and intakes for HVAC systems.

6. Decontamination Units: Arrange Work Area and decontamination units so that the majority of makeup air comes through the Decontamination Units. Use only personnel or equipment Decontamination Unit at any time and seal the other so that make up air passes through unit in use.

7. Supplemental Makeup Air Inlets: Provide where required for proper air flow through the Work Area in location approved by the Designer by making openings in the plastic sheeting that allow air from outside the building into the Work Area. Locate auxiliary makeup air inlets as far as possible from the fan unit(s) (e.g., on an opposite wall), off the floor (preferably near the ceiling), and away from barriers that separate the Work Area from occupied clean areas. Cover with flaps to reseal automatically if the pressure differential system should shut down for any reason. Spray flap and around opening with spray adhesive so that if flap closes meeting surfaces are both covered with adhesive. Use adhesive that forms contact bond when dry.

3.5 RECIRCULATION SYSTEM:

A. Pressure differential isolation and air circulation in the Work Area are to be accomplished by a recirculation system as described below.

1. Re-circulate air in the Work Area through HEPA filtered fan units to accomplish air circulation requirements of this section.

2. Location of Fan Units: Locate HEPA filtered fan units so that air is circulated through all parts of the Work Area, and so that required pressure is maintained at all parts of Work Area geometry. Move units as necessary, so that in any location where asbestos-containing materials are being disturbed, air movement is directed away from employees, and toward the HEPA filter fan unit. Direct air flow in these locations so that it is predominantly toward workers' backs at the breathing zone elevation.

3.6 AIR CIRCULATION IN DECONTAMINATION UNITS:

A. **Pressure Differential Isolation:** Continuously maintain the pressure differential required for the work area in the:

1. Personnel Decontamination Unit: across the Shower Room with the Equipment Room at a lower pressure than the clean room.

2. Equipment Decontamination Unit: Across the Holding Room with the Wash Room at a lower pressure than the Clean Room.

B. **Air Circulation:** Continuously maintain air circulation in Decontamination Units at same level as required for Work Area.

C. **Air Movement:** Arrange air circulation through the Personnel Decontamination Unit so that it produces a movement of air from the Clean Room through the Shower Room into the Equipment Room. At each opening, the air flow velocity must be sufficient to provide visible indications of air movement into the work area. The velocity of air flow within the enclosure must be adequate to remove airborne contamination from each worker's breathing zone without disturbing the asbestos-containing material on surfaces.

3.7 USE OF THE PRESSURE DIFFERENTIAL AND AIR CIRCULATION SYSTEM:

A. **General:** Each unit shall be serviced by a dedicated minimum 115V-20A circuit with ground fault circuit interrupter (GFCI) supplied from temporary power supply installed under requirements of Section "Temporary Facilities." Do not use existing branch circuits to power fan units.

B. **Air Flow Tests:** Air flow patterns will be checked before removal operations begin, at least once per operating shift and any time there is a question regarding the integrity of the enclosure. The primary test for air flow is to trace air currents with smoke tubes or other visual methods. Flow checks are made at each opening and at each doorway to demonstrate that air is being drawn into the enclosure and at each worker's position to show that air is being drawn away from the workers location and toward the HEPA filtration unit.

C. **Demonstrate Condition of Equipment** for each HEPA filtered fan unit and pressure differential monitoring equipment including proper operation of the following:

1. Squareness of HEPA Filter

2. Condition of Seals

3. Proper operation of all lights

4. Proper operation of automatic shut down if exhaust is blocked

5. Proper operation of alarms

6. Proper operation of Magnehelic gauge

7. Proper operation and calibration on pressure monitoring equipment

D. **Demonstrate Operation** of the pressure differential system to the Designer will include, but not be limited to, the following:

1. Plastic barriers and sheeting move lightly in toward Work Area,

2. Curtain of decontamination units move lightly in toward Work Area,

3. There is a noticeable movement of air through the Decontamination Unit.

4. Use smoke tube to demonstrate air movement from Clean Room through Shower Room to Equipment Room.

5. Use smoke tubes to demonstrate a definite motion of air across all areas in which work is to be performed.

6. Use a differential pressure meter or manometer to demonstrate the required pressure differential at every barrier separating the Work Area from the balance of the building, equipment, ductwork or outside.

7. Modify the Pressure Differential System as necessary to demonstrate successfully the above.

E. Use of System during Abatement Operations:

1. Start fan units before beginning work (before any asbestos-containing material is disturbed). After abatement work has begun, run units continuously to maintain a constant pressure differential and air circulation until decontamination of the work area is complete. Do not turn off units at the end of the work shift or when abatement operations temporarily stop.

2. Monitoring Pressure Within the Enclosure: After the initial air flow patterns have been checked, the static pressure must be monitored within the enclosure. Monitoring may be made using manometers, pressure gauges, or combinations of these devices. It is recommended that they be attached to alarms and strip chart recorders
3. Do not shut down air pressure differential system during encapsulating procedures, unless authorized by the Designer in writing. Supply sufficient pre-filters to allow frequent changes.

4. Start abatement work at a location farthest from the fan units and proceed toward them. If an electric power failure occurs, immediately stop all abatement work and do not resume until power is restored and fan units are operating again.

5. Corrective Actions: If the manometers or pressure gauges demonstrate a reduction in pressure differential below the required level, work should cease and the reason for the change investigated and appropriate changes made. The air flow patterns should be retested before work begins again.

6. At completion of abatement work, allow fan units to run as specified under section “Project Decontamination”, to remove airborne fibers that may have been generated during abatement work and cleanup and to purge the Work Area with clean makeup air. The units may be required to run for a longer time after decontamination, if dry or only partially wetted asbestos material was encountered during any abatement work.

F. Dismantling the System:

1. When a final inspection and the results of final air tests indicate that the area has been decontaminated, fan units may be removed from the Work Area. Before removal from the Work Area, remove and properly dispose of pre-filter, decontaminate exterior of machine and seal intake to the machine with 6 mil (0.15 mm) polyethylene to prevent environmental contamination from the filters.

END OF SECTION – 02 80 41

SECTION 02 80 42 - TEMPORARY ENCLOSURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. **Drawings and general provisions of the Contract**, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to work of this section.

1.2 SUBMITTALS:

A. **Before Start of Work** submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal is returned for unrestricted use.

1. Strippable Coatings: Submit following:
- a. Product description including major components and solvents.
- b. Test report on ASTM E84 test of surface burning characteristics.
- c. Manufacturer's installation instructions. Indicate portions applicable to the project and selected assemblies where the manufacturer offers alternatives.

2. Spray Cement: Submit following:
- a. Product description including major components and solvents.
- b. Manufacturer's installation instructions. Indicate portions applicable to the project.

3. Sheet Plastic: For fire retardant plastic submit test reports on NFPA 701 test.

4. Signs: Submit samples of signs to be used.

B. **Before Start of Work** submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal has been' "Received - Not Reviewed."

1. Material Safety Data Sheet: Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for the following:
- a. Strippable Coating.
- b. Spray Cement.

PART 2 - PRODUCTS

2.1 SHEET PLASTIC:

A. **Polyethylene Sheet:** A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mil (0.15 mm) thick, clear, frosted, or black as indicated.

B. **Polyethylene Sheet:** Provide flame-resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-Resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick frosted or black as indicated.

C. **Reinforced Polyethylene Sheet:** Where plastic sheet constitutes the only barrier between the work area and the building exterior, provide translucent, nylon reinforced or woven polyethylene, laminated, flame-resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick, frosted or black as indicated.

2.2 STRIPPABLE COATINGS:

A. **Strippable Coatings:** Provide strippable coatings in aerosol cans or premixed for spray application formulated to adhere gently to surfaces and remove cleanly by peeling off at the completion of the work.

1. Provide only water-based latex materials.
2. Provide materials manufactured for the specific application required.

B. **Wall coating:** designed to be easy to remove.

C. **Floor coating:** designed to provide a tough film which resists spread of water beneath plastic layer.

D. **Window coating:** recommended by the manufacturer for use on windows. Supply materials that are designed to be stable on glass in sunlight and resist the transmission of ultraviolet radiation.

E. **Fire Safety:** Provide materials that meet the following requirements:

1. When wet or while being installed:
   a. Do not create combustible vapors
   b. Have no flash point
   c. Are not noxious
   d. Department of Transportation category of non-flammable.

2. When dry, material must have a Class A rating as a building material and meet the following requirements when tested in accordance with ASTM E-84:
   a. Flame Spread no greater than 20
   b. Fuel Contributed 0
   c. Smoke Developed no more than 110

F. **Deliver materials** to the job site in unopened, factory-labeled containers.

G. **Available Manufacturers:** Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

H. **Manufacturer:** Subject to compliance with requirements, provide products of one of the Following:

1. Isotek Corporation — Spray Poly
P.O. Box 29799
New Orleans, LA 70189-0799
(504)367-9856

2. H.B. Fuller Co. — Spray Poly
3900 Jackson St., NE — Part no. 3256
Minneapolis, MN 55421
(800) 328-4594

2.3 MISCELLANEOUS MATERIALS:

A. **Duct Tape:** Provide duct tape in 2 inch or 3-inch (50 mm or 75 mm) widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

B. **Spray Cement:** Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

PART 3 - EXECUTION

3.1 SEQUENCE OF WORK:

A. **Carry out work of this section sequentially.** Complete each of the following activities in accordance with requirements before proceeding to the next.
1. Provide emergency exits and emergency lighting.
2. Control access
3. Provide respiratory and worker protection.
4. Provide Critical Barriers.
5. Prepare Area.
6. Provide Primary Barriers.
7. Provide Isolation Areas as required.
8. Provide Secondary Barrier.

3.2 GENERAL:

A. **Work Area:** the location where asbestos abatement work occurs. The Work Area is a variable of the extent of work of the Contract. It may be a portion of a room, a single room, or a complex of rooms. A "Work Area" is considered contaminated during the work, and must be isolated from the balance of the building, and decontaminated at the completion of the asbestos control work.

B. **Completely isolate the Work Area** from other parts of the building so as to prevent asbestos-containing dust or debris from passing beyond the isolated area. Should the area beyond the Work Area(s) become contaminated with asbestos-containing dust or debris as a consequence of the work, clean those areas in accordance with the procedures indicated in Section “Project Decontamination”. Perform all such required cleaning or decontamination at no additional cost to owner.

C. Construct enclosures to provide an air-tight seal around ducts and openings into existing ventilation systems and around penetrations for electrical conduits, telephone wires, water lines, drain pipes, etc. Construct enclosures to be both airtight and watertight except for those openings designed to provide entry and/or air flow control.

D. **Size:** Construct enclosure with sufficient volume to encompass all of the working surfaces yet allow unencumbered movement by the worker(s), provide unrestricted air flow past the worker(s), and ensure walking surfaces can be kept free of tripping hazards.

E. **Shape:** The enclosure may be any shape that optimizes the flow of ventilation air past the worker(s).

F. **Structural Integrity:** The walls, ceilings and floors must be supported in such a manner that portions of the enclosure will not fall down during normal use.

G. **Barrier Supports:** Provide frames as necessary to support all unsupported spans of sheeting.

H. **Openings:** It is not necessary that the structure be airtight; openings may be designed to direct air flow. Such openings are to be located at a distance from active removal operations. They are to be designed to draw air into the enclosure under all anticipated circumstances. In the event that negative pressure is lost, they are to be fitted with either HEPA filters to trap dust or automatic trap doors that prevent dust from escaping the enclosure. Openings for exits are to be controlled by an airlock or a vestibule.

I. **Place all tools**, scaffolding, staging, etc. necessary for the work in the area to be isolated prior to completion of Work Area isolation.

J. **Areas Within an Enclosure:** Each enclosure consists of a work area, a decontamination area, and waste storage area. The work area where the asbestos removal operations occur are to be separated from both the waste storage area and the contamination control area by physical curtains, doors, and/or airflow patterns that force any airborne contamination back into the work area. Unless infeasible, the Contractor shall construct each building's containment system to enclose all of the building's respective asbestos abatement work that requires Work of This Section.

K. **Removing Mobile Objects:** Clean movable objects and remove them from the work area before an enclosure is constructed unless moving the objects creates a hazard. Mobile objects will be assumed to be asbestos contaminated and are to be either cleaned with amended water and a HEPA vacuum and then removed from the area or wrapped and then disposed of as asbestos-contaminated waste.

L. **Disabling HVAC Systems:** The power to the heating, ventilation, and air conditioning systems that service the regulated area must be deactivated and locked out. All ducts, grills, access ports, windows and vents must be sealed off with two layers of plastic to prevent entrainment of contaminated air.

M. **Operating HVAC Systems in the regulated Area:** If components of a HVAC system located in the regulated area are connected to a system that will service another zone during the project, the portion of the duct in the regulated area must be sealed and pressurized. Necessary precautions include caulking the duct joints, covering all cracks and openings with two layers of sheeting, and pressurizing the duct throughout the duration of the project by restricting the return air flow. The power to the fan supplying the positive pressure should be locked "on" to prevent pressure loss.

1. If fan providing positive pressure fails for any reason, immediately stop asbestos removal work, mist the area to reduce airborne fiber levels. Notify the Project Administrator. Do not re-start asbestos removal work until authorized by the Designer.

N. **Lockout power to Work Area** by switching off all breakers serving power or lighting circuits in work area. A lock and tag shall be placed on each breaker used to de-energize circuits and equipment with notation "DANGER circuit being worked on". Lock panel and have all keys under control of authorized person who has applied the locks.

O. **Lockout power** to circuits running through work area wherever possible by switching off all breakers or removing fuses serving these circuits. Label breakers with tape over breaker with notation "DANGER circuit being worked on". Lock panel and have all keys under control of authorized person who applied locks. If circuits cannot be shut down for any reason, label at intervals 4 feet (1.22 m) on center with signs reading, "DANGER live electric circuit. Electrocution hazard." Label circuits in hidden locations but which may be affected by the work in a similar manner.

P. **Inspection Windows:** Install inspection windows in locations shown on the plans or as directed by the Designer. Each inspection window is to have a 24-inch X 24-inch (610 X 610 mm) viewing area fabricated from 1/4-inch (6.35 mm) acrylic or polycarbonate sheet. Install window with top at 6 feet-6 inches (1.98 m) above floor height in a manner that provides unobstructed vision from outside to inside of the Work Area. Protect window from damage from scratching, dirt or any coatings used during the work. A sufficient number of windows are to be installed to provide observation of all portions of the Work Area that can be made visible from adjacent areas. Inspection windows that open into uncontrolled area are to be covered with a removable plywood hatch secured by lock and key. Provide keys to Designer for all such locks.

3.3 EMERGENCY EXITS:

A. **Provide emergency exits and emergency lighting** as set forth below:

1. Emergency Exits: At each existing exit door from the Work Area provide the following means for emergency exiting:

2. Arrange exit door so that it is secure from outside the Work area but permits exiting from the Work Area.

3. Mark outline of door on Primary and Critical Barriers with luminescent paint at least 1 inch (25.4 mm) wide. Hang a razor knife on a string beside outline. Arrange Critical and Primary barriers so that they can be easily cut with one pass of razor knife. Paint words "EMERGENCY EXIT" inside outline with luminescent paint in letters at least one foot high and 2 inches (50.8 mm) wide.

4. Provide lighted EXIT sign at each exit.

5. Provide battery-operated emergency lighting that switches on automatically in the event of a power failure.

3.4 CONTROL ACCESS:

A. **Isolate the Work Area** to prevent entry by building occupants into Work Area or surrounding controlled areas. Accomplish isolation by the following:

1. Submit to Designer a list of doors and other openings that must be secured to isolate Work Area. Include on list notation if door or opening is in an indicated exit route.

2. After receiving written authorization from the Designer lock all doors into Work Area, or, if doors cannot be locked, chain shut. Notify the local fire department of the list of doors/or other openings which must be chained or otherwise secured shut. Cover any signs that direct emergency exiting, either outside or inside of Work Area, to locked doors. Do not obstruct doors required for emergency exits from Work Area or from building.

3. After receiving written authorization from the Designer, construct partitions or closures across any opening into Work Area. Partitions are to be a minimum of 8 feet (2.44 meters) high.

4. Fabricate partitions from 3-5/8-inch (9.21 cm), 25 gage metal studs with ½ inch (1.27 cm) gypsum board on both faces. Brace at intervals of 4 feet (1.22 m) on center.

5. Fabricate partitions from 2-inch X 4-inch (50.8mm X 101.6mm) wood studs with ½ inch (1.27 cm) plywood on both faces. Brace at intervals of 4 feet (1.25 m) on center.

6. Fabricate partitions from 2-inch X 4-inch (50.8 mm X 101.6 mm) wood studs with ½ inch (1.27 cm) plywood on both faces. Brace at intervals of 4 feet (1.22 m) on center. Use only fire-retardant treated wood.

7. Fabric-type folding partitions: provide temporary partitions across fabric-type folding doors or partitions into Work Area.

8. Rigid-type folding partitions: remove operating bar and latch on clean side of folding partitions. Fasten down operating lever with hook and chain or other secure device on Work Area side. At completion of all abatement work reinstall bar and latch and adjust for proper operation.

9. Modify elevator controls to prevent elevators from stopping at doors in Work Areas. This work is to be performed by a qualified elevator technician.

10. Replace passage sets on doors required for exiting from Work Area with temporary locksets for duration of the project. Use entry type locksets that are key lockable from one side and always operable from inside. Install locksets with key side in stair tower and escape side on Work Area side. Provide one key to Owner and maintain one key in clean room of decontamination unit. After meeting Contractor release criteria set forth in Section "Project Decontamination", reinstall original passage sets and adjust for proper operation.

B. Locked Access: Arrange Work Area so that the only access into Work Area is through lockable doors to personnel and equipment decontamination units.

1. Install temporary doors with entrance type locksets that are key lockable from the outside and always unlocked and operable from the inside. Do not use deadbolts or padlocks.

2. Replace locksets or passage sets on doors leading to decontamination units with temporary locksets for duration of the project. Remove any deadbolts or padlocks. Use entry type locksets that are key lockable from outside and always unlocked and operable from inside. After meeting contractor release criteria set forth in Section "Project Decontamination" reinstall original locks, passage sets and locksets and adjust for proper operation.

3. Provide one key for each door to Owner, and Designer and maintain one key in clean room of decontamination unit (3 total).

C. Visual Barrier: Where the Work Area is immediately adjacent to or within view of occupied areas, provide a visual barrier of opaque polyethylene sheeting at least 6 mil (0.15 mm) in thickness so that the work procedures are not visible to building occupants. Where this visual barrier would block natural light, substitute frosted or woven rip-stop sheet plastic in locations approved by the Designer.

D. Demarcation. Demarcate the regulated area in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne concentrations of asbestos. Where critical barriers or negative pressure enclosures are used, they may demarcate the regulated area.

E. Access. Limit access to regulated areas to authorized persons as defined by OSHA, and to the Owner, Designer, Project Administrator or a representative authorized by one of these entities.

F. **Provide Warning Signs** at each locked door leading to Work Area reading as follows:

1. Print text in both English and Spanish

Legend	**Notation**
KEEP OUT	3 inch (77 mm) Sans Serif Gothic or Block
BEYOND THIS POINT	1 inch (25.4 mm) Sans Serif Gothic or Block
ASBESTOS ABATEMENT WORK	1 inch (25.4 mm) Sans Serif Gothic or Block
IN PROGRESS	1 inch (25.4 mm) Sans Serif Gothic or Block
BREATHING ASBESTOS DUST MAY BE HAZARDOUS TO YOUR HEALTH	14 Point Gothic

2. Provide Warning Signs at each locked door leading to Work Area reading as follows

Legend	**Notation**
KEEP OUT	3 inch (77 mm) Sans Serif Gothic or Block
CONSTRUCTION	1 inch (25.4 mm) Sans Serif Gothic or Block
WORK AREA	1 inch (25.4 mm) Sans Serif Gothic or Block
PROTECTIVE CLOTHING REQUIRED BEYOND THIS POINT	14 Point Gothic

3. Immediately inside door and outside critical barriers post an approximately 20 inches by 14 inch (508 mm X 356 mm) manufactured caution sign displaying the following legend with letter sizes and styles of a visibility required by 29 CFR 1926:

Legend
DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

4. Provide spacing between respective lines at least equal to the height of the respective upper line.

3.5 ALTERNATE METHODS OF ENCLOSURE:

A. **Alternate methods** of containing the Work Area may be submitted to the Designer for approval in accordance with procedures set forth in Section “Substitutions”. Do not proceed with any such method(s) without prior written approval of the Designer.

B. **Notification:** Before work which involves the removal of more than 25 linear or 10 square feet (7.5 linear meters or 3 square meters) of thermal system insulation or surfacing material is begun using an alternative method which has been the subject of required evaluation and certification. Send a copy of such evaluation and certification to the national office of OSHA, Office of Technical Support, Room N3653, 200 Constitution Avenue, NW, Washington, DC 20210 and to the Designer.

C. **Use a control method** that encloses, contains or isolates the processes or source of airborne asbestos dust, or otherwise captures or redirects such dust before it enters the breathing zone of employees.

D. **Certification:** Submit a certification from a certified industrial hygienist (CIH) or licensed professional engineer who is also qualified as a project designer, who has evaluated the work area, the projected work practices and the engineering controls and who certifies in writing that the planned control method is adequate to reduce direct and indirect employee exposure to below the PELs and any requirements of Section "Respiratory Protection" under worst-case conditions of use, and that the planned control method will prevent asbestos contamination outside the regulated area, as measured by clearance sampling which meets the requirements of EPA's Asbestos in Schools rule issued under AHERA, or perimeter monitoring which meets the criteria of OSHA 1926.1101, and as determined in accordance with the portion of Section "Summary of Work - Asbestos Abatement" that describes the Owner's monitoring of the project.

3.6 RESPIRATORY AND WORKER PROTECTION:

A. **Before proceeding** beyond this point in providing Temporary Enclosures:
1. Provide Worker Protection
2. Provide Respiratory Protection
3. Provide Personnel Decontamination Unit

3.7 CRITICAL BARRIERS:

A. **Completely Separate** the Work Area from other portions of the building, and the outside by closing all openings with sheet plastic barriers at least 6 mil (0.15 mm) in thickness, or by sealing cracks leading out of Work Area with duct tape.

B. **Individually seal** all ventilation openings (supply and exhaust), lighting fixtures, clocks, doorways, windows, convectors and speakers, and other openings into the Work Area with duct tape alone or with polyethylene sheeting at least 6 mil (0.15 mm) in thickness, taped securely in place with duct tape. Maintain seal until all work including Project Decontamination is completed. Take care in sealing of lighting fixtures to avoid melting or burning of sheeting.

C. **Provide Sheet Plastic** barriers at least 6 mil (0.15 mm) in thickness as required to seal openings completely from the Work Area into adjacent areas. Seal the perimeter of all sheet plastic barriers with duct tape or spray cement.

D. **Mechanically Support** sheet plastic independently of duct tape or spray cement seals so that seals do not support the weight of the plastic. Following are acceptable methods of supporting sheet plastic barriers. Alternative support methods may be used if approved in writing by the Designer.

1. Plywood squares 6-inch x 6-inch x 3/8 inch (152 mm x 152 mm x 9.53mm) held in place with one 6d smooth masonry nail or electro-galvanized common nail driven through center of the plywood and duct tape on plastic so that plywood clamps plastic to the wall. Locate plywood squares at each end, corner and at maximum 4 feet (1.22 m) on centers.

2. Nylon or polypropylene rope or wire with a maximum unsupported span of 10 feet (3.05 m), minimum 1/4 inch (6.35 mm) in diameter suspended between supports securely fastened on either side of opening at maximum 1 foot (304.8 mm) below ceiling. Tighten rope so that it has 2 inches (50.8 mm) maximum dip. Drape plastic over rope from outside Work Area so that a two-foot-long flap of plastic extends over rope into Work Area. Staple or wire plastic to itself 1 inch (25.4 mm) below rope at maximum 6 inches (152 mm) on centers to form a sheath over rope. Lift flap and seal to ceiling with duct tape or spray cement. Seal loop at bottom of flap with duct tape. Erect entire assembly so that it hangs vertically without a "shelf" upon which debris could collect.

E. Provide Pressure Differential System per Section "Temporary Pressure Differential & Air Circulation System".

1. Clean housings and ducts of all overspray materials prior to erection of any Critical Barrier that will restrict access.

3.8 PREPARE AREA:

A. Scaffolding: If fixed scaffolding is to be used to provide access HEPA vacuum and wet clean area prior to scaffolding installation.

B. Remove all electrical and mechanical items, such as lighting fixtures, clocks, diffusers, registers, escutcheon plates, etc. which cover any part of the surface to be worked on with the work.

C. Remove all general construction items such as cabinets, casework, door and window trim, moldings, ceilings, trim, etc., which cover the surface of the work as required to prevent interference with the work. Clean, decontaminate and reinstall all such materials, upon completion of all removal work with materials, finishes, and workmanship to match existing installations before start of work.

D. Clean all contaminated furniture, equipment, and or supplies with a HEPA filtered vacuum cleaner or by wet cleaning, as specified in Section "Project Decontamination", prior to being moved or covered. All equipment furniture, etc. is to be deemed contaminated unless specifically declared as uncontaminated on the drawings or in writing by the Designer.

E. Clean All Surfaces in Work Area with a HEPA filtered vacuum or by wet wiping prior to the installation of primary barrier.

F. Cleaning and Sealing Surfaces: After cleaning with water and a HEPA vacuum, surfaces of stationary objects should be covered with two layers of plastic sheeting. The sheeting should be secured with duct tape or an equivalent method to provide a tight seal around the object.

3.9 PRIMARY BARRIER:

A. Protect building and other surfaces in the Work Area from damage from water and high humidity or from contamination from asbestos-containing debris, slurry or high airborne fiber levels.

1. Strippable Coating: If strippable coating is used, perform all work in strict compliance with manufacturer's instructions. Carry out work in the following sequence.

a. Inspect: Before start of coating work inspect all surfaces to be coated. Report on any surfaces that may be damaged by the material or any condition that may interfere with adhesion of the coating to a surface to the Designer before application of coating.

b. Photograph or videotape existing damage to affected surfaces and submit documentation to Designer.

c. Test Patches: Apply test patches as directed by Owner or Designer. Apply a small area of strippable coating to a hidden or obscure area of each surface in the Work Area to be coated. Allow to dry and peel off. Demonstrate results to Designer prior to coating entire area. Commence coating of area only after receiving written authorization from the Designer.

d. Cover surfaces and equipment in work are from which coating may not strip cleanly.

e. Cover shelving, clocks, light fixtures and other equipment with one layer of 6 mil (0.15 mm) sheet plastic.

f. Cover fabric, paper, cork wall coverings or unpainted gypsum board with one layer of 6 mil (0.15 mm) sheet plastic.

g. Tape over any cracks that are larger than 1/16 inch (1.59 mm).

h. Tape over electrical outlets, switches, door locks etc.

i. Wood paneling in area may have the finish partially removed by the strippable coating. These surfaces are to be coated directly with strippable coating and are not to be covered with sheet plastic. Refinishing of this paneling will be accomplished by the Owner and is not a part of the work of this contract.

1) Cover wood paneling in Work Area with one layer of 6 mil (0.15 mm) sheet plastic.

2) Apply small area of coating in concealed location to wood finishes in Work Area. If finish is removed when coating is stripped inform Designer. Cover wood surface with one layer of 6 mil (0.15 mm) sheet plastic unless otherwise notified by Designer.

3) Base bid is for direct coating of wood paneling.

4) If a layer of sheet plastic is necessary this will be a change to the Contract Sum. Submit proposal for change in Contract Sum for the addition of sheet plastic to the Designer.

j. Cover carpeting with three (3) layers of polyethylene sheeting at least 6 mil (0.15 mm) in thickness. Place corrugated cardboard sheets between the top and middle layers of polyethylene.

k. Do not use strippable coating as an adhesive to hold sheet plastic in place.

l. Coat or cover windows into Work Area:

1) Coat windows with window coating applied in a minimum 10 mil (0.254 mm) thickness when wet.

m. Protect critical barriers: Install strippable coating so that it will not remove critical barriers during stripping of coating. Cover critical barriers comprised of sheet plastic with a second layer of sheet plastic configured to be removed with strippable coating. Protect critical barriers made from tape with a protective layer of sheet plastic or duct tape.

n. Coat all surfaces in Work Area with strippable coating in following order.

1) Walls: Coat seams, corners, and junctions vertically. Coat balance of walls horizontally lapping over vertical sprayed areas by 50%.

2) Floor: Coat floor lapping wall by 12 inches (305mm). Start at point furthest from entrance to Work Area and work toward door.

3) Use straight edge to shield ACM from coating during spray application.

o. Apply: to a minimum of the following thicknesses. Thickness is to be measured when material is wet using a wet film thickness gauge.

SURFACE TO BE COATED	MINIMUM THICKNESS WHEN WET	REQUIRED COATING TYPE
Critical Barriers	Not Applicable	Sheet Plastic Covers
Glass	10 mil (0.254 mm)	Window Coating
Plastic Over Glass	2 mil (0.051 mm)	Wall Coating
Paneling Painted Walls, Wall Covering	12 mil (0.305 mm)	Wall Coating
Glazed Tile Smoothly Painted Brick, Painted Concrete Block	15 mil (0.381 mm)	Wall Coating
Floors	15 mil (0.381 mm)	Floor Coating
Unpainted Brick Unpainted Concrete Block, Rough Wood	20 mil (0.51 mm)	Wall Coating

1) Coat brick and concrete block with a sufficient thickness of coating to obscure color of substrate completely.
2) Do not apply over tacky or chalky adhesives remaining from carpet or other flooring covering removal.

p. Respiratory protection: Require that all workers in Work Area from start of spray operation until all surfaces are dry use as a minimum requirement a half-face negative pressure respirator equipped with combination ammonia and HEPA type filter cartridges or other appropriate respiratory protection as required by OSHA 29 CFR 1926.1101(h)(2) and as specified in Section "Respiratory Protection".

q. Worker protection: Equip all workers in Work Area during spray operation with eye protection, disposable gloves, and disposable paper suits.

r. Ventilation: during spraying operation maintain a minimum of 4 air changes per hour in the entire Work Area. Operate one additional HEPA filtered fan unit per spray operator in area while spraying is taking place.

2. Sealing Elevators: If an elevator shaft is located in the regulated area, it should be either shut down or isolated by sealing with two layers of plastic sheeting. The sheeting should provide enough slack to accommodate the pressure changes in the shaft without breaking the air-tight seal.

3. Elevator: Protect walls, floor and ceiling of elevator to prevent contamination. Arrange entry to Work Area so that elevator door is in a positively pressurized space outside the clean room of the decontamination unit. At completion of work clean elevator as set forth in Section "Project Decontamination". Refer to Section "Summary of the Work" for additional requirements for protection of elevator.

4. Sheet Plastic: Protect surfaces in the Work Area with two (2) layers of plastic sheeting on floor and walls, or as otherwise directed on the Contract Drawings or in writing by the Designer. Perform work in the following sequence.

a. All seams in the sheeting should overlap, be staggered and not be located at corners or wall-to-floor joints.

b. Unless work includes floor tile/mastic removal, cover floor of Work Area with 2 individual layers of clear polyethylene sheeting, each at least 6 mil (0.15 mm) in thickness, turned up walls at least 12 inches (305 mm). Form a sharp right-angle bend at junction of floor and wall so that there is no radius which could be stepped on causing the wall attachment to be pulled loose. Both spray-glue and duct tape all seams in floor covering. Locate seams in top layer six feet from, or at right angles to, seams in bottom layer. Install sheeting so that top layer can be removed independently of bottom layer.

c. Unless work includes removal of carpeting and floor tile/mastic, cover carpeting with three (3) layers of polyethylene sheeting at least 6 mil (0.15 mm) in thickness. Place corrugated cardboard sheets between the top and middle layers of polyethylene.

d. Cover Sheet Plastic in areas where scaffolding is to be used with a single layer of ½ inch (13 mm) CDX plywood or 1/4 inch (6.5 mm) tempered hardboard. Wrap edges and corners of each sheet with duct tape. At completion of abatement work wrap plywood or hardboard with 2 layers of 6 mil (0.15 mm) polyethylene and move to next Work Area or dispose of as an asbestos-contaminated waste material in accordance with section “Disposal of Regulated Asbestos Containing Materials”.

e. Cover all walls in Work Area including "Critical Barrier" sheet plastic barriers with one layer of polyethylene sheeting, at least 6 mil (0.15 mm) in thickness, mechanically supported and sealed with duct tape or spray-glue in the same manner as "Critical Barrier" sheet plastic barriers. Tape all joints including the joining with the floor covering with duct tape or as otherwise indicated on the Contract Documents or in writing by the Designer.

f. Elevator: Cover walls, floor and ceiling of elevator with 2 layers of 6 mil (0.15 mm) polyethylene. Arrange entry to Work Area so that elevator door is in a positively pressurized space outside the clean room of the decontamination unit. At completion of work clean elevator as set forth in Section “Project Decontamination”. Refer to Section “Summary of the Work” for additional requirements for protection of elevator.

g. Stairs and Ramps: Do not cover stairs or ramps with unsecured sheet plastic. Where stairs or ramps are covered with plastic, provide 3/4 inch (19.1 mm) exterior grade plywood treads securely held in place, over plastic. Do not cover rungs or rails with any type of protective materials.

h. Repair of Damaged Polyethylene Sheeting: Remove and replace plastic sheeting which has been damaged by removal operations or where seal has failed allowing water to seep between layers. Remove affected sheeting and wipe down entire area. Install new sheet plastic only when area is completely dry.

3.10 ISOLATION AREA:

A. **Maintain isolation areas** between the Work Area and adjacent building area:

1. In locations shown on the plans.
2. In unoccupied rooms located between Work Area and adjacent occupied portions of the building.
3. In locations where separation between Work Area and occupied portions of building is formed by sheet plastic and/or temporary barriers.
4. Floor below Work Area.

B. **Form isolation area** by controlling access to the space in the same manner as a Work Area. Physically isolate the space from the Work Area and adjacent areas. Accomplish physical isolation by:

1. Installing critical barriers in unoccupied space.
2. Erecting a second Critical Barrier a minimum of 3 feet (1.0 m) away from Work Area.

3.11 STOP WORK:

A. **If the Critical or Primary barrier falls** or is breached in any manner stop asbestos removal work immediately and comply with "Stop Work" requirements of Section "Summary of Work - Asbestos Abatement". Do not start work until authorized in writing by the Designer.

3.12 EXTENSION OF WORK AREA:

A. **Extension of Work Area:** If the Critical Barrier is breached in any manner that could allow the passage of asbestos debris or airborne fibers, then add affected area to the Work Area, enclose it as required by this Section of the specification and decontaminate it as described in Section "Project Decontamination".

3.13 SECONDARY BARRIER:

A. **Secondary layer** of plastic as a drop cloth to protect the primary layer from debris generated by the asbestos abatement work is specified in the appropriate work sections.

3.14 EXTERIOR ENCLOSURES:

A. **Construct exterior enclosures** as a Critical Barrier as necessary to completely enclose the work. Fabricate from reinforced polyethylene sheeting and 2-inch x 4-inch (51mm X 102 mm) wood framework. Attach to existing building components or brace as necessary for lateral stability. Construct walls to meet all state and local regulations for construction of temporary buildings. Construct to resist a wind of 30 MPH (13.41 m/s), slope ceiling to permit drainage of rain water.

END OF SECTION – 02 80 42

SECTION 02 80 43 - REGULATED AREAS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. **Drawings and general provisions of Contract**, including General and Supplementary Conditions and other Division-2 Specification Sections, apply to work of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

A. **Worker Protection:** is specified in Section "Worker Protection – Asbestos Abatement".
B. **Respiratory Protection:** is specified in Section "Respiratory Protection"
C. **Wet Decontamination Facilities:** are described in Section "Decontamination Units."

1.3 DESCRIPTION OF WORK:

A. Work of this section consists of preparing a Regulated Area for the work.

1.4 SUBMITTALS

A. **Before the Start of Work:** Submit the following to the Designer for review. Begin no work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use.

1. HEPA Filtered Vacuum Cleaners: Submit product data.
2. Signs: Submit samples of each type of sign to be used.
3. Warning Tape: Submit samples.

PART 2 - EQUIPMENT

2.1 PRODUCTS

A. **HEPA Filter Vacuum Cleaners:**

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

2. Manufacturer: Subject to compliance with requirements, provide products of one of the following:

Nilfisk of America, Inc. 225 Great Valley Parkway Malvern, PA 19355 (800) 645-3475	HEPA filtered Vacuums

Minuteman International 111 South Route 53 Addison, IL 60101 (708) 627-6900	Minuteman HEPA Vacuums
Pullman-Holt (White) Corp. PO Box 16647 Tampa, FL 33617 (813) 645-3475	HEPA Filtered Vacuums

B. Plastic Sheet:

1. Plastic Sheet: A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mil (0.15 mm) thick, clear, frosted, or black as indicated.

PART 3 - EXECUTION

3.1 SECURING WORK AREA:

A. **Secure work** area from access by occupants, staff or users of the building. Accomplish this where possible, by locking doors, windows, or other means of access to the area, by scheduling work for periods of time that the building in unoccupied, or by constructing temporary wood stud and plywood barriers.

3.2 DEMARCATION OF REGULATED AREA:

A. **Demarcation.** Demarcate the Regulated Area with a sheet plastic drop cloth, signs and barrier tape. Configure the regulated area in a manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne concentrations of asbestos.

1. Drop Cloth: Cover floor in vicinity of Work Area and six (6) feet (1.82 meters) beyond, with 6 mil (0.15 mm) polyethylene drop sheet. Where work is adjacent to wall, extend drop sheet up wall and secure at ceiling with duct tape. This drop sheet demarcates the boundary of the Regulated Area.

2. Signs: Post warning signs that carry the following legends in both English and Spanish:

a. First Sign: Provide warning signs at each locked door leading to the controlled area reading as follows:

Legend	**Notation**
KEEP OUT	3 inch (76.2 mm) Block

b. Second Sign: Immediately inside the locked door and outside the controlled area post an approximately 20 inch by 14 inch (508 mm x 356 mm) manufactured caution sign displaying the following legend with letter sizes and styles of a visibility required by 29 CFR 1926:

Legend:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

3. Barrier Tape: Where the controlled area is in a large area such as on part of a boiler room or open office area, delineate area with 3 inch (76.2 mm) wide polyethylene ribbon with the printed warning, "CAUTION ASBESTOS REMOVAL". Install this ribbon at between 3 and 4 feet (0.91 and 1.22 meters) above the floor.

3.3 SCHEDULING:

A. **Work may be carried out** during normal working hours in those areas which can be completely secured by lockable doors from access by building occupants and staff, and which have HVAC equipment that can be shut down and locked off. Otherwise, work is to be carried out after building occupants and cleaning staff have left.

3.4 GENERAL PROCEDURES:

A. **The following precautions and procedures** have application to work of this section. Workers must exercise caution to avoid release of asbestos fibers into the air:

1. Setup and management of the controlled area is to be under the supervision of a OSHA Competent Person as described in Section “Project Coordination - Asbestos Abatement”.

2. Before start of work comply with requirement for in Sections “Worker Protection”, and “Respiratory Protection”.

3. Do not allow eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics in the Regulated Area.

4. Shut down any air handling equipment bringing air into or out of the Regulated Area.

5. Clean any existing dust or debris from the floor and walls, and other surface in the immediate location of the work prior to commencing work by damp-mopping or by use of a High Efficiency Particulate Air (HEPA) filtered vacuum.

6. Cover floor in vicinity of Work Area and six (6) feet (1.82 meters) beyond, with 6 mil (0.15 mm) polyethylene drop sheet. Where work is adjacent to wall, extend drop sheet up wall and secure at ceiling with duct tape. This drop sheet demarcates the boundary of the Regulated Area.

7. Seal all openings, supply and exhaust vents, and convectors within ten (10) feet (3.05 meters) of the Work Area with 6 mil (0.15 mm) polyethylene sheeting secured and completely sealed with duct tape.

8. Perform the work per the appropriate specification section.

9. Immediately remove any asbestos-containing debris by using a HEPA vacuum or by spraying with amended water or removal encapsulant, collecting with wet paper towels, placing in a disposal bag while still wet, and cleaning surfaces with wet paper towels.

10. Thoroughly decontaminate any tools or equipment used at completion of the work.

11. If work day is complete or if moving to another regulated area: all workers remove paper suits turning them inside out while doing so.

12. Place the suits in a properly labeled disposal bag. Adequately wet the suits.

13. Neck down the bag and collapse it with the HEPA vacuum.

14. Twist the bag shut, bend over and seal with duct tape by wrapping around bag neck at least 3 times.

15. Clean all surfaces of the Work Area by use of a HEPA filter vacuum until no visible residue remains.

B. **At completion of work** require all workers to complete decontamination procedures in accordance with Section “Worker Protection”.

C. **Remove respirators** using the procedure in Section “Worker Protection”.

D. **At completion of work** require all workers to complete wet decontamination procedures in accordance with Section “Worker Protection”.

END OF SECTION - 02 80 43

SECTION 02 80 44 - WORKER PROTECTION - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-2 Specification Sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

A. This section describes the equipment and procedures required for protecting workers against asbestos contamination and other workplace hazards except for respiratory protection.

1.3 RELATED WORK SPECIFIED ELSEWHERE:

A. **Respiratory Protection:** is specified in Section “Respiratory Protection”.

1.4 WORKER TRAINING:

A. **AHERA Accreditation:** All workers are to be accredited as Abatement Workers as required by the EPA Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).

B. **State and Local License:** All workers are to be trained, certified and accredited as required by state or local code or regulation.

C. **Training - Class I:** Train in accordance with 29 CFR 1926.1101. Provide training for all workers who will perform Class I operations that is the equivalent in curriculum, training method and length to the EPA Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).

D. **Training - Class II Intact (Non-Friable):** Provide training for workers who will be performing Class II work involving only the removal and/or disturbance of one generic category of building material, such as roofing materials, flooring materials, siding materials or cement asbestos panels; which includes as a minimum the specific work practices and engineering controls which specifically relate to that category. Provide a course that includes "hands-on" training and takes at least 8 hours. Provide training that includes the elements set forth in 29 CFR 1926.1101(k) and the Compliance Directive CPL 2-2.63.

E. **Training - Class II Non-Intact (Friable):** Provide training for workers who will be performing Class II work on materials that are friable, or will become friable during the work that is the equivalent in curriculum, training method and length to the EPA Interim Final Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).

1.5 MEDICAL SURVEILLANCE:

A. **Provide a medical surveillance program** for all employees who are:

1. Engaged in Class I, II and III work for a combined total of 30 or more days per year or,

a. For the purposes of this paragraph, any day in which a worker engages in Class II or Class III work or a combination thereof for one hour or less (taking into account the entire time spent on the removal operation, including cleanup) and, while doing so, adheres fully to the work practices specified in the OSHA standard (29 CFR 1926.1101) is not counted.

2. Are exposed at or above the permissible exposure limit or excursion limit or,

3. Before an employee can be assigned to work requiring use of a respirator.

B. **Provide a medical surveillance program** and physician's opinion before a respirator is assigned as required by 29 CFR 1910.134 and 29 CFR 1926.103(e)(10).

C. **Provide medical examination** that as a minimum meets OSHA requirements as set forth in 29 CFR 1926.1101. In addition, require that the physician provide an evaluation of the individual's ability to work in environments capable of producing heat stress in the worker.

1.6 SUBMITTALS:

A. **Before Start of Work:** Submit the following to the Designer for review. Do not start work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use.

1. **AHERA Accreditation:** Submit copies of certificates from an EPA-approved AHERA Abatement Workers course for each worker as evidence that each asbestos Abatement Worker is accredited as required by the EPA Interim Final Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).

2. **State and Local License:** Submit evidence that all workers have been trained, certified and accredited as required by state or local code or regulation.

3. **Certificate Worker Acknowledgment:** Submit an original signed copy of the Certificate of Worker's Acknowledgment found at the end of this section, for each worker who is to be at the job site or enter the Work Area.

4. **Report from Medical Examination:** conducted within last 12 months as part of compliance with OSHA medical surveillance requirements for each worker who is to enter the Work Area. Submit, at a minimum, for each worker the following:

a. Name and Social Security Number

b. The physician's written opinion as to whether the employee has any detected medical conditions that would place the employee at an increased risk of material health impairment from exposure to asbestos;

c. Any recommended limitations on the employee or on the use of personal protective equipment such as respirators; and

d. A statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.

e. A statement that the employee has been informed by the physician of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure (29 CFR 1926.1101(m)).

f. A legible typed version of the physician's name, the physician's signature, and date of examination.

4. **Notarized Certifications:** Submit certification signed by an officer of the abatement contracting firm and notarized that exposure measurements, medical surveillance, and worker training records are being kept in conformance with 29 CFR 1926.

PART 2 - EQUIPMENT

2.1 PROTECTIVE CLOTHING:

A. General. Provide and require the use of protective clothing, such as coveralls or similar whole-body clothing, head coverings, gloves, and foot coverings for any employee exposed to airborne concentrations of asbestos that exceed the TWA and/or excursion limit prescribed by 29 CFR 1926.1101 or for which a required negative exposure assessment is not produced, and for any employee performing Class I operations which involve the removal of over 25 linear or 10 square feet (7.5 linear meters or 3 square meters) of TSI or surfacing ACM or PACM.

B. Coveralls: Provide disposable full-body coveralls and disposable head covers, and require that they be worn by all workers in the Work Area. Provide a sufficient number for all required changes, for all workers in the Work Area.

C. Coveralls: Provide cloth full-body coveralls and hats, require that they be worn by all workers in the Work Area. Require that workers change out of coverall in the Equipment Room of the Personnel Decontamination Unit. Dispose of coverall as asbestos waste at completion of all work.

D. Additional Protective Clothing: Provide each worker with the protective clothing as required by Federal State and local regulations. This includes, but is not necessarily limited by Hardhats, Cold weather gear, Glove, boots and goggles.

E. **Cold Weather Gear:** Provide each worker with an insulated jacket, pants, gloves, and hat. Require that cold weather gear be removed in Equipment Room of Personnel Decontamination Unit. Dispose of cold weather gear as asbestos waste at completion of all work.

F. **Boots:** Provide work boots with non-skid soles, and where required by OSHA, foot protectives, for all workers. Provide boots at no cost to workers. Paint uppers of all boots red with waterproof enamel. Do not allow boots to be removed from the Work Area for any reason, after being contaminated with ACM. Dispose of boots as asbestos-contaminated waste at the end of the work.

G. **Hard Hats:** Provide head protectives (hard hats) as required by OSHA for all workers, and provide 4 spares for use by Designer, Project Administrator, and Owner. Label hats with same warning labels as used on disposal bags. Require hard hats to be worn at all times that work is in progress that may potentially cause head injury. Provide hard hats of type with plastic strap type suspension. Require hats to remain in the Work Area throughout the work. Thoroughly clean, decontaminate and bag hats before removing them from Work Area at the end of the work.

H. **Goggles:** Provide eye protection (goggles) as required by OSHA for all workers involved in scraping, spraying, or any other activity which may potentially cause eye injury. Thoroughly clean, decontaminate and bag goggles before removing them from Work Area at the end of the work.

I. **Gloves:** Provide work gloves to all workers and require that they be worn at all times in the Work Area. Do not remove gloves from Work Area and dispose of as asbestos-contaminated waste at the end of the work.

2.2 ADDITIONAL PROTECTIVE EQUIPMENT:

A. Disposable coveralls, head covers, and footwear covers shall be provided by the Contractor for the Owner, Designer, Project Administrator, and other authorized representatives who may inspect the job site. Provide six (6) complete coveralls per day.

PART 3 - EXECUTION

3.1 GENERAL:

A. Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work. The following procedures are minimums to be adhered to regardless of fiber count in the Work Area.

B. Each time Work Area is entered remove all street clothes in the Changing Room of the Personnel Decontamination Unit and put on new disposable coverall, new head cover, and a clean respirator. Proceed through shower room to equipment room and put on work boots.

3.2 DECONTAMINATION PROCEDURES:

A. Require all workers to adhere to the following personal decontamination procedures whenever they leave the Work Area:

1. Type C Supplied Air or Powered Air-Purifying Respirators: Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the Work Area:

   a. When exiting area, remove disposable coveralls, disposable head covers, and disposable footwear covers or boots in the equipment room.

   b. Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:

   c. Thoroughly wet body including hair and face. If using a Powered Air-Purifying Respirator (PAPR) hold blower unit above head to keep canisters dry.

   d. With respirator still in place thoroughly wash body, hair, respirator face piece, and all parts of the respirator except the blower unit and battery pack on a PAPR. Pay particular attention to seal between face and respirator and under straps.

   e. Take a deep breath, hold it and/or exhale slowly, completely wet hair, face, and respirator. While still holding breath, remove respirator and hold it away from face before starting to breathe.

   f. Carefully wash facepiece of respirator inside and out.

2. If using PAPR: shut down in the following sequence, first cap inlets to filter cartridges, then turn off blower unit (this sequence will help keep debris which has collected on the inlet side of filter from dislodging and contaminating the outside of the unit). Thoroughly wash blower unit and hoses. Carefully wash battery pack with wet rag. Be extremely cautious of getting water in battery pack as this will short out and destroy battery.

   a. Shower completely with soap and water.

   b. Rinse thoroughly.

   c. Rinse shower room walls and floor prior to exit.

   d. Proceed from shower to Changing Room and change into street clothes or into new disposable work items.

3. Air Purifying-Negative Pressure Respirators: Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the Work Area with a half or full-face cartridge type respirator:

   a. When exiting area, remove disposable coveralls, disposable head-covers, and disposable footwear covers or boots in the Equipment Room.

b. Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator and filters to avoid asbestos fibers while showering. The following procedure is required as a minimum:

c. Thoroughly wet body from neck down.

d. Wet hair as thoroughly as possible without wetting the respirator filter if using an air purifying type respirator.

e. Take a deep breath, hold it and/or exhale slowly, complete wetting of hair, thoroughly wetting face, respirator and filter (air purifying respirator). While still holding breath, remove respirator and hold it away from face before starting to breathe.

f. Dispose of wet filters from air purifying respirator.

g. Carefully wash facepiece of respirator inside and out.

h. Shower completely with soap and water.

i. Rinse thoroughly.

j. Rinse shower room walls and floor prior to exit.

k. Proceed from shower to Changing Room and change into street clothes or into new disposable work items.

B. Remote Shower: The procedures above are to be used if the decontamination facility is used as a remote shower. If a worker cannot gain direct access to the Equipment Room require that he enter Decontamination Unit and proceed directly through Shower Room to Equipment Room. Decontamination procedure is then completed as required above.

C. Within Work Area:

1. Require that workers NOT eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the Work Area. To eat, chew, drink or smoke, workers shall follow the procedure described above, then dress in street clothes before entering the non-Work Areas of the building.

3.3 CERTIFICATE OF WORKER'S ACKNOWLEDGEMENT:

Following this section is a Certificate of Worker Training. After each worker has been included in the Contractor's Respiratory Protection Program, completed the training program and medical examination, secure a fully executed copy of this form.

END OF SECTION - 02 80 44

CERTIFICATE OF WORKER'S ACKNOWLEDGEMENT

PROJECT NAME _____ DATE _____

PROJECT ADDRESS _____

CONTRACTOR'S NAME _____

WORKING WITH ASBESTOS CAN BE DANGEROUS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCER. IF YOU SMOKE AND INHALE ASBESTOS FIBERS THE CHANCE THAT YOU WILL DEVELOP LUNG CANCER IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.

Your employer's contract with the Owner for the above project requires that: You be supplied with the proper respirator and be trained in its use. You be trained in safe work practices and in the use of the equipment found on the job. You receive a medical examination. These things are to have been done at no cost to you.

RESPIRATORY PROTECTION: You must have been trained in the proper use of respirators, and informed of the type respirator to be used on the above referenced project. You must be given a copy of the written respiratory protection manual issued by your employer. You must be equipped at no cost with the respirator to be used on the above project.

TRAINING COURSE: You must have been trained in the dangers inherent in handling asbestos and breathing asbestos dust and in proper work procedures and personal and area protective measures. This training must have been the equivalent in curriculum, training method and length to the EPA Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).

MEDICAL EXAMINATION: You must have had a medical examination within the past 12 months at no cost to you. This examination must have included: health history, pulmonary function tests and may have included an evaluation of a chest x-ray.

By signing this document you are acknowledging only that the Owner of the building you are about to work in has advised you of your rights to training and protection relative to your employer.

Signature _____ Social Security No _____

Printed Name _____ Witness _____

SECTION 02 80 45 - RESPIRATORY PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. **Drawings and general provisions of Contract**, including General and Supplementary Conditions and other Division-2 Specification Sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

A. **Instruct and train each worker** involved in asbestos abatement or maintenance and repair of friable asbestos-containing materials (ACM) in proper respiratory use and require that each worker always wear a respirator, properly fitted on the face in the Work Area from the start of any operation which may cause airborne asbestos fibers until the Work Area is completely decontaminated. Use respiratory protection appropriate for the fiber level encountered in the work place or as required for other toxic or oxygen-deficient situations encountered.

1.3 DEFINITIONS:

A. "Negative Pressure Respirator": A respirator in which the air pressure inside the respiratory-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.

B. "Protection Factor": The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.

C. "Respirator": A device designed to protect the wearer from the inhalation of harmful atmospheres.

1.4 STANDARDS:

A. **Except to the extent** that more stringent requirements are written directly into the Contract Documents, the latest edition of the following regulations and standards have the same force and effect (and are made a part of the Contract Documents by reference) as if copied directly into the Contract Documents, or as if published copies were bound herewith. Where there is a conflict in requirements set forth in these regulations and standards, meet the more stringent requirement.

1. **OSHA -** U.S. Department of Labor Occupational Safety and Health Administration, Safety and Health Standards Section 29 CFR 1910.1001, Section 1910.134, and Section 29 CFR 1926.1101.

2. **CGA -** Compressed Gas Association, Inc., New York, Pamphlet G-7, "Compressed Air for Human Respiration", and Specification G-7.1 "Commodity Specification for Air".

3. **CSA -** Canadian Standard Association, Rexdal, Ontario, Standard Z180.1, "Compressed Breathing Air".

4. **ANSI -** American National Standard Practices for Respiratory Protection, ANSI Z88.2.

5. **NIOSH -** National Institute for Occupational Safety and Health
   - NIOSH Respirator Decision Logic (May 1987) DHHS/NIOSH Publication No. 87-108;
   - NIOSH/EPA, "A Guide to Respiratory Protection for the Asbestos Abatement Industry" EPA-560-OPTS-86-001 (September 1986);
   - 42 CFR 84, NIOSH Standard for Certification of Non-Powered Air Purifying Respirator filters;
   - 30 CFR 11, NIOSH - Certification of Respirators

6. **MSHA -** Mine Safety and Health Administration

1.5 SUBMITTALS:

A. **Before Start of Work** submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal is returned for unrestricted use.

1. **Product Data:** Submit manufacturer's product information for each component used, including NIOSH and MSHA Certifications for each component in an assembly and/or for entire assembly.

2. **System Diagram:** When a supplied air respiratory system is required by the work, submit drawing showing assembly of components into a complete supplied air respiratory system. Include diagram showing location of compressor, filter banks, backup air supply tanks, hose line connections in Work Area(s), routing of air lines to Work Area(s) from compressor.

3. **Operating Instruction:** Submit complete operating and maintenance instructions for all components and systems as a whole. Submittal is to be in bound manual form suitable for field use.

4. **Respiratory Protection Program:** Submit Contractor's written respiratory protection program manual as required by OSHA 1926.1101.

5. **Initial Exposure Assessment**: Submit level of respiratory protection intended for each operation required by the project. Base this selection on an "Initial Exposure Assessment" as required by OSHA 29 CFR 1926.1101. Submit information to support this "Initial Exposure Assessment" on the form included at the end of this Section.
   a. Submit data from exposure monitoring for the PEL and EL from prior asbestos jobs within 12 months;

   b. Submit monitoring and analysis that were performed in compliance with the OSHA asbestos standard in effect;

c. Submit data that was obtained under workplace conditions "closely resembling" those that will exist during the Work;

d. Submit data from past asbestos jobs where the type of asbestos abatement and other work, material, control methods, work practices, and environmental conditions closely resemble those that will exist during the Work;

e. Submit exposure date from prior asbestos jobs where the work that was conducted by employees whose training and experience are no more extensive than that of employees performing the current job;

f. Based on the exposure data from the previous asbestos jobs, select respiratory protection for the Work that will, to a high degree of certainty, prevent worker exposures (inside the respirator) that exceed the Permissible Exposure Limits (PEL) set forth in this Section of the specifications.

6. **Resume information:** Submit resume and information on training for individual monitoring the operation of supplied air respiratory systems. Submit training certifications where applicable.

1.6 AIR QUALITY FOR SUPPLIED AIR RESPIRATORY SYSTEMS:

A. **Provide air** used for breathing in supplied air respiratory systems that meets or exceeds standards set for C.G.A. type 1 (Gaseous Air) Grade H or CSA Z180.1 whichever presents the more stringent quality standard:

1.7 ALLOWABLE CONTAMINANTS:

A. **Supply air** that has an asbestos concentration no greater than outside ambient conditions.

B. **Supply air** that meets the level of contaminants allowed according to the air quality standard specified.

C. **The table below** sets forth the quantity of any given contaminant allowed according to the referenced standards:

CONTAMINANT	CGA Type 1 (Gaseous Air) Grade D	Grade E	Grade H	CSA Z180.1
Carbon Monoxide, PPM/v	20	10	5	5
Carbon Dioxide, PPM/v	1000	500	500	500
Condensed Hydrocarbons, mg./cu. meter	5	5		1
Gaseous Hydrocarbons - as methane, PPM/v			10	25
Water Vapor - PPM/v dewpoint	(1) -50F	(1) -50F	(1) -50F	27 -63F
Objectionable Odors	None	None	None	None
Nitrogen Dioxide, PPM/v	—	—	0.5	0.2
Nitrous Oxide, PPM/v	—	—	—	5
Sulfur Dioxide, PPM/v	—	—	0.5	—
Halogenated solvents, PPM/v	—	—	1	—
Other gaseous contaminants	—	—	—	(2)
Inorganic particulates, mg./cu. meter	—	—	—	1

— Indicates that the standard shows no limiting characteristics

(1) The CGA standards do not indicate a specific moisture limit when the ambient temperature is above freezing. However, since a moisture content no greater than a -50 Degrees Fahrenheit (-45.56 Degrees Celsius) dewpoint (66 PPM/v) is necessary for carbon monoxide elimination, the CO limits could not be met unless the air were dried to a -50 Degrees Fahrenheit (-45.56 Degrees Celsius) dewpoint or better.

(2) Maximum allowable content of trichlorotrifluoroethane, dichlorodifluoromethane, and chlorodifluoromethane is 2 PPM/v for each. Unlisted contaminants shall not exceed one-tenth of the Threshold Limit Values (TLV's) for Chemical Substances in Workroom air adopted by the American Conference of Governmental Industrial Hygienists (ACGIH).

1.8 DELIVERY:

A. **Deliver replacement parts,** etc., not otherwise labeled by NIOSH or MSHA to job site in manufacturer's containers.

PART 2 - EQUIPMENT

2.1 AIR PURIFYING RESPIRATORS

A. **Respirator Bodies:** Provide half face or full face type respirators. Equip full face respirators with a nose cup or other anti-fogging device as would be appropriate for use in air temperatures less than 32 degrees Fahrenheit (0 degrees Celsius).

B. **Filter Cartridges:** Provide, at a minimum, HEPA type filters labeled with NIOSH and MSHA Certification for "Radionuclides, Radon Daughters, Dust, Fumes, Mists including Asbestos-Containing Dusts and Mists" and color coded in accordance with 42 CFR Part 84 and ANSI Z228.2. Also, additional cartridge sections may be added, if required, for solvents, etc., in use. In this case, provide cartridges that have each section of the combination canister labeled with the appropriate color code and NIOSH/MSHA Certification.

C. **Non-permitted respirators.** Do not use single use, disposable or quarter face respirators.

2.2 SUPPLIED AIR RESPIRATOR SYSTEMS:

A. **Provide equipment** capable of producing air of the quality and volume required by the above reference standards applied to the job site conditions and crew size. Comply with provisions of this specification if more stringent than the governing standard.

B. **Facepiece and Hose:** Provide full facepiece and hose by same manufacturer that has been certified by NIOSH/MSHA as an approved Type "C" respirator assembly operating in pressure demand mode with a positive pressure facepiece.

C. **Auxiliary backup system:** In atmospheres which contain sufficient oxygen (greater than or equal to 19.5 percent oxygen) provide a pressure-demand full facepiece supplied air respirator equipped with an emergency back up HEPA filter.

D. **Escape air supply:** In atmospheres which are oxygen deficient (less than 19.5 percent oxygen) provide a pressure-demand full facepiece supplied air respirator incorporating an auxiliary self-contained breathing apparatus (SCBA) which automatically maintains an uninterrupted air supply in pressure demand mode with a positive pressure face piece.

E. **Backup air supply:** Provide a reservoir of compressed air located outside the Work Area which will automatically maintain a continuous uninterruptable source of air automatically available to each connected facepiece and hose assembly in the event of compressor shut-down, contamination of air delivered by compressor, power loss or other failure. Provide sufficient capacity in the back-up air supply to allow a minimum escape time of one-half hour times the number of connections available to the Work Area. Air requirement at each connection is the air requirement of the respirators in use plus the

air requirement of an average-sized adult male engaged in moderately strenuous activity.

F. **Warning device:** Provide a warning device that will operate independently of the building's power supply. Locate so that alarm is clearly audible above the noise level produced by equipment and work procedures in use, in all parts of the Work Area and at the compressor. Connect alarm to warn of:

1. Compressor shut down or other fault requiring use of backup air supply

2. Carbon Monoxide (CO) levels in excess of 5 PPM/V

G. **Carbon Monoxide (CO) Monitor:** Continuously monitor and record on a strip chart recorder Carbon Monoxide (CO) level. Place monitors in the air line between compressor and back-up air supply and between backup air supply and workers. Connect monitors so that they also sound an alarm as specified under "Warning Devices".

H. **Compressor Shut Down:** Interconnect monitors, alarms and compressor so that compressor is automatically shut down and the alarms sound if any of the following occur:

1. Carbon Monoxide (CO) concentrations exceed 5 PPM/v in the air line between the filter bank and backup air supply

2. Compressor temperature exceeds normal operating range

I. **Compressor Motor:** Provide a compressor driven by an electric motor. Do not use a gas or diesel engine to drive compressor. Insure that electrical supply available at the work site is adequate to energize motor.

J. **Compressor Location:** Locate compressor outside of building in location that will not impede access to the building, and that will not cause a nuisance by virtue of noise or fumes to occupied portions of the building.

K. **Air Intake:** Locate air intake remotely from any source of automobile exhaust or any exhaust from engines, motors, auxiliary generator or buildings.

L. **After-Cooler:** Provide an after-cooler at entry to filter system which is capable of reducing temperatures to outside ambient air temperatures.

M. **Self-Contained Breathing Apparatus (SCBA):** Configure system to permit the recharging of ½ hour 2260 PSI (15.58 MPa) SCBA cylinders.

PART 3 - EXECUTION

3.1 GENERAL:

A. **Respiratory Protection Program:** Comply with ANSI Z88.2 “Practices for Respiratory Protection" and OSHA 29 CFR 1910.134 and 1926.103.

B. **Require** that respirators be used in the following circumstances:

1. During all Class I asbestos jobs.

2. During all Class II work where the ACM is not removed in a substantially intact state.

3. During all Class II and III work, which is not performed using wet methods.

4. During all Class II and III asbestos jobs where the employer does not produce a "negative exposure assessment".

5. During all Class III jobs where TSI or surfacing ACM or PACM is being disturbed.

6. During all Class IV work performed within regulated areas where employees performing other work are required to wear respirators.

7. During all work covered by this section where employees are exposed above the OSHA PEL (TWA, or excursion limit).

8. In emergencies. During emergencies where the airborne asbestos fiber concentration is not known, a self-contained breathing apparatus (SCBA) must be used.

C. **Require** that respiratory protection be used at all times that there is any possibility of disturbance of ACM whether intentional or accidental.

D. **Require** that a respirator be worn by anyone in a Work Area at all times, regardless of activity, during a period that starts with any operation which could cause airborne fibers until the area has been cleared for re-occupancy in accordance with Section “Project Decontamination”.

E. **Regardless of Airborne Fiber Levels:** Require that the minimum level of respiratory protection used be half-face air-purifying respirators with high efficiency filters.

F. **Do not allow** the use of single-use, disposable, or quarter-face respirators for any purpose.

3.2 FIT TESTING:

A. **Initial Fitting:** Provide initial fitting of respiratory protection during a respiratory protection course of training set up and administered by a individual qualified to do fit testing. Fit types and sizes of respirator to be actually worn by each individual. Allow an individual to use only those respirators for which training and fit testing has been provided.

B. **On a Weekly Basis,** check the fit of each worker's respirator by having irritant smoke blown onto the respirator from a smoke tube.

C. **Upon Each Wearing:** Require that each time an air-purifying respirator is put on it be checked for fit with a positive and negative pressure fit test in accordance with the manufacturer's instructions or ANSI Z88.2.

3.3 TYPE OF RESPIRATORY PROTECTION REQUIRED:

A. General: After reducing airborne asbestos levels to the lowest feasible level with engineering controls and work practices, provide respiratory protection as necessary to ensure that workers are not exposed to an airborne concentration of asbestos in excess of the Specified Permissible Exposure Limits (SPEL) set forth in this Section.

B. Level of Respiratory Protection: Determine the proper level of respiratory protection by dividing the expected or actual airborne fiber count in the Work Area by the "protection factors" given below. The level of respiratory protection which supplies an airborne fiber level inside the respirator, at the breathing zone of the wearer, at or below the Specified Permissible Exposure Limits (PEL) set forth in this Section is the minimum level of protection allowed.

C. Specific Respiratory Protection Requirements: Provide respiratory protection as indicated below as a minimum requirement:

1. **Half-face Negative Pressure Air-Purifying Respirators:** Provide half-face negative pressure air-purifying respirators during installation of Critical or Primary Barriers or other activities where there has been an “Initial Exposure Assessment” that has determined that airborne asbestos fiber levels will not exceed 0.1 fiber per cubic centimeter (0.1 f/cc). Provide a PAPR where a half-face negative pressure air-purifying respirator is allowed to any worker who so requests.

2. **Powered Air-Purifying Respirators (PAPR):** Provide powered air-purifying respirators (PAPR) during removal of asbestos-containing thermal system insulation (TSI) or surfacing material where there has been an “Initial Exposure Assessment” that has determined that airborne asbestos fiber levels will not exceed 0.5 fiber per cubic centimeter (0.5 f/cc).

3. **Type "C" Supplied-air respirators:** full facepiece pressure demand supplied air respirators are to be used by all workers engaged in the removal of thermal system insulation (TSI) or surfacing materials, or demolition of pipes, structures, or equipment covered or insulated with asbestos, or in the removal or demolition of asbestos insulation or coverings, or any other activity which results in or may result in airborne asbestos fiber levels above 10.0 fibers per cubic centimeter (10.0 f/cc).

D. Provide a full facepiece supplied air respirator operated in the pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus for all workers within a regulated area where Class I work is being performed and for which an initial exposure assessment has not been produced. After an initial exposure assessment is made, use the level of respiratory protection required by that assessment and requirements of this specification and the OSHA Asbestos Construction Standard 29 CFR 1926.1101.

3.4 SPECIFIED PERMISSIBLE EXPOSURE LIMITS (SPEL):

A. Specified Permissible Exposure Limits (SPEL): Ensure that no worker is exposed to an airborne concentration of asbestos in excess of the Time-Weighted Average (TWA) limit, and Excursion Limit (EL) set forth below.

1. **Time Weighted Average (TWA) limit -** Concentration of airborne asbestos fibers to which any worker may be exposed as an eight (8) hour time-weighted average (TWA) shall not exceed the following.

   a. 0.01 fibers per cubic centimeter (0.01 f/cc)

2. **Excursion Limit (EL)** - Concentration of airborne asbestos fibers to which any worker may be exposed as averaged over a sampling period of thirty (30) minutes shall not exceed the following.

   a. 0.01 fibers per cubic centimeter (0.01 f/cc)

B. Fibers: For purposes of this section, fibers are defined as all fibers regardless of composition as counted in the OSHA Reference Method (ORM), or NIOSH 7400 procedure.

1. Electron Microscopy: If Electron Microscopy is used to determine airborne fiber levels, only asbestos fibers will be enumerated, but fibers of any size detected by the testing of Section 01711 Project Decontamination will be counted.

3.5 RESPIRATORY PROTECTION FACTOR:

A.	Respirator Type	Protection Factor
1.	**Air purifying:** Negative pressure respirator High efficiency filter Half facepiece	10
2.	**Air purifying:** Negative pressure respirator High efficiency filter Full facepiece	50
3.	**Powered Air Purifying (PAPR):** Positive pressure respirator High efficiency filter Half facepiece	50
4.	**Powered air-purifying respirator** equipped with high efficiency filters or any supplied air respirator operated in continuous flow mode. Full facepiece	1,000

5.	**Supplied air:** Positive pressure respirator Pressure demand or other positive pressure mode Full facepiece Equipped with an auxiliary HEPA cartridge or positive pressure Self-contained breathing apparatus (SCBA) for escape	1,000

3.6 AIR PURIFYING RESPIRATORS:

A. **Negative pressure - half or full face mask:** Supply a sufficient quantity of respirator filters approved for asbestos, so that workers can change filters during the work day. Require that respirators be wet-rinsed, and filters discarded, each time a worker leaves the Work Area. Require that new filters be installed each time a worker re-enters the Work Area. Store respirators and filters at the job site in the changing room and protect totally from exposure to asbestos prior to their use.

B. **Powered air purifying - half or full face mask:** Supply a sufficient quantity of high efficiency respirator filters approved for asbestos so that workers can change filters at any time that flow through the facepiece decreases to the level at which the manufacturer recommends filter replacement. Require that regardless of flow, filter cartridges be replaced after 40 hours of use. Require that HEPA elements in filter cartridges be protected from wetting during showering. Require entire exterior housing of respirator, including blower unit, filter cartridges, hoses, battery pack, face mask, belt, and cords, be washed each time a worker leaves the Work Area. Caution should be used to avoid shorting battery pack during washing. Provide an extra battery pack for each respirator so that one can be charging while one is in use.

3.7 SUPPLIED AIR RESPIRATOR:

A. **Air Systems Monitor:** Continuously monitor the air system operation including compressor operation, filter system operation, backup air capacity and all warning and monitoring devices at all times that system is in operation. Assign an individual, trained by manufacturer of the equipment in use or by a Certified Industrial Hygienist, in the operation and maintenance of the system to provide this monitoring. Assign no other duties to this individual that will take him away from monitoring the air system.

END OF SECTION - 02 80 45

INITIAL EXPOSURE ASSESSMENT

Project No:_____ Date:_____
Project Name:_____ Facility:_____
Work Area(s):_____
Reference Job:_____
Description of Work:_____

Asbestos Containing Materials | Asbestos/Type Percentage

_____ | _____
_____ | _____
_____ | _____

Task	Personal Monitoring Level High	Low	Average	Respirator Worn	Comments
Prep / Set up					
Removal of Surface Trt					
Removal of TSI					
Removal of Misc Mat.					
Bag Out					
Clean Up					
Other					

Experience Level of Work Force _____

Reference Job: _____
Description of Work: _____

Asbestos Containing Materials | Asbestos/Type Percentage

_____ | _____
_____ | _____
_____ | _____

Task	Personal Monitoring Level High	Low	Average	Respirator Worn	Comments
Prep / Set up					
Removal of Surface Trt					
Removal of TSI					
Removal of Misc Mat.					
Bag Out					
Clean Up					
Other					

Experience Level of Work Force _____

_____

Expected Conditions of This Job

Task	Anticipated Level	Respirator	Comments
Prep / Set up	_____ f/cc		
Removal of Surface Trt	_____ f/cc		
Removal of TSI	_____ f/cc		
Removal of Misc Mat.	_____ f/cc		
Bag Out	_____ f/cc		
Clean Up	_____ f/cc		
Other	_____ f/cc		

Experience Level of Work Force _____

SECTION 02 80 46 - DECONTAMINATION UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. **Drawings and general provisions of Contract**, including General and Supplementary Conditions and other Division-2 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

A. **Provide separate Personnel and Equipment Decontamination facilities.** Require that the Personnel Decontamination Unit be the only means of ingress and egress for the Work Area. Require that all materials exit the Work Area through the Equipment Decontamination Unit.

1.3 RELATED WORK SPECIFIED ELSEWHERE:

A. **Refer to Section "Temporary Facilities" -** Asbestos Abatement for electrical requirements and requirements relative to connection of decontamination facilities to building systems such as water, sewer, and electrical.

1.4 SUBMITTALS

A. **Before the Start of Work:** Submit the following to the Designer for review. Do not begin work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use.

1. Personnel Decontamination Unit: Provide shop drawing showing location and assembly of personnel decontamination units.
2. Equipment Decontamination Unit: Provide shop drawing showing location and assembly of equipment decontamination units.
3. Shower Pan: Provide shop drawing.
4. Shower Walls: Provide product data.
5. Shower Head and Controls: Provide product data.
6. Filters: Provide product data and shop drawing of installation on decontamination unit.
7. Hose Bib: Provide product data.
8. Shower Stall: for Wash Down Station provide product data and shop drawing showing and modifications.
9. Elastomeric membrane: Provide product data.
10. Lumber: Provide product data on fire resistance treatment.
11. Sump Pump: Provide product data.
12. Signs: Submit samples of signs to be used.

PART 2 - PRODUCTS

2.1 MATERIALS

A. **Polyethylene Sheet:** A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mil (0.15 mm) thick , clear, frosted, or black as indicated.

B. **Polyethylene Sheet:** Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick, frosted or black as indicated.

C. **Reinforced Polyethylene Sheet:** Where plastic sheet is the only separation between the Work Area and building exterior, provide translucent, nylon reinforced, laminated, flame resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick , frosted or black as indicated.

D. **Duct Tape:** Provide duct tape in 2 inch or 3 inch (51mm or 76 mm) widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

E. **Spray Adhesive:** Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

F. **Shower Pan:** Provide one-piece waterproof shower pan 4 feet x 8 feet x 6 inches deep (102 mm X 204 mm x 152 mm deep). Fabricate from seamless fiberglass minimum 1/16 inch (1.59 mm) thick reinforced with wood, 18 ga. stainless or galvanized steel with welded seems, copper or lead with soldered seams, or a seamless liner of minimum 60 mil (1.5 mm) thick elastomeric membrane.

G. **Shower Walls:** Provide 8 feet (2.44 m) long by approximately 7 feet (2.13 m) high walls fabricated from rigid, impervious, waterproof material, either corrugated fiberglass roofing or equivalent. Structurally support as necessary for stability.

H. **Shower Head and Controls:** Provide a factory-made shower head producing a spray of water which can be adjusted for spray size and intensity. Feed shower with water mixed from hot and cold supply lines. Arrange so that control of water temperature, flow rate, and shut off is from inside shower without outside aid.

I. **Filters:** Provide cascaded filter units on drain lines from showers or any other water source carrying asbestos-contaminated water from the Work Area. Provide units with disposable filter elements as indicated below. Connect so that discharged water passes primary filter and output of primary filter passes through secondary filter.

1. Primary Filter - Passes particles 20 microns and smaller
2. Secondary Filter - Passes particles 5 microns and smaller

J. **Hose Bib:** Provide heavy bronze angle type with wheel handle, vacuum breaker, and 3/4 inch (19.05 mm) National Standard male hose outlet.

K. **Shower Stall:** For Wash Down Station provide leak tight shower enclosure with integrated drain pan fabricated from fiberglass or other durable waterproof material, approximately 3 feet x 3 feet (0.91m x 0.91 m) square with minimum 6 feet (1.83 m) high sides and back. Structurally support as necessary for stability. Equip with hose bib, as specified in this section, mounted at approximately 4 feet (1.22 m) above drain pan. Connect drain to a reservoir, pump water from reservoir through filters to a drain or store and use for amended water. Mount filters inside shower stall on back wall beneath hose bib.

L. **Elastomeric membrane:** Provide uniform flat sheets of flexible sheet roofing material fabricated from EPDM (ethylene propylene diene monomers) or Neoprene (polychloroprene), in a nominal 45 mil (1.14 mm) thickness.

M. **Lumber:** Provide kiln dried lumber of any grade or species.

N. **Sump Pump:** Provide totally submersible waterproof sump pump with integral float switch. Provide unit sized to pump 2 times the flow capacity of all showers or hoses supplying water to the sump, through the filters specified herein when they are loaded to the extent that replacement is required. Provide unit capable of pumping debris, sand, plaster or other materials washed off during decontamination procedures without damage to mechanism of pump. Adjust float switch so that a minimum of 3 inch (76 mm) remains between top of liquid and top of sump pan.

PART 3 - EXECUTION

3.1 PERSONNEL DECONTAMINATION UNIT:

A. **Provide a Personnel Decontamination Unit** consisting of a serial arrangement of connected rooms or spaces, Changing Room, Drying Room, Shower Room, Equipment Room. Require all persons without exception to pass through this Decontamination Unit for entry into and exiting from the Work Area for any purpose. Do not allow parallel routes for entry or exit. Do not remove equipment or materials through Personnel Decontamination Unit. Provide temporary lighting within Decontamination Units as necessary to reach a lighting level of 100 foot candles (1076 lumens / sq meter).

B. **Changing Room (clean room):** Provide a room that is physically and visually separated from the rest of the building for the purpose of changing into protective clothing.

1. Construct using polyethylene sheeting, at least 6 mil (0.15 mm) in thickness, to provide an airtight seal between the Changing Room and the rest of the building.
2. Locate so that access to Work Area from Changing Room is through Shower Room.
3. Separate Changing Room from the building by a sheet plastic flapped doorway.
4. Require workers to remove all street clothes in this room, dress in clean, disposable coveralls, and don respiratory protection equipment. Do not allow asbestos-contaminated items to enter this room. Require Workers to enter this room either from outside the structure dressed in street clothes, or naked from the showers.
5. An existing room may be utilized as the Changing Room if it is suitably located and of a configuration whereby workers may enter the Changing Room directly from

the Shower Room. Protect all surfaces of room with sheet plastic as set forth in Section 01526 Temporary Enclosures. Authorization for this must be obtained from the Designer in writing prior to start of construction. Submit written request in accordance with Section 01632 "Substitutions" detailing layout and protective measures proposed.

6. Maintain floor of changing room dry and clean at all times. Do not allow overflow water from shower to wet floor in changing room.
7. Damp wipe all surfaces twice after each shift change with a disinfectant solution.
8. Provide posted information for all emergency phone numbers and procedures.
9. Provide 1 storage locker per employee.
10. Provide all other components indicated on the contract drawings.

C. **Airlock:** Provide an airlock between Drying Room and Changing Room. This is a transit area for workers.

1. Separate this room from Drying Room and Changing Room by sheet plastic flapped doorways.
2. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
3. Separate this room from the Drying and Changing Rooms with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.

D. **Drying Room:** Provide a drying room as an airlock and a place for workers to dry after showering.

1. Construct room by providing a pan continuous with or draining to Shower Room pan. Install a freely draining wooden or non-skid metal floor in pan at elevation of top of pan.
2. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
3. Separate this room from the Changing Room and Shower Room with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
4. Separate from Changing Room by a sheet plastic flapped doorway.
5. Provide a continuously adequate supply of disposable bath towels.
6. Provide a rigid, tight-sealing hinged door between Drying Room and Clean Room. Arrange so that there is a sensible movement of air from clean room through breathing zone of worker in Shower and Drying Room toward Equipment Room.

E. **Shower Room:** Provide a completely watertight operational shower to be used for transit by cleanly dressed workers heading for the Work Area from the Changing Room, or for showering by workers headed out of the Work Area after undressing in the Equipment Room.

1. Construct room by providing a shower pan and 2 shower walls in a configuration that will cause water running down walls to drip into pan. Install a freely draining wooden floor in shower pan at elevation of top of pan.
2. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
3. Separate this room from the Drying Room and Airlock with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
4. Provide splashproof entrances to Drying Room and Airlock with doors arranged in

the following configuration:

a. At each entrance to the Shower Room construct a door frame out of nominal 2 inch x 4 inch (51 mm X 102 mm) lumber with 1-1/2 inch (39 mm) jambs (sides) and 1-1/2 inch (39 mm) head (top) and sill (bottom). Attach to this door frame two overlapping flaps of elastomeric membrane material, fastened at the head (top) and jambs (sides) (by clamping between a 1-1/2 inch (39 mm) x 3/4 inch (19mm) batten and frame). Overlap the flaps a minimum of 6 inch (152 mm) in a direction that presents a shingle-like configuration to the water stream from the shower. Overlap sill (bottom) by 1-1/2 inch (39 mm) minimum. Arrange so that any air movement out of the Work Area will cause the flaps to seal against the door frame.

5. Provide shower head and controls.
6. Provide temporary extensions of existing hot and cold water and drainage, as necessary for a complete and operable shower.
7. Provide a soap dish and a continuously adequate supply of soap and maintain in sanitary condition.
8. Arrange so that water from showering does not splash into the Changing or Equipment Rooms.
9. Arrange water shut off and drain pump operation controls so that a single individual can shower without assistance from either inside or outside of the Work Area.
10. Provide flexible hose shower head.
11. Pump waste water to drain or to storage for use in amended water. If pumped to drain, provide 20 micron and 5 micron waste water filters in line to drain or waste water storage. Change filters daily or more often if necessary. Locate filters inside shower unit so that water lost during filter changes is caught by shower pan.
12. Provide hose bib.
13. Provide all other items indicated on contract drawings.

F. **Airlock:** Provide an airlock between Shower Room and Equipment Room. This is a transit area for workers. Separate this room from Equipment Room by a sheet plastic flap doorway.

1. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
2. Separate this room from the Equipment Room and Shower Room with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
3. Separate from Equipment Room by a sheet plastic flapped doorway.

G. **Equipment Room (contaminated area):** Require work equipment, footwear and additional contaminated work clothing to be left here. This is a change and transit area for workers.

1. Separate this room from the Work Area by a 6 mil (0.15 mm) polyethylene flapped doorway.
2. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
3. Separate this room from the Shower Room and Work Area with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
4. Provide a drop cloth layer of sheet plastic on floor in the Equipment Room for every shift change expected. Roll drop cloth layer of plastic from Equipment Room into Work Area after each shift change. Replace before next shift change. Provide a

minimum of two (2) layers of plastic at all times. Use only clear plastic to cover floors.

H. Airlock: Provide an airlock between Equipment Room and Work Area. This is a transit area for workers.

1. Separate this room from Equipment Room and Work Area by a sheet plastic flapped doorways.
2. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
3. Separate this room from the Equipment Room and Work Area with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.

I. Work Area: Separate Work Area from the Equipment Room by polyethylene barriers. If the airborne asbestos level in the Work Area is expected to be high, as in dry removal, add an intermediate cleaning space between the Equipment Room and the Work Area. Damp wipe clean all surfaces after each shift change. Provide one additional floor layer of 6 mil (0.15 mm) polyethylene per shift change and remove contaminated layer after each shift.

J. Decontamination Sequence: Require that all workers adhere to the following sequence when entering or leaving the Work Area.

1. Entering Work Area: Worker enters Changing Room and removes street clothing, puts on clean disposable overalls and respirator, and passes through the Shower Room into the Equipment Room.
2. Any additional clothing and equipment left in Equipment Room needed by the worker are put on in the Equipment Room.
3. Worker proceeds to Work Area.

K. Exiting Work Area:

1. Before leaving the Work Area, require the worker to remove all gross contamination and debris from overalls and feet.
2. The worker then proceeds to the Equipment Room and removes all clothing except respiratory protection equipment.
3. Extra work clothing such as boots, hard hats, goggles, gloves are to be stored in contaminated end of the Equipment Room.
4. Disposable coveralls are placed in a bag for disposal with other material.
5. Require that Decontamination procedures be followed by all individuals leaving the Work Area.
6. After showering, the worker moves to the Changing Room and dresses in either new coveralls for another entry or street clothes if leaving.

3.2 EQUIPMENT DECONTAMINATION UNIT:

A. Provide an Equipment Decontamination Unit consisting of a serial arrangement of rooms, Clean Room, Holding Room, Wash Room for removal of equipment and material from Work Area. Do not allow personnel to enter or exit Work Area through Equipment Decontamination Unit.

B. **Arrange with airlocks** between rooms as required below.

C. **Wash Down Station:** Provide an enclosed Shower Unit located in Work Area just outside Wash Room as an equipment, bag and container cleaning station.

1. Fabricate waterproof floor extending 6 feet (1.83 m) beyond Wash Down station in all directions. Install seamless waterproof membrane over area and extend over curbs on all four sides. Form curbs from 2 inch x 4 inch (51 X 102 mm) lumber laid on the flat.
2. Waterproof membrane is to be fabricated from elastomeric membrane.
3. Do not allow water to collect on waterproof membrane. Remove continuously with a wet vacuum or mops.

D. **Wash Room:** provide wash room for cleaning of bagged or containerized asbestos-containing waste materials passed from the Work Area.

1. Construct wash room of nominal 2 inch x 4 inch (51 X 102 mm) wood framing and polyethylene sheeting, at least 6 mil (0.15 mm) in thickness and located so that packaged materials, after being wiped clean, can be passed to the Holding Room.
2. Separate this room from the Work Area by a single flapped door of 6 mil (0.15 mm) polyethylene sheeting.
3. Provide a drop cloth layer of plastic on floor in the Wash Room for every load-out operation. Roll this drop cloth layer of plastic from Wash Room into Work Area after each load-out. Provide a minimum of two (2) layers of plastic at all times. Use only clear plastic to cover floors.

E. **Airlock:** Provide an airlock between Wash Room and Holding Room. This is a transit area.

1. Separate this room from adjacent spaces by a sheet plastic flapped doorway.
2. Separate this room from the rest of the building and adjacent spaces with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.

F. **Holding Room:** Provide Holding Room as a drop location for bagged asbestos-containing materials passed from the Wash Room. Construct Holding Room of nominal 2 inch x 4 inch (51 X 102 mm) wood framing and polyethylene sheeting, at least 6 mil (0.15 mm) in thickness and located so that bagged materials cannot be passed from the Wash Room through the Holding Room to the Clean Room.

1. Separate this room from the adjacent rooms by flap doors fabricated from 6 mil (0.15 mm) sheet plastic.

G. **Airlock:** Provide an airlock between Holding Room and Clean Room. This is a transit area.

1. Separate this room from adjacent spaces by a sheet plastic flap doorway.
2. Separate this room from the rest of the building and adjacent spaces with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.

H. **Clean Room:** provide Clean Room to isolate the Holding Room from the building exterior. If possible locate to provide direct access to the Holding Room from the building exterior.

1. Erect Critical and Primary Barriers as described in Section "Temporary Enclosures" in an existing space. If no space exists construct Clean Room of 2 x 4 (51 X 102 mm) wood framing and polyethylene sheeting, at least 6 mil (0.15 mm) in thickness.
2. Separate this room from the exterior by a single flap door of 6 mil (0.15 mm) polyethylene sheeting.

I. **Load-out Area:** The load-out area is the transfer area from the building to a truck or dumpster. It may be the Clean Room of the Equipment Decontamination unit or a separate room or loading dock area. Erect Critical and Primary barriers as described in Section "Temporary Enclosures" in load-out area.

1. During transfer of material from load-out area erect primary barriers as described in Section "Temporary Enclosures" as necessary to seal path from load-out area to truck or dumpster.

J. **Decontamination Sequence:** Take all equipment or material from the Work Area through the Equipment Decontamination Unit according to the following procedure:

1. At washdown station, thoroughly wet clean contaminated equipment or sealed polyethylene bags and pass into Wash Room.
2. When passing equipment or containers into the Wash Room, close all doorways of the Equipment Decontamination Unit, other than the doorway between the Washdown Station and the Wash Room. Keep all outside personnel clear of the Equipment Decontamination Unit.
3. Once inside the washroom, wet clean the bags and/or equipment.
4. When cleaning is complete pass items into Holding Room. Close all doorways except the doorway between the Holding room and the Clean Room.
5. Workers from the building exterior enter Holding Area and remove decontaminated equipment and/or containers for disposal.
6. Require these workers to wear full protective clothing and appropriate respiratory protection.
7. At no time is a worker from an uncontaminated area to enter the enclosure when a removal worker is inside.

3.3 CONSTRUCTION OF THE DECONTAMINATION UNITS:

A. **Walls and Ceiling:** Construct airtight walls and ceiling using polyethylene sheeting, at least 6 mil (0.15 mm) in thickness. Attach to existing building components or a temporary framework.

B. **Floors:** Use 2 layers (minimum) of 6 mil (0.15 mm) polyethylene sheeting to cover floors in all areas of the Decontamination Units. Use only clear plastic to cover floors.

C. **Flap Doors:** Fabricated from three (3) overlapping sheets with openings a minimum of three feet (3') (0.91 meters) wide. Configure so that sheeting overlaps adjacent surfaces. Weights at bottom of sheets as required so that they quickly close after being released. Put arrows on sheets to indicate direction of overlap and/or travel. Provide a minimum of six feet (6') (1.22 meters) between entrance and exit of any room. Provide a minimum of three feet (3') (0.91 meters) between doors to airlocks.

D. **If the Decontamination area** is located within an area containing friable asbestos on overhead ceilings, ducts, piping, etc., provide the area with a minimum 1/4 inch (6.4 mm) hardboard or 1/2 inch (12.7 mm) plywood "ceiling" with polyethylene sheeting, at least 6 mil (0.15 mm) in thickness covering the top of the "ceiling".

E. **Visual Barrier:** Where the Decontamination area is immediately adjacent to and within view of occupied areas, provide a visual barrier of opaque polyethylene sheeting at least 6 mil (0.15 mm) in thickness so that worker privacy is maintained and work procedures are not visible to building occupants. Where the area adjacent to the Decontamination area is accessible to the public, construct a solid barrier on the public side of the sheeting to protect the sheeting. Construct barrier with wood or metal studs covered with minimum 1/4 inch (6.4 mm) thick hardboard or 1/2 inch (12.7 mm) plywood. Where the solid barrier is provided, sheeting need not be opaque.

F. **Alternate methods** of providing Decontamination facilities may be submitted to the Designer for approval. Do not proceed with any such method(s) without written authorization of the Designer.

G. **Electrical:** Provide subpanel at Changing Room to accommodate all removal equipment. Power subpanel directly from a building electrical panel.

1. Connect all electrical branch circuits in Decontamination unit and particularly any pumps in shower room to a ground-fault circuit protection device.

3.4 CLEANING OF DECONTAMINATION UNITS:

A. **Clean debris and residue** from inside of Decontamination Units on a daily basis or as otherwise indicated on Contract Drawings. Damp wipe or hose down all surfaces after each shift change. Clean debris from shower pans on a daily basis.

B. **If the Changing Room** of the Personnel Decontamination Unit becomes contaminated with asbestos-containing debris, abandon the entire Decontamination Unit and erect a new Decontamination Unit. Use the former Changing Room as an inner section of the new Equipment Room.

3.5 SIGNS:

A. **Post** an approximately 20 inch by 14 inch (508 mm x 356 mm) manufactured caution sign at each entrance to the Work Area displaying the following legend with letter sizes and styles of a visibility required by 29 CFR 1926:

1. Provide signs in both English and Spanish.

2. Legend:
DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

3. Provide spacing between respective lines at least equal to the height of the

respective upper line.

B. **Post** an approximately 10 inch by 14 (254 mm x 356 mm) inch manufactured sign at each entrance to each Work Area displaying the following legend with letter sizes and styles of a visibility at least equal to the following:

1. Provide signs in both English and Spanish.

2.

Legend	**Notation**
NO FOOD, BEVERAGES OR TOBACCO PERMITTED	3/4 in (19 mm) Block
ALL PERSONS SHALL DON PROTECTIVE CLOTHING (COVERINGS) BEFORE ENTERING THE WORK AREA	3/4 in (19 mm) Block
ALL PERSONS SHALL SHOWER IMMEDIATELY AFTER LEAVING WORK AREA AND BEFORE ENTERING THE CHANGING AREA	3/4 in (19 mm) Block

END OF SECTION – 02 80 46

SECTION 02 82 05 - MATERIALS AND EQUIPMENT - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

B. **Related Sections:** The following Sections contain requirements that relate to this Section:

1. The Contractor's Construction Schedule is included under Section “Coordination - Asbestos Abatement”.
2. The Contractor’s Schedule of Submittals is included under Section “Submittals - Asbestos Abatement”.
3. The applicability of industry standards to products specified is included under Section “Reference Standards and Definitions - Asbestos Abatement”.
4. The administrative procedures for handling requests for substitutions made after award of the Contract is included under Section “Substitutions - Asbestos Abatement”.

1.3 DEFINITIONS

A. **Definitions** used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.

1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

2. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature that is current as of the date of the Contract Documents.

3. "Foreign Products" as distinguished from "domestic products," are items substantially manufactured (50 percent or more of value) outside the United States and its possessions. Products produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens of, nor living within, the United States and its possessions are also considered to be foreign products.
4. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.

5. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

6. "Equipment" are products that may be either operational or fixed.

a. Operational Equipment are products with operating parts, whether motorized or manually operated, that requires temporary or permanent service connections, such as wiring or piping.

b. Fixed Equipment are products necessary for accomplishing the work that are used as a temporary facility during the work and removed afterward.

1.4 SUBMITTALS

Required submittals: A general listing of products requiring submittals is included at the end of Section "Submittals." This listing may not be complete. Submittal requirements are found in each specification section. Prepare a schedule in tabular form showing each product listed. Include the manufacturer's name and proprietary product names for each item listed.

A. Product List: Prepare a list showing products specified in tabular form acceptable to the Owner's representative. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.

1. Coordinate product list with the Contractor's Construction Schedule and the Schedule of Submittals.

2. Form: Prepare product list with information on each item tabulated under the following column headings:

a. Related Specification Section number.
b. Generic name used in Contract Documents.
c. Proprietary name, model number, and similar designations.
d. Manufacturer's name and address.
e. Supplier's name and address.
f. Installer's name and address.
g. Projected delivery date or time span of delivery period.

3. Initial Submittal: Within 30 days after date of commencement of the Work, submit 3 copies of an initial product list. Provide a written explanation for omissions of data and for known variations from Contract requirements.

a. At the Contractor's option, the initial submittal may be limited to product selections and designations that must be established early in the Contract period.

4. Completed List: Within 10 days after date of commencement of the Work, submit 3 copies of the completed product list. Provide a written explanation for omissions of data and for known variations from Contract requirements.

5. Designer's Action: The Designer will respond in writing to Contractor within 2 weeks of receipt of the completed product list. No response within this period constitutes no objection to listed manufacturers or products but does not constitute a waiver of the requirement that products comply with Contract Documents. The Owner's representative's response will include a list of unacceptable product selections, containing a brief explanation of reasons for this action.

1.5 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.

1. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner, consult with the Owner's representative to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.

B. Compatibility of Options: When the Contractor is given the option of selecting between 2 or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. The contractor is responsible for providing products and construction methods that are compatible with products and construction methods to be installed after completion of the work of this contract.

2. If a dispute arises between contractors over concurrently selectable, but incompatible products, the Designer will determine which products shall be retained and which are incompatible and must be replaced.

C. Foreign Product Limitations: Except under one or more of the following conditions, provide domestic products, not foreign products, for inclusion in the Work:

1. No available domestic product complies with the Contract Documents.

2. Domestic products that comply with the Contract Documents are available only at prices or terms substantially higher than foreign products that comply with the Contract Documents.

D. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.

2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:

a. Name of product and manufacturer.
b. Model and serial number.
c. Capacity.
d. Speed.
e. Ratings.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
7. Store products subject to damage by the elements above ground, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

A. **General Product Requirements:** Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.

1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.

2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:

1. Proprietary Specification Requirements: Where Specifications name only a single product or manufacturer, provide the product indicated. No substitutions will be permitted.

2. Semi-proprietary Specification Requirements: Where Specifications name 2 or more products or manufacturers, provide 1 of the products indicated. No substitutions will be permitted.

a. Where Specifications specify products or manufacturers by name, accompanied by the term "or equal" or "or approved equal," comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

3. Nonproprietary Specifications: When Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.

5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.

a. Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.

6. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.

7. Visual Matching: Where Specifications require matching an established Sample, the Designer's decision will be final on whether a proposed product matches satisfactorily.

a. Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category.

8. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures ..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Designer will select the color, pattern, and texture from the product line selected.

9. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division 1 for allowances that control product selection and for procedures required for processing such selections.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

A. **Comply with manufacturer's instructions and recommendations** for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 02 82 05

SECTION 02 82 06 - SUBSTITUTIONS - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section includes** administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

B. **Related Sections:** The following Sections contain requirements that relate to the Section:

1. **Section "Reference Standards and Definitions - Asbestos Abatement"** specifies the applicability of industry standards to products specified.

2. **Section "Coordination - Asbestos Abatement"** specifies requirements for submitting the Contractor's Construction Schedule.

3. **Section "Submittals - Asbestos Abatement"** specifies requirements for submitting the Submittal Schedule.

4. **Section "Materials and Equipment - Asbestos Abatement"** specifies requirements governing the Contractor's selection of products and product options.

1.3 DEFINITIONS

A. **Definitions** in this Article do not change or modify the meaning of other terms used in the Contract Documents.

B. **Substitutions:** Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:

1. Substitutions requested during the bidding period, and accepted by Addendum prior to award of the Contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.

2. Revisions to the Contract Documents requested by the Owner or Designer.

3. Specified options of products and construction methods included in the Contract Documents.

4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

A. Substitution Request Submittal: The Designer will consider requests for substitution if received within 60 days after commencement of the Work. Requests received more than 60 days after commencement of the Work may be considered or rejected at the discretion of the Designer.

1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals.

2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.

3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors that will be necessary to accommodate the proposed substitution.

b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.

c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.

d. Samples, where applicable or requested.

e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.

f. Cost information, including a proposal of the net change, if any in the Contract Sum.

g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.

h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.

4. Designer's Action: If necessary, the Designer will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Designer will notify the Contractor of acceptance or rejection of the substitution within 2 weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a change order.

a. Use the product specified if the Designer cannot make a decision on the use of a proposed substitute within the time allocated.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Conditions: The Designer will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Designer. If the following conditions are not satisfied, the Designer will return the requests without action except to record noncompliance with these requirements.

1. Extensive revisions to the Contract Documents are not required.

2. Proposed changes are in keeping with the general intent of the Contract Documents.

3. The request is timely, fully documented, and properly submitted.

4. The specified product or method of construction cannot be provided within the Contract Time.

5. The Designer will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.

6. The request is directly related to an "or-equal" clause or similar language in the Contract Documents.

7. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Designer for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.

8. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.

9. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.

10. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.

11. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.

B. **The Contractor's submittal** and the Designer's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 02 82 06

SECTION 02 82 08 - PROJECT DECONTAMINATION

PART 1 - GENERAL

1.1 SUMMARY:

A. **Work of This Section** includes the decontamination of air in the Work Area which has been, or may have been, contaminated by the elevated airborne asbestos fiber levels generated during abatement activities, or which may previously have had elevated fiber levels due to friable asbestos-containing materials (ACM) in the space.

B. **Work of** This **Section** includes the cleaning, decontamination, and removal of temporary facilities installed prior to abatement work, including:

1. Primary and Critical Barriers
2. Decontamination Unit
3. Pressure Differential System

C. **Work of This Section** includes the cleaning, and decontamination of all surfaces (ceiling, walls, floor) of the Work Area, and all furniture or equipment in the Work Area.

1.2 RELATED DOCUMENTS:

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

1.3 DESCRIPTION OF REQUIREMENTS:

A. **General: Decontamination** of the Work Area following asbestos abatement.

B. **If the asbestos abatement work is on damaged or friable materials** the work is a four-step procedure with two cleanings of the Primary Barrier plastic prior to its removal and two cleanings of the room surfaces to remove any new or existing contamination. Unless specifically indicated otherwise all materials are considered damaged or friable for purposes of this section.

C. **If the asbestos abatement work is on undamaged and non-friable materials** the decontamination procedure is a two-step procedure with two cleanings of the Primary Barrier plastic to remove contamination, thus preventing contamination of the building when the Work Area isolation barriers are removed.

D. **In both cases** operation of the pressure differential system is used to remove airborne fibers generated by the abatement work.

1.4 RELATED WORK SPECIFIED ELSEWHERE:

A. **Removal of Gross Debris** is integral with the performance of abatement work and as such is specified in Section “Resilient Flooring Removal – Aggressive Asbestos Abatement”.

1.5 CLEARANCE AIR SAMPLING BY THE OWNER:

A. To determine if the elevated airborne asbestos structure concentration encountered during abatement operations has been reduced to the specified level, the Owner will secure samples and analyze them according to the following procedures.

1. Aggressive sampling procedures as described below will be followed.
2. TEM samples will be secured and analyzed as indicated below.
3. Work Area Clearance: upon meeting the TEM Clearance requirements the work of Section Project Decontamination can continue.

1.6 AGGRESSIVE SAMPLING BY THE OWNER:

A. All Air Samples will be taken using aggressive sampling techniques as follows:

1. Before sampling pumps are started the exhaust from forced-air equipment (leaf blower with an approximately 1 horsepower (746 watts) electric motor) will be swept against all walls, ceilings, floors, ledges and other surfaces in the room. This procedure will be continued for 5 minutes per 10,000 (283 cubic meters) cubic feet of room volume.
2. One 20 inch (508 mm) diameter fan per 10,000 cubic feet (283 cubic meters) of room volume will be mounted in a central location at approximately 6 feet-6 inches (2 meters) above floor, directed toward ceiling and operated at low speed for the entire period of sample collection. Contractor shall provide leaf blower, fans, and electrical cords required for aggressive sampling.
3. Air samples will be collected in areas subject to normal air circulation away from room corners, obstructed locations, and sites near windows, doors of vents.
4. After air sampling pumps have been shut off, fans will be shut off.
5. In work areas where a dirt floor or exposed fibrous glass insulation is in the space, but outside the work area, maintain a critical barrier to prevent disturbance of these surfaces during aggressive sampling.

NOTE: The Contractor shall provide all fans, leaf blowers, and extension cords necessary to complete aggressive sampling.

1.7 SCHEDULE OF CLEARANCE AIR SAMPLES BY OWNER:

A. Sample cassettes: Samples will be collected on 25 mm. cassettes as follows:

1. TEM: 0.45 micrometer mixed cellulose ester or 0.40 micrometer polycarbonate, with 5.0 micron mixed cellulose ester backing filter.

B. Number and Volume of Samples: The number and volume of air samples given in the schedules is approximate. The exact number and volume of samples collected by the Owner may vary depending upon job conditions. Contractor shall make all efforts to construct work area enclosures in such a manner that minimizes the number of work area containments required for clearance while including all building work areas where clearance sampling is required.

C. Sampling sensitivity:

1. TEM: Analytical Sensitivity as set forth in the analytical method used or the AHERA regulation.

1.8 TRANSMISSION ELECTRON MICROSCOPY:

A. In each Work Area after completion of all cleaning work, a minimum of 7 samples will be taken and analyzed as follows:

Location Sampled	Number of Samples	Analytical Sensitivity Struct/cc	Approx. Volume (L)	Approx. Flow (LPM)
Each Work Area	5	0.005	1,300-1,800	1-15
Work Area Blank	1	0.005	0	Open for 30 Seconds
Laboratory Blank	1	0.005	0	Do Not Open

B. Analysis will be performed using the analysis method set forth in the AHERA Regulation 40 CFR Part 763 Appendix A.

C. Asbestos Structures referred to in this Section include asbestos fibers, bundles, clusters or matrices, as defined by method of analysis.

D. Release Criteria: Asbestos Decontamination of the work site is complete if the following conditions are met:

1. Work Area Samples are below filter background levels
   a. All Work Area sample volumes are greater than 1,199 liters for a 25 mm. sampling cassette.
   b. The average concentration of asbestos of the five Work Area Samples does not exceed the filter background level of 70 structures per square millimeter (70 s/mm^2) of filter area.

E. If these conditions are not met then the decontamination is incomplete, repeat the cleaning procedures of this section. If work area release criteria are not met, the Contractor shall be responsible for the cost of any failed clearance tests (including analytical costs and air monitoring fees).

F. Termination of Analysis: if the arithmetic mean (average) asbestos concentration on the blank filters exceeds 70 structures per square millimeter (70 s/mm^2) of filter area the analysis will cease and new samples collected.

G. Termination of Analysis: if the sample media are overloaded, the analysis will cease and new samples shall be collected.

1.9 LABORATORY TESTING BY THE OWNER:

A. Transmission Electron Microscopy by the Owner:

1. **Samples will be sent by overnight courier** for analysis by Transmission Electron Microscopy. Samples will not be carried on weekends, so that samples shipped on Friday will arrive on the following Monday. Verbal results will normally be available during the 5th working day after receipt of samples by the laboratory. The laboratory is capable of analyzing a maximum of 13 such samples from this project at any one time. All Transmission Electron Microscopy results will be available to the Contractor.

2. **Submit with bid unit cost** for each day of waiting beyond that set forth in the paragraph above.

1.10 SUBMITTALS:

A. Before Start of Work submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal is returned for “Unrestricted Use” or “Final but Restricted Use.”

1. Submit test report from an independent testing laboratory on the fire resistance rating of the assembly of the spray back fireproofing on the lock-back sealer used.

2. Submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal has been’ “Received - Not Reviewed.”

   a. Material Safety Data Sheet: Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for the following:

   b. “Lock-Back,” sealer.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 START OF WORK:

A. Previous Work: During completion of the asbestos abatement work specified in other sections, the Secondary Barrier of polyethylene sheeting will have been removed and disposed of along with any gross debris generated by the asbestos abatement work.

B. Visual inspection: Perform visual inspections of the work area along with the Project Administrator at each step of the decontamination process.

1. Follow inspection procedures in the American Society for Testing and Material (ASTM) standard for visual inspections, ASTM E1368.

C. Start of Work: Work of this section begins with the cleaning of the Primary Barrier. At start of work the following will be in place:

1. Primary Barrier: Two layers of polyethylene sheeting on floor and one layer on walls.
2. Critical Barrier: An airtight barrier between the Work Area and other portions of the building or the outside.
3. Critical Barrier Sheeting: Over lighting fixtures and clocks, ventilation openings, doorways, convectors, speakers and other openings.
4. Decontamination Units: For personnel and equipment in operating condition.
5. Pressure Differential System: In operation.

3.2 FIRST CLEANING:

A. First Cleaning: Carry out a first cleaning of all surfaces of the work area including items of remaining sheeting, tools, scaffolding and/or staging by use of damp-cleaning and mopping, and/or a High Efficiency Particulate Air (HEPA) filtered vacuum. (Note: A HEPA vacuum may fail if used with wet material.) Do not perform dry dusting or dry sweeping. Use each surface of a cleaning cloth one time only and then dispose of as contaminated waste. Continue this cleaning until there is no visible debris from removed materials or residue on plastic sheeting or other surfaces.

1. Remove All Filters in Air Handling System(s) and dispose of as asbestos-containing waste in accordance with requirements of Section “Disposal of Regulated Asbestos-Containing Material”.

2. After the surfaces have passed a visual inspection verifying that all debris and residue has been removed from the sheet plastic, allow a waiting period that is long enough for the HEPA-filtered fan units operating in the work area to to clean air of airborne asbestos fibers. Use oscillating fans as necessary to assure circulation of air in all parts of work areas during this period. Maintain Pressure Differential System in operation.

3.3 SECOND CLEANING:

A. Second Cleaning: Carry out a second cleaning of all surfaces in the work area in the same manner as the first cleaning.

B. **Visual inspection:** Before the application of any sealer to abated surfaces as a lock-back, perform a visual inspection to determine if all ACM including debris and residue has been removed. Perform visual inspections along with Project Administrator. When the area is visually clean, and if after sweeping of all surfaces with leaf blower, no debris, residue, dust or other material is found, complete the certification at the end of this section. Visual inspection is not complete until confirmed in writing, on the certification, by Project Administrator. After this visual inspection is passed, lock-back sealants can be applied and the work area decontamination process can be initiated.

C. Sealing of substrate: Perform sealing of substrate or installation of spray-applied finishes or fireproofing, where required, at this time. Maintain Pressure Differential System in operation during encapsulation work. Perform work only after meeting the following requirements:

1. Surfaces to be covered with sealer have met the requirements for a visual inspection in this section.
2. Airborne fiber counts in the Work Area are at or below 0.01 fibers per cubic centimeter as measured by phase contrast microscopy.

D. Removal of Primary Barriers:

1. Immediately following the second cleaning of the Primary plastic, remove all Primary Barrier sheeting and Material Decontamination Unit, if there is one, leaving only:

   a. Critical Barrier: Which forms the sole barrier between the Work Area and other portions of the building or the outside.
   b. Critical Barrier Sheeting: Over lighting fixtures and clocks, ventilation openings, doorways, convectors, speakers, and other openings.
   c. Decontamination Unit: For personnel, in operating condition.
   d. Pressure Differential System: Maintain in continuous operation.

3.4 THIRD CLEANING:

A. Third cleaning: Carry out a third cleaning of all surfaces in the work area in the same manner as the first cleaning immediately after removal of Primary plastic. This cleaning is now being applied to existing room surfaces. Take care to avoid water marks or other damage to surfaces.

B. Contractor's Testing: At the completion of the above cleaning visually inspect all surfaces. Reclean if any dust, debris, etc. is found. At completion of this inspection sweep entire Work Area including walls, ceilings, ledges, floors and other surfaces in the Work Area with exhaust from forced-air equipment (leaf blower with approximately 1 horsepower (745.7 watts) electric motor or equivalent). Do not direct forced-air equipment at any seal in any Critical Barrier. If any debris or dust is found repeat the cleaning. Continue this process until no debris dust or other material is found while sweeping of all surfaces with forced-air equipment.

1. Cover carpeting in the work area with 6 mil (0.15 mm) polyethylene during Contractor's testing procedures. Seal plastic to baseboards with duct tape.

C. Cleaning Carpeting: At the completion of cleaning of all surfaces except carpeting, HEPA vacuum carpeting designated to remain in Work Areas using a floor cleaning attachment adjusted so that rubber skirting is in contact with carpet surface. Use a passive (non-power brush type) floor attachment with rubber floor seals and adjustable above-floor height. Completely clean carpeting in one direction with each pass of the floor attachment overlapping the previous pass by one-half the attachment width. At the completion of one such cleaning, vacuum clean in the same manner in a direction at right angles to the initial cleaning. Perform a visual inspection of the carpet at the completion of cleaning, in accordance with inspection standards of the American Society for Testing and Material (ASTM) standard for visual inspections, ASTM E1368.

D. After a visual inspection, again wait for a period of time long enough for the HEPA-filtered fan units operating in the work area to clean air of airborne asbestos fibers. Use oscillating fans as necessary to assure circulation of air in all parts of work areas during this period. Maintain pressure differential system in operation.

3.5 FINAL CLEANING:

A. Final Cleaning: Carry out a final cleaning of all surfaces in the Work Area in the same manner as the previous cleaning.

B. Contractor's Testing: At the completion of the above cleaning visually inspect all surfaces. Reclean if any dust, debris, etc. is found. At completion of this inspection sweep entire Work Area including walls, ceilings, ledges, floors and other surfaces in the Work Area with exhaust from forced air equipment (leaf blower with approximately 1 horsepower electric motor or equivalent). Do not direct forced air equipment at any seal in any critical barrier. If any debris or dust is found repeat the final cleaning. Continue this process until no debris dust or other material is found while sweeping of all surfaces with forced air equipment.

C. After a visual inspection, again wait for a period of time long enough for the HEPA-filtered fan units operating in the work area to clean air of airborne asbestos fibers. Use oscillating fans as necessary to assure circulation of air in all parts of work areas during this period. Maintain pressure differential system in operation.

3.6 VISUAL INSPECTION:

A. After Final Cleaning Perform a Complete Visual Inspection of the entire Work Area including: all surfaces, ceiling, walls, floor, decontamination unit, all plastic sheeting, seals over ventilation openings, doorways, windows, and other openings; look for debris from any source, residue on surfaces, dust or other matter. During visual inspection sweep entire work area including walls, ceilings, ledges, floors, and other surfaces in the room with exhaust from forced air equipment (leaf blower with approximately 1 horsepower electric motor or equivalent). If any debris, residue, dust or other matter is found repeat final cleaning and continue decontamination procedure from that point. When the area is visually clean, and if after sweeping of all surfaces with leaf blower, no debris, residue, dust or other material is found, complete the certification at the end of this section. Visual inspection is not complete until confirmed in writing, on the certification, by Project Administrator.

B. Temporary lighting: Provide a minimum of 100 foot candles (1075 Lumens / sq meter) of lighting on all surfaces in the areas to be subjected to visual inspection. Provide hand held lights providing 150 foot candles (1600 lumens / sq meter) at 4 feet (1.25 meters) capable of reaching all locations in work area.

C. Lifts: Provide ladders, scaffolding, and lifts as required to provide access to all surfaces in the area to be subjected to visual inspection. Access is to allow touching of all surfaces.

3.7 CLEARANCE AIR SAMPLING BY OWNER (TEM):

A. Transmission Electron Microscopy (TEM): After the work area is found to be visually clean by Contractor's inspection and testing, TEM air samples will be collected and analyzed by the Owner in accordance with the procedure for Transmission Electron Microscopy set forth in Part 1 of this section. Contractor shall contact Designer 48 hours prior to requesting TEM clearance air sampling.

1. If Release Criteria are not met, repeat Final Cleaning and continue Decontamination procedure from that point.
2. If Release Criteria are met, remove work area isolation in accordance with requirements of this section.

B. 1. If Release Criteria are not met, repeat Final Cleaning and continue Decontamination procedure from that point.

2. If Release Criteria are met, remove work area isolation in accordance with requirements of this section.

NOTE: The Contractor shall compensate the Owner for the costs of failed clearance sampling and associated fees, including but not limited to: laboratory analytical fees, shipping fees, air monitoring technician mileage, air monitoring technician time on site related to air monitoring, air monitoring technician travel time, air monitoring cassettes, per diem, lodging, and pump rental.

3.8 LOCK-BACK:

A. Encapsulation of substrate: Perform encapsulation of substrate or installation of spray-applied finishes or fireproofing, where required, before Removal of Work Area Isolation as specified below. Maintain Pressure Differential System in operation during encapsulation work.

3.9 REMOVAL OF WORK AREA ISOLATION:

A. After all requirements of this section have been met:

1. Shut down and remove the Pressure Differential System. Seal HEPA filtered fan units, HEPA vacuums and similar equipment with 6 mil (0.15 mm) polyethylene sheet and duct tape to form a tight seal at intake end before being moved from Work Area.
2. Remove Personnel Decontamination Unit.
3. Remove the Critical Barriers separating the Work Area from the rest of the building. Remove any small quantities of residual material found upon removal of the plastic sheeting with wet wiping, HEPA filtered vacuum cleaners and local area protection. If significant quantities, as determined by the Designer, are found then the entire area affected shall be decontaminated as specified in Cleaning and Decontamination Procedures.
4. Remove all equipment, materials, debris from the work site.
5. Dispose of all asbestos-containing waste material as specified in Section “Disposal of Regulated Asbestos Containing Material”.

4.0 SUBSTANTIAL COMPLETION OF ABATEMENT WORK:

A. Abatement Work is Substantially Complete upon meeting the requirements of this section including submission of:

1. Certificate of Visual Inspection.

2. Receipts Documenting proper disposal as required by Section “Disposal of Regulated Asbestos-Containing Material”.
3. Punch list detailing repairs to be made and incomplete items.

4.1 CERTIFICATE OF VISUAL INSPECTION:

A. **Following this section is a "Certificate of Visual Inspection".** This certification is to be completed by the Contractor and certified by the Project Administrator. Submit completed Certificate with Application for Final Payment. Final payment will not be made until this Certification is executed.

END OF SECTION - 02 82 08

CERTIFICATION OF VISUAL INSPECTION

In accordance with Section "Project Decontamination" the Contractor hereby certifies that he has visually inspected the Work Area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, Decontamination Unit, sheet plastic, etc.) and has found no dust, debris or residue.

by: (Signature)_____ Date_____

(Print Name)_____

(Print Title)_____

PROJECT ADMINISTRATOR CERTIFICATION

The Project Administrator hereby certifies that he has accompanied the Contractor on the Contractor's visual inspection and verifies that this inspection has been thorough and to the best of their knowledge and belief, the Contractor's Certification above is a true and honest one.

by: (Signature)_____ Date_____

(Print Name)_____

(Print Title)_____

SECTION 02 82 13 - RESILIENT FLOORING REMOVAL - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 2 Specification Sections, apply to work of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

A. Asbestos abatement project requirements to be completed prior to start of the work of this section are set forth in the following sections:

1. Temporary Facilities - Asbestos Abatement
2. Temporary Pressure Differential & Air Circulation System
3. Temporary Enclosures - Complete Work Except Delete Floor Plastic.
4. Regulated Areas
5. Worker Protection - Asbestos abatement
6. Respiratory Protection
7. Decontamination Units

B. Asbestos abatement project requirements to be completed at completion of the work of this section are set forth in the following sections:
1. Project Decontamination

1.3 SUBMITTALS:

A. **Before Start of Work:** Submit the following to the Designer for review. Do not start work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use.

1. Wetting Materials: Submit product data, use instructions and recommendations from manufacturer of wetting material (surfactant and/or removal encapsulant) intended for use. Include data substantiating that material complies with requirements.
2. NESHAP Compliance Documentation: Submit manufacturer's documentation for removal encapsulants proposed for use that, to the extent required by this specification, the material, if used in accordance with manufacturer's instructions, will comply with the wetting requirements of National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M).
3. NESHAP Compliance Documentation: Submit written approval from the EPA NESHAP Coordinator, in compliance with applicable requirements of National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M), for the use of shot/bead blast equipment for adhesive removal.
4. Adhesive Removal Solvent: Submit product data, use instructions and recommendations from manufacturer of adhesive removal solvent intended for use. Include data substantiating that material complies with requirements.

B. **Before Start of Work** submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal has been' "Received - Not Reviewed."

1. Material Safety Data Sheet: Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for all materials proposed for use on the work including:

a. Surfactants.

b. Adhesive Removal Solvents.

PART 2 - PRODUCTS

2.1 MATERIALS

A. **Wetting Materials:** For wetting prior to disturbance of asbestos-containing materials use:

1. Amended Water: Where amended water is used, provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the asbestos-containing material (ACM) and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons (19 liters) of water.

2. Removal Encapsulant: Where a removal encapsulant is used, provide a penetrating-type encapsulant designed specifically for removal of ACM. Use a material which results in wetting of the asbestos-containing material and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons (19 liters) of water.

B. **Foam or Viscous Liquid:** Where foam or viscous liquid is used, provide material that contains no organic materials, is non-flammable, presents no physical hazard due to reactivity, presents no acute or chronic health hazard, and does not require special skills, knowledge, or equipment for application.

C. **Tile Adhesive Removal Solvent:** Where tile adhesive removal solvent is used, provide a slow-drying solvent intended to remove tile adhesive. Provide material that is not flammable, does not create combustible vapors and has no significant inhalation hazard.

1. Provide materials that have less than 250 g/l of volatile organic solvents (VOCs).

D. **Polyethylene Sheet:** A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mil (0.15 mm) thick, clear, frosted, or black as indicated.

E. **Polyethylene Sheet:** Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick frosted or black as indicated.

F. **Duct Tape:** Provide duct tape in 2 inch or 3 inch (50 or 75 mm) widths as indicated, with an adhesive formulated for use on sheet polyethylene.

G. **Spray Cement:** Provide, in aerosol cans, spray adhesive which is formulated for use on sheet polyethylene. Provide materials that do not contain methylene chloride.

H. **Disposal Bags:** Provide 6 mil (0.15 mm) thick leak-tight polyethylene bags labeled as required by Section 02084 Disposal of Regulated Asbestos-Containing Material.

I. **Fiberboard Drums:** Provide heavy duty leak-tight fiberboard drums with tight sealing locking metal tops.

J. **Steel Drums:** Provide leak-tight steel drums with tight-sealing locking metal tops.

K. **Injection Molded Plastic Drums:** Provide leak-tight injection-molded plastic drums with tight sealing locking tops.

L. **Paper board Boxes:** Provide heavy-duty corrugated paperboard boxes coated with plastic or wax to retard deterioration from moisture. Provide in sizes that will easily fit in disposal bags.

M. **Polyethylene Boxes:** Provide heavy-duty polyethylene boxes. Provide leak-tight boxes or boxes in sizes that will easily fit in disposal bags.

2.2 PRIMARY RESILIENT FLOORING REMOVAL EQUIPMENT

A. **Manual Spades:**

1. Hand operated scraper/chisels with long handles and replaceable blades for removal of resilient flooring.

2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

a. Crain Cutter Co., Inc. — Various manual scrapers/strippers
156 So. Milpitas Blvd.
Milpitas, CA 95035
408-946-6100

b. Beno J. Gundlach Company — Various manual scrapers/strippers
P.O. Box 544
Belleville, IL 62222
618-233-1781

c. Roofing Equipment, Inc. — Taylor Tools "Spud Bar" & other manual scrappers/strippers
11075 East 47th Avenue
Denver, CO 80239
303-371-7667

d. Red Devil, Inc. — "The Slam Scraper"
2400 Vauxhall Road
Union, NJ 07083-1933
201-688-6900 or 800-4-A-DEVIL

B. Powered Spades:

1. Long-handled scraper/chisels used in a full-standing position that have replaceable blades and are pneumatically or electrically-powered to move in a reciprocating (in and out) motion.
2. Provide powered spades that are equipped with pneumatic vents and piston seals that prevent compressed air or blow by from sweeping floor.
3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
   a. Aramsco
      1655 Imperial Way
      Thorofare, NJ 08086
      800-666-6933
      "Air Powered Tile Removal System"
      - hose
      - compressor
      - spade, chisel
   b. Equipment Development Co., Inc.
      100 Thomas Johnson Drive
      Frederick, MD 21701
      301-663-1600 or 800-638-EDCO
      "A-LR-5"

C. Stripper Machines:

1. These are walking units with blades at the front, driven by electric motors, and move either in a reciprocating (in and out) or an oscillating orbital motion.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
   a. Crain Cutter Co., Inc.
      156 So. Milpitas Blvd.
      Milpitas, CA 95035
      408-946-6100
      No. 700 "Bearcat" Stripper
      - without blades
      - various blades available
   b. Beno J. Gundlach Company
      P.O. Box 544
      Belleville, IL 62222
      618-233-1781
      No. 500
      No. 525
   c. Inventive Manufacturing
      1440 South Seneca
      Wichita, KS 67213
      316-267-2443
      "The Big Rip-Off"
   d. Palmer Distributing & Sales Co.
      P.O. Box 6327
      Glendale, CA 91225-0327
      818-244-7261 or 800-423-2733
      Model 460
      Model PG 101
      Model PG 102
   e. Roofing Equipment, Inc.
      11075 East 47th Avenue
      Denver, CO 80239
      303-371-7667
      Taylor Tools
   f. Warner Manufacturing
      13435 Industrial Park Blvd.
      Minneapolis, MN 55441
      612-559-4740 or 800-328-0606
      No. 7079 Warner Floor Stripper

D. Rotary Cutters:

1. Machine with rotating discs facing flat against the floor with spring-loaded cutters that follow the profile of the floor and removes soft resilient materials by cutting them into thin strips and scraping them from the floor.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

a.	Critical Industries, Inc. 5815 Gulf Freeway Houston, TX 77023 800-624-7030	“Strip-Dek" fitted for connection to HEPA Vac

2.3 THERMAL EQUIPMENT WITH AUTOMATIC CONTROL:

A. Thermal Equipment with Automatic Control:

1. Equipment utilizing controlled infrared radiant heat to make the resilient floor tiles and adhesive soft and pliable for removal.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

a.	Enviromethods, Inc. P.O. Box 6151 Wolcott, CT 06716 203-879-5527	"Delta T" series
b.	UAS Automation Systems, Inc. 4524 Parkway Commerce Blvd. Orlando, FL 32808 407/294-8551 or 800/969-8837	"ATR" (Automated Tile Removal) series

2.4 NOT USED

2.5 OTHER TECHNOLOGIES APPLIED TO THE WORK:

A. Rotary Grinders/Surfacers:

1. Machine with discs facing flat against the floor that removes hard materials with a grinding action.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

a.	Allen Engineering Corporation P.O. Box 819 Paragould, AR 72451 501-236-7751 or 800-643-0095	No. 021006 grinders; diamond (wet cut) with dust extraction kit - gasoline, electric, propane
b.	Equipment Development Co. Inc. 100 Thomas Johnson Drive Frederick, MD 21701 301-663-1600 or 800-638-EDCO	EDCO grinders diamond (wet cut) w/HEPA vac connectors models: SEC, 2EC, 2GC, 411

B. Surfacers/Planers/Scarifiers:

1. Machine with a series of small cutters freewheeling on axles mounted on a drum so that the cutters contact the floor surface with a flailing action.

2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

a.	Allen Engineering Corporation P.O. Box 819 Paragould, AR 72451 501-236-7751 or 800-643-0095	"Thunderbird 8" planer w/dust extraction kit "Multi-Duty Planer" diamond head grinder with dust extraction kit
b.	Aurand 1210 Ellis Street Cincinnati, Ohio 45223 513-541-7200	Handheld units (no vac) and small walking units
c.	Bartell Power Products 56 Harvester Avenue Batavia, NY 14020 716-344-0850 or 800-247-8577	"Surface Preparation System" - machine and cutter individually sold Handheld units (2" path, no vac) models SP86, SP86E Walking units (8" path) with dust extractor models B446, 436, 346
d.	Equipment Development Co. Inc. 100 Thomas Johnson Drive Frederick, MD 21701 301-663-1600 or 800-638-EDCO	EDCO various Surfacers/Planers with HEPA vacs - models CPM 4, 8, CPU 10, 10C, 12
e.	SASE Company P.O. Box 81003 Seattle, WA 98108 206-762-0744	VON ARX various Surfacers/Scarifiers

PART 3 - EXECUTION

3.1 RESILIENT FLOOR COVERINGS:

A. Pre-requisite activities: Before starting removal of ACM using the procedures of this section complete work of the following sections:

1. Temporary Facilities - Asbestos Abatement
2. Temporary Pressure Differential & Air Circulation System
3. Temporary Enclosures - Complete work except delete floor plastic.
4. Regulated Areas
5. Worker Protection - Asbestos abatement
6. Respiratory Protection
7. Decontamination Units

B. Preparation: Prior to beginning the removal of any resilient floor covering complete the following:

1. Remove appliances and furniture from the work area.
2. Where detergent is used, mix a detergent solution (16 ounces (0.5 liters) of liquid dishwashing detergent to 1 gallon (4 liters) of warm water) and pour into a garden sprayer.

C. Seal Floor Penetrations: Before using wet methods to remove resilient flooring, seal openings, and penetrations in the floor to prevent water leakage.

D. Remove Resilient Flooring: Use the three step process described in the following sections:

1. First Step: Removal of Resilient Tile Floor Covering, and/or Removal of Resilient Sheet Flooring. This step involves removal of tiles or the wear layer of sheet flooring.
2. Second Step: Removal of Heavy Residue of Adhesive and/or Removal of Residual Backing. This step involves the removal of the bulk of these residual materials.
3. Third Step: Removal of Adhesive Residue. After completion of the first two steps there will be a thin residue of adhesive left on the floor.
4. At the completion of all work, leave the substrate in such a state as to comply with all requirements and recommendations of manufacturer of replacement flooring.

3.2 STEP ONE

REMOVAL OF RESILIENT TILE FLOOR COVERING:

A. Remove resilient tile floor covering using the following procedure:

1. General:
   a. Remove binding strips or other restrictive molding from doorways, walls, etc. clean and dispose of as non-asbestos waste. Dispose of any materials that have glue or floor mastic on them as asbestos-containing waste.
2. Wet Floor:

   a. Wet floor with amended water, removal encapsulant, or detergent solution, so that entire surface is wet. Do not allow to puddle or run off to other areas. If a removal encapsulant is used, use in strict accordance with manufacturer's instructions. Cover with sheet polyethylene to allow humidity to release tile from floor. Allow time for water or removal encapsulant to loosen tiles prior to removal.

   b. Keep floor continuously wet throughout removal operation.

   c. Remove tiles using a manual or powered spade or stripping machine. Continuously mist floor in area where machine is working with amended water, removal encapsulant or detergent solution. Wet any debris generated as necessary to keep continuously wet. Keep floor where tile has been removed continuously wet until after completion of heavy adhesive residue removal.

3. Where Foam or Viscous Liquid is used:

   a. Distribute dry foam in a uniform manner over floor. Use sufficient powder to form 1 inch (25 mm) of foam. Wet powder to produce foam. Add additional powder and wet as necessary to maintain 1 inch (25 mm) of foam during the entire removal process.

   b. Remove tiles using a manual or powered spade or stripping machine. Add additional dry foam powder and wet as necessary to maintain 1 inch (25 mm) of foam during the entire removal process. Maintain layer of foam on floor where tile has been removed until after completion of heavy adhesive residue removal.

B. Debris and Waste

1. Dispose of all materials in accordance with Section “Disposal of Regulated Asbestos containing Material”.

3.3 NOT USED

3.4 STEP TWO - REMOVAL OF HEAVY RESIDUE OF ADHESIVE:

A. Remove the heavy residue of adhesive left after removal of resilient tile flooring using the following procedure. If the residual adhesive is sufficiently thin that the mastic can be effectively removed, this step may be skipped and step three started.

1. Dampen Floor
   a. Dampen floor by misting with amended water, removal encapsulant, or detergent solution so that entire surface is wet. Do not allow to puddle or run off to other areas. If a removal encapsulant is used, use in strict accordance with manufacturer's instructions.
   b. Keep floor continuously damp throughout removal operation.

2. Where Foam or Viscous Liquid is used:
   a. Add additional foam dry powder and wet as necessary to maintain 1 inch (25 mm) of foam during the entire removal process.

3. Adhesive Removal:
   a. Begin removal at a point farthest from the entrance to the work area. Work of this step may proceed concurrently with work of removal of tile.
   b. Remove heavy residue of adhesive backing. Continuously mist floor in area where machine is working with amended water, removal encapsulant or detergent solution. Wet any debris generated as necessary to keep continuously wet.

4. Disposal and Debris
   a. Dispose of all materials in accordance with Section “Disposal of Regulated Asbestos Containing Material”.

5. Wet vacuum standing water with HEPA wet/dry vacuum.

6. Mop floor with amended water, removal encapsulant, or liquid detergent solution to remove all debris and residue.

7. Continue the above steps until the adhesive is sufficiently reduced in thickness that it can be effectively removed.

8. Start in the corner of the room farthest from the entrance door and moisten an area of the adhesive approximately 3 by 10 feet (1 m by 3 m) with amended water, removal encapsulant, or detergent solution. Wet scrape with a stiff-bladed wall or floor scraper removing ridges and any loose adhesives until only a thin smooth film remains. Where deposits are heavy or difficult to scrape, heat with a hot-air blower prior to scraping.
   a. Dispose of all materials in accordance with Section 02084 Disposal of Regulated Asbestos Containing Material.

9. Wet vacuum standing water with HEPA wet/dry vacuum.

10. Mop floor with amended water, removal encapsulant, or liquid detergent solution to remove all debris and residue.

11. Continue the above steps until the adhesive is sufficiently reduced in thickness that it can be effectively removed.

3.5 NOT USED

3.6 STEP THREE - REMOVAL OF ADHESIVE RESIDUE:

A. After removal of resilient flooring and any heavy residue of adhesive, mastic, or backing material, in the previous step, remove all residue of adhesive from the floor using one of the methods described in the paragraphs below. Prior to beginning removal of adhesive residue, allow floor to dry after completion of the wet removal procedures used in previous steps. Begin removal at a point farthest from the entrance to the work area.

3.7 NOT USED
3.8 NOT USED

3.9 ADHESIVE SOLVENT:

A. **Adhesive:** Where solvents are used, remove adhesive residue by using adhesive removal solvents. Use solvents in accordance with manufacturers' instructions. Saturate adhesive with removal solvent and allow adhesive to soften. Remove by scraping, wet sanding, or wet scrub with floor cleaning machine with abrasive pad. Provide worker protection as required by material safety data sheet (MSDS) for any material used.

1. Mop floor with removal solvent as required by manufacturer's directions as required to completely remove all residue of adhesive.

2. Clean Floor after completion of removal of ACM by wet mopping with amended water. Mop three times allowing a drying time between each mopping.

3. Encapsulate cleaned floor with one coat of an encapsulant. Use an encapsulant that has been determined not to prevent the bond of new resilient flooring. Follow manufacturer's recommendations for new floor covering installation.

4. Dispose of all rags, plastic sheet, etc. in accordance with requirements of Section "Disposal of Regulated Asbestos-Containing Material".

B. Decontaminate Equipment: After the completion of all work, decontaminate all equipment and machinery used for work of this section. Accomplish decontamination as required by the section on Project Decontamination.

3.10 WORK AREA CLEARANCE:

A. After completion of all resilient flooring and adhesive removal work and prior to removal of critical barriers, decontamination units, and shut down of pressure differential and ventilation system; complete project decontamination and clearance in accordance with section "Project Decontamination."

END OF SECTION 02 82 13

SECTION 02 82 15 - REMOVAL OF ASBESTOS-CONTAINING MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 02 Specification Sections, apply to work of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

A. Worker Protection requirements are set forth in Section Worker Protection - Asbestos abatement.

B. Installation of Critical and Primary Barriers, and Work Area Isolation Procedures are set forth in Section Temporary Enclosures.

C. Project Decontamination procedures after removal of the Secondary Barrier are specified in Section Project Decontamination.

D. Disposal of asbestos-containing waste is specified in Section Disposal of Regulated Asbestos-Containing Material.

E. Omitted intentionally.

1.3 SUBMITTALS:

A. **Before Start of Work:** Submit the following to the Engineer for review. Do not start work until these submittals are returned with Engineer's action stamp indicating that the submittal is returned for unrestricted use.

1. **Surfactant:** Submit product data, use instructions and recommendations from manufacturer of surfactant intended for use. Include data substantiating that material complies with requirements.
2. **Removal Encapsulant:** Submit product data, use instructions and recommendations from manufacturer of removal encapsulant intended for use. Include data substantiating that material complies with requirements.
3. **NESHAP Certification:** Submit certification from manufacturer of surfactant or removal encapsulant that, to the extent required by this specification, the material, if used in accordance with manufacturer's instructions, will wet Asbestos-Containing Materials (ACM) to which it is applied as required by the National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M).

B. Before Start of Work submit the following to the Engineer for review. Do not begin work until these submittals are returned with the Engineer's action stamp indicating that the submittal has been' "Received-Not Reviewed."

1. **Material Safety Data Sheet:** Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for the following

i. Surfactants.
ii. Encapsulants.
iii. Solvents.

PART 2 - PRODUCTS:

2.1 MATERIALS

A. Wetting Materials: For wetting prior to disturbance of ACM use either amended water or a removal encapsulant:

B. Amended Water: Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons (19 liters) of water.

C. Removal Encapsulant: Provide a penetrating type encapsulant designed specifically for removal of ACM. Use a material which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of a mixture of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether in five gallons (19 liters) of water.

D. Polyethylene Sheet: A single polyethylene film in the largest sheet size practicable to minimize seams, 6.0 mil (0.15 mm) thick clear, frosted, or black as indicated.

E. Polyethylene Sheet: Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick frosted or black as indicated.

F. Duct Tape: Provide duct tape in 2-inch or 3-inch (50mm or 75 mm) widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

G. Spray Cement: Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

H. Disposal Bags: Provide 6 mil (0.15 mm) thick leak-tight polyethylene bags labeled as required by Section Disposal of Regulated Asbestos Containing Material.

I. Omitted intentionally.

J. Omitted intentionally.

K. Felt: Standard felt approximately 1/16 inch (1.6 mm) thick and 36 inches (900 mm) to 72 inches (1800 mm) in width.

PART 3 - EXECUTION

3.1 SECONDARY BARRIER:

Secondary Barrier: Over the Primary Barrier, install as a drop cloth a clear 6 mil (0.15 mm) sheet plastic in all areas where asbestos removal work is to be carried out. Completely cover floor with sheet plastic. Where the work is within 10 feet (3 m) of a wall extend the Secondary Barrier up wall to ceiling. Support sheet plastic on wall with duct tape, seal top of Secondary plastic to Primary Barrier with duct tape so that debris is unable to get behind it. Provide cross strips of duct tape at wall support as necessary to support sheet plastic and prevent its falling during removal operations.

A. Install Secondary Barrier at the beginning of each work shift. Install only sufficient plastic for work of that shift.

B. Remove Secondary Barrier at end of each work shift or as work in an area is completed. Fold plastic toward center of sheet and pack in disposal bags. Keep material on sheet continuously wet until bagged.

C. Install Walkways of black 6 mil (0.15 mm) plastic between active removal areas and decontamination units to protect Primary Layer from tracked material. Install walkways at the beginning of, and remove at the end of, each work shift.

3.2 WORKER PROTECTION:

Before beginning work with any material for which a Material Safety Data Sheet has been submitted provide workers with the required protective equipment. Require that appropriate protective equipment be used at all times.

3.3 WET REMOVAL:

A. Thoroughly wet to satisfaction of Engineer ACM to be removed prior to stripping and/or tooling to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of amended water or removal encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for amended water or removal encapsulant to penetrate material thoroughly. If amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions. Perforate outer covering of any installation which has been painted and/or jacketed in order to allow penetration of amended water or removal encapsulant, or use injection equipment to wet material under the covering. Where necessary, carefully strip away while simultaneously spraying amended water or removal encapsulant on the installation to minimize dispersal of asbestos fibers into the air.
   1. Mist work area continuously with amended water whenever necessary to reduce airborne fiber levels.
   2. Remove saturated ACM in small sections from all areas. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into disposal bags. Twist neck of bags, bend over and seal with minimum three wraps of duct tape. Clean outside and move to Wash Down Station adjacent to Material Decontamination Unit.

B. Not Used

C. Not Used

D. Not used

3.4 Omitted intentionally.

3.5 Omitted intentionally.

3.6 Omitted intentionally.

3.7 Omitted intentionally.

END OF SECTION 02 82 15

SECTION 02 82 16 - BUILDING COMPONENT DEMOLITION-ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 2 Specification Sections, apply to work of this section.

1.2 DESCRIPTION OF THE WORK

A.The work of this Section includes the demolition of buildings and installations where asbestos containing materials are present.

1.3 RELATED WORK SPECIFIED ELSEWHERE:

A.Work to be completed prior to start of the work of this section are set forth in the following sections:
1. Worker Protection **-** Asbestos abatement
2. Respiratory Protection
3. Decontamination Units

B. Section "Disposal of Regulated Asbestos-Containing Material" describes the handling and disposal of asbestos-containing waste.

C. Section "Hazardous Waste Management" describes the management and disposal of hazardous waste such as PCB Ballasts, fluorescent light tubes, and mercury containing thermostats encountered during the work of this section.

1.4 SUBMITTALS:

A. Before Start of Work: Submit the following to the Engineer for review. Do not start work until these submittals are returned with Engineer's action stamp indicating that the submittal is returned for unrestricted use.

1. Surfactant: Submit product data, use instructions and recommendations from manufacturer of surfactant intended for use. Include data substantiating that material complies with requirements.

2. Removal Encapsulant: Submit product data, use instructions and recommendations from manufacturer of removal encapsulant intended for use. Include data substantiating that material complies with requirements.

3. NESHAP Certification: Submit certification from manufacturer of surfactant or removal encapsulant that, to the extent required by this specification, the material, if used in accordance with manufacturer's instructions, will wet asbestos-containing materials (ACM) to which it is applied as required by the National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M).

B. Before Start of Work submit the following to the Engineer for review. Do not begin work until these submittals are returned with the Engineer's action stamp indicating that the submittal has been' "Received - Not Reviewed."

1. Material Safety Data Sheet: Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for the following:
a.Surfactants.
b.Encapsulants.

PART 2 - PRODUCTS:

2.1 MATERIALS

A. Wetting Materials: For wetting prior to disturbance of ACM use either amended water or a removal encapsulant.

B. Amended Water: Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons of water.

C. Removal Encapsulant: Provide a penetrating type encapsulant designed specifically for removal of ACM. Use a material which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of 50 percent polyoxyethylene ester and50 percent polyoxyethylene ether mixed with five gallons of water.

D. Reinforced Polyethylene Sheet: Where plastic sheet is the only separation between the Work Area and building exterior, provide translucent, nylon reinforced, laminated, flame resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick, frosted or black as indicated.

E. Duct Tape: Provide duct tape in 2 inch or 3 inch (51 mm or 76 mm) widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

F.Spray Cement: Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

PART 3 - EXECUTION

3.1 WORKER PROTECTION:

A. Before beginning work with any material for which a Material Safety Data Sheet has been submitted provide workers with the required protective equipment. Require that appropriate protective equipment be used at all times.

3.2 REMOVAL OF ARCHITECTURAL FINISHES, FIREPROOFING, AND THERMAL SYSTEM INSULATION:

A. Isolate Work Area: from the building exterior and other portions of the building. Where existing walls, doors, windows, or other such closure is missing, seal openings
with polyethylene sheet at least 6 mil (0.15 mm) in thickness, mechanically fastened in
place and sealed with duct tape or spray glue. Seal broken windows or other openings to
the building exterior with nylon-reinforced plastic.

B. Drop Cloth: Install a drop cloth consisting of clear 6 mil (0.15 mm) sheet plastic in any area where asbestos removal work is to carried out.

C. Adequately wet ACM to be removed prior to stripping and/or tooling to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of water, amended water or removal encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for water, amended water or removal encapsulant to penetrate material thoroughly. If water or amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's instructions. Perforate outer covering of any installation which has been painted and/or jacketed in order to allow penetration of water, amended water or removal encapsulant, or where necessary, carefully strip away while simultaneously wetting the installation to minimize dispersal of asbestos fibers into the air.

D. Remove Saturated ACM in small sections from all areas. Scrape materials from substrate and remove residue using nylon bristled hand brush. Remove materials in manageable quantities and control the descent to staging or floor below. If height is over 20' use drop chute to contain material during descent. If using water or

amended water spray mist continuously during work process. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into disposal bags. Seal bags, clean outside and move to washdown station adjacent to Material Decontamination Unit.

E. At Completion of Removal Work: Clean all surfaces in the removal area by wet wiping, HEPA vacuuming or washing down with hoses. Clean from top down. At Contractor's option a proportional feed nozzle may be used to add a surfactant to the water. Collect any water runoff and filter through a dual filtration system. Provide first filter that removes fibers 20 microns and larger, and a final filter that removes all fibers 5 microns and larger.

F. Visual Inspection: Visually inspect work area for debris. If any visible debris is noted, clean all surfaces in the Work Area again. Continue this procedure until no visible debris is found in the Work Area.

G. Final Air Testing: If the Work Area is to remain unoccupied prior to demolition or be occupied only by workers wearing the proper respiratory protection then final air testing is unnecessary. If the area is to be occupied prior to demolition by workers not wearing proper respiratory protection, clear the Work Area in accordance with requirements of section “Project Decontamination”.

3.3 HAZARDOUS WASTE MANAGEMENT AND DISPOSAL.

A. Manage and dispose of hazardous waste such as PCB ballasts, fluorescent light tubes, and mercury thermostats in accordance with the requirements of Section 02086 **-** Hazardous Waste Management.

B. Do not mix potentially hazardous waste streams. Where feasible, separate each type of hazardous waste from other types of hazardous wastes, from asbestos waste and from construction waste.

C. Segregate, package, label, transport and dispose of Hazardous Waste in accordance with DOT, EPA, State and Local regulations.

3.4 DISPOSAL OF WASTE:

A. Pack: All asbestos-containing or contaminated waste material in bags marked as required by Section “Disposal of Regulated Asbestos-Containing Material”.

3.5 REMOVAL OF COMPLETE SYSTEMS:

A. Before Starting Work of This Section: Complete the work set forth in the following specification sections:

1. Regulated Areas
2. Worker Protection
3. Respiratory Protection

B. Completely Seal all components to be removed in 6 mil (0.15 mm) polyethylene sheet sealed with duct tape. Candy stripe surface of plastic as reinforcement. Wrap large items such as boilers, tanks, and converters with nylon reinforced sheet plastic. Install sheet plastic to allow cutting of components into sections where this is necessary for the work.

C. Remove ACM where necessary to allow the cutting components into sections using the procedures set forth in these Specifications.

D. Remove Components: In largest sections possible.

END OF SECTION – 02 82 16

SECTION 02 82 17 REMOVAL AND DISPOSAL OF LEAD-CONTAINING PAINT

PART 1 GENERAL

1.1 SUMMARY

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z9.2	1979 Fundamentals Governing the Design and Operation of Local Exhaust Systems
ANSI Z88.2	1980 Respiratory Protection

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.134	Respiratory Protection
29 CFR 1926.62	Lead
29 CFR 1910.1200	Hazard Communication
29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists
29 CFR 1926.57	Ventilation
29 CFR 1926.62	OSHA Lead Standard
40 CFR 260	Hazardous Waste Management Systems: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Generators of Hazardous Waste
40 CFR 263	Transporters of Hazardous Waste
40 CFR 264	Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 268	Land Disposal Restrictions
49 CFR 172	Hazardous Materials Tables and Hazardous Materials Communications Regulations
49 CFR 178	Shipping Container Specification

MILITARY SPECIFICATIONS (MIL)

MIL-A-22262	(Rev. A) (Am. 2) Abrasive Blasting Media Ship Hull Blast Cleaning

UNDERWRITERS LABORATORIES INC. (UL)

UL 586	1990 High-Efficiency, Particulate, Air Filter Units

1.3 DEFINITIONS

1.3.1 Action Level

A. Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period. As used in this section, "30 micrograms per cubic meter of air" refers to the action level.

1.3.2 Area Monitoring

A. Sampling of lead concentrations within the lead control area and inside the physical boundaries which is representative of the airborne lead concentrations which may reach the breathing zone of personnel potentially exposed to lead.

1.3.3 Physical Boundary

A. Area physically roped or partitioned off around an enclosed lead control area to limit unauthorized entry of personnel. As used in this section, "inside boundary" shall mean the same as "outside lead control area."

1.3.4 Certified Industrial Hygienist (CIH)

A. As used in this section, refers to an Industrial Hygienist employed by the Contractor and is certified by the American Board of Industrial Hygiene in comprehensive practice.

1.3.5 Change Rooms and Shower Facilities

A. Rooms within the designated physical boundary around the lead control area equipped with separate storage facilities for clean protective work clothing and equipment and for street clothes which prevent cross-contamination.

1.3.6 Decontamination Room

A. Room for removal of contaminated personal protective equipment (PPE).

1.3.7 Eight-Hour Time Weighted Average (TWA)

A. Airborne concentration of lead averaged over an 8-hour workday to which an employee is exposed.

1.3.8 High Efficiency Particulate Air (HEPA) Filter Equipment

A. HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint dust. A high efficiency particulate filter means 99.97 percent efficient against 0.3 micron size particles.

1.3.9 Lead

A. Metallic lead, inorganic lead compounds, and organic lead soaps. Excluded from this definition are other organic lead compounds.

1.3.10 Lead Control Area

A. An enclosed area or structure with full containment to prevent the spread of lead dust, paint chips, or debris of lead-containing paint removal operations. The lead control area is isolated by physical boundaries to prevent unauthorized entry of personnel.

1.3.11 Lead Permissible Exposure Limit (PEL)

A. Fifty micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than 8 hours in a work day, the PEL shall be determined by the following formula:

PEL (micrograms/cubic meter of air) = 400/No. hrs worked per day

1.3.12 Personal Monitoring

A. Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with 29 CFR 1926.62. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and the center at the nose or mouth of an employee.

1.4 QUALITY ASSURANCE

1.4.1 Medical Examinations

A. Before exposure to lead-contaminated dust, provide workers with a comprehensive medical examination as required by 29 CFR 1926.62 and 29 CFR 1910.1200. The examination will not be required if adequate records show that employees have been examined as required by 29 CFR 1926.62 within the last year.

1.4.1.1 Medical Records

A. Maintain complete and accurate medical records of employees for a period of at least 40 years or for the duration of employment plus 20 years, whichever is longer.

1.4.2 CIH Responsibilities

a. Certify training.
b. Review and approve lead-containing paint removal plan for conformance to the applicable referenced standards.
c. Inspect lead-containing paint removal work for conformance with the approved plan.
d. Direct monitoring.
e. Ensure work is performed in strict accordance with specifications at all times.
f. Ensure hazardous exposures to personnel and to the environment are adequately controlled at all times.

1.4.3 Training

A. Train each employee performing paint removal, disposal, and air sampling operations prior to the time of initial job assignment, in accordance with 29 CFR 1926.62.

1.4.3.1 Training Certification

A. Submit certificates signed and dated by the CIH and by each employee stating that the employee has received training.

1.4.4 Respiratory Protection Program

A. Furnish each employee required to wear a negative pressure respirator or other appropriate type with a respirator fit test at the time of initial fitting and at least every 6 months thereafter as required by 29 CFR 1926.62.
B. Establish and implement a respiratory protection program as required by ANSI Z88.2, 29 CFR 1910.134, 29 CFR, 1926.62, and 29 CFR 1926.55.

1.4.5 Hazard Communication Program

A. Establish and implement a Hazard Communication Program as required by 29 CFR 1910.1200.

1.4.6 Hazardous Waste Management

A. The Hazardous Waste Management plan shall comply with applicable requirements of federal, state, and local hazardous waste regulations and address:
1. Identification of hazardous wastes associated with the work.
2. Estimated quantities of wastes to be generated and disposed of.
3. Names and qualifications of each contractor that will be transporting, storing, treating, and disposing of the wastes. Include the facility location and a 24-hour point of contact. Furnish two copies of EPA, state, and local hazardous waste permit applications permits and EPA Identification numbers.
4. Names and qualifications (experience and training) of personnel who will be working on-site with hazardous wastes.
5. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.
6. Spill prevention, containment, and cleanup contingency measures to be implemented.
7. Work plan and schedule for waste containment, removal and disposal. Wastes shall be cleaned up and containerized daily.
8. Cost for hazardous waste disposal according to this plan.

1.4.7 Safety and Health Compliance

A. In addition to the detailed requirements of this specification, comply with laws, ordinances, rules, and regulations of federal, state, and local authorities regarding removing, handling, storing, transporting, and disposing of lead waste materials. Comply with the applicable requirements of the current issue of 29 CFR 1926.62. Submit matters regarding interpretation of standards to the Owner for resolution before

starting work. Where specification requirements and the referenced documents vary, the most stringent requirement shall apply. The following local laws, ordinances, criteria, rules and regulations regarding removing, handling, storing, transporting, and disposing of lead-contaminated materials apply:

1. Chapter 15-A of Title 30 of the Louisiana Revised Statues; Lead Hazard Reduction, Licensure and Certification.

1.4.8 Pre-Construction Conference

A. Along with the CIH, meet with the Owner's Representatives to discuss in detail the lead-containing paint removal work plan, including work procedures and precautions for the work plan.

1.5 SUBMITTALS

A. Submit the following in accordance with Section 01301, "Submittals."

1.5.1 Manufacturer's Catalog Data

A. Vacuum filters
B. Respirators

1.5.2 Instructions

A. Paint removal materials. Include applicable material safety data sheets.

1.5.3 Statements

A. Qualifications of CIH
B. Testing laboratory qualifications
C. Lead-containing paint removal plan
D. Rental equipment notification
E. CIH approval of work plan (signature, date, and certification number)
F. Respiratory protection program
G. Hazard communication program
H. EPA approved hazardous waste treatment or disposal facility for lead disposal
I. Hazardous waste management plan.
J. Written Lead Compliance Program.

1.5.3.1 Qualifications of CIH

A. Submit name, address, and telephone number of the CIH selected to perform responsibilities in paragraph entitled "CIH Responsibilities." Provide previous experience of the CIH. Submit proper documentation that the Industrial Hygienist is certified by the American Board of Industrial Hygiene in comprehensive practice, including certification number and date of certification/recertification.

1.5.3.2 Testing Laboratory

A. Submit the name, address, and telephone number of the testing laboratory selected to perform the monitoring, testing, and reporting of airborne concentrations of lead. Provide proper documentation that persons performing the analysis have been judged proficient by successful participation within the last year in the National Institute for Occupational Safety and Health (NIOSH) Proficiency Analytical Testing (PAT) Program. The laboratory shall be accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA documentation along with date of accreditation/reaccreditation.

1.5.3.3 Lead-Containing Paint Removal Plan

A. Submit a detailed job-specific plan of the work procedures to be used in the removal of lead-containing paint. The plan shall include a sketch showing the location, size, and details of lead control areas, location and details of decontamination rooms, change rooms, shower facilities, and mechanical ventilation system. Include in the plan, eating, drinking, smoking and restroom procedures, interface of trades, sequencing of lead related work, collected wastewater and paint debris disposal plan, air sampling plan, respirators, protective equipment, and a detailed description of the method of containment of the operation to ensure that airborne lead concentrations of 30 micrograms per cubic meter of air are not exceeded outside of the lead control area. Include air sampling, training and strategy, sampling methodology, frequency, duration of sampling, and qualifications of air monitoring personnel in the air sampling portion of the plan.

1.5.4 Field Test Reports

A. Monitoring Results

1.5.4.1 Air Monitoring

A. Submit monitoring results to the Owner within 3 working days, signed by the testing laboratory employee performing the air monitoring, the employee that analyzed the sample, and the CIH.

1.5.5 Certificates

A. Vacuum filters

1.5.6 Records

A. Completed and signed hazardous waste manifest from treatment or disposal facility
B. Certification of medical examinations
C. Employee training certification

1.6 REMOVAL

1.6.1 Title to Materials

A. Materials resulting from demolition work, except as specified otherwise, shall become the property of the Contractor and shall be disposed of in accordance with Section 02070, "Demolition and Removal," except as specified herein.

1.7 EQUIPMENT

A. Furnish the Owner with six complete sets of personal protective equipment daily, as required herein, for entry into and inspection of the paint removal work within the lead-controlled area. Personal protective equipment shall include fitted respirators and disposable whole body covering, including appropriate foot, head, and hand protection. PPE shall remain the property of the Contractor.

1.7.1 Respirators

A. Furnish appropriate respirators approved by NIOSH for use in atmospheres containing lead dust. Respirators shall comply with the requirements of 29 CFR 1926.62.

1.7.2 Special Protective Clothing

A. Furnish personnel who will be exposed to lead-contaminated dust with appropriate disposable protective whole-body clothing, head covering, gloves, and foot coverings. Furnish appropriate disposable plastic or rubber gloves to protect hands. Reduce the level of protection only after obtaining approval from the CIH.

1.7.3 Rental Equipment Notification

A. If rental equipment is to be used during lead-containing paint handling and disposal, notify the rental agency in writing concerning the intended use of the equipment. Furnish a copy of the written notification to the Owner.

1.7.4 Vacuum Filters

A. UL 586 labeled HEPA filters.

PART 2 PRODUCTS

2.1 PAINT REMOVAL PRODUCTS

A. Submit applicable Material Safety Data Sheets for paint removal products used in paint removal work. Use the least toxic product acceptable to the Industrial Hygienist.

2.2 Abrasive Materials

A. Abrasive blasting materials shall meet the requirements of MIL-A-22262 for limits on chemical composition and hazardous material ingredients.

2.2.1 Limits on the Composition of Abrasive Materials

A. The soluble metal content and the total metal content shall not exceed values which would cause a material to be classified as a hazardous waste as specified in MIL-A-22262.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Notification

A. Notify the Owner and Wynn L. White Consulting Engineers, Inc. two weeks prior to the start of any paint removal work.

3.1.2 Lead Control Area Requirements

A. Establish a lead control area by completely enclosing with containment screens, the area or structure where lead-containing paint removal operations will be performed.
B. Contain removal operations by the use of a negative pressure full containment system with at least one change room and with HEPA filtered exhaust.

3.1.3 Protection of Existing Work to Remain

A. Perform paint removal work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better.

3.1.4 Boundary Requirements

A. Provide physical boundaries around the lead control area by roping off the area or providing curtains, portable partitions or other enclosures to ensure that airborne concentrations of lead will not reach 30 micrograms per cubic meter of air outside of the lead control area.

3.1.5 Furnishings

A. The Owner will remove furniture and equipment from the work area before lead-containing paint removal work begins.

3.1.6 Heating, Ventilating and Air Conditioning (HVAC) Systems

A. Shut down, lock out, and isolate HVAC systems that supply, exhaust, or pass through the lead control areas. Seal intake and exhaust vents in the lead control area with 6-mil plastic sheet and tape. Seal seams in HVAC components that pass through the lead control area.

3.1.7 Change Room and Shower Facilities

A. Provide clean change rooms and shower facilities within the physical boundary around the designated lead control area in accordance with requirements of 29 CFR 1926.62.

3.1.8 Mechanical Ventilation System

A. Use adequate ventilation to control personnel exposure to lead in accordance with 29 CFR 1926.57.
B. To the extent feasible, use fixed local exhaust ventilation connected to HEPA filters or other collection systems, approved by the industrial hygienist. Local exhaust ventilation systems shall be designed, constructed, installed, and maintained in accordance with ANSI Z9.2.

C. If air from exhaust ventilation is recirculated into the work place, the system shall have a high efficiency filter with reliable back-up filter and controls to monitor the concentration of lead in the return air and to bypass the recirculation system automatically if it fails. Air may be recirculated only where exhaust to the outside is not feasible.

3.1.9 Personnel Protection

A. Personnel shall wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking is not permitted in the lead control area. No one will be permitted in the lead control area unless they have been given appropriate training and protective equipment.

3.1.10 Warning Signs

A. Provide warning signs at approaches to lead control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs shall comply with the requirements of 29 CFR 1926.62.

3.2 WORK PROCEDURES

A. Perform removal of lead-containing paint in accordance with approved lead-containing paint removal plan. Use procedures and equipment required to limit occupational and environmental exposure to lead when lead-containing paint is removed in accordance with 29 CFR 1926.62, except as specified herein. Dispose of removed paint chips and associated waste in compliance with Environmental Protection Agency (EPA), federal, state, and local requirements.

3.2.1 Personnel Exiting Procedures

A. Whenever personnel exit the lead-controlled area, they shall perform the following procedures and shall not leave the work place wearing any clothing or equipment worn during the work day:

1. Vacuum themselves off.

2. Remove protective clothing in the decontamination room, and place them in an approved impermeable disposal bag.

3. Shower.

4. Change to clean clothes prior to leaving the physical boundary designated around the lead-contaminated job site.

3.2.2 Monitoring

A. Monitoring of airborne concentrations of lead shall be in accordance with 29 CFR 1926.62 and as specified herein. Air monitoring, testing, and reporting shall be performed by a CIH or an Industrial Hygiene (IH) Technician who is under the direction of the CIH.

1. The CIH or the IH Technician under the direction of the CIH shall be on the jobsite directing the monitoring, and inspecting the lead-containing paint removal work to ensure that the requirements of the Contract have been satisfied during the entire lead-containing paint removal operation.

a. Take personal air monitoring samples on employees who are anticipated to have the greatest risk of exposure as determined by the CIH. In addition, take air monitoring samples on at least 25 percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.

b. Submit results of air monitoring samples, signed by the CIH, within 48 hours after the air samples are taken. Notify the Owner immediately of exposure to lead at or in excess of the action level of 30 micrograms per cubic meter of air outside of the lead control area.

3.2.2.1 Monitoring During Paint Removal Work

A. Perform personal and area monitoring during the entire paint removal operation. Sufficient area monitoring shall be conducted at the physical boundary to ensure unprotected personnel are not exposed above 30 micrograms per cubic meter of air at all times. If the outside boundary lead levels are at or exceed 30 micrograms per cubic meter of air, work shall be stopped and the CIH shall immediately correct the condition(s) causing the increased levels and notify the Owner immediately. The CIH shall review the sampling data collected on that day to determine if condition(s) requires any further change in work methods. Removal work shall resume when approval is given by the CIH. The Contractor shall control the lead level outside of the work boundary to less than 30 micrograms per cubic meter of air at all times. As a minimum, conduct area monitoring daily on each shift in which lead paint removal operations are performed in areas immediately adjacent to the lead control area. For outdoor operations, at least one sample on each shift shall be taken on the downwind side of the lead control area. If adjacent areas are contaminated, clean and visually inspect contaminated areas. The CIH shall certify that the area has been cleaned of lead contamination.

3.3 LEAD-CONTAINING PAINT REMOVAL

3.3.1 Indoor Lead Paint Removal

3.3.1.1 Selection

A. Select paint removal processes to minimize contamination of work areas with lead-contaminated dust or other lead-contaminated debris/waste. This paint removal process should be described in the lead-containing paint removal plan.

3.3.1.2 Mechanical Paint Removal and Blast Cleaning

A. Perform mechanical paint removal and blast cleaning in lead control areas using negative pressure full containments with HEPA filtered exhaust. Collect paint residue and spent grit (used abrasive) from blasting operations for disposal in accordance with EPA, state and local requirements.

3.4 SURFACE PREPARATIONS

A. Avoid flash rusting or other deterioration of the substrate.

3.5 CLEANUP AND DISPOSAL

3.5.1 Cleanup

A. Maintain surfaces of the lead control area free of accumulations of paint chips and dust. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use compressed air to clean up the area. At the end of each shift and when the paint removal operation has been completed, clean the area of visible lead paint contamination by vacuuming with a HEPA filtered vacuum cleaner and wet mopping the area.

3.5.2 Certification

A. The CIH shall certify in writing that the inside and outside the lead control area air monitoring samples are less than 30 micrograms per cubic meter of air, the respiratory protection for the employees was adequate, the work procedures were performed in accordance with 29 CFR 1926.62, and that there were no visible accumulations of lead-contaminated paint and dust on the worksite. Do not remove the lead control area or roped-off boundary and warning signs prior to the Owner's receipt of the CIH's certification. Reclean areas showing dust or residual paint chips.

3.5.3 Testing of Lead-Containing Paint Residue and Used Abrasive

A. Where indicated or when directed by the Owner's Representative, test lead containing paint residue and used abrasive in accordance with 40 CFR 261 for hazardous waste.

3.5.4 Disposal

A. Collect lead-contaminated waste, scrap, debris, bags, containers, equipment, and lead-contaminated clothing which may produce airborne concentrations of lead particles. Label the containers in accordance with 29 CFR 1926.62. Dispose of lead-contaminated waste material at an approved hazardous waste treatment, storage, or disposal facility.

B. Store waste materials in U.S. Department of Transportation (49 CFR 178) approved 55-gallon drums. Properly label each drum to identify the type of waste (49 CFR 172) and the date the drum was filled. The Owner's Representative or an authorized representative will assign an area for interim storage of waste-containing drums. Do not store hazardous waste drums in interim storage longer than 90 calendar days from the date affixed to each drum.

C. Handle, store, transport, and dispose lead or lead-contaminated waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, and 40 CFR 265. Comply with land disposal restriction notification requirements as required by 40 CFR 268.

3.5.5 Disposal Documentation

A. Submit written evidence that the hazardous waste treatment, storage, or disposal facility (TSD) is approved for lead disposal by the EPA and state or local regulatory agencies. Submit one copy of the completed manifest, signed and dated by the initial transporter in accordance with 40 CFR 262.

3.5.6 Payment for Hazardous Waste

A. Payment for disposal of hazardous waste will not be made until a signed copy of the manifest from the treatment or disposal facility certifying the amount of lead-containing materials delivered is returned and a copy is furnished to the Owner.

END OF SECTION 02 82 17

SECTION 02 82 35 - DISPOSAL OF REGULATED ASBESTOS-CONTAINING MATERIAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. **Drawings and general provisions of Contract**, including General and Supplementary Conditions and Division-2 Specification Sections, apply to work of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

A. **Worker protection requirements** are set forth in Section Worker Protection - Asbestos abatement

B. **Section Codes, Regulations and Standards - Asbestos Abatement** describes applicable federal, state and local regulations.

1.3 DESCRIPTION OF THE WORK:

A. **This section describes the disposal of Regulated Asbestos-Containing Materials (RACM).** Disposal includes packaging of Regulated Asbestos-Containing Materials. Disposal may be accomplished either by land filling or converting Regulated Asbestos Containing Materials to non-Asbestos waste.

1.4 SUBMITTALS:

A. **Before Start of Work:** Submit the following to the Designer for review. Do not start work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use.

1. **Copy of state or local license** for waste hauler.

2. **Name and address of landfill** where Regulated Asbestos Containing Materials are to be buried. Include contact person and telephone number.

3. **Name and address of processor** where Regulated Asbestos-Containing Materials are to be processed into non-asbestos waste if conversion of waste is the disposal method used. Include contact person and telephone number. Also provide the following information about the process and operation used by the processor:

    a. Results of start-up performance testing and performance testing for last 90 days including operating parameters, feed characteristics, and analysis of output materials.
    b. Results of composite analysis required during initial 90 days of operation and results of composite analysis of monthly product composite samples for last 90 days.
    c. Results of continuous monitoring and logs of process operating parameters for the initial 90 days and last 90 days of operation.

d. A description of any deviation from the operating parameters established during performance testing, the duration of the deviation, and steps taken to correct the deviation.
e. Product data on process to be used

4. **Chain of Custody form** and form of waste manifest proposed

5. **Sample of disposal bag** and any added labels to be used.

B. **On a weekly basis** submit copies of all manifests and disposal site receipts to Designer.

C. **Waste Shipment Record:** Maintain a waste shipment record as required by the NESHAP regulation which indicates the waste generator, transporter, and disposal site, and which describes the nature, size, type of container, and form of asbestos waste. Submit to Designer within 35 days of departure from building.

PART 2 - PRODUCTS:

2.1 MATERIALS

A. **Disposal Bags:** Provide 6 mil (0.15 mm) thick leak-tight polyethylene bags labeled with three labels with text as follows:

1. **First Label:** Provide in accordance with 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD
BREATHING AIRBORNE FIBERS IS
HAZARDOUS TO YOUR HEALTH

2. **Second Label:** Provide in accordance with U. S. Department of Transportation regulation on hazardous waste marking. 49 CFR parts 171 and 172. Hazardous Substances

RQ-ASBESTOS WASTE
CLASS 9
NA2212-PG III

3. **Third Label:** Provide the name of the waste generator (Owner's name), the location from which the waste was generated and the names and addresses of the contractor and transporter. This label must be durable, able to repel dirt and moisture (e.g., permanent marker). Label must be placed directly on disposal bag(s) in a legible format. **Peel and stick type labels are expressly prohibited.**

2.2 VITRIFICATION:

A. **If conversion is used, convert Regulated Asbestos-Containing Materials to non-asbestos waste** by thermal conversion in a process including the following principal elements. Comply with all EPA and DOT requirements for asbestos waste until the waste is converted:

1. **Receiving and storage:** areas that are maintained as contained controlled areas isolated by physical barriers and a pressure differential
2. **Melting:** process that is intrinsically safe in that it will not allow unconverted asbestos to appear in the final product under any circumstances

B. **Processor:** Use a processor that meets all the requirements of the EPA NESHAP regulation for an operation that converts regulated asbestos-containing material and asbestos-containing waste material into non-asbestos (asbestos-free) material as set forth in 40 CFR 61 Sub-part A and M section 61.155

C. **Available Processors:** Subject to compliance with requirements, providers of processes include, but are not limited to, the following:

D. **Processors:** Subject to compliance with requirements, utilize process provided by one of the Following:

1. GTS Duratek
   8955 Guilford Rd, Suite 200
   Columbia, MD 21045
   (800) 638-3838
2. Penberthy Electromelt
   631 So. 96th Street
   Seattle, WA 98108

PART 3 - EXECUTION

3.1 SEQUENCE

A. **Comply with the following sections** during all phases of this work:

1. Section Worker Protection - Asbestos Abatement
2. Section Respiratory Protection

3.2 GENERAL:

A. **All waste** is to be hauled by a waste hauler with all required licenses from all state and local authority with jurisdiction.

B. **Liquid waste:** Mix all liquid asbestos-containing waste or asbestos contaminated waste with a bladeable material so that it forms a bladeable (non-liquid) form, and have the concurrence of the landfill operator prior to disposal.

C. **Load all adequately wetted Regulated Asbestos-Containing Material** in disposal bags or leak-tight containers. All materials are to be contained in one of the following:

1. **Two 6 mil (0.15 mm) disposal bags** or
2. **Two 6 mil (0.15 mm) disposal bags and a fiberboard drum** or

3. **Sealed steel drum** with no bag

D. **Protect interior of truck** or dumpster with Critical and Primary Barriers as described in Section "Temporary Enclosures".

E. **Carefully load containerized waste** in fully enclosed dumpsters, trucks or other appropriate vehicles for transport. Exercise care before and during transport, to insure that no unauthorized persons have access to the material.

F. **Warning Signs:** During loading and unloading mark dumpsters, receptacles and vehicles with a sign complying with requirements of the EPA NESHAP regulation (40 CFR Part 61), in a manner and location that a person can read the following legend:

DANGER
ASBESTOS DUST HAZARD
CANCER AND LUNG DISEASE HAZARD
Authorized Personnel Only

G. **Do not store containerized materials outside of the Work Area.** Take containers from the Work Area directly to a sealed truck or dumpster.

H. **Do not transport disposal bagged materials on open trucks.** Label drums with same warning labels as bags. Uncontaminated drums may be reused. Treat drums that have been contaminated as Regulated Asbestos-Containing Material and dispose of in accordance with this specification.

I. **Advise the landfill** operator or processor, at least ten days in advance of transport, of the quantity of material to be delivered.

J. **At disposal site** unload containerized waste:

1. **At a disposal site**, sealed plastic bags may be carefully unloaded from the truck. If bags are broken or damaged, return to work site for rebagging. Clean entire truck and contents using procedures set forth in section Project Decontamination.

2. **At a processing site** truck and loading dock are arranged as a controlled work area and containerized waste is transferred to storage area by site personnel. All bags including broken ones will be transferred. Clean truck, using procedures set forth in section Project Decontamination.

K. **Retain receipts from landfill** or processor for materials disposed of.

L. **At completion of hauling** and disposal of each load submit copy of waste manifest, chain of custody form, and landfill receipt to Designer.

END OF SECTION - 02 82 35

SECTION 02 82 36 - HAZARDOUS WASTE MANAGEMENT

PART 1 - GENERAL

1.1RELATED DOCUMENTS:

A. **Drawings and general provisions of Contract**, including General and Supplementary Conditions and Division 2 Specification Sections, apply to work of this section.

1.2 RELATED SECTIONS

A. **Section "Codes and Regulations - Asbestos Abatement"** describes federal, state and local regulations applicable to asbestos.
B. **Section "Disposal of Regulated Asbestos-Containing Material"** describes the handling and disposal of asbestos-containing waste.

1.3 DESCRIPTION OF THE WORK:

A. **This section describes** the segregation, packaging, labeling, transport, and disposal of waste materials generated by demolition activities and the subsequent shipment of properly packaged and labeled waste materials to an approved disposal site.

1.4 CODES AND REGULATIONS

A. **General Applicability of Codes and Regulations:** Except to the extent that more explicit or more stringent requirements are written directly into the Contract Documents, all applicable codes and regulations have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the Contract Documents, or as if published copies are bound herewith.
B. **Contractor Responsibility:** The Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to hazardous waste management and disposal. Hold the Owner and Engineer harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of the Contractor, the Contractor's employees, or Subcontractors.
C. **Federal Requirements:** which govern the management, hauling and disposal of hazardous waste include but are not limited to the following:
    1. **DOT:** U. S. Department of Transportation, including but not limited to:
        a. Hazardous Substances
           Title 49, Part 171 and 172 of the Code of Federal Regulations
        b. Hazardous Material Regulations General Awareness and Training Requirements for Handlers, Loaders and Drivers
           Title 49, Parts 171-180 of the Code of Federal Regulations
        c. Hazardous Material Regulations Editorial and Technical Revisions
           Title 49, Parts 171-180 of the Code of Federal Regulations

2. **EPA:** U. S. Environmental Protection Agency (EPA), including but not limited to:
    a. Management of Hazardous Wastes Resource Conservation and Recovery Act (RCRA) Title 40, Parts 260- 268 of the Code of Federal Regulations

D. **State Requirements:** Abide by all state requirements which govern the management, hauling and disposal of hazardous waste.

1.5 DEFINITIONS:

A. **Toxicity Characteristic Leaching Procedure (TCLP):** A laboratory test method to determine the mobility of both organic and inorganic analytes present in liquid, solid, and multiphasic wastes performed in accordance with test methods required under 40 CFR Part 268.

1.5 SUBMITTALS:

A. **Before Start of Work:** Submit the following to the Engineer for review. Do not start work until these submittals are returned with Engineer's action stamp indicating that the submittal is returned for unrestricted use.
    1. **Copy of state and local licenses** for waste hauler.
    2. **U.S. EPA Identification Number** of waste hauler.
    3. **Name and address of waste disposal facility** where hazardous waste materials are to be disposed including:
        a. Contact person and telephone number.
        b. Copy of state license and permit
        c. Disposal facility permits
    4. **Specimen copy** of Uniform Hazardous Waste Manifest form.
    5. **Copy** of EPA “Notice of Hazardous Waste activity” form
    6. **Copy** of forms requires by state and local agencies
    7. **Sample** of disposal label to be used.
B. **During Work:** Submit the following as required by the work.
    1. **TCLP test results**, as required to characterize waste for segregation and packaging purposes.
    2. **Submit copies** of all executed manifests and disposal site receipts to the Engineer.

PART 2 - PRODUCTS:

2.1 MATERIALS

A. **Disposal Bags:** Provide 6 mil (0.15 mm) thick leak-tight polyethylene bags.
B. **DOT Hazardous Waste Disposal Drums:** Provide DOT 17-H Open -Top Drums (55 gallon) in accordance with DOT regulations title 49 CFR Parts 173, 178, and 179.
C. **DOT Hazardous Waste Labels:** in accordance with DOT regulations Title 49 CFR parts 173, 178, and 179.

PART 3 - EXECUTION

3.1 GENERAL

A. **Do not mix potentially hazardous waste streams.** Where feasible, separate each type of hazardous waste from other types of hazardous wastes, from asbestos waste and from construction waste.
B. **Segregate, package, label, transport and dispose** of Hazardous Waste in accordance with DOT, EPA, State and Local regulations.

3.2 HAZARDOUS WASTE DESIGNATION

A. **Where not otherwise designated** by the Owner as Hazardous waste, characterize all suspect waste products by conducting representative TCLP testing.
    1. An Environmental Report was completed by Owner's consultant prior to this project.
    2. The reports prepared by Wynn L. White Consulting Engineers, Inc. dated 5/6/2024 and 5/7/2024 are included in the project manual.
    3. Contractor shall include all required TCLP and waste characterization testing in his bid for purposes of contractor's use in fulfilling waste management requirements is at contractor's expense.
B. Representative sampling of waste products shall be in accordance with EPA Document SW 846.
C. TCLP test analysis shall be performed in accordance with EPA Method 1311.

3.3 HAZARDOUS WASTE:

A. The following waste products are designated by the Owner as non-salvageable and as Hazardous Waste Types:
    1. **Waste Type A:** PCB waste.
B. PCB-containing ballasts from fluorescent light fixtures.
    1. **Waste Type B:** Mercury-containing waste.
        a. Thermostats with mercury switches. Individual mercury-containing thermostats.
        b. Fluorescent, and mercury-vapor lamps.

3.4 Hazardous Waste Packaging and Labeling

A. Package each segregated Hazardous Waste Type , A and B, in specified containers as follows. **Do Not Mix Waste Streams:**

B. **Waste Type A**

    1. Package in DOT 17-H Open-Top Drums

2. Fill to capacity only with Waste Type A (Do Not Mix Waste Stream types).
3. Install gasket on lid, apply lock ring, and seal.
4. Apply Hazardous Waste Label to drum side.
5. Enter DOT Shipping Data as follows: RQ Waste Polychlorinated Biphenols, 9, UN-2315, PG-II, (M001).
6. Adjacent to each label, enter the date indicating when waste was first placed in each drum.

C. **Waste Type B**

1. Package in DOT 17-H Open-Top Drums with Polyethylene disposal Bag liners
2. Fill liner bags only with Waste Type B (Do Not Mix Waste Stream types); then neck liner bags down into DOT 17-H Open-Top Drum and seal with duct tape.
3. Install gasket on lid, apply lock ring, and seal.
4. Apply Hazardous Waste Label to drum side.
5. Enter DOT Shipping Data as follows: RQ Hazardous Waste Solid, NOS, 9, NA3077, PG-III, (D009).
6. Adjacent to each label, enter the date indicating when waste was first placed in each drum.

D. **Sealed and Labeled Containers:** maintain all containers in a continuously sealed condition after they have been sealed.
   1. Do not reopen sealed containers.
   2. Do not place additional waste in sealed containers.

3.5 Temporary Storage: Partially filled containers of hazardous waste may be stored at the work site for intermittent packaging provided that:

A. Each container is properly labeled when it is first placed in service;
B. Each container remains closed at all times except when compatible waste types are added; and
C. When moved from site to site, each container remains within the geographic boundaries of the facility without moving nor crossing public access highways.

3.6 Removal of Hazardous Wastes: Immediately seal containers of hazardous waste as each the container is filled. Remove containers of hazardous waste from the work site **within seventy-two (72) hours of being filled.**

A. Transporting filled containers from the work site to an approved disposal site or recycling center.
B. Continuously maintain custody of all hazardous material generated at the work site including security, short-term storage, transportation and disposition until custody is transferred to an approved disposal site or recycling center. Document continuous chain-of custody.

C. Do not remove, or cause to be removed, hazardous waste from Owner's property without a legally executed Uniform Hazardous Waste manifest .

D. At completion of hauling and disposal of each load submit copy of waste manifest, chain of custody form, and landfill receipt to Engineer.

3.7 Recycling and Recovery: Turn over waste which contains materials for which recovery and/or recycling is possible to an approved recycling center.

3.8 Backcharges:

A. Where contractor fails to fulfill packaging, handling, transport or disposal requirements as outlined herein, Owner will charge back to the Contractor all costs associated with insuring that hazardous wastes are segregated, packaged, transported and disposed of in accordance with all applicable Federal and State regulations.

B. Environmental pollution of Owner's property or other environments resulting from Contractor's hazardous waste management activities will be promptly remediated under Owner's direction, to the Owner's sole satisfaction, and at the Contractor's sole expense.

C. Contractor agrees to either reimburse the Owner, or reduce the Contract amount by change order to cover all costs associated with waste re-packaging, waste re-segregation, or pollution remediation efforts.

3.9 Removal of Non-Hazardous Waste Materials:

A. Transport and legally dispose of non-hazardous waste products, materials, residues and refuse at a location not on Owner's property.

B. Non-hazardous waste products, materials, residues and refuse include, but are not necessarily limited to:

1. Materials which are determined to be non-hazardous wastes through objective sampling in accordance with EPA Document SW-846 and laboratory analysis in accordance with EPA Method 1311.

2. Emptied hazardous material containers: containers holding a material with constituents listed on the MSDS as hazardous.

a. When a container is emptied of its hazardous contents by pouring or scraping so that less than one inch of material remains in the bottom of the container, the container is considered "empty" and is not in itself a hazardous waste.

. Emptied hazardous material containers may be disposed of as construction debris waste (i.e. non-hazardous).

3. Personnel protective clothing and safety equipment with de minimis or trace contamination, as determined by visual inspection by Owner's Representative.

C. Keep premises in a clean and orderly condition during performance of abatement work.

D. Place non-hazardous construction debris wastes on a daily basis in secure containers for local landfill disposal.

End of Section 028236

SECTION 02 82 70 - CONTRACT CLOSEOUT - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section includes** administrative and procedural requirements for contract closeout including, but not limited to, the following:

1. Inspection procedures.
2. Project record document submittal.
3. Submittal of warranties.
4. Final cleaning.

1.3 SUBSTANTIAL COMPLETION

A. **Preliminary Procedures:** Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.

5. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.

a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.

b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.

6. Advise the Owner of pending insurance changeover requirements.

7. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

8. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

9. Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.

10. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.

11. Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.

12. Complete final cleanup requirements, including touch up painting.

13. Touch up and otherwise repair and restore marred, exposed finishes.

B. **Inspection Procedures:** On receipt of a request for inspection, the Designer will either proceed with inspection or advise the Contractor of unfilled requirements. The Designer will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Designer will repeat inspection when requested and assured that the Work is substantially complete.

2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

A. **Preliminary Procedures:** Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.

2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.

3. Submit a certified copy of the Designer's final inspection list of items to be completed or corrected, endorsed and dated by the Designer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Designer.

4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.

5. Submit consent of surety to final payment.

6. Submit a final liquidated damages settlement statement.

7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Reinspection Procedure: The Designer will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Designer.

1. Upon completion of reinspection, the Designer will prepare a certificate of final acceptance. If the Work is incomplete, the Designer will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

2. If necessary, reinspection will be repeated.

1.5 RECORD DOCUMENT SUBMITTALS

A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Designer's reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.

2. Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.

3. Note related change-order numbers where applicable.

4. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.

C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.

1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.

2. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.

3. Note related record drawing information and Product Data.

4. Upon completion of the Work, submit record Specifications to the Designer for the Owner's records.

D. Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.

1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.

2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.

3. Upon completion of markup, submit complete set of record Product Data to the Designer for the Owner's records.

E. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Designer for the Owner's records.

All submittals required for project closeout shall be electronic format, latest version of Microsoft Word or Excel, and transmitted electronically (via email or CD-ROM).

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 1 Section "Construction Facilities and Temporary Controls." The cleaning in this Section is in addition to cleaning which is part of decontamination work. This section is intended to return the facility to the Owner in presentable condition.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.

   a. Remove labels that are not permanent labels.

   b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials.

c. Replace chipped or broken glass and other damaged transparent materials.

d. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.

e. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

f. 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.

C. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

1. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

END OF SECTION 02 82 70

Post Office Box 83527
Baton Rouge, LA 70884-3527

WYNN L. WHITE
CONSULTING
ENGINEERS, INC.

May 6, 2024

Mr. Kenny Brown
Calcasieu Parish School Board
3310 Broad Street
Lake Charles, LA 70602
(sent via email)

RE: April 30 & May1, 2024 Westwood Elementary Gym Asbestos Sampling 24035

Dear Kenny:

I have enclosed the analytical results for the asbestos bulk samples Todd Peterson, an accredited asbestos inspector, collected April 30 and May 1, 2024. The building address is 1900 Sampson Street, Westlake, LA 70669. This report is for your review and files.

CA Labs of Baton Rouge, LA analyzed the asbestos bulk samples using Polarized Light Microscopy (PLM). Laboratory analysis detected asbestos in the Brown Vinyl Base in the Gym Lounge Entrance, Roof Decking in room A-144, Transite in A-146 Med Room A-3, Tan TSI Straightrun in A-146 Med room A-3, Tan TSI Elbows (White) in Lounge 137, 9'' Green Floor Tile/Mastic in Lounge 137, White TSI Straightrun in A-144-B Med Room A-4, White TSI Elbows in Lounge 137, 12" Tan Floor Tile/Mastic with Specks in Room A-138, 9" White Floor Tile/Mastic in Room A-140, Window Caulk (frame to wall) on the Exterior, Window Glazing on the Exterior, and in the Corrugated Silver TSI Elbows on the Exterior. We assume window spandrel material contains asbestos.

Materials sampled include:

- Tan Vinyl Flooring in Rooms A-144 and A-139
- Brown Vinyl Base in Gym Entrance, Lounge Entrance, and Women's Restroom
- 2'x2' White Ceiling Tiles with Holes in Loung 137, Gym Entrance, and Room A-138
- 2'x2' White Ceiling Tiles with Rough Surface in Room A-140, Room A-144, and Gym Entrance
- Tan Stage Curtains on Stage
- Blue Stage Curtains on Stage
- Roof Decking in Room A-144
- Transite in A-146 Med Room A-3
- Tan TSI Straightrun in A-146 Med A-3 and Lounge 137
- Tan TSI Elbows (White) in Lounge 137 and A-146 Med Room A-3
- Tectum in Mini Gym 139
- 2'x2' White Ceiling Tile with Lines in Loung Entrance and A-137 Boys Restroom
- 2'x2' White Ceiling Tile with Vinyl Face in A-137-A Women's Restroom and Room A-140
- 9'' Green Floor Tile/Mastic in Lounge 137
- Gray Vinyl Base in Lounge 137, Room A-140, and Room A-143
- White TSI Straightrun in A-144-B Med Room A-4 and Lounge 137
- White TSI Elbows in A-144-B Med Room A-4 and Lounge 137

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- 12” Tan Floor Tile/Mastic with Specks in A-138
- 9” White Floor Tile/Mastic in A-140
- Gypsum and Joint Compound in A-143 and A-144-B Med A-4
- Black Wall Insulation in A-144-B Med RoomA-4
- Door Caulk (frame to wall) on the Exterior
- Window Spandrels (Metal Surface) on the Exterior
- Window Caulk (frame to wall) on the Exterior
- Plaster on the Exterior
- Window Glazing on the Exterior
- Smooth Silver TSI Straightrun on the Exterior
- Smooth Silver TSI Elbows on the Exterior
- Corrugated Silver TSI Elbows on the Exterior

I recommend you have us prepare asbestos abatement and demolition design documents, work with you to select an asbestos abatement contractor, and you have us perform asbestos air monitoring/contractor observation during asbestos abatement work.

If you have questions or would like to discuss the project, please call me at (225) 761-9141 extension 2.

Very truly yours,

Wynn L. White Consulting Engineers, Inc.

Chris White, P.E., LEED AP
Vice President

Enclosures: Homogenous Area Material List 4/30 & 5/1/2024, Building Survey Data Sheet 4/30 & 5/1/2024, Homogeneous Area Sampling Log 4/30 & 5/1/2024, Sample Location Sketch 4/30 & 5/1/2024, CA Labs Report CBR24052902 & CBR24052951

Post Office Box 83527
Baton Rouge, LA 70884-3527

WYNN L. WHITE
CONSULTING
ENGINEERS, INC.

May 7, 2024

Mr. Kenny Brown
Calcasieu Parish School Board
3310 Broad Street
Lake Charles, LA 70602
(sent via email)

RE: April 29, 2024 Westwood Elementary Gym Lead Survey 24035

Dear Kenny:

I have enclosed the analytical results for the X-Ray Fluorescence (XRF) Survey Todd Peterson, an accredited lead inspector, conducted April 29, 2024. This report is for your review and files. This survey is for the building located at 1900 Sampson Street Westlake, LA 70669.

We used a SciAps X-550 handheld XRF Lead Paint Analyzer, serial #X550-02131.

Samples 216-275 and 280-282 are from the interior and exterior of the building, including exterior painted equipment.

The XRF analyzer detected positive materials in the yellow wall, yellow door frame, and yellow door on the east wall of the gym entrance; gray beam and gray pipe on the west wall of the gym entrance; varnished floor on the stage; varnished wall on the south wall of the stage; white window frame, dark grey heater, gray wall, and dark gray pipe on the west wall of the mini gym 139; white pipe on the south wall of room 135; off- white wall on the north wall of room a-137-b restroom; off-white cabinets on the south wall of lounge room 137; off-white beam on the east wall of lounge room 137; brown door frame on the north wall of lounge room 137; gray wall on the west wall of room 138; sea green pipe, sea green beam, and gray door frame on the east wall of room 139; sea green platform on the south wall of room a-144b med a-4; white window frame on the north wall of room 144; black door frame and yellow door on the west wall of room 144; white window frame on the north wall of the restroom; peach overhang on the east exterior; and gray piping on the north east exterior.

Locations sampled include:

- Yellow Wall, Yellow Door Frame, and Yellow Door on the East Wall of the Gym Entrance
- Gray Door on the South Wall of the Gym Entrance
- Brown Door Frame on the South Wall of the Gym Entrance
- Gray Dark wall, Gray Beam, Gray Heater, and Gray Pipe on the West Wall of the Gym Entrance
- Varnished Floor on the Stage
- Varnished Wall on the South Wall of the Stage
- Gray Wall on the East Wall of Room A-146 (A-3)
- White Window Frame, Off-White Window Screen, Dark Grey Heater, Gray Wall, White Door, Brown Door Frame, and Dark Gray Pipe on the West Wall of the Mini Gym 139
- Red Door on the South Wall of Room 135

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- Brown Door Frame on the South Wall of Room 135
- White Pipe on the South Wall of Room 135
- Off-White Wall on the West Wall of Room 135
- Off- White Wall on the North Wall of Room A-137-B Restroom
- Off- White Cabinet on the East Wall of A-137-B Restroom
- Off-White Heater on the East Wall of Lounge Room 137
- Off-White Cabinets on the South Wall of Lounge room 137
- Off-White Wall on the West Wall of Lounge Room 137
- Off-White Beam on the East Wall of Lounge Room 137
- Brown Wall, Brown Door Frame, and Brown Door on the North Wall of Lounge Room 137
- Gray Wall on the West Wall of Room 138
- Gray Shelves on the North Wall of Room 138
- Sea Green Wall, Sea Green Pipe, Sea Green Beam, Gray Door Frame, and Gray Door on the East Wall of Room 139
- Sea Green Wall on the North Wall of Room 139
- Sea Green Wall on the West Wall of Room 139
- White Wall on the West Wall of Room A-143-Closet
- White Wall on the East Wall of Room A-143-Closet
- Sea Green Platform on the South Wall of Room A-144B Med A-4
- Yellow Wall and White Window Frame on the North Wall of Room 144
- Black Door Frame and Yellow Door on the West Wall of Room 144
- White Window Frame on the North Wall of the Restroom
- Brown Wall on the South Wall of Room 144
- Brown Cabinet on the North Wall of Room 144
- Maroon Door, Brown Window Spandrel, Black Gate, Sea Green Beam, and Gray Wall on the West Exterior
- Sea Green Port on the South Exterior
- Maroon Downspout and Peach Overhang on the East Exterior
- Gray Piping, Maroon Door, Gray Door Frame on the North East Exterior
- Maroon Downspout on the North Exterior

We recommend you have us prepare renovation and demolition design documents for work that will disturb lead containing materials.

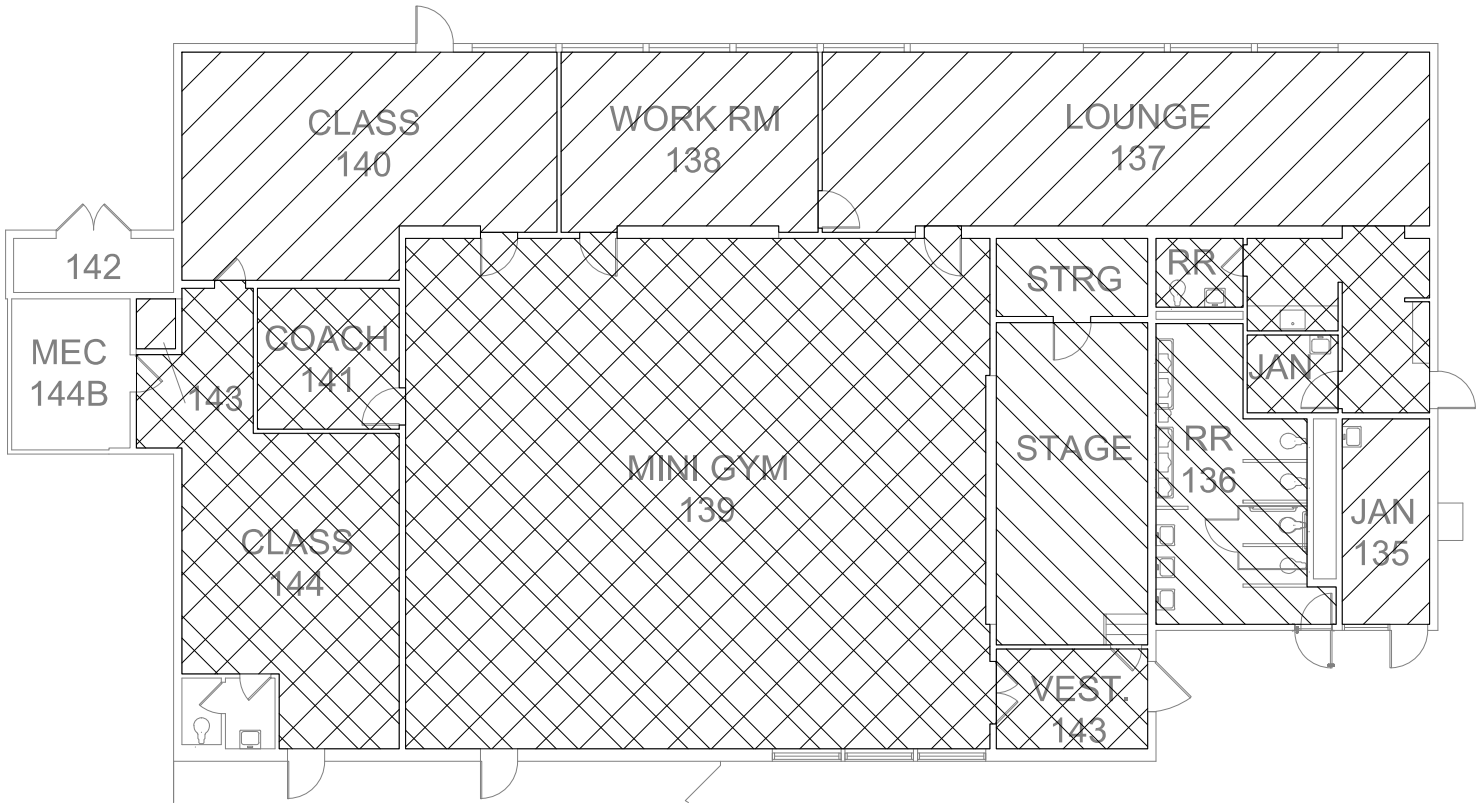
If you have questions or would like to discuss the project, please call me at (225) 761-9141 extension 2.

Very truly yours,

Wynn L. White Consulting Engineers, Inc.

Chris White, P.E., LEED AP
Vice President

Enclosures: Lead Based Paint Testing Data Sheets 4/29/2024 and Sample Locations Sketch 4/29/2024



FLOORING AND CEILING

0' 5' 10' 15'

REMOVE AND DISPOSE OF FLOORING TO SUBSTRATE

REMOVE AND DISPOSE OF ROOF DECKING

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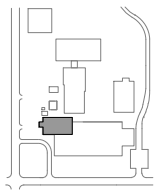


KEY MAP
NOT TO SCALE

WYNN L. WHITE
CONSULTING ENGINEERS, INC.
PHONE: (225) 761 - 9141
WWW.WYNNWHITE.COM

CLIENT: CALCASIEU PARISH SCHOOL BOARD

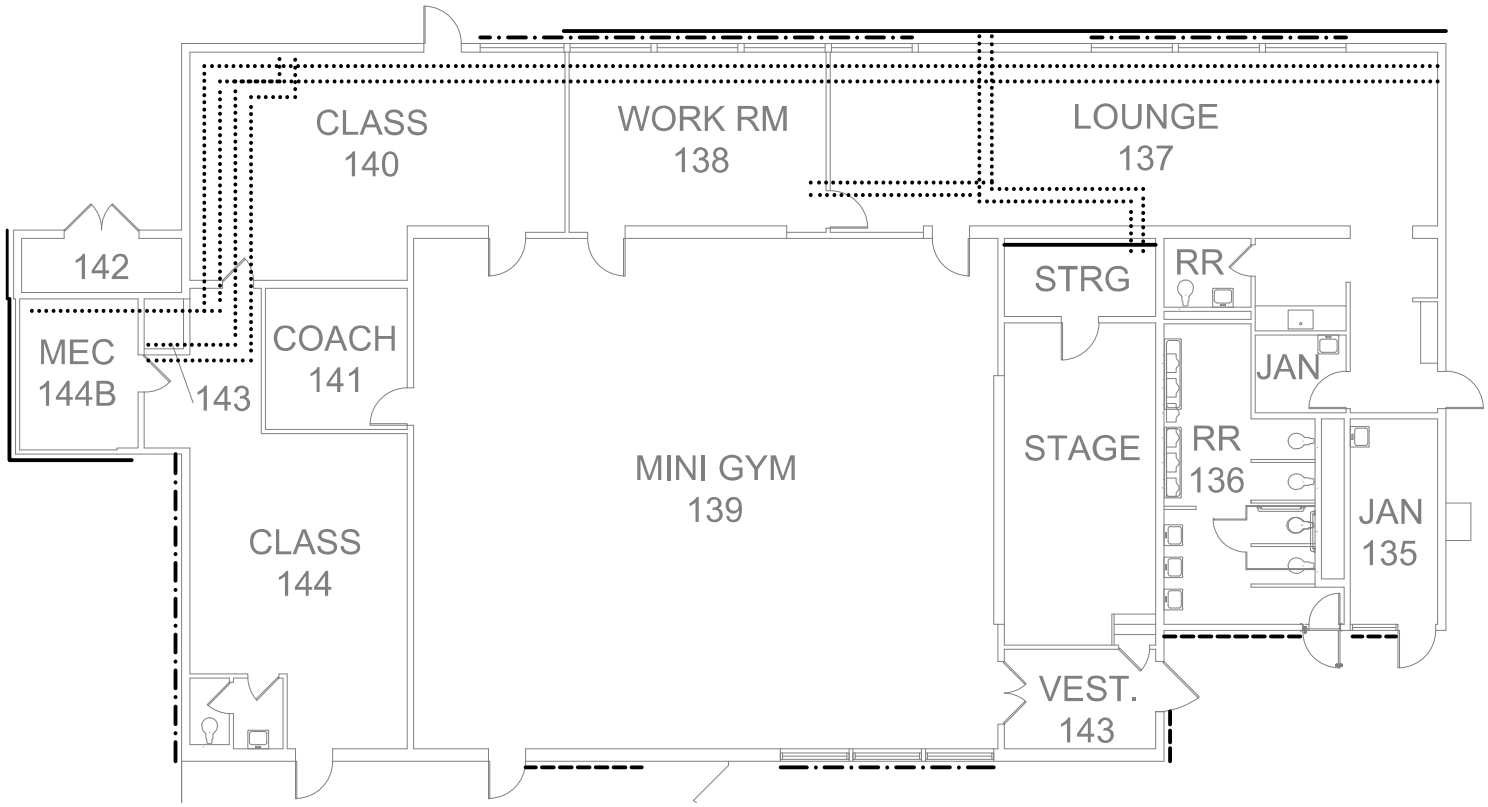
PROJECT: WESTWOOD ELEMENTARY SCHOOL
MINI GYM AREA

SHEET: ASBTESTOS ABATEMENT PLAN
FLOORING AND CEILING

PROJECT NUMBER
24046
FACILITY_BLDG NUMBER
148_2270

REVISION		
NO.	DATE	BY

DRAWN BY:	JLY
CHECKED BY:	CMW
DATE:	6/19/2025
SCALE:	AS NOTED
SHEET	1 OF 3



VERTICAL COMPONENTS AND TSI

0' 5' 10' 15'

REMOVE AND DISPOSE OF TRANSITE

REMOVE AND DISPOSE OF THERMAL SYSTEM INSULATION

REMOVE AND DISPOSE OF SPANDREL WINDOW PANELS

REMOVE AND DISPOSE OF CAULK/GLAZING

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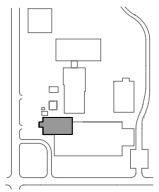

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CLIENT: CALCASIEU PARISH SCHOOL BOARD

PROJECT: WESTWOOD ELEMENTARY SCHOOL
MINI GYM AREA

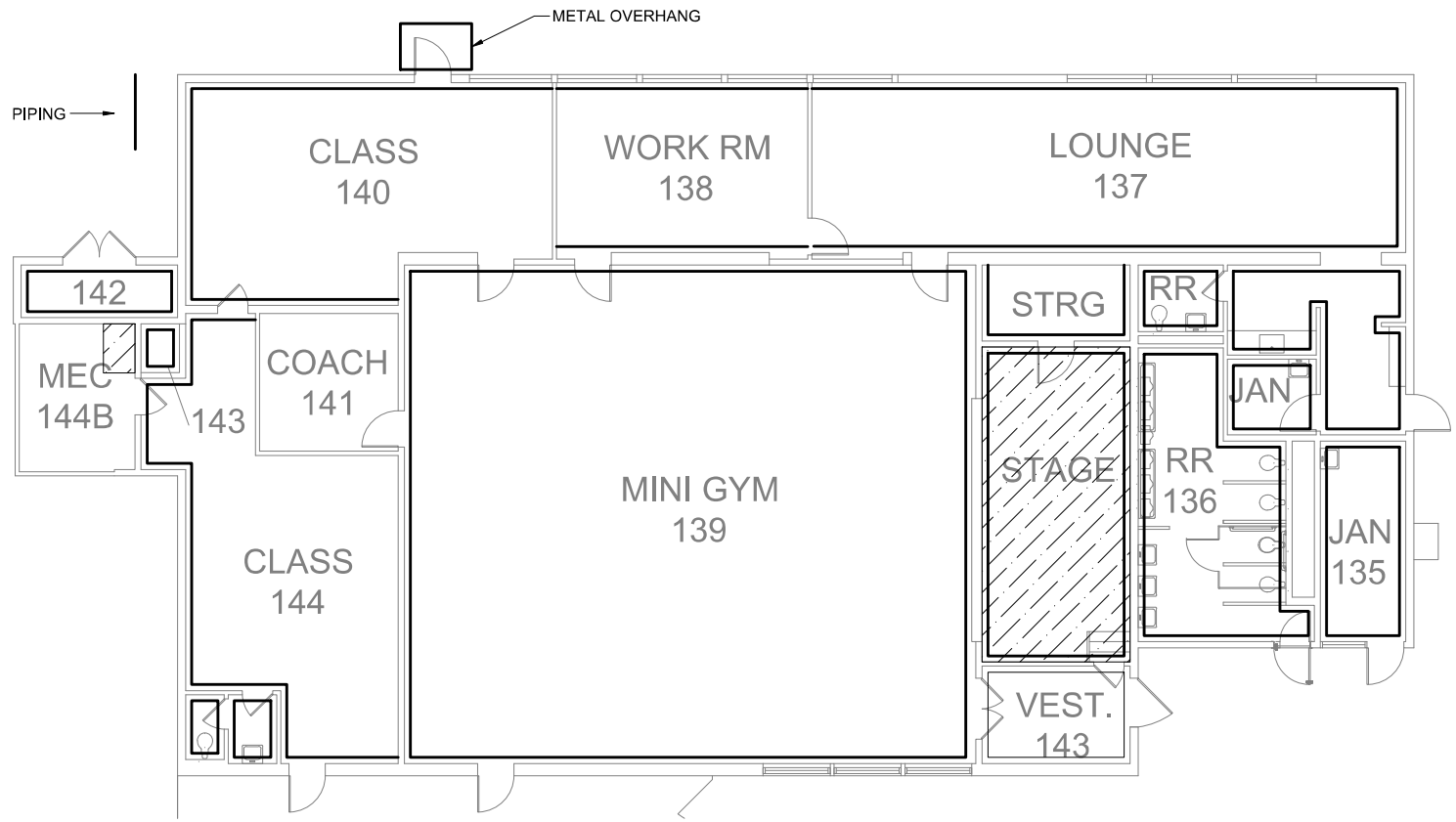
SHEET: ASBTESTOS ABATEMENT PLAN
VERTICAL COMPONENTS & TSI

STATE OF LOUISIANA
CHRISTOPHER M. WHITE
License No.
PROFESSIONAL ENGINEER
CIVIL ENGINEERING
6/20/25

PROJECT NUMBER
24046
FACILITY_BLDG NUMBER
148_2270

REVISION		
NO.	DATE	BY

DRAWN BY:	JLY
CHECKED BY:	CMW
DATE:	6/19/2025
SCALE:	AS NOTED
SHEET	2 OF 3



LEAD ABATEMENT PLAN

0' 5' 10' 15'

LEAD PAINT/GLAZE

LEAD PAINT/GLAZE

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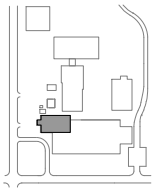

KEY MAP
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CLIENT: CALCASIEU PARISH SCHOOL BOARD

PROJECT: WESTWOOD ELEMENTARY SCHOOL
MINI GYM AREA

SHEET: LEAD ABATEMENT PLAN

STATE OF LOUISIANA
CHRISTOPHER M. WHITE
CERTIFIED
PROFESSIONAL ENGINEER
CIVIL ENGINEERING
6/20/25

PROJECT NUMBER
24046
FACILITY_BLDG NUMBER
148_2270

REVISION		
NO.	DATE	BY

DRAWN BY:	JLY
CHECKED BY:	CMW
DATE:	6/19/2025
SCALE:	AS NOTED
SHEET	3 OF 3

CALCASIEU PARISH SCHOOL BOARD

ASBESTOS AND LEAD ABATEMENT
WESTWOOD ELEMENTARY SCHOOL
MAY 2025

WESTLAKE, LA

Engineer's Project Number
24046

Wynn L. White Consulting Engineers, Inc.
PO Box 83527
Baton Rouge, LA 70884-3527
Phone: (225) 761-91 41
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Environmental Sampling Report

SECTION 02 80 10 - SUMMARY OF THE WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The contract and other Division 2 sections apply to this section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Work areas are shown on the project plans.
Contractor shall handle and dispose of as Regulated Asbestos Containing Materials (RACM) all vinyl wall base, floor tile/mastic, roof decking, transite, spandrel window panels, thermal system insulation, and window caulking/glazing.

The works areas shown may contain multiple layers of flooring, adhesive, and floor tile/mastic. Contractor shall remove and dispose of as regulated asbestos containing materials floor tile/mastic, adhesive, and floor patch/filler to the substrate. Glove bagging shall only be done inside a full negative pressure enclosure with decontamination unit. Contractor shall include all exploratory demolition to access ACM in his bid.

Contractor shall perform all waste characterization testing as required to classify debris/waste materials prior to disposal. Contractor shall include waste characterization testing and analysis in his bid. Contractor shall coordinate waste characterization testing with Owner's representative.

Demolition activities will disturb materials containing lead, asbestos, polychlorinated biphenyls, mercury, or other environmental hazards. Contractor shall clean and decontaminate all work areas. Contractor shall comply with all applicable local, state, and federal regulations.

Owner: Calcasieu Parish School Board

B. **Contract Documents**, dated June 2025 were prepared by Wynn L. White Consulting Engineers, Inc., 17485 Opportunity Drive, Baton Rouge, LA 70817.

1.3 ASBESTOS CONTAINING MATERIALS:

A. **The Work** of this contract involves activities that will disturb asbestos. The location of these materials known to be present at the worksite is set forth in the contract documents. If any other of these materials is found, notify the Owner and Engineer about the location and quantity of these materials within 24 hours of the discovery.

1.4 ASBESTOS HEALTH RISK:

A. The disturbance or dislocation of ACM may cause asbestos fibers to be released into the building's atmosphere, thereby creating a potential health risk to workers and building occupants. Apprise all workers, supervisory personnel, subcontractors and consultants who will be at the job site of the seriousness of the risk and of proper work procedures that must be followed.

B. Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified ACM, take appropriate continuous measures as necessary to protect all building occupants from the risk of exposure to airborne asbestos. Such measures shall include the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.

1.5 CONTRACTOR USE OF PREMISES

A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.

1. **Owner Occupancy:** Coordinate with Owner to allow for Owner occupancy of areas not involved in the work under this contract, or work areas under this contract that have been completed and are ready for release to the Owner.

2. **Driveways and Entrances:** Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Coordinate use of these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment onsite.

B. Use of the Existing Building: Maintain the existing building and jobsite in a secure condition throughout the construction period. Take all precautions necessary to secure the existing building and jobsite during the construction period.

1. **Smoking:** Smoking or open fires will not be permitted within the building enclosure or on the premises.

2. **Toilet Rooms:** Use of existing toilets within the building, by the Contractor's personnel, will not be permitted.

1.6 OCCUPANCY REQUIREMENTS

A. Partial Owner Occupancy: The Owner reserves the right to occupy completed areas of the site prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work. Coordinate with Owner.

1.7 AIR MONITORING BY THE OWNER:

A. The Owner shall contract for air monitoring. Air monitoring shall be conducted both outside and inside of the work area during the work, and for clearance sampling at the end of the project

1. **Outside of the Work Area:** The Owner's air monitoring firm may sample air outside of the work area to detect faults in the work area isolation such as:
   a. Contamination of the building outside of the work area with airborne asbestos fibers.

b. Failure of filtration or rupture in the differential pressure system,
c. Contamination of air outside the building envelope with airborne asbestos fibers.

2. **Inside the Work Area:** The Owner's air monitoring firm may monitor airborne fiber counts in the Work Area. The purpose of this air monitoring is to detect airborne asbestos concentrations that may challenge the ability of the Work Area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.

B. Work area clearance: Clearance air sampling by the Owner's air monitoring firm at the completion of asbestos abatement work is described in Section "Project Decontamination".

C. Air monitoring required by OSHA is work of the Contractor and is not covered in this section.

1.8 SCHEDULE OF AIR SAMPLES BY OWNER:

A. Sample cassettes: Samples will be collected on 25 mm. cassettes as follows:

1. **PCM:** 0.8 micrometer mixed cellulose ester.
2. **TEM:** 0.45 micrometer mixed cellulose ester or 0.40 micrometer polycarbonate, with 5.0 micron mixed cellulose ester backing filter.

B. Number and Volume of Samples: The number and volume of air samples given in the schedules is approximate. The exact number and volume of samples collected by the Owner may vary depending upon job conditions and the analytical method used.

C. Sample Volume and Sensitivity:

1. **PCM:** The sample volumes collected by the Owner's air monitoring firm will be determined by the following formula:

$$Volume = \frac{\left(\frac{Number\ of\ Fibers}{Area\ of\ 100\ fields}\right) X\ Total\ Filter\ Area}{\left(\frac{Limit\ Value}{4}\right)}$$

Where:
Number of fibers = 5 fibers/100 fields, based on a limit of detection (LOD) of 7 fibers/mm^2 on the filter
Area of 100 fields = 0.785mm^2
Total Filter Area = 385mm^2
Limit Value = as specified in the schedules of samples below

a. For purposes of this specification, the sample volume calculated above will be considered to be of sufficient size so that there is a 95% level of confidence that the value measured by each individual sample at the limit of detection (LOD) is less than or equal to the limit values specified below.

b. For purposes of this specification, the Limit of Detection (LOD) is defined as 7 fibers/mm^2 on the filter or 5 fibers/100 fields.
c. For purposes of this specification overloaded samples will be considered as exceeding the applicable limit value.

2. **TEM:** Analytical Sensitivity of 0.005 structures/cc as set forth in the AHERA regulation.

D. Not Used

E. Daily:

1. **From start of work** of Section "Temporary Enclosures" through the work of Section "Project Decontamination", the Owner may take samples.

2. **Sample volume and sensitivity:** inside the work area may vary depending upon conditions in the work area. If samples are overloaded at the sample volume required for a limit value equal to the "Stop Action Levels" or "Immediate Stop Action Levels" given later in this section, the level is considered to have been exceeded.

3. **PCM Samples:**

Location Sampled	Number of Samples	Limit Value (Fibers/cc)	Approx. Volume (Liters)	Rate (LPM)
Each Work Area	1	0.1	100	1-10
Outside Each Work Area at Critical Barrier	1	0.01	1,000	1-10
Clean Room	1	0.01	1,000	1-10
Equipment Decon	1	0.01	1,000	1-10
Outside Building	1	0.01	1,000	1-10
Output of Pressure Differential System	1	0.01	1,000	1-10

F. Additional samples may be taken at Owner's or Designer's discretion. If airborne fiber counts exceed allowed limits additional samples may be taken as necessary to monitor fiber levels.

1.9 ANALYTICAL METHODS USED BY THE OWNER:

A. The following methods will be used by The Owner in analyzing filters used to collect air samples. Sampling rates may be varied from printed standards to allow for high volume

sampling.

1. Phase Contrast Microscopy (PCM) will be performed using the NIOSH 7400 method.
2. Transmission Electron Microscopy (TEM) will be performed using the analysis method set forth in the AHERA regulation 40 CFR Part 763 Appendix A.

1.10 LABORATORY TESTING BY OWNER:

A. **The services of a testing laboratory** will be employed by the Owner to perform laboratory analyses of the air samples. A microscope and technician will be set up at the job site, or samples will be sent overnight on a daily basis, so that verbal reports on air samples can be obtained within 24 hours. If on-site analysis is performed, the air sampling and analysis firm employed by the Owner shall participate in the Proficiency Analytical Testing (PAT) program administered by the American Industrial Hygiene Association (AIHA).

B. **The Contractor will have access** to all air monitoring tests and results upon written request.

C. **Written Reports:** of all air monitoring tests will be made available to the Contractor upon written request.

1.11 FIBERS AND STRUCTURES

A. **Fibers Counted:** The following procedure will be used to resolve any disputes regarding fiber types when a project has been stopped due to excessive airborne fiber counts.

1. **Large Fibers:** "Airborne Fibers" referred to above include all fibers regardless of composition as counted by phase contrast microscopy (PCM), unless additional analysis by transmission or scanning electron microscopy demonstrates to the satisfaction of the Designer that non-asbestos fibers are being counted. "Airborne Fibers" counted in samples analyzed by transmission electron microscopy shall be asbestos fibers, greater than 5 microns in length. For purposes of stop action levels, subsequent to analysis by electron microscopy, the number of "Airborne Fibers" shall be determined by multiplying the number of fibers, regardless of composition, counted by PCM by the proportion of fibers that are asbestos as determined by TEM (a number equal to, asbestos fibers counted, divided by all fibers counted in the electron microscopy analysis).

2. **Small Structures:** "Airborne Fibers" referred to above include asbestos structures (fibers, bundles, clusters or matrices) of any diameter and any length greater than 0.5 microns.

1.12 ADDITIONAL TESTING:

A. **The Contractor may conduct** air monitoring and laboratory testing. If he elects to do this the cost of such air monitoring and laboratory testing shall be at no additional cost to the Owner.

1.13 PERSONAL MONITORING:

A. **Owner will not perform** air monitoring for the Contractor to meet Contractor's OSHA requirements for personal sampling or any other purpose.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 STOP ACTION LEVELS:

B. **Asbestos samples Inside Work Area:** Maintain an average airborne count in the work area of less than the Stop Action Level given below for the type of respiratory protection in use. If the fiber counts rise above this figure for any sample taken, revise work procedures to lower fiber counts. If the Time Weighted Average (TWA) fiber count for any work shift or 8 hour period exceeds the Stop Action Level, stop all work except corrective action, leave pressure differential and air circulation system in operation and notify Designer. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by Designer.

STOP ACTION LEVEL (f/cc)	IMMEDIATELY STOP LEVEL (f/cc)	MINIMUM RESPIRATOR REQUIRED	PROTECTION FACTOR
0.1	0.5	Half face	10
0.5	2.5	PAPR	50
1.0	5.0	Supplied Air Pressure Demand	100

1. If airborne fiber counts exceed Immediate Stop Level given above for type of respiratory protection in use for any period of time cease all work except corrective action. Notify Designer. Do not recommence work until fiber counts fall below Stop Action Level given above for the type of respiratory protection in use. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by Designer.

B. **Outside Work Area:** If any air sample taken outside of the Work Area exceeds 0.01 f/cc, immediately and automatically stop all work except corrective action. The Designer will determine the source of the high reading and so notify the Contractor in writing.

1. If the high reading was the result of a failure of Work Area isolation measures initiate the following actions:

   a. Immediately erect new critical barriers as set forth in Section “Temporary Enclosures” to isolate the affected area from the balance of the building. Erect Critical Barriers at the next existing structural isolation of the involved

space (e.g. wall, ceiling, floor).

b. Decontaminate the affected area in accordance with Section “Project Decontamination”.

c. Require that respiratory protection as set forth in Section “Respiratory Protection” be worn in affected area until area is cleared for re-occupancy in accordance with Section “Project Decontamination”.

d. Leave Critical Barriers in place until completion of work and ensure that the operation of the pressure differential system in the Work Area results in a flow of air from the balance of the building into the affected area.

e. If the exit from the clean room of the personnel decontamination unit enters the affected area, establish a decontamination facility consisting of a Shower Room and Changing Room as set forth in Section “Decontamination Units” at entry point to affected area.

f. After Certification of Visual Inspection in the Work Area remove critical barriers separating the work area from the affected area. Final air samples will be taken within the entire area as set forth in Section “Project Decontamination”.

2. If the high reading was the result of other causes initiate corrective action as determined by the Designer.

C. Effect on Contract Sum: Complete corrective work with no change in the Contract Sum if high airborne fiber counts were caused by Contractor's activities. The Contract Sum and schedule will be adjusted for additional work caused by high airborne fiber counts beyond the Contractor's control.

3.2 STOP WORK:

A. If the Owner, Designer, or Project Administrator presents a written stop work order, immediately and automatically conforms to that stop work order, while maintaining temporary enclosures and pressure differential. Do not recommence abatement work until authorized in writing by Owner, Designer or Project Administrator.

B. Immediately initiate the following actions: After being presented with a stop work order immediately:

1. Cease all asbestos removal activities, or any other activities that disturbs ACM.
2. Repair any fallen, ripped or otherwise failed work area isolation measures.
3. Maintain in operation all work area isolation measures including those required by Sections “Temporary Enclosures,” “Temporary Pressure Differential & Air Circulation System,” “Decontamination Units.”
4. Maintain all worker protections including those required by Sections “Worker Protection - Asbestos Abatement,” and “Respiratory Protection.”
5. Fog the air in the work area with a mist of amended water to reduce airborne fiber levels.

C. **Do not recommence work** until authorized in writing by the Owner or Designer**.**

END OF SECTION – 02 80 10

SECTION 02 80 15 - COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section includes** administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Plan of Action.
4. Contingency Plan.
5. Project Directory.
6. Notifications.
7. Pre-Construction Inspection.
8. Contractor's Construction Schedule.
9. Administrative and supervisory personnel.
10. Pre-Construction Conference
11. Progress Meetings
12. Coordination meetings.
13. Record Keeping.
14. Special Reports.

B. **Related Sections:** The following Sections contain requirements that relate to this Section:

1. "Section Submittals - Asbestos Abatement" for administrative procedures regarding submittals.
2. "Section Materials and Equipment - Asbestos Abatement" for coordinating general installation.
3. "Section Project Closeout - Asbestos Abatement" for coordinating contract closeout.

1.3 COORDINATION

A. **Owner Occupancy:** Coordinate construction operations and scheduling with partial occupancy requirements of the Owner and the Owner's use of utilities.

B. **Coordinate construction operations** included in various Sections of these Specifications to assure efficient and orderly completion of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in the sequence required to obtain the best results where execution of one part of the Work depends on execution of other components, before or after its own execution.
2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
3. Make provisions to accommodate items scheduled for later installation.

C. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

D. **Administrative Procedures:** Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure 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 closeout activities.

E. **Conservation:** Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.4 PLAN OF ACTION:

A. **Prepare a detailed plan** of the procedures proposed for use in complying with the requirements of this specification. Include in the plan the location and layout of decontamination areas, the sequencing of asbestos work, the interface of trades involved in the performance of work, methods to be used to assure the safety of building occupants and visitors to the site, disposal plan including location of approved disposal site, and a detailed description of the methods to be employed to control pollution. Expand upon the use of portable HEPA ventilation system, method of removal to prohibit visible emissions, and packaging of removed asbestos debris.

1. Submit the Plan of Action to the Designer for information only, prior to the start of work.

1.5 CONTINGENCY PLAN:

A. **Contingency Plan:** Prepare a contingency plan for emergencies or any other event that may require breaching of work area containment or modification or abridgement of decontamination or work area isolation procedures. Include in this plan procedures for performing electrical and mechanical repairs inside containment after abatement work

has begun. Include in plan specific procedures for decontamination or work area isolation. Include in plan measures to comply with Interim Life Safety Measures listed below. Note that nothing in this specification should impede safe exiting or providing of adequate medical attention in the event of an emergency. Items to be addressed in the plan include, but are not limited to the following:

1. Fire
2. Accident
3. Life threatening injury
4. Non life threatening injury
5. Rescue
6. Power Failure
7. Pressure differential system failure
8. Breach of containment
9. Electrical faults or shock
10. Excessive heat / cold (if/when such limits are specified)
11. Supplied air system failure
12. Water leaks
13. Waste spills
14. Unauthorized entry into work area
15. Elevated air samples outside of containment
16. Repairs inside containment
17. Toxic releases

INTERIM LIFE SAFETY MEASURES:

1. Contractor shall ensure exits provide free and unobstructed egress. Personnel shall receive training if alternate exits must be designated.

2. Contractor shall ensure free and unobstructed access to emergency department/services and for emergency forces.

3. Contractor shall ensure fire alarm detection and suppression systems are not impaired. A temporary, equivalent, system shall be provided when any fire system is impaired. Temporary system must be inspected and tested monthly.

4. Contractor shall ensure temporary construction partitions are smoke tight and built of noncombustible materials.

5. Contractor shall provide additional fire fighting equipment and use training for personnel.

6. No smoking within the building is allowed by contractors.

7. Contractor shall develop and enforce storage, housekeeping and debris removal procedures that reduce the flammable and combustible fire load to the lowest level necessary for daily operations.

8. Contractor shall conduct minimum of two (2) fire drills per shift per quarter in the affected areas.

9. Contractor shall increase surveillance hazard of buildings, grounds and equipment with special attention construction areas, construction storage and excavations.
10. Contractor shall train personnel when structural or compartmentation features of fire safety are compromised.

11. Contractor shall conduct organization-wide safety education programs to ensure awareness of any *life safety code* deficiencies and construction hazards for the interim life safety measures.

1.6 PROJECT DIRECTORY

A. **Develop a directory** of all entities involved in the project. Include the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site. Identify individuals, their duties and responsibilities. List business name, contact person, normal business and emergency telephone, pager and fax numbers and addresses of:

1. Owner, Designer, and Project Administrator
2. Contractor's General Superintendent, supervisory personnel and Contractor's home office
3. Emergency services including but not limited to fire, ambulance, doctor, hospital, police, power company, telephone company.
4. Local, state, and federal agencies with jurisdiction over the project.

B. **Post:** Post copies of the Project Directory in the project meeting room, the temporary field office, each temporary telephone, and at entrance to clean room of Personnel Decontamination Unit.

1.7 NOTIFICATIONS

A. **Notify other entities** at the job site of the nature of the asbestos abatement activities, location of asbestos-containing materials (ACM), requirements relative to asbestos set forth in these specifications and applicable regulations. Advance notification will be made to:

1. Owners of the building/facility;
2. Employees who will perform asbestos abatement work or related activities, or who will be in the work area during the course of the work of this contract.
3. Employers of employees who work and/or will be working in adjacent areas during the course of the work of this contract.

B. **Notify emergency service agencies** including fire, ambulance, police or other agency that may service the abatement work site in case of an emergency. Notification is to include methods of entering work area, emergency entry and exit locations, modifications to fire notification or fire fighting equipment, and other information needed by agencies providing emergency services.

C. **Notifications of Emergency:** Any individual at the job site may notify emergency service agencies if necessary without effect on this Contract or the Contract Sum.

1.8 PRE-CONSTRUCTION INSPECTION:

A. **Inspect areas** in which work will be performed, prior to commencement of work. Prepare a listing of damage to structure, surfaces, equipment or of surrounding properties which could be misconstrued as damage resulting from the work. Photograph or videotape existing conditions as necessary to document conditions. Submit to Designer for record purposes prior to starting work.

1.9 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. **Bar-Chart Schedule:** Prepare a fully developed, horizontal bar-chart-type, contractor's construction schedule. Submit within 3 days after the date established for "Commencement of the Work."

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.
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, of 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 Clearance of each Work Area in advance of the dates established for Clearance. Allow time for testing and other Designer's procedures necessary for certification of Clearance.
7. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Designer's procedures necessary for certification of Substantial Completion.
8. Indicate completion and Clearance of each Work Area in advance of the date established for Substantial Completion. Allow time for testing and other Designer's procedures necessary for certification of Clearance and Substantial Completion.

B. **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.

C. **Work Stages:** Indicate important stages of construction for each major portion of the Work, including submittal review, testing, and installation.
1. Non-asbestos demolitions.
2. Preparation of the Work Area.
3. Asbestos removal.

4. Clearance testing.
5. Substantial Completion.

D. **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.

E. **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.

F. **Distribution:** Following response to the initial submittal, print and distribute copies to the Designer, 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.

G. **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.

1.10 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. Project Supervisor: Provide a full-time Project Supervisor at the work site who is experienced in administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, project scheduling, management, etc. This person is the Contractor's Representative, and will function as the 'competent person' at the work site responsible for compliance with all applicable federal, state and local regulations, particularly those relating to ACM.

1. Training: The General Superintendent must have a current certification from a state approved trainer for a course that meets the requirements of the EPA Model Accreditation Plan for asbestos abatement contractor/supervisor (40 CFR part 763, Subpart E, Appendix C).

2. Experience: The General Superintendent must have demonstrable experience in the successful management of asbestos abatement projects that are similar to the work of this contract.

    a. The General Superintendent must have a minimum of two (2) years' experience in the on-site management of asbestos abatement projects.
    b. The General Superintendent must have had responsible charge of a minimum of ten (10) asbestos abatement projects similar in size and type to the work of this contract.

3. Competent Person: The General Superintendent is to be a Competent Person as required by OSHA in 29 CFR 1926.

B. Supervisors / Forepersons: Provide full-time Supervisors / Forepersons who are experienced in the supervision of asbestos abatement work areas including work practices, building and personnel, disposal practices, etc. These persons are contractor employees directly responsible to the General Superintendent.

C. Accreditation: The General Superintendent, Supervisors and Forepersons are to be accredited as an Asbestos Abatement Supervisor in accordance with the AHERA regulation 40 CFR Part 763, Subpart E, Appendix C.

1.11 PRE-CONSTRUCTION CONFERENCE:

A. **An initial progress meeting**, recognized as "Pre-Construction Conference" will be convened by the Designer prior to start of any work. The preconstruction conference will be scheduled before start of construction, at a time convenient to the Owner and the Designer. Meet at the project site, or as otherwise directed, with General Superintendent, Owner, Designer, Project Administrator, and other entities concerned with the asbestos abatement work.

B. **Attendees:** Authorized representatives of the Owner, Designer, and their consultants will be in attendance. An authorized representative of the Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

1. 72 hours advance notice will be provided to all participants prior to convening Pre-Construction Conference.

C. **Agenda:** This is an organizational meeting, to review responsibilities and personnel assignments, to locate regulated areas and temporary facilities including power, light, water, etc. Items of significance that could affect progress will be discussed, including the following:

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 of Shop Drawings, Product Data, and Samples.
8. Preparation of record documents.
9. Use of the premises.
10. Parking availability.
11. Office, work, and storage areas.
12. Equipment deliveries and priorities.
13. Safety procedures.
14. First aid.
15. Security.
16. Housekeeping.
17. Working hours.

1.12 PROGRESS MEETINGS:

A. General: In addition to specific coordination and pre-installation meetings for each element of work, and other regular project meetings held for other purposes, the Designer will hold general progress meetings as required. These meeting will be scheduled, where possible, at time of preparation of payment request.

B. Attendees: Representatives of the Owner and Designer will attend these meetings. In addition to representatives of the Contractor, 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. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the work. Require each entity then involved in planning, coordination or performance of work to be properly represented at each meeting.

C. Agenda: Be prepared to discuss the following items at the progress meetings. Review other items of significance that could affect progress.

1. 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 insure that current and subsequent activities will be completed within the Contract Time.

2. Review the present and future needs of each entity present, including the following:

- **a.** Interface requirements.
- **b.** Time.
- **c.** Sequences.
- **d.** Status of submittals.
- **e.** Deliveries.
- **f.** Access.
- **g.** Site utilization.
- **h.** Temporary facilities and services.
- **i.** Hours of work.
- **j.** Hazards and risks.
- **k.** Housekeeping.
- **l.** Quality and work standards.
- **m.** Change Orders.
- **n.** Documentation of information for payment requests.

D. Reporting: Revise the Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule no later than 3 days after each meeting. Include a brief summary, in narrative form, of progress since the previous meeting and report.

1.13 COORDINATION MEETINGS

A. **Attend project coordination meetings** that will be conducted as required by the Designer at regular intervals convenient for all parties involved. Project coordination meetings are intended to coordinate the work of all contractors performing work on the site, and are in addition to specific meetings held for other purposes, such as regular progress meetings.

1.14 RECORD KEEPING:

A. **Daily Log:** Maintain a Daily Log (in an area accessible to the Owner, Designer and Project Administrator) as a bound, sequential, hand-written record carefully prepared daily that documents but is not limited to the following items:

1. Meetings; purpose, attendees, brief discussion

2. Special or unusual events, i.e. barrier breeching, equipment failures, accidents

3. Documentation of Contractor's completion of the following:

a. Inspection of work area preparation prior to start of removal and daily thereafter.
b. Removal of any sheet plastic barriers.
c. Contractor's inspections prior to spray back, lock back, encapsulation, enclosure or any other operation that will conceal the condition of ACM or the substrate from which such materials have been removed.
d. Removal of waste materials from work area.
e. Decontamination of equipment (list items).
f. Contractors final inspection/final air test analysis.

B. **Entry/Exit Log:** Maintain within the Decontamination Unit a daily log documenting the dates and time of but not limited to, the following items:

1. Visitations; authorized and unauthorized with the following information
a. Name
b. Organization
c. Entry time
d. Exit Time
e. Respiratory protection

2. Personnel, by name, entering and leaving the work area with the following information
a. Printed Name
b. Identification Number
c. Entry Time
d. Exit Time
e. Respiratory Protection

C. **Air Monitoring Results:** Post personnel and area air monitoring results in Decontamination Unit within 24 hours of sample collection. Post the respiratory protection requirements for the work in progress.

D. Records in Decontamination Unit: Maintain the following documentation in the Decontamination Unit, in a location accessible to workers.

1. Documentation of inspections by OSHA, EPA or local authority
2. Respiratory Protection Program.

E. Other records: Maintain other documentation in a location that is accessible to the Owner, Designer, and Project Administrator including:

1. Waste Manifests and shipping records
2. Landfill receipts.
3. Accident reports.

1.15 SPECIAL REPORTS:

A. General: Except as otherwise indicated, submit special reports directly to Owner within one day of occurrence requiring special report, with copy to Designer and others affected by occurrence.

B. Reporting Unusual Events: When an event of unusual and significant nature occurs at site (examples: failure of pressure differential system, rupture of temporary enclosures), prepare and submit report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. When such events are known or predictable in advance, advise Owner in advance at earliest possible date.

C. Reporting Accidents: Prepare and submit reports of significant accidents, at site and anywhere else work is in progress. Record and document data and actions; comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury is sustained, property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury, or where work was stopped for over four hours during a scheduled shift.

D. Report Discovered Conditions: When an unusual condition of the building is discovered during the work (e.g. leaks, termites, corrosion) prepare and submit a special report indication condition discovered.

1.16 SUBMITTALS

A. Before the Start of Work: Submit the following to the Designer in the same manner as product data. Do not begin work until these submittals are returned with designer's action stamp indicating that all submittals have been "received-not reviewed".

1. Plan of Action.
2. Contingency Plans.
3. Project Directory.
4. Notifications: copy of notification sent to other entities at the work site, notification sent to Louisiana Department of Environmental Quality, emergency service agencies, and all other notifications as directed by the Owner or Owner's Representative.

5. Pre-Construction Inspection: Report on inspection carried out as required by this section. Include copies of all photographs, video tapes, etc.
6. Contractor's Construction Schedule.
7. Accreditation: Submit evidence in the form of training course certificates for the General Superintendent, Supervisors, and Forepersons as asbestos abatement supervisors in accordance with AHERA requirements. Submit evidence in the form of training course certificates that each worker is trained as an asbestos abatement worker in accordance with AHERA requirements.
8. Resume: Submit resume of General Superintendent

B. Submit daily: Provide two (2) copies for information purposes of all documents indicated in the following sub-sections to Project Administrator by end of the next working day after the day they are received by Contractor.

1. Section on Record Keeping.
2. Section on Special Reports.

C. Project Close-out: Submit two (2) copies for information purposes of all documents indicated in the following sections at final closeout of project as a project close-out submittal.

1. Section on Record Keeping.
2. Section on Special Reports.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION – 02 80 15

SECTION 02 80 21 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. **General:** Basic contract definitions are included in the Conditions of the Contract.

1. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited.

2. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Designer, requested by the Designer, and similar phrases.

3. "Approved": The term "approved," when used in conjunction with the Designer's action on the Contractor's submittals, applications, and requests, is limited to the Designer's duties and responsibilities as stated in the Conditions of the Contract.

4. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

5. "Furnish": The term "furnish" means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.

6. "Install": The term "install" describes operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

7. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

8. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.

a. The term "experienced," when used with the term "installer," means having a minimum of 5 previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of authorities having jurisdiction.

b. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades persons of the corresponding generic name.

c. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.

1) This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.

9. "Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

10. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

11. "Designer": This is the entity described as the "Architect" in AIA Document A201 "General Conditions of the Contract for Construction," or is the entity described as "Engineer" in Engineers Joint Contract Document Committee (EJCDC) Document 1910-8 "Standard General Conditions of the Construction Contract." All references to Architect or Engineer in the Contract Documents in all cases refer to the Designer. The Designer will represent the Owner during construction and until final payment is due. The Designer will advise and consult with the Owner. The Owner's instructions to the Contractor will be forwarded through the Designer.

12. "Project Administrator": This is the entity described as the "Project Representative" in AIA Document A201 "General Conditions of the Contract for Construction," or is the entity described as "Engineer" in Engineers Joint Contract Document Committee (EJCDC) Document 1910-8 "Standard General Conditions of the Construction Contract." The Project Administrator is a full time representative of the Owner at the job site with authority to stop the work upon written or verbal order if requirements of the Contract Documents are not met, or if in the sole judgement of the Project Administrator, Designer, or Owner, the interests of the Owner, safety of any person or the Owner's property are jeopardized by the work.

13. “Stop Work Order”: is a written order to cease work activities. The Contractor must maintain work area isolation during the period that a Stop Work Order is in affect.

14. "General Superintendent": This is the Contractor's Representative at the work site. This person must be a Competent Person as defined by OSHA in 29 CFR 1926.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. **Specification Format:** These Specifications are organized into Divisions and Sections based on CSI 2004 MasterFormat's numbering system.

B. **Specification Content:** This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. **Abbreviated Language:** Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

2. **Streamlined Language:** The Specifications generally use the imperative mood and streamlined language. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.

1.4 INDUSTRY STANDARDS

A. **Applicability of Standards:** Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. **Publication Dates:** Comply with the standards in effect as of the date of the Contract Documents.

C. **Conflicting Requirements:** Where compliance with 2 or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer to the Designer before proceeding for a decision on requirements that are different but apparently equal, and where it is uncertain which requirement is the most stringent.

1. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum acceptable. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Designer for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research Co.'s "Encyclopedia of Associations," available in most libraries.

1. ACI American Concrete Institute
P.O. Box 19150
Detroit, MI 48219 (313) 532-2600

2. ACIL American Council of Independent Laboratories
1629 K St., NW
Washington, DC 20006 (202) 887-5872

3. ACPA American Concrete Pipe Assoc.
8300 Boone Blvd., Suite 400
Vienna, VA 22182 (703) 821-1990

4. ACGIH American Conference of Governmental Industrial Hygienists
1330 Kemper Meadow Dr.
Cincinnati, OH 45240 (513) 742-2020

5. AIA The American Institute of Architects
1735 New York Ave., NW
Washington, DC 20006 (202) 626-7300

6. AIHA American Industrial Hygiene Assoc.
2700 Prosperity Ave., Suite 250
Fairfax, VA 22031(703) 849-8888

7. ANSI American National Standards Institute
11 West 42nd St., 13th Floor
New York, NY 10036 (212) 642-4900

8. ASHRAE American Society of Heating,
Refrigerating and Air-Conditioning Engineers
1791 Tullie Circle, NE
Atlanta, GA 30329 (404) 636-8400

9. ASME American Society of Mechanical Engineers
345 East 47th St.
New York, NY 10017 (212) 705-7722

10. ASPE American Society of Plumbing Engineers
3617 Thousand Oaks Blvd., Suite 210
Westlake, CA 91362 (805) 495-7120

11. ASTM American Society for Testing and Materials
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959 (610) 832-9585

12. CGA Compressed Gas Assoc.
1725 Jefferson Davis Highway, Suite 1004
Arlington, VA 22202-4100 (703) 412-0900

13. FM Factory Mutual Systems
1151 Boston-Providence Turnpike
P.O. Box 9102
Norwood, MA 02062 (617) 762-4300

14. GA Gypsum Association
810 First St., NE, Suite 510
Washington, DC 20002 (202) 289-5440

15. IEEE Institute of Electrical and Electronic Engineers
345 E. 47th St.
New York, NY 10017 (212) 705-7900

16. IETA International Electrical Testing Assoc.
P.O. Box 687
Morrison, CO 80465 (303) 697-8441

17. IRI Industrial Risk Insurers
P.O. Box 5010
85 Woodland St.
Hartford, CT 06102-5010 (203) 520-7300

18. ISA Instrument Society of America
P.O. Box 12277
67 Alexander Dr.
Research Triangle Park, NC 27709 (919) 549-8411

19. ISO International Standards Organization

20. NEC National Electrical Code (from NFPA)

21. NECA National Electrical Contractors Assoc.
3 Bethesda Metro Center, Suite 1100
Bethesda, MD 20814 (301) 657-3110

22. NEMA National Electrical Manufacturers Assoc.
2101 L St., NW, Suite 300
Washington, DC 20037 (202) 457-8400

23. NFPA National Fire Protection Assoc.
One Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101 (617) 770-3000 (800) 344-3555

24. NRCA National Roofing Contractors Assoc.
10255 W. Higgins Rd., Suite 600
Rosemont, IL 60018-5607 (708) 299-9070

25. RFCI Resilient Floor Covering Institute
966 Hungerford Dr., Suite 12-B
Rockville, MD 20805 (301) 340-8580

26. UL Underwriters Laboratories
333 Pfingsten Rd.
Northbrook, IL 60062 (708) 272-8800

27. White Lung Association
PO Box 1483
Baltimore, MD 21203

E. **Federal Government Agencies:** Names and titles of federal government standard- or Specification-producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard- or Specification-producing agencies of the federal government. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.

1. CE Corps of Engineers
(U.S. Department of the Army)
Chief of Engineers - Referral
Washington, DC 20314 (202) 272-0660

2. CFR Code of Federal Regulations
(Available from the Government Printing Office)
N. Capitol St. between G and H St., NW
Washington, DC 20402 (202) 783-3238
(Material is usually first published in the "Federal Register")

3. CPSC Consumer Product Safety Commission
5401 Westbard Ave.
Bethesda, MD 20207 (800) 638-2772

4. CS Commercial Standard
(U.S. Department of Commerce)
Government Printing Office
Washington, DC 20402 (202) 783-3238

5. DOC Department of Commerce
14th St. and Constitution Ave., NW
Washington, DC 20230 (202) 482-2000

6. DOT Department of Transportation
400 Seventh St., SW
Washington, DC 20590 (202) 366-4000

7. EPA Environmental Protection Agency
401 M St., SW
Washington, DC 20460 (202) 260-2090

8. FS Federal Specification (from GSA)
Specifications Unit (WFSIS)
7th and D St., SW
Washington, DC 20407 (202) 708-9205

9. GSA General Services Administration
F St. and 18th St., NW
Washington, DC 20405 (202) 708-5082

10. MIL Military Standardization Documents
(U.S. Department of Defense)
Naval Publications and Forms Center
5801 Tabor Ave.
Philadelphia, PA 19120

11. NIST National Institute of Standards and Technology
(U.S. Department of Commerce)
Gaithersburg, MD 20899 (301) 975-2000

12. OSHA Occupational Safety and Health Administration
(U.S. Department of Labor)
200 Constitution Ave., NW
Washington, DC 20210 (202) 219-6091

13. PS Product Standard of NBS
(U.S. Department of Commerce)
Government Printing Office
Washington, DC 20402 (202) 783-3238

14. USPS U.S. Postal Service
475 L'Enfant Plaza, SW
Washington, DC 20260-0010 (202) 268-2000

15. Louisiana Department of Environmental Quality
Office of Environmental Compliance
P.O. Box 82215
Baton Rouge, La. 70884-2215 (225) 765-0634

F. **Trade Union Jurisdictions:** The Contractor shall maintain, and require subcontractors to maintain, complete current information on jurisdictional matters, regulations and pending actions, as applicable to construction activities. The manner in which Contract Documents have been organized and subdivided is not intended to be indicative of trade union or jurisdictional agreements.

1. Discuss new developments at project meetings at the earliest feasible dates. Record relevant information and actions agreed upon.

2. Assign and subcontract construction activities, and employ tradesmen and laborers in a manner that will not unduly risk jurisdictional disputes that could result in conflicts, delays, claims and losses.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 02 80 21

SECTION 02 80 22 - CODES, REGULATIONS AND STANDARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this section.

1.2 SUMMARY

A. This section sets forth governmental regulations which are included and incorporated herein by reference and made a part of the specification. This section also sets forth those notices and permits which are known to the Owner and which either must be applied for and received, or which must be given to governmental agencies before start of work.

1. Requirements include adherence to work practices and procedures set forth in applicable codes, regulations and standards.

2. Requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with codes, regulations, and standards.

1.3 CODES, REGULATIONS AND STANDARDS

A. **General Applicability of Codes, Regulations and Standards:** Except to the extent that more explicit or more stringent requirements are written directly into the Contract Documents, all applicable codes and regulations have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the Contract Documents, or as if published copies are bound herewith.

B. **Contractor Responsibility:** The Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State, and local regulations. The Contractor shall hold the Owner and Designer harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of the contractor, the contractor's employees, or subcontractors.

C. **Federal Requirements:** which govern renovation work or hauling and disposal of waste materials include but are not limited to the following:

1. **OSHA:** U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA), including but not limited to:

a. Respiratory Protection
Title 29, Part 1910, Section 134 of the Code of Federal Regulations
Title 29, Part 1926, Section 103 of the Code of Federal Regulations

b. Personal Protective Equipment for General Industry
Title 29, Part 1910, Section 132 of the Code of Federal Regulations
Title 29, Part 1926, Sections 95 - 107 of the Code of Federal Regulations

c. Access to Employee Exposure and Medical Records
Title 29, Part 1926, Section 33 of the Code of Federal Regulations

d. Hazard Communication
Title 29, Part 1926, Section 59 of the Code of Federal Regulations

e. Specifications for Accident Prevention Signs and Tags
Title 29, Part 1910, Section 145 of the Code of Federal Regulations

f. Permit Required Confined Space
Title 29, Part 1910, Section 146 of the Code of Federal Regulations

g. Construction Industry
Title 29, Part 1910, Section 1001 of the Code of Federal Regulations
Title 29, Part 1926, Section 1101 of the Code of Federal Regulations

h. Construction Industry - General Duty Standards
Title 29, Part 1926, Sections 20 through 35 of the Code of Federal Regulations

i. Shipyard Industry
Title 29 Part 1915 Section 1001 of the Code of Federal Regulations

2. DOT: U. S. Department of Transportation, including but not limited to:

a. Hazardous Substances
Title 49, Part 171 and 172 of the Code of Federal Regulations

b. Hazardous Material Regulations
General Awareness and Training Requirements for Handlers, Loaders and Drivers
Title 49, Parts 171-180 of the Code of Federal Regulations

c. Hazardous Material Regulations
Editorial and Technical Revisions
Title 49, Parts 171-180 of the Code of Federal Regulations

3. EPA: U. S. Environmental Protection Agency (EPA), including but not limited to:

a. National Emission Standard for Hazardous Air Pollutants (NESHAP)
National Emission Standard for Asbestos
Title 40, Part 61, Sub-part A, and Sub-part M (Revised Sub-part B) of the Code of Federal Regulations

D. **State Requirements:** which govern work or hauling and disposal of asbestos waste materials include but are not limited to the following: LAC 33:III:51.
Abide by all local requirements which govern renovation work or hauling and disposal of waste materials.

1.4 PERMITS:

Contractor is responsible for obtaining any demolition, building, renovation or other permits, and for paying application fees, if any, where required by State or Local jurisdictions.

1.5 LICENSES:

A. Licenses: Maintain current licenses as required by applicable state or local jurisdictions for the removal, transporting, disposal or other regulated activity relative to the work of this contract.

1.6 POSTING AND FILING OF REGULATIONS

A. **Posting and Filing of Regulations:** Post all notices required by applicable federal, state and local regulations. Maintain two (2) copies of applicable federal, state and local regulations and standard. Maintain one copy of each at job site. Keep on file in Contractor's office one copy of each.

1.7 SUBMITTALS:

A. **Before Start of Work:** Submit the following to the Designer for review. No work shall begin until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use.

1. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work including:

a. State and Local Regulations: Submit copies of codes and regulations applicable to the work.

2. Notices: Submit notices required by federal, state and local regulations together with proof of timely transmittal to agency requiring the notice.

3. Permits: Submit copies of current valid permits required by state and local regulations.

4. Licenses: Submit copies of all State and local licenses and permits necessary to carry out the work of this contract.

PART 2 - PRODUCTS (Not Applicable)
PART 3 - EXECUTION (Not Applicable)

END OF SECTION – 02 80 22

SECTION 02 80 30 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:

1. Submittal schedule.
2. Daily construction reports.
3. Shop Drawings.
4. Product Data.
5. Samples.
6. Quality Assurance Submittals

B. Administrative Submittals: Refer to other Division 2 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:

1. Permits
2. List of Subcontractors

C. RELATED SECTIONS

1. The following Sections contain requirements that relate to this Section:

a. Section "Coordination" specifies requirements governing submittal and distribution of meeting and conference minutes.

b. Section "Project Closeout" specifies requirements for submittal of Project Record Documents and warranties at project closeout.

1.3 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.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

a. The Designer reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.

B. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.

No extension of Contract Time will be authorized because of failure to transmit submittals to the Designer sufficiently in advance of the Work to permit processing.

C. 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. Contractor may elect to prepare and transmit all submittals electronically, provided the submittals are in PDF file format and convey information as required by these specifications.

1. Provide a space approximately 4 by 5 inches (100 by 125 mm) on the label or beside the title block on Shop Drawings to record the Contractor's review and approval 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 Designer.
d. Name and address of the Contractor.
e. Name and address of the supplier.
f. Name of the manufacturer.
g. Number and title of appropriate Specification Section.
h. Drawing number and detail references, as appropriate.

3. 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.

4. Contractor shall transmit all closeout submittals in electronic format (email to Designer or via CD-ROM). Contractor shall use latest version of Microsoft Word or Excel file formats for submittal preparation.

D. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Designer using a transmittal form. The Designer 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.

E. Transmittal Form: Use AIA Document G810.

1.4 SUBMITTAL SCHEDULE

A. Submittal Schedule: After development and acceptance of the Contractor's Construction Schedule, prepare a complete schedule of submittals.

1. Coordinate Submittal Schedule with the list of products as well as the Contractor's Construction Schedule.

2. Prepare the schedule in chronological order. Provide the following information:
- a. Scheduled date for the first submittal.
- b. Related Section number.
- c. Submittal category (Shop Drawings, Product Data, or Samples).
- d. Description of the part of the Work covered.
- e. Scheduled date for resubmittal.
- f. Scheduled date for the Designer's final release or approval.

B. Distribution: Following response to the initial submittal, print and distribute copies to the Designer, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies at the jobsite.

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.

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

1.5 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. 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.

C. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 36 by 48 inches (890 by 1220 mm).

D. Initial Submittal: Submit one correctable, translucent, reproducible print and one blue- or black-line print for the Designer's review. The Designer will return the reproducible print.

E. **Final Submittal:** Submit 3 blue- or black-line prints; submit 5 prints where required for maintenance manuals. The Designer will retain 2 prints and return the remainder.

F. **Final Submittal:** Submit 3 blue- or black-line prints and 2 additional prints where required for maintenance manuals, plus the number of prints needed by the Designer for distribution. The Designer will retain 2 prints and return the remainder.

1. One of the prints returned shall be marked up and maintained as a "Record Document."
2. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

1.6 PRODUCT DATA

A. **Collect Product Data into a single submittal.** Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."

1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:

a. Manufacturer's printed recommendations.
b. Compliance with recognized 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. **Preliminary Submittal:** Submit a preliminary single-copy of Product Data where selection of options is required.

C. **Submittals:** Submit 3 copies of each required submittal. The Designer will retain two, and will return the one marked 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.

D. **Distribution:** Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.

1. Do not proceed with installation until a final submittal is in the installer's possession.
2. Do not permit use of unmarked copies of Product Data in connection with construction.

1.7 SAMPLES

A. **Submit full-size, fully fabricated Samples** cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.

1. Mount or display Samples in the manner to facilitate review of qualities indicated. Prepare Samples to match the Designer's sample. Include the following:

a. Specification Section number and reference.
b. Generic description of the Sample.
c. Sample source.
d. Product name or name of the manufacturer.
e. Compliance with recognized standards.
f. Availability and delivery time.

2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.

a. 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.

3. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

B. **Submittals:** Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit 3 sets. The Designer will return one set marked with the action taken.

1. Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.
2. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

3. Sample sets may be used to obtain final acceptance of the construction associated with each set.

C. **Distribution of Samples:** Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.

1. Field samples are full-size examples erected on-site to illustrate finishes, coatings, or finish materials and to establish the Project standard.
a. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.8 QUALITY ASSURANCE SUBMITTALS

A. **Submit quality-control submittals,** including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.

B. **Certifications:** Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.

1. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.

1.9 MISCELLANEOUS SUBMITTALS:

A. **Material Safety Data Sheets:** Process material safety data sheets as “product data.” These are submitted for information purposes only, they will be returned with the action stamp, “Received - Not Reviewed.”

B. **Inspection and Test Reports:** Classify each inspection and test report as being either "shop drawings" or "product data" depending on whether the report is specially prepared for the project, or a standard publication of workmanship control testing at the point of production. Process inspection and test reports accordingly.

C. **Worker Identification and Accreditation:** Provide legally recognized identification of contractor personnel (such as valid driver’s license from any of the fifty states of the United States of America or territories, or valid photographic ID from any of the fifty states of the United States of America or territories) as well as required drug screening and employee background information.

D. **Project Photographs:** Furnish 2 prints each of 3 project photographs at monthly intervals. Comply with Designer's direction concerning desired vantage points for shots.

E. **Records of Actual Work:** Furnish 4 copies of records of actual work, one of which will be returned for inclusion in the record documents as specified in section "Project Closeout".

F. **Standards:** Where submittal of a copy of standards is indicated, and except where copies of standards are specified as an integral part of a "Product Data" submittal, submit a single copy of standards for the Designer's use. Where workmanship, whether at the project site or elsewhere is governed by a standard, furnish additional copies of the standard to fabricators, installers and others involved in the performance of the work.

G. **Closeout Submittals:** Refer to section "Project Closeout" and to individual sections of these specifications for specific submittal requirements of project closeout information.

H. **Record Documents:** Furnish set of original documents as maintained on the project site. Along with original marked-up record drawings provide 2 photographic copies of marked-up drawings, which, at the Contractor's option, may be reduced to not less than half size.

1.10 DESIGNER'S ACTION

A. Except for submittals for the record or information, where action and return is required, the Designer will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is the Contractor's responsibility.

B. **Action Label:** The Designer will label each submittal with a uniform, action label. The Designer will mark the label appropriately to indicate the action taken, as follows:

1. Final Unrestricted Release: When the Designer marks a submittal "Approved," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.

2. Final-But-Restricted Release: When the Designer marks a submittal "Approved as Noted," 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 payment depends on that compliance.

3. Returned for Resubmittal: When the Designer marks a submittal "Not Approved, Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.

a. Do not use, or allow others to use, submittals marked "Not Approved, Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.

4. Received - Not Reviewed: When the Designer marks a submittal "Received - Not Reviewed" this acknowledges that the submittal has been received. This action applies to materials that are to be submitted for information purposes only, and where no review or action by the Designer is required.

5. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the Designer will return the submittal marked "Action Not Required."

C. **Unsolicited Submittals:** The Designer will return unsolicited submittals to the sender without action.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 02 80 30

SECTION 02 80 40 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. **Drawings and general provisions** of the Contract, including General and Supplementary Conditions and other Division 1 & 2 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section includes requirements** for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection where required.

B. **Temporary utilities include**, but are not limited to, the following:

1. Water service and distribution.
2. Temporary electric power and light.
3. Temporary heat.
4. Ventilation.
5. Telephone service.
5. Sanitary facilities, including drinking water.
6. Storm and sanitary sewer.

C. **Support facilities include**, but are not limited to, the following:

1. Temporary enclosures.
2. Hoists.

D. **Security and protection facilities include**, but are not limited to, the following:

1. Temporary fire protection.
2. Barricades, warning signs, and lights.

1.3 DESCRIPTION OF REQUIREMENTS:

A. **General:** Provide temporary connection to existing building utilities or provide temporary facilities as required herein or as necessary to carry out the work.

1.4 SUBMITTALS

A. **Before the Start of Work:** Submit the following to the Designer for review. Begin no work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use. Only submit data on items listed below that are required for use on this project.

1. Water heater: Submit manufacturers name, model number, size in gallons (liters), heating capacity, power requirements.

2. Decontamination Unit Sub-panel: Submit product data.
3. Ground Fault Circuit Interrupters (GFCI): Submit product data.
4. Lamps and Light Fixtures: Submit product data.
5. Temporary Heating Units: Provide product data.
6. Temporary Cooling Units: Provide product data and installation instructions.
7. Self-Contained Toilet Units: Provide product data and name of sub-contractor to be used for servicing self-contained toilets. Submit method to use for servicing.
8. Fire Extinguishers: Provide product data. Submit schedule indicating location at job site and compliance with NFPA 10 and NFPA 241.
9. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
10. Implementation and Termination Schedule: Within 15 days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.

1.5 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:

1. Building code requirements.
2. Health and safety regulations.
3. Utility company regulations.
4. Police, fire department, and rescue squad rules.
5. Environmental protection regulations.

B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, 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 NFPA 70 "National Electric Code."

D. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.

B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. General: Provide new materials and equipment. If acceptable to the Designer, the Contractor may use undamaged, previously used materials and equipment in serviceable condition. Provide materials and equipment suitable for use intended.

B. Lumber and Plywood:

1. For job-built temporary offices, shops, and sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding.
2. For fences and vision barriers, provide minimum 3/8-inch- (9.5mm) thick exterior plywood.

C. Scaffolding: Provide scaffolding, ladders and/or staging, etc. as necessary to accomplish the work of this contract. Scaffolding may be of suspension type or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of scaffolding shall comply with applicable OSHA provisions.

1. Equip rungs of metal ladders, etc. with an abrasive non-slip surface.
2. Provide a nonskid surface on scaffold surfaces subject to foot traffic.

2.2 WATER SERVICE

A. Water: Provide potable water approved by local health authorities.

B. Temporary Water Service Connection: Connections to the Owner's water system shall include backflow protection. Valves shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall be piped to the nearest drain or located over an existing sink or grade where water will not damage existing finishes or equipment. Provide separate hoses and/or/ pumps for shower water and amended water, without the possibility of cross connection.

C. Water Hoses: Provide heavy-duty, abrasion-resistant, flexible hoses in diameters and lengths necessary to adequately serve temporary facilities, and with a pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

1. Provide water into each work area and to each Decontamination Unit. Provide fittings as required to allow for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping, showers, shut-off nozzles and equipment.

D. **Water Heater:** Provide UL rated minimum 40 gallon (150 liters) electric water heater to supply hot water for the Decontamination Unit shower. Activate from 30-amp circuit breaker located within the Decontamination Unit subpanel. Provide with relief valve compatible with water heater operation; pipe relief valve down to drip pan on floor with type L copper. Drip pans shall consist of a 12" X 12" X 6" (30 cm. X 30 cm. X 15 cm) deep pan, made of 19-gauge galvanized steel, with handles. A 3-quart (3 liter) kitchen saucepan may be substituted for this purpose. Drip pan shall be securely fastened to the water heater with bailing wire or similar material. Wiring of the hot water heater shall be in compliance with NEMA, NECA, and UL standards.

E. **Hot Water:** may be secured from the building hot water system, provided backflow protection is installed at point of connection as described in this section under Temporary Water Service connection, and if authorized in writing by the Designer.

2.3 ELECTRICAL SERVICE:

A. **General:** Comply with applicable NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service.

B. **Temporary Power:** Provide service to Decontamination Unit subpanel with minimum 60 amp, 2 pole circuit breaker or fused disconnect connected to the building's main distribution panel. Subpanel and disconnect shall be sized and equipped to accommodate electrical equipment required for completion of the work.

1. Connection to the building's main distribution panel is to be made by a licensed electrician

C. **Voltage Differences:** Provide identification warning signs at power outlets which are other than 110–120-volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets. Dry type transformers shall be provided where required to provide voltages necessary for work operations.

D. **Electrical Outlets:** Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters (GFCI), reset button, and pilot light for connection of power tools and equipment.

1. Locate GFCI's exterior to Work Area so that circuits are protected prior to entry to Work Area. Provide circuit breaker type ground fault circuit interrupters (GFCI) equipped with test button and reset switch for circuits to be used for any purpose in work area, decontamination units, exterior, or as otherwise required by national electrical code, OSHA or other authority. Locate in panel exterior to Work Area.

E. **Electrical Power Cords:** Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

F. **Lamps and Light Fixtures:** Provide general service incandescent lamps or fluorescent lamps of wattage indicated or required for adequate illumination as required by the work or this section. Protect lamps with guard cages or tempered glass enclosures, where fixtures are exposed to breakage by construction operations. Provide vapor tight fixtures in work area and decontamination units. Provide exterior fixtures where fixtures are exposed to the weather or moisture.

2.4 TEMPORARY HEAT:

A. **Heating Units:** Provide temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the fuel being consumed. Use steam or hot water radiant heat where available, and where not available use electric resistant fin radiation supplied from a branch circuit with ground fault circuit interrupter.

2.5 TEMPORARY COOLING:

A. **Cooling Units:** Provide temporary cooling units consisting of a fan coil unit inside the work area with a compressor and heat rejection coil outside.

2.6 TEMPORARY STRUCTURES

A. **Temporary Toilet Units:** Provide self-contained, single-occupant toilet units of the chemical or aerated recirculation type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

2.7 FIRST AID

A. **First Aid Supplies:** Comply with governing regulations and recognized recommendations within the construction industry.

2.8 FIRE EXTINGUISHERS:

A. **Fire Extinguishers:** Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

B. **Comply with NFPA 10 and NFPA 241** for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. **General:** Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. **Provide** each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

C. **Require** that personnel accomplishing this work be licensed as required by local authority for the work performed.

D. **Relocate**, modify and extend services and facilities as required during the course of work so as to accommodate the entire work of the project.

3.2 SCAFFOLDING:

A. **During the erection and/or moving** of scaffolding, care must be exercised so that the polyethylene floor covering is not damaged.

B. **Clean** as necessary debris from non-slip surfaces.

C. **At the completion of abatement work** clean construction aids within the work area, wrap in one layer of 6 mil (0.15 mm) polyethylene sheet and seal before removal from the Work Area.

3.3 TEMPORARY UTILITY INSTALLATION

A. **General:** Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.

1. Arrange with company and existing users for a time when service can be interrupted, if 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. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Designer. Neither the Owner nor Designer will accept cost or use charges as a basis of claims for Change Orders.

B. **Water Service:**

1. Water connection (without charge) to Owner's existing potable water system is limited to one 3/4" (19 mm) pipe-size connection, and a maximum flow of 10 g.p.m. (38 liters / minute) each to hot and cold-water supply. Install using vacuum breakers or other backflow preventer as required by local authority. Hot water shall be supplied at a minimum temperature of 100 degrees F (35 degrees C). Supply hot and cold water to the Decontamination Unit in accordance with Section 01563.

a. Maintain hose connections and outlet valves in leakproof condition. Where finish work below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize the possibility of water damage. Drain water promptly from pans as it accumulates.

2. Sterilization: Sterilize temporary water piping prior to use.

C. Electrical Service:

1. Lock out: Lock out all existing power to or through the work area as described below. Unless specifically noted otherwise existing power and lighting circuits to the Work Area are not to be used. All power and lighting to the Work Area and Decontamination facilities are to be provided from temporary electrical panel described below.

a. Comply with requirements to OSHA 29 CFR 1910.147 the control of hazardous energy lock out/tag out.
b. Lock out power to Work Area by switching off breakers serving power or lighting circuits in work area. Tagout breakers with notation "DANGER circuit being worked on". Lock panel and have all keys under control of authorized person who has locked pane.
c. Lock out power to circuits running through Work Area wherever possible by switching off and locking all breakers serving these circuits. Tag out breakers with notation "DANGER circuit being worked on". Sign and date danger tag. Lock panel and supply keys to authorized person who has applied locks. If circuits cannot be shut down for any reason, label at intervals of 4-feet" (1.25 meter) on center with signs reading, "DANGER live electric circuit. Electrocution hazard." All asbestos abatement work in the vicinity of the live circuit is to be performed dry. All necessary notifications and procedures for dry removal are to be followed.
d. Lock out power to electrical equipment located in the work area, and to any fans or other equipment that is going to be worked on.

2. Temporary Electrical Panel: Provide temporary electrical panel sized and equipped to accommodate electrical equipment and lighting required by the work. Connect temporary panel to existing building electrical system. Protect with circuit breaker or fused disconnect. Locate temporary panel as directed by Owner or Designer. Panel is to be installed by a licensed electrician.

3. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.

4. Circuit Protection: Protect each circuit with a ground fault circuit interrupter (GFCI) of proper size located in the temporary panel. Do not use outlet type GFCI devices.

5. Temporary Wiring: in the Work Area shall be type UF non-metallic sheathed cable located overhead and exposed for surveillance. Do not wire temporary lighting with plain, exposed (insulated) electrical conductors. Provide liquid tight enclosures or boxes for wiring devices.

6. Number of Branch Circuits: Provide sufficient branch circuits as required by the work. Branch circuits are to originate at temporary electrical panel. At minimum provide the following:

a. One Circuit for each HEPA filtered fan unit
b. For power tools and task lighting, provide one temporary 4-gang outlet in the following locations. Provide a separate 110-120 Volt, 20 Amp circuit for each 4-gang outlet (4 outlets per circuit).

c. One outlet in the work area for each 2500 square feet (225 square meters) of work area
d. One outlet at each decontamination unit, located in equipment room

7. 110–120-volt 20-amp branch circuits with 4-gang outlet for Owner's exclusive use while conducting visual inspection and air sampling during the work as follows:

a. One in each work area
b. One at clean side of each Decontamination Unit.
c. One at each exhaust location for HEPA filtered fan units

8. 110–120-volt 20-amp branch circuits with 4-gang outlet for Owner's exclusive use for conducting visual inspection and final air sampling as set forth in Section 01711 Project Decontamination as follows:

a. Five inside work area
b. Two outside work area in location designated by Designer

D. Temporary Lighting:

1. Lock out: Lock out existing power to lighting circuits in Work Area as described in section "Temporary Enclosures". Unless specifically noted otherwise existing lighting circuits to the Work Area are not to be used. All lighting to the Work Area and Decontamination facilities is to be provided from temporary electrical panel described above.

2. Provide the following or equivalent where natural lighting or existing building lighting does not meet the required light level:

a. One 200-watt incandescent lamp per 1000 square feet (92.9 square meters) of floor area, uniformly distributed, for general construction lighting, or equivalent illumination of a similar nature. In corridors and similar traffic areas provide one 100-watt incandescent lamp every 50 feet (15.2 meters). In stair ways and at ladder runs, provide one lamp minimum per story, located to illuminate each landing and flight. Provide sufficient temporary lighting to ensure proper workmanship everywhere; by combined use of daylight, general lighting, and portable plug-in task lighting.
b. Provide lighting in areas where work is being performed as required to supply a 100-foot candle (1,076 lumens/sq meter) minimum light level.
c. Provide lighting in any area being subjected to a visual inspection as required to supply a 100-foot candle (1,076 lumens/sq meter) minimum light level.
d. Provide lighting in the Decontamination Unit as required to supply a 50-foot candle (538 lumens/sq meter) minimum light level.

3. Number of Lighting Circuits: Provide sufficient lighting circuits as required by the work. Lighting circuits are to originate at temporary electrical panel.

4. Circuit Protection: Protect each circuit with a ground fault circuit interrupter (GFCI) of proper size located in the temporary panel.

E. Temporary Heat:

1. **General:** Provide temporary heat were indicated or needed for performance of the Work.
2. Heating Facilities: Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP-gas or fuel-oil heaters with individual space thermostatic control.

    a. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.

3. Maintain a minimum temperature of 70 degrees F (21 degrees C). Where finished work has been installed.
4. Maintain a minimum temperature of 75 degrees F (24 degrees C).in the shower of the decontamination unit.
5. Maintain a minimum temperature of 65 degrees F (18 degrees C) in the Work Area at all times that work is going on. At all other times and at completion of removal work, but before start of reconstruction work, maintain a minimum temperature of 50 degrees F (10 degrees C).
6. Maintain a minimum temperature of 50 degrees F (10 degrees C) in the Work Area at all times during and after removal work.

F. Temporary Cooling:

1. Required Cooling: Provide units sufficient to supply 20,000 BTU/hr (5,862 w) of cooling per 8,000 cubic feet (225 cubic meters) of work area.

G. Temporary Utilities

1. Temporary Telephones: Provide temporary telephone service throughout the construction period for personnel engaged in construction activities. Install telephone on a separate line for each temporary office and first-aid station.
2. Separate Telephone Lines: Provide additional telephone lines for the following:

    a. Where an office has more than 2 occupants, install a telephone for each additional occupant or pair of occupants.
    b. Provide a dedicated telephone line for a fax machine in the field office.
    c. Provide a separate line for the Owner's use.
    d. At each telephone, post a list of emergency telephone numbers.

H. Sanitary Facilities:

1. 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.

    a. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.

2. Toilets: Use of the Owner's existing toilet facilities will not be permitted.
3. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.
4. Provide separate facilities for male and female personnel.
5. 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.
6. Drinking-Water Facilities: Provide containerized, tap-dispenser, bottled-water drinking-water units, including paper supply.

    a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7.2 to 12.8 deg C).

7. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.

    a. Filter out excessive amounts of soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
    b. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.

3.4 NOT USED.

3.5 FIRE PROTECTION FACILITIES INSTALLATION

A. **Except for use of permanent fire protection** as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Designer.

B. **Temporary Fire Protection**: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."
1. 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.
2. Store combustible materials in containers in fire-safe locations.
3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires.
4. Prohibit smoking within any building, structure, other enclosures or in hazardous fire-exposure areas.
5. Prohibit smoking in hazardous fire-exposure areas.

6. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

C. **Permanent Fire Protection**: At the earliest feasible date in each area of the Project, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

D. **Barricades, Warning Signs, and Lights:** Comply with standards and code requirements for erection of structurally adequate barricades. 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.

Temporary Fencing: Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch-(3.76-mm-) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch-(73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails.

E. **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 that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. **Supervision:** Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. **Maintenance:** Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. **Termination and Removal:** Unless the Designer requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.

END OF SECTION 02 80 40

SECTION 02 80 41 - TEMPORARY PRESSURE DIFFERENTIAL AND AIR CIRCULATION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-2 Specification Sections, apply to work of this section.

1.2 RELATED SECTIONS

A. **Heating and cooling requirements** are set forth in Section "Temporary Facilities - Asbestos Abatement".

1.3 MONITORING

A. **Continuously monitor** and record the pressure differential between the Work Area and the building outside of the Work Area with a monitoring device incorporating a continuous recorder (e.g. strip chart).

1.4 SUBMITTALS

A. **Before Start of Work:** Submit design of pressure differential system to the Designer for review. Do not begin work until submittal is returned with the Designer's action stamp indicating that the submittal is returned for unrestricted use. Include in the submittal at a minimum:

1. Number of HEPA filtered fan units required and the calculations necessary to determine the number of machines
2. Description of projected air flow within Work Area and methods required to provide adequate air flow in all portions of the work area
3. Anticipated pressure differential across Work Area enclosures
4. Description of methods of testing for correct air flow and pressure differentials
5. Manufacturer's product data on the HEPA filtered fan units to be used
6. Location of the machines in the Work Area
7. Method of supplying adequate power to the machines and designation of building electrical panel(s) which will be supplying the power.
8. Description of work practices to insure that airborne fibers travel away from workers
9. Manufacturer's product data on equipment used to monitor pressure differential between inside and outside of Work Area.
10. Manufacturer's product data on auxiliary generator to be used
11. Manufacturer's product data on auxiliary power switch to be used
12. Schematic diagram of power and auxiliary power supply to HEPA filtered fan units

B. On a weekly basis: Submit printout from pressure differential monitoring equipment. Mark printout with date and start of time for each day. Use printout paper that indicates elapsed time in intervals no greater than hours. Indicate on each day's record times of starting and stopping abatement work, type of work in progress, breaks for lunch or other purposes, periods of stop work, and filter changes. Cut printout into segments by day, attach to 8 ½" by 11" paper. Label with project name, contractors name and date.

1.5 QUALITY ASSURANCE:

A. Monitor pressure differential at Personnel and Equipment Decontamination Units with a differential pressure meter equipped with a continuous recorder. Meter shall be equipped with a warning buzzer which will sound if pressure differential drops below 0.02 inch [0.5 mm] of water.

PART 2 - PRODUCTS

2.1 HEPA FILTERED FAN UNITS:

A. General: Supply the required number of HEPA filtered fan units to the site in accordance with these specifications. Use units that meet the following requirements.

B. Cabinet: Constructed of durable materials able to withstand damage from rough handling and transportation. The width of the cabinet should be less than 30 inches [0.76 meters] to fit through standard-size doorways. Provide units whose cabinets are:

1. Factory-sealed to prevent asbestos-containing dust from being released during use, transport, or maintenance
2. Arranged to provide access to and replacement of all air filters from intake end
3. Mounted on casters or wheels

C. Fans: Rate capacity of fan according to usable air-moving capacity under actual operating conditions.

D. HEPA Filters: Provide units whose final filter is the HEPA type with the filter media (folded into closely pleated panels) completely sealed on all edges with a structurally rigid frame.

1. Provide units with a continuous rubber gasket located between the filter and the filter housing to form a tight seal.
2. Provide HEPA filters that are individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 um dioctylphthalate (DOP) particles when tested in accordance with Military Standard Number 282 and Army Instruction Manual 136-300-175A. Provide filters that bear a UL586 label to indicate ability to perform under specified conditions.
3. Provide filters that are marked with: the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of test air flow.
4. Pre-filters, which protect the final filter by removing the larger particles, are required to prolong the operating life of the HEPA filter. Two stages of pre-filtration are required. Provide units with the following pre-filters:

a. First-stage pre-filter: low-efficiency type (e.g., for particles 100 um and larger)
b. Second-stage (or intermediate) filter: medium efficiency (eg., effective for particles down to 5 um)
c. Provide units with pre-filters and intermediate filters installed either on or in the intake grid of the unit and held in place with special housings or clamps.

E. Instrumentation: Provide units equipped with:

1. Magnehelic gauge or manometer to measure the pressure drop across filters and indicate when filters have become loaded and need to be changed

2. A table indicating the usable air-handling capacity for various static pressure readings on the Magnehelic gauge affixed near the gauge for reference, or the Magnehelic reading indicating at what point the filters should be changed, noting Cubic Feet per Minute (CFM) (Liters / Second (LPS)) air delivery at that point

3. Elapsed time meter to show the total accumulated hours of operation

F. Safety and Warning Devices: Provide units with the following safety and warning devices:

1. Electrical (or mechanical) lockout to prevent fan from operating without a HEPA filter

2. Automatic shutdown system to stop fan in the event of a rupture in the HEPA filter or blocked air discharge

3. Warning lights to indicate normal operation (green), too high a pressure drop across the filters (i.e., filter overloading) (yellow), and too low of a pressure drop (i.e., rupture in HEPA filter or obstructed discharge) (red)

4. Audible alarm if unit shuts down due to operation of safety systems

G. Electrical components: Provide units with electrical components approved by the National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL). Each unit is to be equipped with overload protection sized for the equipment. The motor, fan, fan housing, and cabinet are to be grounded.

H. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

I. Manufacturer: Subject to compliance with requirements, provide products of the following:

1. HEPA filtered Fan Units: The following machines are standard 2000 CFM machines used in typical asbestos abatement jobs.

Aerospace America, Inc.
900 Truman Parkway
P.O. Box 189
Bay City, Michigan 48707
(517) 684-2121
"Aero-Clean 2000"

Abatement Technologies
3305 Breckinridge Blvd. #118
Deluth, GA 30136
(800) 634-9091 or (404) 925-2761
"HEPA-AIRE 1990 and HEPA-AIRE 2000"

Global Consumer Services, Inc.
4615-1U E. Industrial St.
Sims Valley, CA 93063
(805) 579-0230

M-Tec Corp.
1300 W. Steel Rd.
Unit #2
Morrisville, PA 19067
(215) 295-8208
Micro-Trap
Alumina II

2. **Large Capacity:** The following are large capacity 5000-6000 CFM machines used on large asbestos abatement jobs.

Abatement Technologies
3305 Breckinridge Blvd. #118
Deluth, GA 30136
(800) 634-9091 or (404) 925-2761
"HEPA-AIRE 5000"
model H5000C

3. **Hazardous Locations:** The following are pneumatically powered machines for use in asbestos abatement jobs in hazardous locations where electric motors are prohibited.

Abatement Technologies
3305 Breckinridge Blvd. #118
Deluth, GA 30136
(800) 634-9091 or (404) 925-2761
"HEPA-AIRE PNEUMATIC"
model H2000P

2.2 AUXILIARY GENERATOR:

A. **Auxiliary Generator:** Provide a gasoline-powered self-starting generator with a capacity adequate to power a minimum of 50% of the HEPA filtered fan units in operation at any time during the work.

2.3 AUXILIARY POWER SWITCH:

A. **Auxiliary Power Switch:** Provide a switching relay which will automatically start auxiliary generator and switch over power supplied to HEPA filtered fan units to auxiliary generator.

PART 3 - EXECUTION

3.1 PRESSURE DIFFERENTIAL ISOLATION

A. **Isolate the Work Area** from all adjacent areas or systems of the building with a Pressure Differential that will cause a movement of air from outside to inside at any breach in the physical isolation of the Work Area.

B. **Relative Pressure in Work Area:** Continuously maintain the work area at an air pressure that is lower than that in any surrounding space in the building, or at any location in the immediate proximity outside of the building envelope. This pressure differential when measured across any physical or critical barrier must equal or exceed a static pressure of: 0.02 inches (0 .5 mm) of water.

C. **Accomplish the pressure differential by exhausting** a sufficient number of HEPA filtered fan units from the work area. The number of units required will depend on machine characteristics, the seal at barriers, and required air circulation. The number of units will increase with increased make-up air or leaks into the Work Area. Determine the number of units required for pressure isolation by the following procedure:

1. Establish required air circulation in the work area, personnel and equipment decontamination units.

2. Establish isolation by increased pressure in adjacent areas or as part of seals where required.

3. Exhaust a sufficient number of units from the work area to develop the required pressure differential.

4. The required number of units is the number determined above plus one additional unit.

5. Vent HEPA filtered fan units to outside of building unless authorized in writing by Designer.

6. Vent each HEPA filtered fan unit to inlet of second unit. Vent second unit to a controlled area in the building. Insure that controlled area is isolated from balance of building by critical barriers at all times that units are in operation.

7. Mount units to exhaust directly or through disposable ductwork.

8. Use only new ductwork except for sheet metal connections and elbows.

9. Use ductwork and fittings of same diameter or larger than discharge connection on fan unit.

10. Use inflatable, disposable plastic ductwork in lengths not greater than 100 feet (30 meters).

11. Use spiral wire-reinforced flex duct in lengths not greater than 50 feet (15 meters).

12. Arrange exhaust as required to inflate duct to a rigidity sufficient to prevent flapping.

13. If direction of discharge from fan unit is not aligned with duct use sheet metal elbow to change direction. Use six feet (2 meters) of spiral wire reinforced flex duct after direction change.

D. Isolation of elevators, stair towers, and return air intakes: Erect seals with an air space at doors to elevators and stair towers. Pressurize this space with HEPA-filtered air so that it is at a pressure greater than either the Work Area elevator shaft or stair tower.

1. Fabricate seal by first sealing door with duct tape and 6 mil polyethylene. Construct a barrier from ½" (13 mm) gypsum board supported by 3-5/8" (92 mm) x 25-gauge metal studs at 16" (410 mm) on centers. Space face of barrier a minimum of 3" (76 mm) from face of door. Seal barrier with 6 mil (0.15 mm) sheet plastic and duct tape.

2. Fabricate seal by first sealing door with duct tape and 6 mil (0.15 mm) polyethylene. Construct a barrier from ½" (13mm) CDX plywood supported by 2" X 4" (51 mm x 102 mm) wood studs at 16" (410 mm) on centers. Space face of barrier a minimum of 3" (76 mm) from face of door. Seal barrier with 6 mil (0.15 mm) sheet plastic and duct tape.

3. Use plywood and framing lumber that is treated to be fire resistant.

4. Pressurize space with exhaust from HEPA filtered fan unit. Continuously maintain a pressure differential with this space a minimum of 0.02 inches (0.5 mm) of water higher in static pressure than any adjacent space.

5. Locate HEPA filtered fan unit outside of work area. Fabricate a manifold as required to distribute air to individual spaces to be isolated. Provide relief venting at unit as required to prevent shut down due to low air flow while still maintaining required air pressure.

E. Isolation of chases and enclosed stairs: Pressurize chases and enclosed stairs with HEPA filtered air so that it is at a pressure greater than any adjacent work area.

1. Pressurize space with exhaust from HEPA filtered fan unit. Continuously maintain a pressure differential with this space a minimum of 0.02 (.5 mm) inches of water higher in static pressure than any adjacent work area.

2. Pressurize space with centrifugal-type fans. Axial type fans are not to be used for this purpose. Continuously maintain a pressure differential in this space a minimum of 0.02 inches (0.5 mm) of water higher in static pressure than any adjacent work area.

F. **Isolation of return air ductwork:** Return air duct work which must be kept operating is located in the Work Area. This duct work is to be isolated from the Work Area by an enclosure forming an annular space around the duct which is positively pressurized with HEPA filtered air.

1. Wrap the duct with 6 mil (0.15 mm) polyethylene. Seal all polyethylene seams with spray glue and duct tape.

2. Enclose wrapped duct with two layers of polyethylene. Fabricate inner layer from 6 mil (0.15 mm) polyethylene with all seams sealed with spray glue and duct tape. Arrange outer layer to support inner layer. Fabricate out of reinforced sheet plastic with seams sealed with spray glue and duct tape and reinforced with staples. Support outer layer with a frame work fabricated from 2" x 4"s (51 mm x 102 mm) at 24" (610 mm) on center. Enclosures less than 2'-6' in diameter may be reinforced with box strapping in lieu of wood framing.

3.2 AUXILIARY GENERATOR

A. **Provide auxiliary gasoline-powered generator** located outside of the building in a location protected from the weather. Install the generator in a location so that the exhaust from the generator does not flow to any building ventilation or supplied air intakes. Arrange so that if a power failure occurs the generator automatically starts and supplies power to a minimum of 50% of the HEPA filtered fan units in operation.

3.3 AIR CIRCULATION IN THE WORK AREA:

A. **Air Circulation:** For purposes of this section air circulation refers to either the introduction of outside air to the Work Area or the circulation and cleaning of air within the Work Area. Maintain the Work Area and all adjacent areas or systems of the Work Area with a Pressure Differential as specified in this section that will cause a movement of outside work area to inside work area. Contractor shall continuously monitor and record the pressure differential between the Work Area and the building outside of the Work Area with a monitoring device incorporating a continuous recorder (e.g. strip chart).

B. **Air circulation in the Work Area** is a minimum requirement intended to help maintain airborne fiber counts at a level that does not significantly challenge the work area isolation measures. The Contractor may also use this air circulation as part of the engineering controls in the worker protection program.

C. **Determining the Air circulation Requirements:** The air flow volume (cubic meters per minute) exhausted (removed) from the workplace must exceed the amount of makeup air supplied to the enclosure. Provide a fully operational air circulation system supplying a minimum of the following air circulation rate: 4 air changes per hour

D. Determine Number of Units needed to achieve required air circulation according to the

following procedure:

1. Determine the volume in cubic feet of the work area by multiplying floor area by ceiling height. Determine total air circulation requirement in cubic feet per minute (CFM) for the work area by dividing this volume by 60 and multiplying by the air change rate.

2. Air Circulation Required in Cubic Feet of Air per Minute (CFM) =

$$\frac{\text{Volume of work area (cu. ft.)}}{\text{60 (minutes per hour)}} \times \text{Number of air changes per hour}$$

3. Divide the air circulation requirement (CFM) above by capacity of HEPA filtered fan unit(s) used. Capacity of a unit for purposes of this section is the capacity in cubic feet per minute with fully loaded filters (pressure differential which causes loaded filter warning light to come on) in the machine's labeled operating characteristics.

4. Number of Units Needed =

$$\frac{\text{Air circulation Requirement (CFM)}}{\text{Capacity of Unit with Loaded Filters (CFM)}}$$

5. Add one (1) additional unit as a backup in case of equipment failure or machine shutdown for filter changing.

3.4 EXHAUST SYSTEM:

A. **Pressure differential isolation and air circulation** and pressure differential in the Work Area are to be accomplished by an exhaust system as described below.

1. Exhaust all units from the Work Area to meet air circulation requirement of this section.

2. Location of HEPA Filtered Fan Units: Locate fan unit(s) so that makeup air enters work area primarily through decontamination facilities and traverses Work Area as much as possible. This may be accomplished by positioning the HEPA filtered fan unit(s) at a maximum distance from the worker access opening or other makeup air sources.

3. The end of the unit or its exhaust duct should be placed through an opening in the plastic barrier or wall covering. Seal plastic around the unit or duct with tape.

4. Vent to Outside of Building, unless authorized in writing by the Designer.

5. Air Handling Unit Exhaust: The exhaust plume from air handling units should be located away from adjacent personnel and intakes for HVAC systems.

6. Decontamination Units: Arrange Work Area and decontamination units so that the majority of makeup air comes through the Decontamination Units. Use only personnel or equipment Decontamination Unit at any time and seal the other so that make up air passes through unit in use.

7. Supplemental Makeup Air Inlets: Provide where required for proper air flow through the Work Area in location approved by the Designer by making openings in the plastic sheeting that allow air from outside the building into the Work Area. Locate auxiliary makeup air inlets as far as possible from the fan unit(s) (e.g., on an opposite wall), off the floor (preferably near the ceiling), and away from barriers that separate the Work Area from occupied clean areas. Cover with flaps to reseal automatically if the pressure differential system should shut down for any reason. Spray flap and around opening with spray adhesive so that if flap closes meeting surfaces are both covered with adhesive. Use adhesive that forms contact bond when dry.

3.5 RECIRCULATION SYSTEM:

A. Pressure differential isolation and air circulation in the Work Area are to be accomplished by a recirculation system as described below.

1. Re-circulate air in the Work Area through HEPA filtered fan units to accomplish air circulation requirements of this section.

2. Location of Fan Units: Locate HEPA filtered fan units so that air is circulated through all parts of the Work Area, and so that required pressure is maintained at all parts of Work Area geometry. Move units as necessary, so that in any location where asbestos-containing materials are being disturbed, air movement is directed away from employees, and toward the HEPA filter fan unit. Direct air flow in these locations so that it is predominantly toward workers' backs at the breathing zone elevation.

3.6 AIR CIRCULATION IN DECONTAMINATION UNITS:

A. **Pressure Differential Isolation:** Continuously maintain the pressure differential required for the work area in the:

1. Personnel Decontamination Unit: across the Shower Room with the Equipment Room at a lower pressure than the clean room.

2. Equipment Decontamination Unit: Across the Holding Room with the Wash Room at a lower pressure than the Clean Room.

B. **Air Circulation:** Continuously maintain air circulation in Decontamination Units at same level as required for Work Area.

C. **Air Movement:** Arrange air circulation through the Personnel Decontamination Unit so that it produces a movement of air from the Clean Room through the Shower Room into the Equipment Room. At each opening, the air flow velocity must be sufficient to provide visible indications of air movement into the work area. The velocity of air flow within the enclosure must be adequate to remove airborne contamination from each worker's breathing zone without disturbing the asbestos-containing material on surfaces.

3.7 USE OF THE PRESSURE DIFFERENTIAL AND AIR CIRCULATION SYSTEM:

A. **General:** Each unit shall be serviced by a dedicated minimum 115V-20A circuit with ground fault circuit interrupter (GFCI) supplied from temporary power supply installed under requirements of Section "Temporary Facilities." Do not use existing branch circuits to power fan units.

B. **Air Flow Tests:** Air flow patterns will be checked before removal operations begin, at least once per operating shift and any time there is a question regarding the integrity of the enclosure. The primary test for air flow is to trace air currents with smoke tubes or other visual methods. Flow checks are made at each opening and at each doorway to demonstrate that air is being drawn into the enclosure and at each worker's position to show that air is being drawn away from the workers location and toward the HEPA filtration unit.

C. **Demonstrate Condition of Equipment** for each HEPA filtered fan unit and pressure differential monitoring equipment including proper operation of the following:

1. Squareness of HEPA Filter

2. Condition of Seals

3. Proper operation of all lights

4. Proper operation of automatic shut down if exhaust is blocked

5. Proper operation of alarms

6. Proper operation of Magnehelic gauge

7. Proper operation and calibration on pressure monitoring equipment

D. **Demonstrate Operation** of the pressure differential system to the Designer will include, but not be limited to, the following:

1. Plastic barriers and sheeting move lightly in toward Work Area,

2. Curtain of decontamination units move lightly in toward Work Area,

3. There is a noticeable movement of air through the Decontamination Unit.

4. Use smoke tube to demonstrate air movement from Clean Room through Shower Room to Equipment Room.

5. Use smoke tubes to demonstrate a definite motion of air across all areas in which work is to be performed.

6. Use a differential pressure meter or manometer to demonstrate the required pressure differential at every barrier separating the Work Area from the balance of the building, equipment, ductwork or outside.

7. Modify the Pressure Differential System as necessary to demonstrate successfully the above.

E. Use of System during Abatement Operations:

1. Start fan units before beginning work (before any asbestos-containing material is disturbed). After abatement work has begun, run units continuously to maintain a constant pressure differential and air circulation until decontamination of the work area is complete. Do not turn off units at the end of the work shift or when abatement operations temporarily stop.

2. Monitoring Pressure Within the Enclosure: After the initial air flow patterns have been checked, the static pressure must be monitored within the enclosure. Monitoring may be made using manometers, pressure gauges, or combinations of these devices. It is recommended that they be attached to alarms and strip chart recorders

3. Do not shut down air pressure differential system during encapsulating procedures, unless authorized by the Designer in writing. Supply sufficient pre-filters to allow frequent changes.

4. Start abatement work at a location farthest from the fan units and proceed toward them. If an electric power failure occurs, immediately stop all abatement work and do not resume until power is restored and fan units are operating again.

5. Corrective Actions: If the manometers or pressure gauges demonstrate a reduction in pressure differential below the required level, work should cease and the reason for the change investigated and appropriate changes made. The air flow patterns should be retested before work begins again.

6. At completion of abatement work, allow fan units to run as specified under section “Project Decontamination”, to remove airborne fibers that may have been generated during abatement work and cleanup and to purge the Work Area with clean makeup air. The units may be required to run for a longer time after decontamination, if dry or only partially wetted asbestos material was encountered during any abatement work.

F. Dismantling the System:

1. When a final inspection and the results of final air tests indicate that the area has been decontaminated, fan units may be removed from the Work Area. Before removal from the Work Area, remove and properly dispose of pre-filter, decontaminate exterior of machine and seal intake to the machine with 6 mil (0.15 mm) polyethylene to prevent environmental contamination from the filters.

END OF SECTION – 02 80 41

SECTION 02 80 42 - TEMPORARY ENCLOSURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. **Drawings and general provisions of the Contract**, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to work of this section.

1.2 SUBMITTALS:

A. **Before Start of Work** submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal is returned for unrestricted use.

1. Strippable Coatings: Submit following:
- a. Product description including major components and solvents.
- b. Test report on ASTM E84 test of surface burning characteristics.
- c. Manufacturer's installation instructions. Indicate portions applicable to the project and selected assemblies where the manufacturer offers alternatives.

2. Spray Cement: Submit following:
- a. Product description including major components and solvents.
- b. Manufacturer's installation instructions. Indicate portions applicable to the project.

3. Sheet Plastic: For fire retardant plastic submit test reports on NFPA 701 test.

4. Signs: Submit samples of signs to be used.

B. **Before Start of Work** submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal has been' "Received - Not Reviewed."

1. Material Safety Data Sheet: Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for the following:
- a. Strippable Coating.
- b. Spray Cement.

PART 2 - PRODUCTS

2.1 SHEET PLASTIC:

A. **Polyethylene Sheet:** A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mil (0.15 mm) thick, clear, frosted, or black as indicated.

B. Polyethylene Sheet: Provide flame-resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-Resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick frosted or black as indicated.

C. Reinforced Polyethylene Sheet: Where plastic sheet constitutes the only barrier between the work area and the building exterior, provide translucent, nylon reinforced or woven polyethylene, laminated, flame-resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick, frosted or black as indicated.

2.2 STRIPPABLE COATINGS:

A. Strippable Coatings: Provide strippable coatings in aerosol cans or premixed for spray application formulated to adhere gently to surfaces and remove cleanly by peeling off at the completion of the work.

1. Provide only water-based latex materials.
2. Provide materials manufactured for the specific application required.

B. Wall coating: designed to be easy to remove.

C. Floor coating: designed to provide a tough film which resists spread of water beneath plastic layer.

D. Window coating: recommended by the manufacturer for use on windows. Supply materials that are designed to be stable on glass in sunlight and resist the transmission of ultraviolet radiation.

E. Fire Safety: Provide materials that meet the following requirements:

1. When wet or while being installed:
   a. Do not create combustible vapors
   b. Have no flash point
   c. Are not noxious
   d. Department of Transportation category of non-flammable.

2. When dry, material must have a Class A rating as a building material and meet the following requirements when tested in accordance with ASTM E-84:
   a. Flame Spread no greater than 20
   b. Fuel Contributed 0
   c. Smoke Developed no more than 110

F. Deliver materials to the job site in unopened, factory-labeled containers.

G. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

H. **Manufacturer:** Subject to compliance with requirements, provide products of one of the Following:

1. Isotek Corporation — Spray Poly
P.O. Box 29799
New Orleans, LA 70189-0799
(504)367-9856

2. H.B. Fuller Co. — Spray Poly
3900 Jackson St., NE — Part no. 3256
Minneapolis, MN 55421
(800) 328-4594

2.3 MISCELLANEOUS MATERIALS:

A. **Duct Tape:** Provide duct tape in 2 inch or 3-inch (50 mm or 75 mm) widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

B. **Spray Cement:** Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

PART 3 - EXECUTION

3.1 SEQUENCE OF WORK:

A. **Carry out work of this section sequentially.** Complete each of the following activities in accordance with requirements before proceeding to the next.
1. Provide emergency exits and emergency lighting.
2. Control access
3. Provide respiratory and worker protection.
4. Provide Critical Barriers.
5. Prepare Area.
6. Provide Primary Barriers.
7. Provide Isolation Areas as required.
8. Provide Secondary Barrier.

3.2 GENERAL:

A. **Work Area:** the location where asbestos abatement work occurs. The Work Area is a variable of the extent of work of the Contract. It may be a portion of a room, a single room, or a complex of rooms. A "Work Area" is considered contaminated during the work, and must be isolated from the balance of the building, and decontaminated at the completion of the asbestos control work.

B. **Completely isolate the Work Area** from other parts of the building so as to prevent asbestos-containing dust or debris from passing beyond the isolated area. Should the area beyond the Work Area(s) become contaminated with asbestos-containing dust or debris as a consequence of the work, clean those areas in accordance with the procedures indicated in Section “Project Decontamination”. Perform all such required cleaning or decontamination at no additional cost to owner.

C. Construct enclosures to provide an air-tight seal around ducts and openings into existing ventilation systems and around penetrations for electrical conduits, telephone wires, water lines, drain pipes, etc. Construct enclosures to be both airtight and watertight except for those openings designed to provide entry and/or air flow control.

D. **Size:** Construct enclosure with sufficient volume to encompass all of the working surfaces yet allow unencumbered movement by the worker(s), provide unrestricted air flow past the worker(s), and ensure walking surfaces can be kept free of tripping hazards.

E. **Shape:** The enclosure may be any shape that optimizes the flow of ventilation air past the worker(s).

F. **Structural Integrity:** The walls, ceilings and floors must be supported in such a manner that portions of the enclosure will not fall down during normal use.

G. **Barrier Supports:** Provide frames as necessary to support all unsupported spans of sheeting.

H. **Openings:** It is not necessary that the structure be airtight; openings may be designed to direct air flow. Such openings are to be located at a distance from active removal operations. They are to be designed to draw air into the enclosure under all anticipated circumstances. In the event that negative pressure is lost, they are to be fitted with either HEPA filters to trap dust or automatic trap doors that prevent dust from escaping the enclosure. Openings for exits are to be controlled by an airlock or a vestibule.

I. **Place all tools**, scaffolding, staging, etc. necessary for the work in the area to be isolated prior to completion of Work Area isolation.

J. **Areas Within an Enclosure:** Each enclosure consists of a work area, a decontamination area, and waste storage area. The work area where the asbestos removal operations occur are to be separated from both the waste storage area and the contamination control area by physical curtains, doors, and/or airflow patterns that force any airborne contamination back into the work area. Unless infeasible, the Contractor shall construct each building's containment system to enclose all of the building's respective asbestos abatement work that requires Work of This Section.

K. **Removing Mobile Objects:** Clean movable objects and remove them from the work area before an enclosure is constructed unless moving the objects creates a hazard. Mobile objects will be assumed to be asbestos contaminated and are to be either cleaned with amended water and a HEPA vacuum and then removed from the area or wrapped and then disposed of as asbestos-contaminated waste.

L. **Disabling HVAC Systems:** The power to the heating, ventilation, and air conditioning systems that service the regulated area must be deactivated and locked out. All ducts, grills, access ports, windows and vents must be sealed off with two layers of plastic to prevent entrainment of contaminated air.

M. **Operating HVAC Systems in the regulated Area:** If components of a HVAC system located in the regulated area are connected to a system that will service another zone during the project, the portion of the duct in the regulated area must be sealed and pressurized. Necessary precautions include caulking the duct joints, covering all cracks and openings with two layers of sheeting, and pressurizing the duct throughout the duration of the project by restricting the return air flow. The power to the fan supplying the positive pressure should be locked "on" to prevent pressure loss.

1. If fan providing positive pressure fails for any reason, immediately stop asbestos removal work, mist the area to reduce airborne fiber levels. Notify the Project Administrator. Do not re-start asbestos removal work until authorized by the Designer.

N. **Lockout power to Work Area** by switching off all breakers serving power or lighting circuits in work area. A lock and tag shall be placed on each breaker used to de-energize circuits and equipment with notation "DANGER circuit being worked on". Lock panel and have all keys under control of authorized person who has applied the locks.

O. **Lockout power** to circuits running through work area wherever possible by switching off all breakers or removing fuses serving these circuits. Label breakers with tape over breaker with notation "DANGER circuit being worked on". Lock panel and have all keys under control of authorized person who applied locks. If circuits cannot be shut down for any reason, label at intervals 4 feet (1.22 m) on center with signs reading, "DANGER live electric circuit. Electrocution hazard." Label circuits in hidden locations but which may be affected by the work in a similar manner.

P. **Inspection Windows:** Install inspection windows in locations shown on the plans or as directed by the Designer. Each inspection window is to have a 24-inch X 24-inch (610 X 610 mm) viewing area fabricated from 1/4-inch (6.35 mm) acrylic or polycarbonate sheet. Install window with top at 6 feet-6 inches (1.98 m) above floor height in a manner that provides unobstructed vision from outside to inside of the Work Area. Protect window from damage from scratching, dirt or any coatings used during the work. A sufficient number of windows are to be installed to provide observation of all portions of the Work Area that can be made visible from adjacent areas. Inspection windows that open into uncontrolled area are to be covered with a removable plywood hatch secured by lock and key. Provide keys to Designer for all such locks.

3.3 EMERGENCY EXITS:

A. **Provide emergency exits and emergency lighting** as set forth below:

1. Emergency Exits: At each existing exit door from the Work Area provide the following means for emergency exiting:

2. Arrange exit door so that it is secure from outside the Work area but permits exiting from the Work Area.

3. Mark outline of door on Primary and Critical Barriers with luminescent paint at least 1 inch (25.4 mm) wide. Hang a razor knife on a string beside outline. Arrange Critical and Primary barriers so that they can be easily cut with one pass of razor knife. Paint words "EMERGENCY EXIT" inside outline with luminescent paint in letters at least one foot high and 2 inches (50.8 mm) wide.

4. Provide lighted EXIT sign at each exit.

5. Provide battery-operated emergency lighting that switches on automatically in the event of a power failure.

3.4 CONTROL ACCESS:

A. **Isolate the Work Area** to prevent entry by building occupants into Work Area or surrounding controlled areas. Accomplish isolation by the following:

1. Submit to Designer a list of doors and other openings that must be secured to isolate Work Area. Include on list notation if door or opening is in an indicated exit route.

2. After receiving written authorization from the Designer lock all doors into Work Area, or, if doors cannot be locked, chain shut. Notify the local fire department of the list of doors/or other openings which must be chained or otherwise secured shut. Cover any signs that direct emergency exiting, either outside or inside of Work Area, to locked doors. Do not obstruct doors required for emergency exits from Work Area or from building.

3. After receiving written authorization from the Designer, construct partitions or closures across any opening into Work Area. Partitions are to be a minimum of 8 feet (2.44 meters) high.

4. Fabricate partitions from 3-5/8-inch (9.21 cm), 25 gage metal studs with ½ inch (1.27 cm) gypsum board on both faces. Brace at intervals of 4 feet (1.22 m) on center.

5. Fabricate partitions from 2-inch X 4-inch (50.8mm X 101.6mm) wood studs with ½ inch (1.27 cm) plywood on both faces. Brace at intervals of 4 feet (1.25 m) on center.

6. Fabricate partitions from 2-inch X 4-inch (50.8 mm X 101.6 mm) wood studs with ½ inch (1.27 cm) plywood on both faces. Brace at intervals of 4 feet (1.22 m) on center. Use only fire-retardant treated wood.

7. Fabric-type folding partitions: provide temporary partitions across fabric-type folding doors or partitions into Work Area.

8. Rigid-type folding partitions: remove operating bar and latch on clean side of folding partitions. Fasten down operating lever with hook and chain or other secure device on Work Area side. At completion of all abatement work reinstall bar and latch and adjust for proper operation.

9. Modify elevator controls to prevent elevators from stopping at doors in Work Areas. This work is to be performed by a qualified elevator technician.

10. Replace passage sets on doors required for exiting from Work Area with temporary locksets for duration of the project. Use entry type locksets that are key lockable from one side and always operable from inside. Install locksets with key side in stair tower and escape side on Work Area side. Provide one key to Owner and maintain one key in clean room of decontamination unit. After meeting Contractor release criteria set forth in Section "Project Decontamination", reinstall original passage sets and adjust for proper operation.

B. Locked Access: Arrange Work Area so that the only access into Work Area is through lockable doors to personnel and equipment decontamination units.

1. Install temporary doors with entrance type locksets that are key lockable from the outside and always unlocked and operable from the inside. Do not use deadbolts or padlocks.

2. Replace locksets or passage sets on doors leading to decontamination units with temporary locksets for duration of the project. Remove any deadbolts or padlocks. Use entry type locksets that are key lockable from outside and always unlocked and operable from inside. After meeting contractor release criteria set forth in Section "Project Decontamination" reinstall original locks, passage sets and locksets and adjust for proper operation.

3. Provide one key for each door to Owner, and Designer and maintain one key in clean room of decontamination unit (3 total).

C. Visual Barrier: Where the Work Area is immediately adjacent to or within view of occupied areas, provide a visual barrier of opaque polyethylene sheeting at least 6 mil (0.15 mm) in thickness so that the work procedures are not visible to building occupants. Where this visual barrier would block natural light, substitute frosted or woven rip-stop sheet plastic in locations approved by the Designer.

D. Demarcation. Demarcate the regulated area in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne concentrations of asbestos. Where critical barriers or negative pressure enclosures are used, they may demarcate the regulated area.

E. Access. Limit access to regulated areas to authorized persons as defined by OSHA, and to the Owner, Designer, Project Administrator or a representative authorized by one of these entities.

F. **Provide Warning Signs** at each locked door leading to Work Area reading as follows:

1. Print text in both English and Spanish

Legend	**Notation**
KEEP OUT	3 inch (77 mm) Sans Serif Gothic or Block
BEYOND THIS POINT	1 inch (25.4 mm) Sans Serif Gothic or Block
ASBESTOS ABATEMENT WORK	1 inch (25.4 mm) Sans Serif Gothic or Block
IN PROGRESS	1 inch (25.4 mm) Sans Serif Gothic or Block
BREATHING ASBESTOS DUST MAY BE HAZARDOUS TO YOUR HEALTH	14 Point Gothic

2. Provide Warning Signs at each locked door leading to Work Area reading as follows

Legend	**Notation**
KEEP OUT	3 inch (77 mm) Sans Serif Gothic or Block
CONSTRUCTION	1 inch (25.4 mm) Sans Serif Gothic or Block
WORK AREA	1 inch (25.4 mm) Sans Serif Gothic or Block
PROTECTIVE CLOTHING REQUIRED BEYOND THIS POINT	14 Point Gothic

3. Immediately inside door and outside critical barriers post an approximately 20 inches by 14 inch (508 mm X 356 mm) manufactured caution sign displaying the following legend with letter sizes and styles of a visibility required by 29 CFR 1926:

Legend
DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

4. Provide spacing between respective lines at least equal to the height of the respective upper line.

3.5 ALTERNATE METHODS OF ENCLOSURE:

A. **Alternate methods** of containing the Work Area may be submitted to the Designer for approval in accordance with procedures set forth in Section “Substitutions”. Do not proceed with any such method(s) without prior written approval of the Designer.

B. **Notification:** Before work which involves the removal of more than 25 linear or 10 square feet (7.5 linear meters or 3 square meters) of thermal system insulation or surfacing material is begun using an alternative method which has been the subject of required evaluation and certification. Send a copy of such evaluation and certification to the national office of OSHA, Office of Technical Support, Room N3653, 200 Constitution Avenue, NW, Washington, DC 20210 and to the Designer.

C. **Use a control method** that encloses, contains or isolates the processes or source of airborne asbestos dust, or otherwise captures or redirects such dust before it enters the breathing zone of employees.

D. **Certification:** Submit a certification from a certified industrial hygienist (CIH) or licensed professional engineer who is also qualified as a project designer, who has evaluated the work area, the projected work practices and the engineering controls and who certifies in writing that the planned control method is adequate to reduce direct and indirect employee exposure to below the PELs and any requirements of Section "Respiratory Protection" under worst-case conditions of use, and that the planned control method will prevent asbestos contamination outside the regulated area, as measured by clearance sampling which meets the requirements of EPA's Asbestos in Schools rule issued under AHERA, or perimeter monitoring which meets the criteria of OSHA 1926.1101, and as determined in accordance with the portion of Section "Summary of Work - Asbestos Abatement" that describes the Owner's monitoring of the project.

3.6 RESPIRATORY AND WORKER PROTECTION:

A. **Before proceeding** beyond this point in providing Temporary Enclosures:
1. Provide Worker Protection
2. Provide Respiratory Protection
3. Provide Personnel Decontamination Unit

3.7 CRITICAL BARRIERS:

A. **Completely Separate** the Work Area from other portions of the building, and the outside by closing all openings with sheet plastic barriers at least 6 mil (0.15 mm) in thickness, or by sealing cracks leading out of Work Area with duct tape.

B. **Individually seal** all ventilation openings (supply and exhaust), lighting fixtures, clocks, doorways, windows, convectors and speakers, and other openings into the Work Area with duct tape alone or with polyethylene sheeting at least 6 mil (0.15 mm) in thickness, taped securely in place with duct tape. Maintain seal until all work including Project Decontamination is completed. Take care in sealing of lighting fixtures to avoid melting or burning of sheeting.

C. **Provide Sheet Plastic** barriers at least 6 mil (0.15 mm) in thickness as required to seal openings completely from the Work Area into adjacent areas. Seal the perimeter of all sheet plastic barriers with duct tape or spray cement.

D. **Mechanically Support** sheet plastic independently of duct tape or spray cement seals so that seals do not support the weight of the plastic. Following are acceptable methods of supporting sheet plastic barriers. Alternative support methods may be used if approved in writing by the Designer.

1. Plywood squares 6-inch x 6-inch x 3/8 inch (152 mm x 152 mm x 9.53mm) held in place with one 6d smooth masonry nail or electro-galvanized common nail driven through center of the plywood and duct tape on plastic so that plywood clamps plastic to the wall. Locate plywood squares at each end, corner and at maximum 4 feet (1.22 m) on centers.

2. Nylon or polypropylene rope or wire with a maximum unsupported span of 10 feet (3.05 m), minimum 1/4 inch (6.35 mm) in diameter suspended between supports securely fastened on either side of opening at maximum 1 foot (304.8 mm) below ceiling. Tighten rope so that it has 2 inches (50.8 mm) maximum dip. Drape plastic over rope from outside Work Area so that a two-foot-long flap of plastic extends over rope into Work Area. Staple or wire plastic to itself 1 inch (25.4 mm) below rope at maximum 6 inches (152 mm) on centers to form a sheath over rope. Lift flap and seal to ceiling with duct tape or spray cement. Seal loop at bottom of flap with duct tape. Erect entire assembly so that it hangs vertically without a "shelf" upon which debris could collect.

E. **Provide Pressure Differential System** per Section “Temporary Pressure Differential & Air Circulation System”.

1. Clean housings and ducts of all overspray materials prior to erection of any Critical Barrier that will restrict access.

3.8 PREPARE AREA:

A. **Scaffolding:** If fixed scaffolding is to be used to provide access HEPA vacuum and wet clean area prior to scaffolding installation.

B. **Remove all electrical and mechanical items**, such as lighting fixtures, clocks, diffusers, registers, escutcheon plates, etc. which cover any part of the surface to be worked on with the work.

C. **Remove all general construction items** such as cabinets, casework, door and window trim, moldings, ceilings, trim, etc., which cover the surface of the work as required to prevent interference with the work. Clean, decontaminate and reinstall all such materials, upon completion of all removal work with materials, finishes, and workmanship to match existing installations before start of work.

D. **Clean all contaminated furniture**, equipment, and or supplies with a HEPA filtered vacuum cleaner or by wet cleaning, as specified in Section “Project Decontamination”, prior to being moved or covered. All equipment furniture, etc. is to be deemed contaminated unless specifically declared as uncontaminated on the drawings or in writing by the Designer.

E. **Clean All Surfaces in Work Area** with a HEPA filtered vacuum or by wet wiping prior to the installation of primary barrier.

F. **Cleaning and Sealing Surfaces:** After cleaning with water and a HEPA vacuum, surfaces of stationary objects should be covered with two layers of plastic sheeting. The sheeting should be secured with duct tape or an equivalent method to provide a tight seal around the object.

3.9 PRIMARY BARRIER:

A. **Protect building and other surfaces** in the Work Area from damage from water and high humidity or from contamination from asbestos-containing debris, slurry or high airborne fiber levels.

1. Strippable Coating: If strippable coating is used, perform all work in strict compliance with manufacturer's instructions. Carry out work in the following sequence.

a. Inspect: Before start of coating work inspect all surfaces to be coated. Report on any surfaces that may be damaged by the material or any condition that may interfere with adhesion of the coating to a surface to the Designer before application of coating.

b. Photograph or videotape existing damage to affected surfaces and submit documentation to Designer.

c. Test Patches: Apply test patches as directed by Owner or Designer. Apply a small area of strippable coating to a hidden or obscure area of each surface in the Work Area to be coated. Allow to dry and peel off. Demonstrate results to Designer prior to coating entire area. Commence coating of area only after receiving written authorization from the Designer.

d. Cover surfaces and equipment in work are from which coating may not strip cleanly.

e. Cover shelving, clocks, light fixtures and other equipment with one layer of 6 mil (0.15 mm) sheet plastic.

f. Cover fabric, paper, cork wall coverings or unpainted gypsum board with one layer of 6 mil (0.15 mm) sheet plastic.

g. Tape over any cracks that are larger than 1/16 inch (1.59 mm).

h. Tape over electrical outlets, switches, door locks etc.

i. Wood paneling in area may have the finish partially removed by the strippable coating. These surfaces are to be coated directly with strippable coating and are not to be covered with sheet plastic. Refinishing of this paneling will be accomplished by the Owner and is not a part of the work of this contract.

1) Cover wood paneling in Work Area with one layer of 6 mil (0.15 mm) sheet plastic.

2) Apply small area of coating in concealed location to wood finishes in Work Area. If finish is removed when coating is stripped inform Designer. Cover wood surface with one layer of 6 mil (0.15 mm) sheet plastic unless otherwise notified by Designer.

3) Base bid is for direct coating of wood paneling.

4) If a layer of sheet plastic is necessary this will be a change to the Contract Sum. Submit proposal for change in Contract Sum for the addition of sheet plastic to the Designer.

j. Cover carpeting with three (3) layers of polyethylene sheeting at least 6 mil (0.15 mm) in thickness. Place corrugated cardboard sheets between the top and middle layers of polyethylene.

k. Do not use strippable coating as an adhesive to hold sheet plastic in place.

l. Coat or cover windows into Work Area:

1) Coat windows with window coating applied in a minimum 10 mil (0.254 mm) thickness when wet.

m. Protect critical barriers: Install strippable coating so that it will not remove critical barriers during stripping of coating. Cover critical barriers comprised of sheet plastic with a second layer of sheet plastic configured to be removed with strippable coating. Protect critical barriers made from tape with a protective layer of sheet plastic or duct tape.

n. Coat all surfaces in Work Area with strippable coating in following order.

1) Walls: Coat seams, corners, and junctions vertically. Coat balance of walls horizontally lapping over vertical sprayed areas by 50%.

2) Floor: Coat floor lapping wall by 12 inches (305mm). Start at point furthest from entrance to Work Area and work toward door.

3) Use straight edge to shield ACM from coating during spray application.

o. Apply: to a minimum of the following thicknesses. Thickness is to be measured when material is wet using a wet film thickness gauge.

SURFACE TO BE COATED	MINIMUM THICKNESS WHEN WET	REQUIRED COATING TYPE
Critical Barriers	Not Applicable	Sheet Plastic Covers
Glass	10 mil (0.254 mm)	Window Coating
Plastic Over Glass	2 mil (0.051 mm)	Wall Coating
Paneling Painted Walls, Wall Covering	12 mil (0.305 mm)	Wall Coating
Glazed Tile Smoothly Painted Brick, Painted Concrete Block	15 mil (0.381 mm)	Wall Coating
Floors	15 mil (0.381 mm)	Floor Coating
Unpainted Brick Unpainted Concrete Block, Rough Wood	20 mil (0.51 mm)	Wall Coating

1) Coat brick and concrete block with a sufficient thickness of coating to obscure color of substrate completely.
2) Do not apply over tacky or chalky adhesives remaining from carpet or other flooring covering removal.

p. Respiratory protection: Require that all workers in Work Area from start of spray operation until all surfaces are dry use as a minimum requirement a half-face negative pressure respirator equipped with combination ammonia and HEPA type filter cartridges or other appropriate respiratory protection as required by OSHA 29 CFR 1926.1101(h)(2) and as specified in Section "Respiratory Protection".

q. Worker protection: Equip all workers in Work Area during spray operation with eye protection, disposable gloves, and disposable paper suits.

r. Ventilation: during spraying operation maintain a minimum of 4 air changes per hour in the entire Work Area. Operate one additional HEPA filtered fan unit per spray operator in area while spraying is taking place.

2. Sealing Elevators: If an elevator shaft is located in the regulated area, it should be either shut down or isolated by sealing with two layers of plastic sheeting. The sheeting should provide enough slack to accommodate the pressure changes in the shaft without breaking the air-tight seal.

3. Elevator: Protect walls, floor and ceiling of elevator to prevent contamination. Arrange entry to Work Area so that elevator door is in a positively pressurized space outside the clean room of the decontamination unit. At completion of work clean elevator as set forth in Section "Project Decontamination". Refer to Section "Summary of the Work" for additional requirements for protection of elevator.

4. Sheet Plastic: Protect surfaces in the Work Area with two (2) layers of plastic sheeting on floor and walls, or as otherwise directed on the Contract Drawings or in writing by the Designer. Perform work in the following sequence.

a. All seams in the sheeting should overlap, be staggered and not be located at corners or wall-to-floor joints.

b. Unless work includes floor tile/mastic removal, cover floor of Work Area with 2 individual layers of clear polyethylene sheeting, each at least 6 mil (0.15 mm) in thickness, turned up walls at least 12 inches (305 mm). Form a sharp right-angle bend at junction of floor and wall so that there is no radius which could be stepped on causing the wall attachment to be pulled loose. Both spray-glue and duct tape all seams in floor covering. Locate seams in top layer six feet from, or at right angles to, seams in bottom layer. Install sheeting so that top layer can be removed independently of bottom layer.

c. Unless work includes removal of carpeting and floor tile/mastic, cover carpeting with three (3) layers of polyethylene sheeting at least 6 mil (0.15 mm) in thickness. Place corrugated cardboard sheets between the top and middle layers of polyethylene.

d. Cover Sheet Plastic in areas where scaffolding is to be used with a single layer of ½ inch (13 mm) CDX plywood or 1/4 inch (6.5 mm) tempered hardboard. Wrap edges and corners of each sheet with duct tape. At completion of abatement work wrap plywood or hardboard with 2 layers of 6 mil (0.15 mm) polyethylene and move to next Work Area or dispose of as an asbestos-contaminated waste material in accordance with section “Disposal of Regulated Asbestos Containing Materials”.

e. Cover all walls in Work Area including "Critical Barrier" sheet plastic barriers with one layer of polyethylene sheeting, at least 6 mil (0.15 mm) in thickness, mechanically supported and sealed with duct tape or spray-glue in the same manner as "Critical Barrier" sheet plastic barriers. Tape all joints including the joining with the floor covering with duct tape or as otherwise indicated on the Contract Documents or in writing by the Designer.

f. Elevator: Cover walls, floor and ceiling of elevator with 2 layers of 6 mil (0.15 mm) polyethylene. Arrange entry to Work Area so that elevator door is in a positively pressurized space outside the clean room of the decontamination unit. At completion of work clean elevator as set forth in Section “Project Decontamination”. Refer to Section “Summary of the Work” for additional requirements for protection of elevator.

g. Stairs and Ramps: Do not cover stairs or ramps with unsecured sheet plastic. Where stairs or ramps are covered with plastic, provide 3/4 inch (19.1 mm) exterior grade plywood treads securely held in place, over plastic. Do not cover rungs or rails with any type of protective materials.

h. Repair of Damaged Polyethylene Sheeting: Remove and replace plastic sheeting which has been damaged by removal operations or where seal has failed allowing water to seep between layers. Remove affected sheeting and wipe down entire area. Install new sheet plastic only when area is completely dry.

3.10 ISOLATION AREA:

A. **Maintain isolation areas** between the Work Area and adjacent building area:

1. In locations shown on the plans.
2. In unoccupied rooms located between Work Area and adjacent occupied portions of the building.
3. In locations where separation between Work Area and occupied portions of building is formed by sheet plastic and/or temporary barriers.
4. Floor below Work Area.

B. **Form isolation area** by controlling access to the space in the same manner as a Work Area. Physically isolate the space from the Work Area and adjacent areas. Accomplish physical isolation by:

1. Installing critical barriers in unoccupied space.
2. Erecting a second Critical Barrier a minimum of 3 feet (1.0 m) away from Work Area.

3.11 STOP WORK:

A. **If the Critical or Primary barrier falls** or is breached in any manner stop asbestos removal work immediately and comply with "Stop Work" requirements of Section "Summary of Work - Asbestos Abatement". Do not start work until authorized in writing by the Designer.

3.12 EXTENSION OF WORK AREA:

A. **Extension of Work Area:** If the Critical Barrier is breached in any manner that could allow the passage of asbestos debris or airborne fibers, then add affected area to the Work Area, enclose it as required by this Section of the specification and decontaminate it as described in Section "Project Decontamination".

3.13 SECONDARY BARRIER:

A. **Secondary layer** of plastic as a drop cloth to protect the primary layer from debris generated by the asbestos abatement work is specified in the appropriate work sections.

3.14 EXTERIOR ENCLOSURES:

A. **Construct exterior enclosures** as a Critical Barrier as necessary to completely enclose the work. Fabricate from reinforced polyethylene sheeting and 2-inch x 4-inch (51mm X 102 mm) wood framework. Attach to existing building components or brace as necessary for lateral stability. Construct walls to meet all state and local regulations for construction of temporary buildings. Construct to resist a wind of 30 MPH (13.41 m/s), slope ceiling to permit drainage of rain water.

END OF SECTION – 02 80 42

SECTION 02 80 43 - REGULATED AREAS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. **Drawings and general provisions of Contract**, including General and Supplementary Conditions and other Division-2 Specification Sections, apply to work of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

A. **Worker Protection:** is specified in Section "Worker Protection – Asbestos Abatement".
B. **Respiratory Protection:** is specified in Section "Respiratory Protection"
C. **Wet Decontamination Facilities:** are described in Section "Decontamination Units."

1.3 DESCRIPTION OF WORK:

A. Work of this section consists of preparing a Regulated Area for the work.

1.4 SUBMITTALS

A. **Before the Start of Work:** Submit the following to the Designer for review. Begin no work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use.

1. HEPA Filtered Vacuum Cleaners: Submit product data.
2. Signs: Submit samples of each type of sign to be used.
3. Warning Tape: Submit samples.

PART 2 - EQUIPMENT

2.1 PRODUCTS

A. **HEPA Filter Vacuum Cleaners:**

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

2. Manufacturer: Subject to compliance with requirements, provide products of one of the following:

Nilfisk of America, Inc. 225 Great Valley Parkway Malvern, PA 19355 (800) 645-3475	HEPA filtered Vacuums

Minuteman International 111 South Route 53 Addison, IL 60101 (708) 627-6900	Minuteman HEPA Vacuums
Pullman-Holt (White) Corp. PO Box 16647 Tampa, FL 33617 (813) 645-3475	HEPA Filtered Vacuums

B. Plastic Sheet:

1. Plastic Sheet: A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mil (0.15 mm) thick, clear, frosted, or black as indicated.

PART 3 - EXECUTION

3.1 SECURING WORK AREA:

A. **Secure work** area from access by occupants, staff or users of the building. Accomplish this where possible, by locking doors, windows, or other means of access to the area, by scheduling work for periods of time that the building in unoccupied, or by constructing temporary wood stud and plywood barriers.

3.2 DEMARCATION OF REGULATED AREA:

A. **Demarcation.** Demarcate the Regulated Area with a sheet plastic drop cloth, signs and barrier tape. Configure the regulated area in a manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne concentrations of asbestos.

1. Drop Cloth: Cover floor in vicinity of Work Area and six (6) feet (1.82 meters) beyond, with 6 mil (0.15 mm) polyethylene drop sheet. Where work is adjacent to wall, extend drop sheet up wall and secure at ceiling with duct tape. This drop sheet demarcates the boundary of the Regulated Area.

2. Signs: Post warning signs that carry the following legends in both English and Spanish:

a. First Sign: Provide warning signs at each locked door leading to the controlled area reading as follows:

Legend	**Notation**
KEEP OUT	3 inch (76.2 mm) Block

b. Second Sign: Immediately inside the locked door and outside the controlled area post an approximately 20 inch by 14 inch (508 mm x 356 mm) manufactured caution sign displaying the following legend with letter sizes and styles of a visibility required by 29 CFR 1926:

Legend:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

3. Barrier Tape: Where the controlled area is in a large area such as on part of a boiler room or open office area, delineate area with 3 inch (76.2 mm) wide polyethylene ribbon with the printed warning, "CAUTION ASBESTOS REMOVAL". Install this ribbon at between 3 and 4 feet (0.91 and 1.22 meters) above the floor.

3.3 SCHEDULING:

A. **Work may be carried out** during normal working hours in those areas which can be completely secured by lockable doors from access by building occupants and staff, and which have HVAC equipment that can be shut down and locked off. Otherwise, work is to be carried out after building occupants and cleaning staff have left.

3.4 GENERAL PROCEDURES:

A. **The following precautions and procedures** have application to work of this section. Workers must exercise caution to avoid release of asbestos fibers into the air:

1. Setup and management of the controlled area is to be under the supervision of a OSHA Competent Person as described in Section “Project Coordination - Asbestos Abatement”.

2. Before start of work comply with requirement for in Sections “Worker Protection”, and “Respiratory Protection”.

3. Do not allow eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics in the Regulated Area.

4. Shut down any air handling equipment bringing air into or out of the Regulated Area.

5. Clean any existing dust or debris from the floor and walls, and other surface in the immediate location of the work prior to commencing work by damp-mopping or by use of a High Efficiency Particulate Air (HEPA) filtered vacuum.

6. Cover floor in vicinity of Work Area and six (6) feet (1.82 meters) beyond, with 6 mil (0.15 mm) polyethylene drop sheet. Where work is adjacent to wall, extend drop sheet up wall and secure at ceiling with duct tape. This drop sheet demarcates the boundary of the Regulated Area.

7. Seal all openings, supply and exhaust vents, and convectors within ten (10) feet (3.05 meters) of the Work Area with 6 mil (0.15 mm) polyethylene sheeting secured and completely sealed with duct tape.

8. Perform the work per the appropriate specification section.

9. Immediately remove any asbestos-containing debris by using a HEPA vacuum or by spraying with amended water or removal encapsulant, collecting with wet paper towels, placing in a disposal bag while still wet, and cleaning surfaces with wet paper towels.

10. Thoroughly decontaminate any tools or equipment used at completion of the work.

11. If work day is complete or if moving to another regulated area: all workers remove paper suits turning them inside out while doing so.

12. Place the suits in a properly labeled disposal bag. Adequately wet the suits.

13. Neck down the bag and collapse it with the HEPA vacuum.

14. Twist the bag shut, bend over and seal with duct tape by wrapping around bag neck at least 3 times.

15. Clean all surfaces of the Work Area by use of a HEPA filter vacuum until no visible residue remains.

B. **At completion of work** require all workers to complete decontamination procedures in accordance with Section “Worker Protection”.

C. **Remove respirators** using the procedure in Section “Worker Protection”.

D. **At completion of work** require all workers to complete wet decontamination procedures in accordance with Section “Worker Protection”.

END OF SECTION - 02 80 43

SECTION 02 80 44 - WORKER PROTECTION - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-2 Specification Sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

A. This section describes the equipment and procedures required for protecting workers against asbestos contamination and other workplace hazards except for respiratory protection.

1.3 RELATED WORK SPECIFIED ELSEWHERE:

A. **Respiratory Protection:** is specified in Section “Respiratory Protection”.

1.4 WORKER TRAINING:

A. **AHERA Accreditation:** All workers are to be accredited as Abatement Workers as required by the EPA Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).

B. **State and Local License:** All workers are to be trained, certified and accredited as required by state or local code or regulation.

C. **Training - Class I:** Train in accordance with 29 CFR 1926.1101. Provide training for all workers who will perform Class I operations that is the equivalent in curriculum, training method and length to the EPA Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).

D. **Training - Class II Intact (Non-Friable):** Provide training for workers who will be performing Class II work involving only the removal and/or disturbance of one generic category of building material, such as roofing materials, flooring materials, siding materials or cement asbestos panels; which includes as a minimum the specific work practices and engineering controls which specifically relate to that category. Provide a course that includes "hands-on" training and takes at least 8 hours. Provide training that includes the elements set forth in 29 CFR 1926.1101(k) and the Compliance Directive CPL 2-2.63.

E. **Training - Class II Non-Intact (Friable):** Provide training for workers who will be performing Class II work on materials that are friable, or will become friable during the work that is the equivalent in curriculum, training method and length to the EPA Interim Final Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).

1.5 MEDICAL SURVEILLANCE:

A. **Provide a medical surveillance program** for all employees who are:

1. Engaged in Class I, II and III work for a combined total of 30 or more days per year or,

a. For the purposes of this paragraph, any day in which a worker engages in Class II or Class III work or a combination thereof for one hour or less (taking into account the entire time spent on the removal operation, including cleanup) and, while doing so, adheres fully to the work practices specified in the OSHA standard (29 CFR 1926.1101) is not counted.

2. Are exposed at or above the permissible exposure limit or excursion limit or,

3. Before an employee can be assigned to work requiring use of a respirator.

B. **Provide a medical surveillance program** and physician's opinion before a respirator is assigned as required by 29 CFR 1910.134 and 29 CFR 1926.103(e)(10).

C. **Provide medical examination** that as a minimum meets OSHA requirements as set forth in 29 CFR 1926.1101. In addition, require that the physician provide an evaluation of the individual's ability to work in environments capable of producing heat stress in the worker.

1.6 SUBMITTALS:

A. **Before Start of Work:** Submit the following to the Designer for review. Do not start work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use.

1. **AHERA Accreditation:** Submit copies of certificates from an EPA-approved AHERA Abatement Workers course for each worker as evidence that each asbestos Abatement Worker is accredited as required by the EPA Interim Final Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).

2. **State and Local License:** Submit evidence that all workers have been trained, certified and accredited as required by state or local code or regulation.

3. **Certificate Worker Acknowledgment:** Submit an original signed copy of the Certificate of Worker's Acknowledgment found at the end of this section, for each worker who is to be at the job site or enter the Work Area.

4. **Report from Medical Examination:** conducted within last 12 months as part of compliance with OSHA medical surveillance requirements for each worker who is to enter the Work Area. Submit, at a minimum, for each worker the following:

a. Name and Social Security Number

b. The physician's written opinion as to whether the employee has any detected medical conditions that would place the employee at an increased risk of material health impairment from exposure to asbestos;

c. Any recommended limitations on the employee or on the use of personal protective equipment such as respirators; and

d. A statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.

e. A statement that the employee has been informed by the physician of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure (29 CFR 1926.1101(m)).

f. A legible typed version of the physician's name, the physician's signature, and date of examination.

4. **Notarized Certifications:** Submit certification signed by an officer of the abatement contracting firm and notarized that exposure measurements, medical surveillance, and worker training records are being kept in conformance with 29 CFR 1926.

PART 2 - EQUIPMENT

2.1 PROTECTIVE CLOTHING:

A. General. Provide and require the use of protective clothing, such as coveralls or similar whole-body clothing, head coverings, gloves, and foot coverings for any employee exposed to airborne concentrations of asbestos that exceed the TWA and/or excursion limit prescribed by 29 CFR 1926.1101 or for which a required negative exposure assessment is not produced, and for any employee performing Class I operations which involve the removal of over 25 linear or 10 square feet (7.5 linear meters or 3 square meters) of TSI or surfacing ACM or PACM.

B. Coveralls: Provide disposable full-body coveralls and disposable head covers, and require that they be worn by all workers in the Work Area. Provide a sufficient number for all required changes, for all workers in the Work Area.

C. Coveralls: Provide cloth full-body coveralls and hats, require that they be worn by all workers in the Work Area. Require that workers change out of coverall in the Equipment Room of the Personnel Decontamination Unit. Dispose of coverall as asbestos waste at completion of all work.

D. Additional Protective Clothing: Provide each worker with the protective clothing as required by Federal State and local regulations. This includes, but is not necessarily limited by Hardhats, Cold weather gear, Glove, boots and goggles.

E. **Cold Weather Gear:** Provide each worker with an insulated jacket, pants, gloves, and hat. Require that cold weather gear be removed in Equipment Room of Personnel Decontamination Unit. Dispose of cold weather gear as asbestos waste at completion of all work.

F. **Boots:** Provide work boots with non-skid soles, and where required by OSHA, foot protectives, for all workers. Provide boots at no cost to workers. Paint uppers of all boots red with waterproof enamel. Do not allow boots to be removed from the Work Area for any reason, after being contaminated with ACM. Dispose of boots as asbestos-contaminated waste at the end of the work.

G. **Hard Hats:** Provide head protectives (hard hats) as required by OSHA for all workers, and provide 4 spares for use by Designer, Project Administrator, and Owner. Label hats with same warning labels as used on disposal bags. Require hard hats to be worn at all times that work is in progress that may potentially cause head injury. Provide hard hats of type with plastic strap type suspension. Require hats to remain in the Work Area throughout the work. Thoroughly clean, decontaminate and bag hats before removing them from Work Area at the end of the work.

H. **Goggles:** Provide eye protection (goggles) as required by OSHA for all workers involved in scraping, spraying, or any other activity which may potentially cause eye injury. Thoroughly clean, decontaminate and bag goggles before removing them from Work Area at the end of the work.

I. **Gloves:** Provide work gloves to all workers and require that they be worn at all times in the Work Area. Do not remove gloves from Work Area and dispose of as asbestos-contaminated waste at the end of the work.

2.2 ADDITIONAL PROTECTIVE EQUIPMENT:

A. Disposable coveralls, head covers, and footwear covers shall be provided by the Contractor for the Owner, Designer, Project Administrator, and other authorized representatives who may inspect the job site. Provide six (6) complete coveralls per day.

PART 3 - EXECUTION

3.1 GENERAL:

A. Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work. The following procedures are minimums to be adhered to regardless of fiber count in the Work Area.

B. Each time Work Area is entered remove all street clothes in the Changing Room of the Personnel Decontamination Unit and put on new disposable coverall, new head cover, and a clean respirator. Proceed through shower room to equipment room and put on work boots.

3.2 DECONTAMINATION PROCEDURES:

A. Require all workers to adhere to the following personal decontamination procedures whenever they leave the Work Area:

1. Type C Supplied Air or Powered Air-Purifying Respirators: Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the Work Area:

    a. When exiting area, remove disposable coveralls, disposable head covers, and disposable footwear covers or boots in the equipment room.

    b. Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:

    c. Thoroughly wet body including hair and face. If using a Powered Air-Purifying Respirator (PAPR) hold blower unit above head to keep canisters dry.

    d. With respirator still in place thoroughly wash body, hair, respirator face piece, and all parts of the respirator except the blower unit and battery pack on a PAPR. Pay particular attention to seal between face and respirator and under straps.

    e. Take a deep breath, hold it and/or exhale slowly, completely wet hair, face, and respirator. While still holding breath, remove respirator and hold it away from face before starting to breathe.

    f. Carefully wash facepiece of respirator inside and out.

2. If using PAPR: shut down in the following sequence, first cap inlets to filter cartridges, then turn off blower unit (this sequence will help keep debris which has collected on the inlet side of filter from dislodging and contaminating the outside of the unit). Thoroughly wash blower unit and hoses. Carefully wash battery pack with wet rag. Be extremely cautious of getting water in battery pack as this will short out and destroy battery.

    a. Shower completely with soap and water.

    b. Rinse thoroughly.

    c. Rinse shower room walls and floor prior to exit.

    d. Proceed from shower to Changing Room and change into street clothes or into new disposable work items.

3. Air Purifying-Negative Pressure Respirators: Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the Work Area with a half or full-face cartridge type respirator:

    a. When exiting area, remove disposable coveralls, disposable head-covers, and disposable footwear covers or boots in the Equipment Room.

b. Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator and filters to avoid asbestos fibers while showering. The following procedure is required as a minimum:

c. Thoroughly wet body from neck down.

d. Wet hair as thoroughly as possible without wetting the respirator filter if using an air purifying type respirator.

e. Take a deep breath, hold it and/or exhale slowly, complete wetting of hair, thoroughly wetting face, respirator and filter (air purifying respirator). While still holding breath, remove respirator and hold it away from face before starting to breathe.

f. Dispose of wet filters from air purifying respirator.

g. Carefully wash facepiece of respirator inside and out.

h. Shower completely with soap and water.

i. Rinse thoroughly.

j. Rinse shower room walls and floor prior to exit.

k. Proceed from shower to Changing Room and change into street clothes or into new disposable work items.

B. Remote Shower: The procedures above are to be used if the decontamination facility is used as a remote shower. If a worker cannot gain direct access to the Equipment Room require that he enter Decontamination Unit and proceed directly through Shower Room to Equipment Room. Decontamination procedure is then completed as required above.

C. Within Work Area:

1. Require that workers NOT eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the Work Area. To eat, chew, drink or smoke, workers shall follow the procedure described above, then dress in street clothes before entering the non-Work Areas of the building.

3.3 CERTIFICATE OF WORKER'S ACKNOWLEDGEMENT:

Following this section is a Certificate of Worker Training. After each worker has been included in the Contractor's Respiratory Protection Program, completed the training program and medical examination, secure a fully executed copy of this form.

END OF SECTION - 02 80 44

CERTIFICATE OF WORKER'S ACKNOWLEDGEMENT

PROJECT NAME _____ DATE _____

PROJECT ADDRESS _____

CONTRACTOR'S NAME _____

WORKING WITH ASBESTOS CAN BE DANGEROUS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCER. IF YOU SMOKE AND INHALE ASBESTOS FIBERS THE CHANCE THAT YOU WILL DEVELOP LUNG CANCER IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.

Your employer's contract with the Owner for the above project requires that: You be supplied with the proper respirator and be trained in its use. You be trained in safe work practices and in the use of the equipment found on the job. You receive a medical examination. These things are to have been done at no cost to you.

RESPIRATORY PROTECTION: You must have been trained in the proper use of respirators, and informed of the type respirator to be used on the above referenced project. You must be given a copy of the written respiratory protection manual issued by your employer. You must be equipped at no cost with the respirator to be used on the above project.

TRAINING COURSE: You must have been trained in the dangers inherent in handling asbestos and breathing asbestos dust and in proper work procedures and personal and area protective measures. This training must have been the equivalent in curriculum, training method and length to the EPA Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR Part 763, Subpart E, Appendix C).

MEDICAL EXAMINATION: You must have had a medical examination within the past 12 months at no cost to you. This examination must have included: health history, pulmonary function tests and may have included an evaluation of a chest x-ray.

By signing this document you are acknowledging only that the Owner of the building you are about to work in has advised you of your rights to training and protection relative to your employer.

Signature _____ Social Security No _____

Printed Name _____ Witness _____

SECTION 02 80 45 - RESPIRATORY PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. **Drawings and general provisions of Contract**, including General and Supplementary Conditions and other Division-2 Specification Sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

A. **Instruct and train each worker** involved in asbestos abatement or maintenance and repair of friable asbestos-containing materials (ACM) in proper respiratory use and require that each worker always wear a respirator, properly fitted on the face in the Work Area from the start of any operation which may cause airborne asbestos fibers until the Work Area is completely decontaminated. Use respiratory protection appropriate for the fiber level encountered in the work place or as required for other toxic or oxygen-deficient situations encountered.

1.3 DEFINITIONS:

A. "Negative Pressure Respirator": A respirator in which the air pressure inside the respiratory-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.

B. "Protection Factor": The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.

C. "Respirator": A device designed to protect the wearer from the inhalation of harmful atmospheres.

1.4 STANDARDS:

A. **Except to the extent** that more stringent requirements are written directly into the Contract Documents, the latest edition of the following regulations and standards have the same force and effect (and are made a part of the Contract Documents by reference) as if copied directly into the Contract Documents, or as if published copies were bound herewith. Where there is a conflict in requirements set forth in these regulations and standards, meet the more stringent requirement.

1. **OSHA** - U.S. Department of Labor Occupational Safety and Health Administration, Safety and Health Standards Section 29 CFR 1910.1001, Section 1910.134, and Section 29 CFR 1926.1101.

2. **CGA** - Compressed Gas Association, Inc., New York, Pamphlet G-7, "Compressed Air for Human Respiration", and Specification G-7.1 "Commodity Specification for Air".

3. **CSA** - Canadian Standard Association, Rexdal, Ontario, Standard Z180.1, "Compressed Breathing Air".

4. **ANSI** - American National Standard Practices for Respiratory Protection, ANSI Z88.2.

5. **NIOSH** - National Institute for Occupational Safety and Health
   - NIOSH Respirator Decision Logic (May 1987) DHHS/NIOSH Publication No. 87-108;
   - NIOSH/EPA, "A Guide to Respiratory Protection for the Asbestos Abatement Industry" EPA-560-OPTS-86-001 (September 1986);
   - 42 CFR 84, NIOSH Standard for Certification of Non-Powered Air Purifying Respirator filters;
   - 30 CFR 11, NIOSH - Certification of Respirators

6. **MSHA** - Mine Safety and Health Administration

1.5 SUBMITTALS:

A. **Before Start of Work** submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal is returned for unrestricted use.

1. **Product Data:** Submit manufacturer's product information for each component used, including NIOSH and MSHA Certifications for each component in an assembly and/or for entire assembly.

2. **System Diagram:** When a supplied air respiratory system is required by the work, submit drawing showing assembly of components into a complete supplied air respiratory system. Include diagram showing location of compressor, filter banks, backup air supply tanks, hose line connections in Work Area(s), routing of air lines to Work Area(s) from compressor.

3. **Operating Instruction:** Submit complete operating and maintenance instructions for all components and systems as a whole. Submittal is to be in bound manual form suitable for field use.

4. **Respiratory Protection Program:** Submit Contractor's written respiratory protection program manual as required by OSHA 1926.1101.

5. **Initial Exposure Assessment**: Submit level of respiratory protection intended for each operation required by the project. Base this selection on an "Initial Exposure Assessment" as required by OSHA 29 CFR 1926.1101. Submit information to support this "Initial Exposure Assessment" on the form included at the end of this Section.
   a. Submit data from exposure monitoring for the PEL and EL from prior asbestos jobs within 12 months;

   b. Submit monitoring and analysis that were performed in compliance with the OSHA asbestos standard in effect;

c. Submit data that was obtained under workplace conditions "closely resembling" those that will exist during the Work;

d. Submit data from past asbestos jobs where the type of asbestos abatement and other work, material, control methods, work practices, and environmental conditions closely resemble those that will exist during the Work;

e. Submit exposure date from prior asbestos jobs where the work that was conducted by employees whose training and experience are no more extensive than that of employees performing the current job;

f. Based on the exposure data from the previous asbestos jobs, select respiratory protection for the Work that will, to a high degree of certainty, prevent worker exposures (inside the respirator) that exceed the Permissible Exposure Limits (PEL) set forth in this Section of the specifications.

6. **Resume information:** Submit resume and information on training for individual monitoring the operation of supplied air respiratory systems. Submit training certifications where applicable.

1.6 AIR QUALITY FOR SUPPLIED AIR RESPIRATORY SYSTEMS:

A. **Provide air** used for breathing in supplied air respiratory systems that meets or exceeds standards set for C.G.A. type 1 (Gaseous Air) Grade H or CSA Z180.1 whichever presents the more stringent quality standard:

1.7 ALLOWABLE CONTAMINANTS:

A. **Supply air** that has an asbestos concentration no greater than outside ambient conditions.

B. **Supply air** that meets the level of contaminants allowed according to the air quality standard specified.

C. **The table below** sets forth the quantity of any given contaminant allowed according to the referenced standards:

CONTAMINANT	CGA Type 1 (Gaseous Air) Grade D	Grade E	Grade H	CSA Z180.1
Carbon Monoxide, PPM/v	20	10	5	5
Carbon Dioxide, PPM/v	1000	500	500	500
Condensed Hydrocarbons, mg./cu. meter	5	5		1
Gaseous Hydrocarbons - as methane, PPM/v			10	25
Water Vapor - PPM/v dewpoint	(1) -50F	(1) -50F	(1) -50F	27 -63F
Objectionable Odors	None	None	None	None
Nitrogen Dioxide, PPM/v	—	—	0.5	0.2
Nitrous Oxide, PPM/v	—	—	—	5
Sulfur Dioxide, PPM/v	—	—	0.5	—
Halogenated solvents, PPM/v	—	—	1	—
Other gaseous contaminants	—	—	—	(2)
Inorganic particulates, mg./cu. meter	—	—	—	1

— Indicates that the standard shows no limiting characteristics

(1) The CGA standards do not indicate a specific moisture limit when the ambient temperature is above freezing. However, since a moisture content no greater than a -50 Degrees Fahrenheit (-45.56 Degrees Celsius) dewpoint (66 PPM/v) is necessary for carbon monoxide elimination, the CO limits could not be met unless the air were dried to a -50 Degrees Fahrenheit (-45.56 Degrees Celsius) dewpoint or better.

(2) Maximum allowable content of trichlorotrifluoroethane, dichlorodifluoromethane, and chlorodifluoromethane is 2 PPM/v for each. Unlisted contaminants shall not exceed one-tenth of the Threshold Limit Values (TLV's) for Chemical Substances in Workroom air adopted by the American Conference of Governmental Industrial Hygienists (ACGIH).

1.8 DELIVERY:

A. **Deliver replacement parts,** etc., not otherwise labeled by NIOSH or MSHA to job site in manufacturer's containers.

PART 2 - EQUIPMENT

2.1 AIR PURIFYING RESPIRATORS

A. **Respirator Bodies:** Provide half face or full face type respirators. Equip full face respirators with a nose cup or other anti-fogging device as would be appropriate for use in air temperatures less than 32 degrees Fahrenheit (0 degrees Celsius).

B. **Filter Cartridges:** Provide, at a minimum, HEPA type filters labeled with NIOSH and MSHA Certification for "Radionuclides, Radon Daughters, Dust, Fumes, Mists including Asbestos-Containing Dusts and Mists" and color coded in accordance with 42 CFR Part 84 and ANSI Z228.2. Also, additional cartridge sections may be added, if required, for solvents, etc., in use. In this case, provide cartridges that have each section of the combination canister labeled with the appropriate color code and NIOSH/MSHA Certification.

C. **Non-permitted respirators.** Do not use single use, disposable or quarter face respirators.

2.2 SUPPLIED AIR RESPIRATOR SYSTEMS:

A. **Provide equipment** capable of producing air of the quality and volume required by the above reference standards applied to the job site conditions and crew size. Comply with provisions of this specification if more stringent than the governing standard.

B. **Facepiece and Hose:** Provide full facepiece and hose by same manufacturer that has been certified by NIOSH/MSHA as an approved Type "C" respirator assembly operating in pressure demand mode with a positive pressure facepiece.

C. **Auxiliary backup system:** In atmospheres which contain sufficient oxygen (greater than or equal to 19.5 percent oxygen) provide a pressure-demand full facepiece supplied air respirator equipped with an emergency back up HEPA filter.

D. **Escape air supply:** In atmospheres which are oxygen deficient (less than 19.5 percent oxygen) provide a pressure-demand full facepiece supplied air respirator incorporating an auxiliary self-contained breathing apparatus (SCBA) which automatically maintains an uninterrupted air supply in pressure demand mode with a positive pressure face piece.

E. **Backup air supply:** Provide a reservoir of compressed air located outside the Work Area which will automatically maintain a continuous uninterruptable source of air automatically available to each connected facepiece and hose assembly in the event of compressor shut-down, contamination of air delivered by compressor, power loss or other failure. Provide sufficient capacity in the back-up air supply to allow a minimum escape time of one-half hour times the number of connections available to the Work Area. Air requirement at each connection is the air requirement of the respirators in use plus the

air requirement of an average-sized adult male engaged in moderately strenuous activity.

F. **Warning device:** Provide a warning device that will operate independently of the building's power supply. Locate so that alarm is clearly audible above the noise level produced by equipment and work procedures in use, in all parts of the Work Area and at the compressor. Connect alarm to warn of:

1. Compressor shut down or other fault requiring use of backup air supply

2. Carbon Monoxide (CO) levels in excess of 5 PPM/V

G. **Carbon Monoxide (CO) Monitor:** Continuously monitor and record on a strip chart recorder Carbon Monoxide (CO) level. Place monitors in the air line between compressor and back-up air supply and between backup air supply and workers. Connect monitors so that they also sound an alarm as specified under "Warning Devices".

H. **Compressor Shut Down:** Interconnect monitors, alarms and compressor so that compressor is automatically shut down and the alarms sound if any of the following occur:

1. Carbon Monoxide (CO) concentrations exceed 5 PPM/v in the air line between the filter bank and backup air supply

2. Compressor temperature exceeds normal operating range

I. **Compressor Motor:** Provide a compressor driven by an electric motor. Do not use a gas or diesel engine to drive compressor. Insure that electrical supply available at the work site is adequate to energize motor.

J. **Compressor Location:** Locate compressor outside of building in location that will not impede access to the building, and that will not cause a nuisance by virtue of noise or fumes to occupied portions of the building.

K. **Air Intake:** Locate air intake remotely from any source of automobile exhaust or any exhaust from engines, motors, auxiliary generator or buildings.

L. **After-Cooler:** Provide an after-cooler at entry to filter system which is capable of reducing temperatures to outside ambient air temperatures.

M. **Self-Contained Breathing Apparatus (SCBA):** Configure system to permit the recharging of ½ hour 2260 PSI (15.58 MPa) SCBA cylinders.

PART 3 - EXECUTION

3.1 GENERAL:

A. **Respiratory Protection Program:** Comply with ANSI Z88.2 “Practices for Respiratory Protection" and OSHA 29 CFR 1910.134 and 1926.103.

B. **Require** that respirators be used in the following circumstances:

1. During all Class I asbestos jobs.

2. During all Class II work where the ACM is not removed in a substantially intact state.

3. During all Class II and III work, which is not performed using wet methods.

4. During all Class II and III asbestos jobs where the employer does not produce a "negative exposure assessment".

5. During all Class III jobs where TSI or surfacing ACM or PACM is being disturbed.

6. During all Class IV work performed within regulated areas where employees performing other work are required to wear respirators.

7. During all work covered by this section where employees are exposed above the OSHA PEL (TWA, or excursion limit).

8. In emergencies. During emergencies where the airborne asbestos fiber concentration is not known, a self-contained breathing apparatus (SCBA) must be used.

C. **Require** that respiratory protection be used at all times that there is any possibility of disturbance of ACM whether intentional or accidental.

D. **Require** that a respirator be worn by anyone in a Work Area at all times, regardless of activity, during a period that starts with any operation which could cause airborne fibers until the area has been cleared for re-occupancy in accordance with Section “Project Decontamination”.

E. **Regardless of Airborne Fiber Levels:** Require that the minimum level of respiratory protection used be half-face air-purifying respirators with high efficiency filters.

F. **Do not allow** the use of single-use, disposable, or quarter-face respirators for any purpose.

3.2 FIT TESTING:

A. **Initial Fitting:** Provide initial fitting of respiratory protection during a respiratory protection course of training set up and administered by a individual qualified to do fit testing. Fit types and sizes of respirator to be actually worn by each individual. Allow an individual to use only those respirators for which training and fit testing has been provided.

B. **On a Weekly Basis,** check the fit of each worker's respirator by having irritant smoke blown onto the respirator from a smoke tube.

C. **Upon Each Wearing:** Require that each time an air-purifying respirator is put on it be checked for fit with a positive and negative pressure fit test in accordance with the manufacturer's instructions or ANSI Z88.2.

3.3 TYPE OF RESPIRATORY PROTECTION REQUIRED:

A. General: After reducing airborne asbestos levels to the lowest feasible level with engineering controls and work practices, provide respiratory protection as necessary to ensure that workers are not exposed to an airborne concentration of asbestos in excess of the Specified Permissible Exposure Limits (SPEL) set forth in this Section.

B. Level of Respiratory Protection: Determine the proper level of respiratory protection by dividing the expected or actual airborne fiber count in the Work Area by the "protection factors" given below. The level of respiratory protection which supplies an airborne fiber level inside the respirator, at the breathing zone of the wearer, at or below the Specified Permissible Exposure Limits (PEL) set forth in this Section is the minimum level of protection allowed.

C. Specific Respiratory Protection Requirements: Provide respiratory protection as indicated below as a minimum requirement:

1. **Half-face Negative Pressure Air-Purifying Respirators:** Provide half-face negative pressure air-purifying respirators during installation of Critical or Primary Barriers or other activities where there has been an “Initial Exposure Assessment” that has determined that airborne asbestos fiber levels will not exceed 0.1 fiber per cubic centimeter (0.1 f/cc). Provide a PAPR where a half-face negative pressure air-purifying respirator is allowed to any worker who so requests.

2. **Powered Air-Purifying Respirators (PAPR):** Provide powered air-purifying respirators (PAPR) during removal of asbestos-containing thermal system insulation (TSI) or surfacing material where there has been an “Initial Exposure Assessment” that has determined that airborne asbestos fiber levels will not exceed 0.5 fiber per cubic centimeter (0.5 f/cc).

3. **Type "C" Supplied-air respirators:** full facepiece pressure demand supplied air respirators are to be used by all workers engaged in the removal of thermal system insulation (TSI) or surfacing materials, or demolition of pipes, structures, or equipment covered or insulated with asbestos, or in the removal or demolition of asbestos insulation or coverings, or any other activity which results in or may result in airborne asbestos fiber levels above 10.0 fibers per cubic centimeter (10.0 f/cc).

D. Provide a full facepiece supplied air respirator operated in the pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus for all workers within a regulated area where Class I work is being performed and for which an initial exposure assessment has not been produced. After an initial exposure assessment is made, use the level of respiratory protection required by that assessment and requirements of this specification and the OSHA Asbestos Construction Standard 29 CFR 1926.1101.

3.4 SPECIFIED PERMISSIBLE EXPOSURE LIMITS (SPEL):

A. Specified Permissible Exposure Limits (SPEL): Ensure that no worker is exposed to an airborne concentration of asbestos in excess of the Time-Weighted Average (TWA) limit, and Excursion Limit (EL) set forth below.

1. **Time Weighted Average (TWA) limit** - Concentration of airborne asbestos fibers to which any worker may be exposed as an eight (8) hour time-weighted average (TWA) shall not exceed the following.

   a. 0.01 fibers per cubic centimeter (0.01 f/cc)

2. **Excursion Limit (EL)** - Concentration of airborne asbestos fibers to which any worker may be exposed as averaged over a sampling period of thirty (30) minutes shall not exceed the following.

   a. 0.01 fibers per cubic centimeter (0.01 f/cc)

B. Fibers: For purposes of this section, fibers are defined as all fibers regardless of composition as counted in the OSHA Reference Method (ORM), or NIOSH 7400 procedure.

1. Electron Microscopy: If Electron Microscopy is used to determine airborne fiber levels, only asbestos fibers will be enumerated, but fibers of any size detected by the testing of Section 01711 Project Decontamination will be counted.

3.5 RESPIRATORY PROTECTION FACTOR:

A.	Respirator Type	Protection Factor
1.	**Air purifying:** Negative pressure respirator High efficiency filter Half facepiece	10
2.	**Air purifying:** Negative pressure respirator High efficiency filter Full facepiece	50
3.	**Powered Air Purifying (PAPR):** Positive pressure respirator High efficiency filter Half facepiece	50
4.	**Powered air-purifying respirator** equipped with high efficiency filters or any supplied air respirator operated in continuous flow mode. Full facepiece	1,000

5.	**Supplied air:** Positive pressure respirator Pressure demand or other positive pressure mode Full facepiece Equipped with an auxiliary HEPA cartridge or positive pressure Self-contained breathing apparatus (SCBA) for escape	1,000

3.6 AIR PURIFYING RESPIRATORS:

A. **Negative pressure - half or full face mask:** Supply a sufficient quantity of respirator filters approved for asbestos, so that workers can change filters during the work day. Require that respirators be wet-rinsed, and filters discarded, each time a worker leaves the Work Area. Require that new filters be installed each time a worker re-enters the Work Area. Store respirators and filters at the job site in the changing room and protect totally from exposure to asbestos prior to their use.

B. **Powered air purifying - half or full face mask:** Supply a sufficient quantity of high efficiency respirator filters approved for asbestos so that workers can change filters at any time that flow through the facepiece decreases to the level at which the manufacturer recommends filter replacement. Require that regardless of flow, filter cartridges be replaced after 40 hours of use. Require that HEPA elements in filter cartridges be protected from wetting during showering. Require entire exterior housing of respirator, including blower unit, filter cartridges, hoses, battery pack, face mask, belt, and cords, be washed each time a worker leaves the Work Area. Caution should be used to avoid shorting battery pack during washing. Provide an extra battery pack for each respirator so that one can be charging while one is in use.

3.7 SUPPLIED AIR RESPIRATOR:

A. **Air Systems Monitor:** Continuously monitor the air system operation including compressor operation, filter system operation, backup air capacity and all warning and monitoring devices at all times that system is in operation. Assign an individual, trained by manufacturer of the equipment in use or by a Certified Industrial Hygienist, in the operation and maintenance of the system to provide this monitoring. Assign no other duties to this individual that will take him away from monitoring the air system.

END OF SECTION - 02 80 45

INITIAL EXPOSURE ASSESSMENT

Project No:_____ Date:_____
Project Name:_____ Facility:_____
Work Area(s):_____
Reference Job:_____
Description of Work:_____

Asbestos Containing Materials | Asbestos/Type Percentage

_____ | _____
_____ | _____
_____ | _____

Task	Personal Monitoring Level High	Low	Average	Respirator Worn	Comments
Prep / Set up	_____	_____	_____	_____	_____
Removal of Surface Trt	_____	_____	_____	_____	_____
Removal of TSI	_____	_____	_____	_____	_____
Removal of Misc Mat.	_____	_____	_____	_____	_____
Bag Out	_____	_____	_____	_____	_____
Clean Up	_____	_____	_____	_____	_____
Other	_____	_____	_____	_____	_____

Experience Level of Work Force _____
Reference Job: _____
Description of Work: _____

Asbestos Containing Materials | Asbestos/Type Percentage

_____ | _____
_____ | _____
_____ | _____

Task	Personal Monitoring Level High	Low	Average	Respirator Worn	Comments
Prep / Set up	_____	_____	_____	_____	_____
Removal of Surface Trt	_____	_____	_____	_____	_____
Removal of TSI	_____	_____	_____	_____	_____
Removal of Misc Mat.	_____	_____	_____	_____	_____
Bag Out	_____	_____	_____	_____	_____
Clean Up	_____	_____	_____	_____	_____
Other	_____	_____	_____	_____	_____

Experience Level of Work Force _____

Expected Conditions of This Job

Task	Anticipated Level	Respirator	Comments
Prep / Set up	_____ f/cc	_____	_____
Removal of Surface Trt	_____ f/cc	_____	_____
Removal of TSI	_____ f/cc	_____	_____
Removal of Misc Mat.	_____ f/cc	_____	_____
Bag Out	_____ f/cc	_____	_____
Clean Up	_____ f/cc	_____	_____
Other	_____ f/cc	_____	_____

Experience Level of Work Force _____

SECTION 02 80 46 - DECONTAMINATION UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. **Drawings and general provisions of Contract**, including General and Supplementary Conditions and other Division-2 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

A. **Provide separate Personnel and Equipment Decontamination facilities.** Require that the Personnel Decontamination Unit be the only means of ingress and egress for the Work Area. Require that all materials exit the Work Area through the Equipment Decontamination Unit.

1.3 RELATED WORK SPECIFIED ELSEWHERE:

A. **Refer to Section "Temporary Facilities"** - Asbestos Abatement for electrical requirements and requirements relative to connection of decontamination facilities to building systems such as water, sewer, and electrical.

1.4 SUBMITTALS

A. **Before the Start of Work:** Submit the following to the Designer for review. Do not begin work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use.

1. Personnel Decontamination Unit: Provide shop drawing showing location and assembly of personnel decontamination units.
2. Equipment Decontamination Unit: Provide shop drawing showing location and assembly of equipment decontamination units.
3. Shower Pan: Provide shop drawing.
4. Shower Walls: Provide product data.
5. Shower Head and Controls: Provide product data.
6. Filters: Provide product data and shop drawing of installation on decontamination unit.
7. Hose Bib: Provide product data.
8. Shower Stall: for Wash Down Station provide product data and shop drawing showing and modifications.
9. Elastomeric membrane: Provide product data.
10. Lumber: Provide product data on fire resistance treatment.
11. Sump Pump: Provide product data.
12. Signs: Submit samples of signs to be used.

PART 2 - PRODUCTS

2.1 MATERIALS

A. **Polyethylene Sheet:** A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mil (0.15 mm) thick , clear, frosted, or black as indicated.

B. **Polyethylene Sheet:** Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick, frosted or black as indicated.

C. **Reinforced Polyethylene Sheet:** Where plastic sheet is the only separation between the Work Area and building exterior, provide translucent, nylon reinforced, laminated, flame resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick , frosted or black as indicated.

D. **Duct Tape:** Provide duct tape in 2 inch or 3 inch (51mm or 76 mm) widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

E. **Spray Adhesive:** Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

F. **Shower Pan:** Provide one-piece waterproof shower pan 4 feet x 8 feet x 6 inches deep (102 mm X 204 mm x 152 mm deep). Fabricate from seamless fiberglass minimum 1/16 inch (1.59 mm) thick reinforced with wood, 18 ga. stainless or galvanized steel with welded seems, copper or lead with soldered seams, or a seamless liner of minimum 60 mil (1.5 mm) thick elastomeric membrane.

G. **Shower Walls:** Provide 8 feet (2.44 m) long by approximately 7 feet (2.13 m) high walls fabricated from rigid, impervious, waterproof material, either corrugated fiberglass roofing or equivalent. Structurally support as necessary for stability.

H. **Shower Head and Controls:** Provide a factory-made shower head producing a spray of water which can be adjusted for spray size and intensity. Feed shower with water mixed from hot and cold supply lines. Arrange so that control of water temperature, flow rate, and shut off is from inside shower without outside aid.

I. **Filters:** Provide cascaded filter units on drain lines from showers or any other water source carrying asbestos-contaminated water from the Work Area. Provide units with disposable filter elements as indicated below. Connect so that discharged water passes primary filter and output of primary filter passes through secondary filter.

1. Primary Filter - Passes particles 20 microns and smaller
2. Secondary Filter - Passes particles 5 microns and smaller

J. **Hose Bib:** Provide heavy bronze angle type with wheel handle, vacuum breaker, and 3/4 inch (19.05 mm) National Standard male hose outlet.

K. Shower Stall: For Wash Down Station provide leak tight shower enclosure with integrated drain pan fabricated from fiberglass or other durable waterproof material, approximately 3 feet x 3 feet (0.91m x 0.91 m) square with minimum 6 feet (1.83 m) high sides and back. Structurally support as necessary for stability. Equip with hose bib, as specified in this section, mounted at approximately 4 feet (1.22 m) above drain pan. Connect drain to a reservoir, pump water from reservoir through filters to a drain or store and use for amended water. Mount filters inside shower stall on back wall beneath hose bib.

L. Elastomeric membrane: Provide uniform flat sheets of flexible sheet roofing material fabricated from EPDM (ethylene propylene diene monomers) or Neoprene (polychloroprene), in a nominal 45 mil (1.14 mm) thickness.

M. Lumber: Provide kiln dried lumber of any grade or species.

N. Sump Pump: Provide totally submersible waterproof sump pump with integral float switch. Provide unit sized to pump 2 times the flow capacity of all showers or hoses supplying water to the sump, through the filters specified herein when they are loaded to the extent that replacement is required. Provide unit capable of pumping debris, sand, plaster or other materials washed off during decontamination procedures without damage to mechanism of pump. Adjust float switch so that a minimum of 3 inch (76 mm) remains between top of liquid and top of sump pan.

PART 3 - EXECUTION

3.1 PERSONNEL DECONTAMINATION UNIT:

A. Provide a Personnel Decontamination Unit consisting of a serial arrangement of connected rooms or spaces, Changing Room, Drying Room, Shower Room, Equipment Room. Require all persons without exception to pass through this Decontamination Unit for entry into and exiting from the Work Area for any purpose. Do not allow parallel routes for entry or exit. Do not remove equipment or materials through Personnel Decontamination Unit. Provide temporary lighting within Decontamination Units as necessary to reach a lighting level of 100 foot candles (1076 lumens / sq meter).

B. Changing Room (clean room): Provide a room that is physically and visually separated from the rest of the building for the purpose of changing into protective clothing.

1. Construct using polyethylene sheeting, at least 6 mil (0.15 mm) in thickness, to provide an airtight seal between the Changing Room and the rest of the building.
2. Locate so that access to Work Area from Changing Room is through Shower Room.
3. Separate Changing Room from the building by a sheet plastic flapped doorway.
4. Require workers to remove all street clothes in this room, dress in clean, disposable coveralls, and don respiratory protection equipment. Do not allow asbestos-contaminated items to enter this room. Require Workers to enter this room either from outside the structure dressed in street clothes, or naked from the showers.
5. An existing room may be utilized as the Changing Room if it is suitably located and of a configuration whereby workers may enter the Changing Room directly from

the Shower Room. Protect all surfaces of room with sheet plastic as set forth in Section 01526 Temporary Enclosures. Authorization for this must be obtained from the Designer in writing prior to start of construction. Submit written request in accordance with Section 01632 "Substitutions" detailing layout and protective measures proposed.

6. Maintain floor of changing room dry and clean at all times. Do not allow overflow water from shower to wet floor in changing room.
7. Damp wipe all surfaces twice after each shift change with a disinfectant solution.
8. Provide posted information for all emergency phone numbers and procedures.
9. Provide 1 storage locker per employee.
10. Provide all other components indicated on the contract drawings.

C. **Airlock:** Provide an airlock between Drying Room and Changing Room. This is a transit area for workers.

1. Separate this room from Drying Room and Changing Room by sheet plastic flapped doorways.
2. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
3. Separate this room from the Drying and Changing Rooms with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.

D. **Drying Room:** Provide a drying room as an airlock and a place for workers to dry after showering.

1. Construct room by providing a pan continuous with or draining to Shower Room pan. Install a freely draining wooden or non-skid metal floor in pan at elevation of top of pan.
2. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
3. Separate this room from the Changing Room and Shower Room with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
4. Separate from Changing Room by a sheet plastic flapped doorway.
5. Provide a continuously adequate supply of disposable bath towels.
6. Provide a rigid, tight-sealing hinged door between Drying Room and Clean Room. Arrange so that there is a sensible movement of air from clean room through breathing zone of worker in Shower and Drying Room toward Equipment Room.

E. **Shower Room:** Provide a completely watertight operational shower to be used for transit by cleanly dressed workers heading for the Work Area from the Changing Room, or for showering by workers headed out of the Work Area after undressing in the Equipment Room.

1. Construct room by providing a shower pan and 2 shower walls in a configuration that will cause water running down walls to drip into pan. Install a freely draining wooden floor in shower pan at elevation of top of pan.
2. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
3. Separate this room from the Drying Room and Airlock with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
4. Provide splashproof entrances to Drying Room and Airlock with doors arranged in

the following configuration:

a. At each entrance to the Shower Room construct a door frame out of nominal 2 inch x 4 inch (51 mm X 102 mm) lumber with 1-1/2 inch (39 mm) jambs (sides) and 1-1/2 inch (39 mm) head (top) and sill (bottom). Attach to this door frame two overlapping flaps of elastomeric membrane material, fastened at the head (top) and jambs (sides) (by clamping between a 1-1/2 inch (39 mm) x 3/4 inch (19mm) batten and frame). Overlap the flaps a minimum of 6 inch (152 mm) in a direction that presents a shingle-like configuration to the water stream from the shower. Overlap sill (bottom) by 1-1/2 inch (39 mm) minimum. Arrange so that any air movement out of the Work Area will cause the flaps to seal against the door frame.

5. Provide shower head and controls.

6. Provide temporary extensions of existing hot and cold water and drainage, as necessary for a complete and operable shower.

7. Provide a soap dish and a continuously adequate supply of soap and maintain in sanitary condition.

8. Arrange so that water from showering does not splash into the Changing or Equipment Rooms.

9. Arrange water shut off and drain pump operation controls so that a single individual can shower without assistance from either inside or outside of the Work Area.

10. Provide flexible hose shower head.

11. Pump waste water to drain or to storage for use in amended water. If pumped to drain, provide 20 micron and 5 micron waste water filters in line to drain or waste water storage. Change filters daily or more often if necessary. Locate filters inside shower unit so that water lost during filter changes is caught by shower pan.

12. Provide hose bib.

13. Provide all other items indicated on contract drawings.

F. Airlock: Provide an airlock between Shower Room and Equipment Room. This is a transit area for workers. Separate this room from Equipment Room by a sheet plastic flap doorway.

1. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.

2. Separate this room from the Equipment Room and Shower Room with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.

3. Separate from Equipment Room by a sheet plastic flapped doorway.

G. Equipment Room (contaminated area): Require work equipment, footwear and additional contaminated work clothing to be left here. This is a change and transit area for workers.

1. Separate this room from the Work Area by a 6 mil (0.15 mm) polyethylene flapped doorway.

2. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.

3. Separate this room from the Shower Room and Work Area with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.

4. Provide a drop cloth layer of sheet plastic on floor in the Equipment Room for every shift change expected. Roll drop cloth layer of plastic from Equipment Room into Work Area after each shift change. Replace before next shift change. Provide a

minimum of two (2) layers of plastic at all times. Use only clear plastic to cover floors.

H. Airlock: Provide an airlock between Equipment Room and Work Area. This is a transit area for workers.

1. Separate this room from Equipment Room and Work Area by a sheet plastic flapped doorways.
2. Separate this room from the rest of the building with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.
3. Separate this room from the Equipment Room and Work Area with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.

I. Work Area: Separate Work Area from the Equipment Room by polyethylene barriers. If the airborne asbestos level in the Work Area is expected to be high, as in dry removal, add an intermediate cleaning space between the Equipment Room and the Work Area. Damp wipe clean all surfaces after each shift change. Provide one additional floor layer of 6 mil (0.15 mm) polyethylene per shift change and remove contaminated layer after each shift.

J. Decontamination Sequence: Require that all workers adhere to the following sequence when entering or leaving the Work Area.

1. Entering Work Area: Worker enters Changing Room and removes street clothing, puts on clean disposable overalls and respirator, and passes through the Shower Room into the Equipment Room.
2. Any additional clothing and equipment left in Equipment Room needed by the worker are put on in the Equipment Room.
3. Worker proceeds to Work Area.

K. Exiting Work Area:

1. Before leaving the Work Area, require the worker to remove all gross contamination and debris from overalls and feet.
2. The worker then proceeds to the Equipment Room and removes all clothing except respiratory protection equipment.
3. Extra work clothing such as boots, hard hats, goggles, gloves are to be stored in contaminated end of the Equipment Room.
4. Disposable coveralls are placed in a bag for disposal with other material.
5. Require that Decontamination procedures be followed by all individuals leaving the Work Area.
6. After showering, the worker moves to the Changing Room and dresses in either new coveralls for another entry or street clothes if leaving.

3.2 EQUIPMENT DECONTAMINATION UNIT:

A. Provide an Equipment Decontamination Unit consisting of a serial arrangement of rooms, Clean Room, Holding Room, Wash Room for removal of equipment and material from Work Area. Do not allow personnel to enter or exit Work Area through Equipment Decontamination Unit.

B. **Arrange with airlocks** between rooms as required below.

C. **Wash Down Station:** Provide an enclosed Shower Unit located in Work Area just outside Wash Room as an equipment, bag and container cleaning station.

1. Fabricate waterproof floor extending 6 feet (1.83 m) beyond Wash Down station in all directions. Install seamless waterproof membrane over area and extend over curbs on all four sides. Form curbs from 2 inch x 4 inch (51 X 102 mm) lumber laid on the flat.
2. Waterproof membrane is to be fabricated from elastomeric membrane.
3. Do not allow water to collect on waterproof membrane. Remove continuously with a wet vacuum or mops.

D. **Wash Room:** provide wash room for cleaning of bagged or containerized asbestos-containing waste materials passed from the Work Area.

1. Construct wash room of nominal 2 inch x 4 inch (51 X 102 mm) wood framing and polyethylene sheeting, at least 6 mil (0.15 mm) in thickness and located so that packaged materials, after being wiped clean, can be passed to the Holding Room.
2. Separate this room from the Work Area by a single flapped door of 6 mil (0.15 mm) polyethylene sheeting.
3. Provide a drop cloth layer of plastic on floor in the Wash Room for every load-out operation. Roll this drop cloth layer of plastic from Wash Room into Work Area after each load-out. Provide a minimum of two (2) layers of plastic at all times. Use only clear plastic to cover floors.

E. **Airlock:** Provide an airlock between Wash Room and Holding Room. This is a transit area.

1. Separate this room from adjacent spaces by a sheet plastic flapped doorway.
2. Separate this room from the rest of the building and adjacent spaces with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.

F. **Holding Room:** Provide Holding Room as a drop location for bagged asbestos-containing materials passed from the Wash Room. Construct Holding Room of nominal 2 inch x 4 inch (51 X 102 mm) wood framing and polyethylene sheeting, at least 6 mil (0.15 mm) in thickness and located so that bagged materials cannot be passed from the Wash Room through the Holding Room to the Clean Room.

1. Separate this room from the adjacent rooms by flap doors fabricated from 6 mil (0.15 mm) sheet plastic.

G. **Airlock:** Provide an airlock between Holding Room and Clean Room. This is a transit area.

1. Separate this room from adjacent spaces by a sheet plastic flap doorway.
2. Separate this room from the rest of the building and adjacent spaces with airtight walls fabricated of 6 mil (0.15 mm) polyethylene.

H. **Clean Room:** provide Clean Room to isolate the Holding Room from the building exterior. If possible locate to provide direct access to the Holding Room from the building exterior.

1. Erect Critical and Primary Barriers as described in Section "Temporary Enclosures" in an existing space. If no space exists construct Clean Room of 2 x 4 (51 X 102 mm) wood framing and polyethylene sheeting, at least 6 mil (0.15 mm) in thickness.
2. Separate this room from the exterior by a single flap door of 6 mil (0.15 mm) polyethylene sheeting.

I. **Load-out Area:** The load-out area is the transfer area from the building to a truck or dumpster. It may be the Clean Room of the Equipment Decontamination unit or a separate room or loading dock area. Erect Critical and Primary barriers as described in Section "Temporary Enclosures" in load-out area.

1. During transfer of material from load-out area erect primary barriers as described in Section "Temporary Enclosures" as necessary to seal path from load-out area to truck or dumpster.

J. **Decontamination Sequence:** Take all equipment or material from the Work Area through the Equipment Decontamination Unit according to the following procedure:

1. At washdown station, thoroughly wet clean contaminated equipment or sealed polyethylene bags and pass into Wash Room.
2. When passing equipment or containers into the Wash Room, close all doorways of the Equipment Decontamination Unit, other than the doorway between the Washdown Station and the Wash Room. Keep all outside personnel clear of the Equipment Decontamination Unit.
3. Once inside the washroom, wet clean the bags and/or equipment.
4. When cleaning is complete pass items into Holding Room. Close all doorways except the doorway between the Holding room and the Clean Room.
5. Workers from the building exterior enter Holding Area and remove decontaminated equipment and/or containers for disposal.
6. Require these workers to wear full protective clothing and appropriate respiratory protection.
7. At no time is a worker from an uncontaminated area to enter the enclosure when a removal worker is inside.

3.3 CONSTRUCTION OF THE DECONTAMINATION UNITS:

A. **Walls and Ceiling:** Construct airtight walls and ceiling using polyethylene sheeting, at least 6 mil (0.15 mm) in thickness. Attach to existing building components or a temporary framework.

B. **Floors:** Use 2 layers (minimum) of 6 mil (0.15 mm) polyethylene sheeting to cover floors in all areas of the Decontamination Units. Use only clear plastic to cover floors.

C. **Flap Doors:** Fabricated from three (3) overlapping sheets with openings a minimum of three feet (3') (0.91 meters) wide. Configure so that sheeting overlaps adjacent surfaces. Weights at bottom of sheets as required so that they quickly close after being released. Put arrows on sheets to indicate direction of overlap and/or travel. Provide a minimum of six feet (6') (1.22 meters) between entrance and exit of any room. Provide a minimum of three feet (3') (0.91 meters) between doors to airlocks.

D. **If the Decontamination area** is located within an area containing friable asbestos on overhead ceilings, ducts, piping, etc., provide the area with a minimum 1/4 inch (6.4 mm) hardboard or 1/2 inch (12.7 mm) plywood "ceiling" with polyethylene sheeting, at least 6 mil (0.15 mm) in thickness covering the top of the "ceiling".

E. **Visual Barrier:** Where the Decontamination area is immediately adjacent to and within view of occupied areas, provide a visual barrier of opaque polyethylene sheeting at least 6 mil (0.15 mm) in thickness so that worker privacy is maintained and work procedures are not visible to building occupants. Where the area adjacent to the Decontamination area is accessible to the public, construct a solid barrier on the public side of the sheeting to protect the sheeting. Construct barrier with wood or metal studs covered with minimum 1/4 inch (6.4 mm) thick hardboard or 1/2 inch (12.7 mm) plywood. Where the solid barrier is provided, sheeting need not be opaque.

F. **Alternate methods** of providing Decontamination facilities may be submitted to the Designer for approval. Do not proceed with any such method(s) without written authorization of the Designer.

G. **Electrical:** Provide subpanel at Changing Room to accommodate all removal equipment. Power subpanel directly from a building electrical panel.

1. Connect all electrical branch circuits in Decontamination unit and particularly any pumps in shower room to a ground-fault circuit protection device.

3.4 CLEANING OF DECONTAMINATION UNITS:

A. **Clean debris and residue** from inside of Decontamination Units on a daily basis or as otherwise indicated on Contract Drawings. Damp wipe or hose down all surfaces after each shift change. Clean debris from shower pans on a daily basis.

B. **If the Changing Room** of the Personnel Decontamination Unit becomes contaminated with asbestos-containing debris, abandon the entire Decontamination Unit and erect a new Decontamination Unit. Use the former Changing Room as an inner section of the new Equipment Room.

3.5 SIGNS:

A. **Post** an approximately 20 inch by 14 inch (508 mm x 356 mm) manufactured caution sign at each entrance to the Work Area displaying the following legend with letter sizes and styles of a visibility required by 29 CFR 1926:

1. Provide signs in both English and Spanish.

2. Legend:
DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

3. Provide spacing between respective lines at least equal to the height of the

respective upper line.

B. **Post** an approximately 10 inch by 14 (254 mm x 356 mm) inch manufactured sign at each entrance to each Work Area displaying the following legend with letter sizes and styles of a visibility at least equal to the following:

1. Provide signs in both English and Spanish.

2.

Legend	**Notation**
NO FOOD, BEVERAGES OR TOBACCO PERMITTED	3/4 in (19 mm) Block
ALL PERSONS SHALL DON PROTECTIVE CLOTHING (COVERINGS) BEFORE ENTERING THE WORK AREA	3/4 in (19 mm) Block
ALL PERSONS SHALL SHOWER IMMEDIATELY AFTER LEAVING WORK AREA AND BEFORE ENTERING THE CHANGING AREA	3/4 in (19 mm) Block

END OF SECTION – 02 80 46

SECTION 02 82 05 - MATERIALS AND EQUIPMENT - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

B. **Related Sections:** The following Sections contain requirements that relate to this Section:

1. The Contractor's Construction Schedule is included under Section “Coordination - Asbestos Abatement”.
2. The Contractor’s Schedule of Submittals is included under Section “Submittals - Asbestos Abatement”.
3. The applicability of industry standards to products specified is included under Section “Reference Standards and Definitions - Asbestos Abatement”.
4. The administrative procedures for handling requests for substitutions made after award of the Contract is included under Section “Substitutions - Asbestos Abatement”.

1.3 DEFINITIONS

A. **Definitions** used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.

1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

2. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature that is current as of the date of the Contract Documents.

3. "Foreign Products" as distinguished from "domestic products," are items substantially manufactured (50 percent or more of value) outside the United States and its possessions. Products produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens of, nor living within, the United States and its possessions are also considered to be foreign products.
4. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.

5. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

6. "Equipment" are products that may be either operational or fixed.

    a. Operational Equipment are products with operating parts, whether motorized or manually operated, that requires temporary or permanent service connections, such as wiring or piping.

    b. Fixed Equipment are products necessary for accomplishing the work that are used as a temporary facility during the work and removed afterward.

1.4 SUBMITTALS

Required submittals: A general listing of products requiring submittals is included at the end of Section "Submittals." This listing may not be complete. Submittal requirements are found in each specification section. Prepare a schedule in tabular form showing each product listed. Include the manufacturer's name and proprietary product names for each item listed.

A. Product List: Prepare a list showing products specified in tabular form acceptable to the Owner's representative. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.

1. Coordinate product list with the Contractor's Construction Schedule and the Schedule of Submittals.

2. Form: Prepare product list with information on each item tabulated under the following column headings:

    a. Related Specification Section number.
    b. Generic name used in Contract Documents.
    c. Proprietary name, model number, and similar designations.
    d. Manufacturer's name and address.
    e. Supplier's name and address.
    f. Installer's name and address.
    g. Projected delivery date or time span of delivery period.

3. Initial Submittal: Within 30 days after date of commencement of the Work, submit 3 copies of an initial product list. Provide a written explanation for omissions of data and for known variations from Contract requirements.

    a. At the Contractor's option, the initial submittal may be limited to product selections and designations that must be established early in the Contract period.

4. Completed List: Within 10 days after date of commencement of the Work, submit 3 copies of the completed product list. Provide a written explanation for omissions of data and for known variations from Contract requirements.

5. Designer's Action: The Designer will respond in writing to Contractor within 2 weeks of receipt of the completed product list. No response within this period constitutes no objection to listed manufacturers or products but does not constitute a waiver of the requirement that products comply with Contract Documents. The Owner's representative's response will include a list of unacceptable product selections, containing a brief explanation of reasons for this action.

1.5 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.

1. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner, consult with the Owner's representative to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.

B. Compatibility of Options: When the Contractor is given the option of selecting between 2 or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. The contractor is responsible for providing products and construction methods that are compatible with products and construction methods to be installed after completion of the work of this contract.

2. If a dispute arises between contractors over concurrently selectable, but incompatible products, the Designer will determine which products shall be retained and which are incompatible and must be replaced.

C. Foreign Product Limitations: Except under one or more of the following conditions, provide domestic products, not foreign products, for inclusion in the Work:

1. No available domestic product complies with the Contract Documents.

2. Domestic products that comply with the Contract Documents are available only at prices or terms substantially higher than foreign products that comply with the Contract Documents.

D. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.

2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:

a. Name of product and manufacturer.
b. Model and serial number.
c. Capacity.
d. Speed.
e. Ratings.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
7. Store products subject to damage by the elements above ground, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

A. **General Product Requirements:** Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.

1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.

2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:

1. Proprietary Specification Requirements: Where Specifications name only a single product or manufacturer, provide the product indicated. No substitutions will be permitted.

2. Semi-proprietary Specification Requirements: Where Specifications name 2 or more products or manufacturers, provide 1 of the products indicated. No substitutions will be permitted.

a. Where Specifications specify products or manufacturers by name, accompanied by the term "or equal" or "or approved equal," comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

3. Nonproprietary Specifications: When Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.

5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.

a. Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.

6. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.

7. Visual Matching: Where Specifications require matching an established Sample, the Designer's decision will be final on whether a proposed product matches satisfactorily.

a. Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category.

8. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures ..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Designer will select the color, pattern, and texture from the product line selected.

9. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division 1 for allowances that control product selection and for procedures required for processing such selections.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

A. **Comply with manufacturer's instructions and recommendations** for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 02 82 05

SECTION 02 82 06 - SUBSTITUTIONS - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section includes** administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

B. **Related Sections:** The following Sections contain requirements that relate to the Section:

1. **Section "Reference Standards and Definitions - Asbestos Abatement"** specifies the applicability of industry standards to products specified.

2. **Section "Coordination - Asbestos Abatement"** specifies requirements for submitting the Contractor's Construction Schedule.

3. **Section "Submittals - Asbestos Abatement"** specifies requirements for submitting the Submittal Schedule.

4. **Section "Materials and Equipment - Asbestos Abatement"** specifies requirements governing the Contractor's selection of products and product options.

1.3 DEFINITIONS

A. **Definitions** in this Article do not change or modify the meaning of other terms used in the Contract Documents.

B. **Substitutions:** Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:

1. Substitutions requested during the bidding period, and accepted by Addendum prior to award of the Contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.

2. Revisions to the Contract Documents requested by the Owner or Designer.

3. Specified options of products and construction methods included in the Contract Documents.

4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

A. Substitution Request Submittal: The Designer will consider requests for substitution if received within 60 days after commencement of the Work. Requests received more than 60 days after commencement of the Work may be considered or rejected at the discretion of the Designer.

1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals.

2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.

3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors that will be necessary to accommodate the proposed substitution.

b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.

c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.

d. Samples, where applicable or requested.

e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.

f. Cost information, including a proposal of the net change, if any in the Contract Sum.

g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.

h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.

4. Designer's Action: If necessary, the Designer will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Designer will notify the Contractor of acceptance or rejection of the substitution within 2 weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a change order.

a. Use the product specified if the Designer cannot make a decision on the use of a proposed substitute within the time allocated.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Conditions: The Designer will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Designer. If the following conditions are not satisfied, the Designer will return the requests without action except to record noncompliance with these requirements.

1. Extensive revisions to the Contract Documents are not required.

2. Proposed changes are in keeping with the general intent of the Contract Documents.

3. The request is timely, fully documented, and properly submitted.

4. The specified product or method of construction cannot be provided within the Contract Time.

5. The Designer will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.

6. The request is directly related to an "or-equal" clause or similar language in the Contract Documents.

7. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Designer for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.

8. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.

9. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.

10. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.

11. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.

B. **The Contractor's submittal** and the Designer's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 02 82 06

SECTION 02 82 08 - PROJECT DECONTAMINATION

PART 1 - GENERAL

1.1 SUMMARY:

A. **Work of This Section** includes the decontamination of air in the Work Area which has been, or may have been, contaminated by the elevated airborne asbestos fiber levels generated during abatement activities, or which may previously have had elevated fiber levels due to friable asbestos-containing materials (ACM) in the space.

B. **Work of** This **Section** includes the cleaning, decontamination, and removal of temporary facilities installed prior to abatement work, including:

1. Primary and Critical Barriers
2. Decontamination Unit
3. Pressure Differential System

C. **Work of This Section** includes the cleaning, and decontamination of all surfaces (ceiling, walls, floor) of the Work Area, and all furniture or equipment in the Work Area.

1.2 RELATED DOCUMENTS:

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

1.3 DESCRIPTION OF REQUIREMENTS:

A. **General: Decontamination** of the Work Area following asbestos abatement.

B. **If the asbestos abatement work is on damaged or friable materials** the work is a four-step procedure with two cleanings of the Primary Barrier plastic prior to its removal and two cleanings of the room surfaces to remove any new or existing contamination. Unless specifically indicated otherwise all materials are considered damaged or friable for purposes of this section.

C. **If the asbestos abatement work is on undamaged and non-friable materials** the decontamination procedure is a two-step procedure with two cleanings of the Primary Barrier plastic to remove contamination, thus preventing contamination of the building when the Work Area isolation barriers are removed.

D. **In both cases** operation of the pressure differential system is used to remove airborne fibers generated by the abatement work.

1.4 RELATED WORK SPECIFIED ELSEWHERE:

A. **Removal of Gross Debris** is integral with the performance of abatement work and as such is specified in Section “Resilient Flooring Removal – Aggressive Asbestos Abatement”.

1.5 CLEARANCE AIR SAMPLING BY THE OWNER:

A. **To determine** if the elevated airborne asbestos structure concentration encountered during abatement operations has been reduced to the specified level, the Owner will secure samples and analyze them according to the following procedures.

1. Aggressive sampling procedures as described below will be followed.
2. TEM samples will be secured and analyzed as indicated below.
3. Work Area Clearance: upon meeting the TEM Clearance requirements the work of Section Project Decontamination can continue.

1.6 AGGRESSIVE SAMPLING BY THE OWNER:

A. **All Air Samples** will be taken using aggressive sampling techniques as follows:

1. Before sampling pumps are started the exhaust from forced-air equipment (leaf blower with an approximately 1 horsepower (746 watts) electric motor) will be swept against all walls, ceilings, floors, ledges and other surfaces in the room. This procedure will be continued for 5 minutes per 10,000 (283 cubic meters) cubic feet of room volume.
2. One 20 inch (508 mm) diameter fan per 10,000 cubic feet (283 cubic meters) of room volume will be mounted in a central location at approximately 6 feet-6 inches (2 meters) above floor, directed toward ceiling and operated at low speed for the entire period of sample collection. Contractor shall provide leaf blower, fans, and electrical cords required for aggressive sampling.
3. Air samples will be collected in areas subject to normal air circulation away from room corners, obstructed locations, and sites near windows, doors of vents.
4. After air sampling pumps have been shut off, fans will be shut off.
5. In work areas where a dirt floor or exposed fibrous glass insulation is in the space, but outside the work area, maintain a critical barrier to prevent disturbance of these surfaces during aggressive sampling.

NOTE: **The Contractor shall provide all fans, leaf blowers, and extension cords necessary to complete aggressive sampling.**

1.7 SCHEDULE OF CLEARANCE AIR SAMPLES BY OWNER:

A. **Sample cassettes**: Samples will be collected on 25 mm. cassettes as follows:

1. **TEM:** 0.45 micrometer mixed cellulose ester or 0.40 micrometer polycarbonate, with 5.0 micron mixed cellulose ester backing filter.

B. **Number and Volume of Samples:** The number and volume of air samples given in the schedules is approximate. The exact number and volume of samples collected by the Owner may vary depending upon job conditions. Contractor shall make all efforts to construct work area enclosures in such a manner that minimizes the number of work area containments required for clearance while including all building work areas where clearance sampling is required.

C. Sampling sensitivity:

1. TEM: Analytical Sensitivity as set forth in the analytical method used or the AHERA regulation.

1.8 TRANSMISSION ELECTRON MICROSCOPY:

A. In each Work Area after completion of all cleaning work, a minimum of 7 samples will be taken and analyzed as follows:

Location Sampled	Number of Samples	Analytical Sensitivity Struct/cc	Approx. Volume (L)	Approx. Flow (LPM)
Each Work Area	5	0.005	1,300-1,800	1-15
Work Area Blank	1	0.005	0	Open for 30 Seconds
Laboratory Blank	1	0.005	0	Do Not Open

B. Analysis will be performed using the analysis method set forth in the AHERA Regulation 40 CFR Part 763 Appendix A.

C. Asbestos Structures referred to in this Section include asbestos fibers, bundles, clusters or matrices, as defined by method of analysis.

D. Release Criteria: Asbestos Decontamination of the work site is complete if the following conditions are met:

1. Work Area Samples are below filter background levels
   a. All Work Area sample volumes are greater than 1,199 liters for a 25 mm. sampling cassette.
   b. The average concentration of asbestos of the five Work Area Samples does not exceed the filter background level of 70 structures per square millimeter (70 s/mm^2) of filter area.

E. If these conditions are not met then the decontamination is incomplete, repeat the cleaning procedures of this section. If work area release criteria are not met, the Contractor shall be responsible for the cost of any failed clearance tests (including analytical costs and air monitoring fees).

F. Termination of Analysis: if the arithmetic mean (average) asbestos concentration on the blank filters exceeds 70 structures per square millimeter (70 s/mm^2) of filter area the analysis will cease and new samples collected.

G. Termination of Analysis: if the sample media are overloaded, the analysis will cease and new samples shall be collected.

1.9 LABORATORY TESTING BY THE OWNER:

A. Transmission Electron Microscopy by the Owner:

1. **Samples will be sent by overnight courier** for analysis by Transmission Electron Microscopy. Samples will not be carried on weekends, so that samples shipped on Friday will arrive on the following Monday. Verbal results will normally be available during the 5th working day after receipt of samples by the laboratory. The laboratory is capable of analyzing a maximum of 13 such samples from this project at any one time. All Transmission Electron Microscopy results will be available to the Contractor.

2. **Submit with bid unit cost** for each day of waiting beyond that set forth in the paragraph above.

1.10 SUBMITTALS:

A. Before Start of Work submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal is returned for “Unrestricted Use” or “Final but Restricted Use.”

1. Submit test report from an independent testing laboratory on the fire resistance rating of the assembly of the spray back fireproofing on the lock-back sealer used.

2. Submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal has been’ “Received - Not Reviewed.”

   a. Material Safety Data Sheet: Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for the following:

   b. “Lock-Back,” sealer.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 START OF WORK:

A. Previous Work: During completion of the asbestos abatement work specified in other sections, the Secondary Barrier of polyethylene sheeting will have been removed and disposed of along with any gross debris generated by the asbestos abatement work.

B. Visual inspection: Perform visual inspections of the work area along with the Project Administrator at each step of the decontamination process.

1. Follow inspection procedures in the American Society for Testing and Material (ASTM) standard for visual inspections, ASTM E1368.

C. Start of Work: Work of this section begins with the cleaning of the Primary Barrier. At start of work the following will be in place:

1. Primary Barrier: Two layers of polyethylene sheeting on floor and one layer on walls.
2. Critical Barrier: An airtight barrier between the Work Area and other portions of the building or the outside.
3. Critical Barrier Sheeting: Over lighting fixtures and clocks, ventilation openings, doorways, convectors, speakers and other openings.
4. Decontamination Units: For personnel and equipment in operating condition.
5. Pressure Differential System: In operation.

3.2 FIRST CLEANING:

A. First Cleaning: Carry out a first cleaning of all surfaces of the work area including items of remaining sheeting, tools, scaffolding and/or staging by use of damp-cleaning and mopping, and/or a High Efficiency Particulate Air (HEPA) filtered vacuum. (Note: A HEPA vacuum may fail if used with wet material.) Do not perform dry dusting or dry sweeping. Use each surface of a cleaning cloth one time only and then dispose of as contaminated waste. Continue this cleaning until there is no visible debris from removed materials or residue on plastic sheeting or other surfaces.

1. Remove All Filters in Air Handling System(s) and dispose of as asbestos-containing waste in accordance with requirements of Section “Disposal of Regulated Asbestos-Containing Material”.

2. After the surfaces have passed a visual inspection verifying that all debris and residue has been removed from the sheet plastic, allow a waiting period that is long enough for the HEPA-filtered fan units operating in the work area to to clean air of airborne asbestos fibers. Use oscillating fans as necessary to assure circulation of air in all parts of work areas during this period. Maintain Pressure Differential System in operation.

3.3 SECOND CLEANING:

A. Second Cleaning: Carry out a second cleaning of all surfaces in the work area in the same manner as the first cleaning.

B. **Visual inspection:** Before the application of any sealer to abated surfaces as a lock-back, perform a visual inspection to determine if all ACM including debris and residue has been removed. Perform visual inspections along with Project Administrator. When the area is visually clean, and if after sweeping of all surfaces with leaf blower, no debris, residue, dust or other material is found, complete the certification at the end of this section. Visual inspection is not complete until confirmed in writing, on the certification, by Project Administrator. After this visual inspection is passed, lock-back sealants can be applied and the work area decontamination process can be initiated.

C. Sealing of substrate: Perform sealing of substrate or installation of spray-applied finishes or fireproofing, where required, at this time. Maintain Pressure Differential System in operation during encapsulation work. Perform work only after meeting the following requirements:

1. Surfaces to be covered with sealer have met the requirements for a visual inspection in this section.
2. Airborne fiber counts in the Work Area are at or below 0.01 fibers per cubic centimeter as measured by phase contrast microscopy.

D. Removal of Primary Barriers:

1. Immediately following the second cleaning of the Primary plastic, remove all Primary Barrier sheeting and Material Decontamination Unit, if there is one, leaving only:

   a. Critical Barrier: Which forms the sole barrier between the Work Area and other portions of the building or the outside.
   b. Critical Barrier Sheeting: Over lighting fixtures and clocks, ventilation openings, doorways, convectors, speakers, and other openings.
   c. Decontamination Unit: For personnel, in operating condition.
   d. Pressure Differential System: Maintain in continuous operation.

3.4 THIRD CLEANING:

A. Third cleaning: Carry out a third cleaning of all surfaces in the work area in the same manner as the first cleaning immediately after removal of Primary plastic. This cleaning is now being applied to existing room surfaces. Take care to avoid water marks or other damage to surfaces.

B. Contractor's Testing: At the completion of the above cleaning visually inspect all surfaces. Reclean if any dust, debris, etc. is found. At completion of this inspection sweep entire Work Area including walls, ceilings, ledges, floors and other surfaces in the Work Area with exhaust from forced-air equipment (leaf blower with approximately 1 horsepower (745.7 watts) electric motor or equivalent). Do not direct forced-air equipment at any seal in any Critical Barrier. If any debris or dust is found repeat the cleaning. Continue this process until no debris dust or other material is found while sweeping of all surfaces with forced-air equipment.

1. Cover carpeting in the work area with 6 mil (0.15 mm) polyethylene during Contractor's testing procedures. Seal plastic to baseboards with duct tape.

C. Cleaning Carpeting: At the completion of cleaning of all surfaces except carpeting, HEPA vacuum carpeting designated to remain in Work Areas using a floor cleaning attachment adjusted so that rubber skirting is in contact with carpet surface. Use a passive (non-power brush type) floor attachment with rubber floor seals and adjustable above-floor height. Completely clean carpeting in one direction with each pass of the floor attachment overlapping the previous pass by one-half the attachment width. At the completion of one such cleaning, vacuum clean in the same manner in a direction at right angles to the initial cleaning. Perform a visual inspection of the carpet at the completion of cleaning, in accordance with inspection standards of the American Society for Testing and Material (ASTM) standard for visual inspections, ASTM E1368.

D. After a visual inspection, again wait for a period of time long enough for the HEPA-filtered fan units operating in the work area to clean air of airborne asbestos fibers. Use oscillating fans as necessary to assure circulation of air in all parts of work areas during this period. Maintain pressure differential system in operation.

3.5 FINAL CLEANING:

A. **Final Cleaning:** Carry out a final cleaning of all surfaces in the Work Area in the same manner as the previous cleaning.

B. **Contractor's Testing:** At the completion of the above cleaning visually inspect all surfaces. Reclean if any dust, debris, etc. is found. At completion of this inspection sweep entire Work Area including walls, ceilings, ledges, floors and other surfaces in the Work Area with exhaust from forced air equipment (leaf blower with approximately 1 horsepower electric motor or equivalent). Do not direct forced air equipment at any seal in any critical barrier. If any debris or dust is found repeat the final cleaning. Continue this process until no debris dust or other material is found while sweeping of all surfaces with forced air equipment.

C. **After a visual inspection**, again wait for a period of time long enough for the HEPA-filtered fan units operating in the work area to clean air of airborne asbestos fibers. Use oscillating fans as necessary to assure circulation of air in all parts of work areas during this period. Maintain pressure differential system in operation.

3.6 VISUAL INSPECTION:

A. **After Final Cleaning Perform a Complete Visual Inspection** of the entire Work Area including: all surfaces, ceiling, walls, floor, decontamination unit, all plastic sheeting, seals over ventilation openings, doorways, windows, and other openings; look for debris from any source, residue on surfaces, dust or other matter. During visual inspection sweep entire work area including walls, ceilings, ledges, floors, and other surfaces in the room with exhaust from forced air equipment (leaf blower with approximately 1 horsepower electric motor or equivalent). If any debris, residue, dust or other matter is found repeat final cleaning and continue decontamination procedure from that point. When the area is visually clean, and if after sweeping of all surfaces with leaf blower, no debris, residue, dust or other material is found, complete the certification at the end of this section. Visual inspection is not complete until confirmed in writing, on the certification, by Project Administrator.

B. **Temporary lighting:** Provide a minimum of 100 foot candles (1075 Lumens / sq meter) of lighting on all surfaces in the areas to be subjected to visual inspection. Provide hand held lights providing 150 foot candles (1600 lumens / sq meter) at 4 feet (1.25 meters) capable of reaching all locations in work area.

C. **Lifts:** Provide ladders, scaffolding, and lifts as required to provide access to all surfaces in the area to be subjected to visual inspection. Access is to allow touching of all surfaces.

3.7 CLEARANCE AIR SAMPLING BY OWNER (TEM):

A. **Transmission Electron Microscopy (TEM):** After the work area is found to be visually clean by Contractor's inspection and testing, TEM air samples will be collected and analyzed by the Owner in accordance with the procedure for Transmission Electron Microscopy set forth in Part 1 of this section. Contractor shall contact Designer 48 hours prior to requesting TEM clearance air sampling.

1. If Release Criteria are not met, repeat Final Cleaning and continue Decontamination procedure from that point.
2. If Release Criteria are met, remove work area isolation in accordance with requirements of this section.

B. 1. If Release Criteria are not met, repeat Final Cleaning and continue Decontamination procedure from that point.

2. If Release Criteria are met, remove work area isolation in accordance with requirements of this section.

NOTE: The Contractor shall compensate the Owner for the costs of failed clearance sampling and associated fees, including but not limited to: laboratory analytical fees, shipping fees, air monitoring technician mileage, air monitoring technician time on site related to air monitoring, air monitoring technician travel time, air monitoring cassettes, per diem, lodging, and pump rental.

3.8 LOCK-BACK:

A. Encapsulation of substrate: Perform encapsulation of substrate or installation of spray-applied finishes or fireproofing, where required, before Removal of Work Area Isolation as specified below. Maintain Pressure Differential System in operation during encapsulation work.

3.9 REMOVAL OF WORK AREA ISOLATION:

A. After all requirements of this section have been met:

1. Shut down and remove the Pressure Differential System. Seal HEPA filtered fan units, HEPA vacuums and similar equipment with 6 mil (0.15 mm) polyethylene sheet and duct tape to form a tight seal at intake end before being moved from Work Area.
2. Remove Personnel Decontamination Unit.
3. Remove the Critical Barriers separating the Work Area from the rest of the building. Remove any small quantities of residual material found upon removal of the plastic sheeting with wet wiping, HEPA filtered vacuum cleaners and local area protection. If significant quantities, as determined by the Designer, are found then the entire area affected shall be decontaminated as specified in Cleaning and Decontamination Procedures.
4. Remove all equipment, materials, debris from the work site.
5. Dispose of all asbestos-containing waste material as specified in Section “Disposal of Regulated Asbestos Containing Material”.

4.0 SUBSTANTIAL COMPLETION OF ABATEMENT WORK:

A. Abatement Work is Substantially Complete upon meeting the requirements of this section including submission of:

1. Certificate of Visual Inspection.

2. Receipts Documenting proper disposal as required by Section “Disposal of Regulated Asbestos-Containing Material”.
3. Punch list detailing repairs to be made and incomplete items.

4.1 CERTIFICATE OF VISUAL INSPECTION:

A. **Following this section is a "Certificate of Visual Inspection".** This certification is to be completed by the Contractor and certified by the Project Administrator. Submit completed Certificate with Application for Final Payment. Final payment will not be made until this Certification is executed.

END OF SECTION - 02 82 08

CERTIFICATION OF VISUAL INSPECTION

In accordance with Section "Project Decontamination" the Contractor hereby certifies that he has visually inspected the Work Area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, Decontamination Unit, sheet plastic, etc.) and has found no dust, debris or residue.

by: (Signature_____ Date_____

(Print Name)_____

(Print Title)_____

PROJECT ADMINISTRATOR CERTIFICATION

The Project Administrator hereby certifies that he has accompanied the Contractor on the Contractor's visual inspection and verifies that this inspection has been thorough and to the best of their knowledge and belief, the Contractor's Certification above is a true and honest one.

by: (Signature)_____ Date_____

(Print Name)_____

(Print Title)_____

SECTION 02 82 13 - RESILIENT FLOORING REMOVAL - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 2 Specification Sections, apply to work of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

A. Asbestos abatement project requirements to be completed prior to start of the work of this section are set forth in the following sections:

1. Temporary Facilities - Asbestos Abatement
2. Temporary Pressure Differential & Air Circulation System
3. Temporary Enclosures - Complete Work Except Delete Floor Plastic.
4. Regulated Areas
5. Worker Protection - Asbestos abatement
6. Respiratory Protection
7. Decontamination Units

B. Asbestos abatement project requirements to be completed at completion of the work of this section are set forth in the following sections:
1. Project Decontamination

1.3 SUBMITTALS:

A. **Before Start of Work:** Submit the following to the Designer for review. Do not start work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use.

1. Wetting Materials: Submit product data, use instructions and recommendations from manufacturer of wetting material (surfactant and/or removal encapsulant) intended for use. Include data substantiating that material complies with requirements.
2. NESHAP Compliance Documentation: Submit manufacturer's documentation for removal encapsulants proposed for use that, to the extent required by this specification, the material, if used in accordance with manufacturer's instructions, will comply with the wetting requirements of National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M).
3. NESHAP Compliance Documentation: Submit written approval from the EPA NESHAP Coordinator, in compliance with applicable requirements of National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M), for the use of shot/bead blast equipment for adhesive removal.
4. Adhesive Removal Solvent: Submit product data, use instructions and recommendations from manufacturer of adhesive removal solvent intended for use. Include data substantiating that material complies with requirements.

B. **Before Start of Work** submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal has been' "Received - Not Reviewed."

1. Material Safety Data Sheet: Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for all materials proposed for use on the work including:

a. Surfactants.

b. Adhesive Removal Solvents.

PART 2 - PRODUCTS

2.1 MATERIALS

A. **Wetting Materials:** For wetting prior to disturbance of asbestos-containing materials use:

1. Amended Water: Where amended water is used, provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the asbestos-containing material (ACM) and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons (19 liters) of water.

2. Removal Encapsulant: Where a removal encapsulant is used, provide a penetrating-type encapsulant designed specifically for removal of ACM. Use a material which results in wetting of the asbestos-containing material and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons (19 liters) of water.

B. **Foam or Viscous Liquid:** Where foam or viscous liquid is used, provide material that contains no organic materials, is non-flammable, presents no physical hazard due to reactivity, presents no acute or chronic health hazard, and does not require special skills, knowledge, or equipment for application.

C. **Tile Adhesive Removal Solvent:** Where tile adhesive removal solvent is used, provide a slow-drying solvent intended to remove tile adhesive. Provide material that is not flammable, does not create combustible vapors and has no significant inhalation hazard.

1. Provide materials that have less than 250 g/l of volatile organic solvents (VOCs).

D. **Polyethylene Sheet:** A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mil (0.15 mm) thick, clear, frosted, or black as indicated.

E. **Polyethylene Sheet:** Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick frosted or black as indicated.

F. **Duct Tape:** Provide duct tape in 2 inch or 3 inch (50 or 75 mm) widths as indicated, with an adhesive formulated for use on sheet polyethylene.

G. **Spray Cement:** Provide, in aerosol cans, spray adhesive which is formulated for use on sheet polyethylene. Provide materials that do not contain methylene chloride.

H. **Disposal Bags:** Provide 6 mil (0.15 mm) thick leak-tight polyethylene bags labeled as required by Section 02084 Disposal of Regulated Asbestos-Containing Material.

I. **Fiberboard Drums:** Provide heavy duty leak-tight fiberboard drums with tight sealing locking metal tops.

J. **Steel Drums:** Provide leak-tight steel drums with tight-sealing locking metal tops.

K. **Injection Molded Plastic Drums:** Provide leak-tight injection-molded plastic drums with tight sealing locking tops.

L. **Paper board Boxes:** Provide heavy-duty corrugated paperboard boxes coated with plastic or wax to retard deterioration from moisture. Provide in sizes that will easily fit in disposal bags.

M. **Polyethylene Boxes:** Provide heavy-duty polyethylene boxes. Provide leak-tight boxes or boxes in sizes that will easily fit in disposal bags.

2.2 PRIMARY RESILIENT FLOORING REMOVAL EQUIPMENT

A. **Manual Spades:**

1. Hand operated scraper/chisels with long handles and replaceable blades for removal of resilient flooring.

2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

a. Crain Cutter Co., Inc. — Various manual scrapers/strippers
156 So. Milpitas Blvd.
Milpitas, CA 95035
408-946-6100

b. Beno J. Gundlach Company — Various manual scrapers/strippers
P.O. Box 544
Belleville, IL 62222
618-233-1781

c. Roofing Equipment, Inc. — Taylor Tools
11075 East 47th Avenue — "Spud Bar" & other manual scrappers/strippers
Denver, CO 80239
303-371-7667

d. Red Devil, Inc. — "The Slam Scraper"
2400 Vauxhall Road
Union, NJ 07083-1933
201-688-6900 or 800-4-A-DEVIL

B. Powered Spades:

1. Long-handled scraper/chisels used in a full-standing position that have replaceable blades and are pneumatically or electrically-powered to move in a reciprocating (in and out) motion.
2. Provide powered spades that are equipped with pneumatic vents and piston seals that prevent compressed air or blow by from sweeping floor.
3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

a.	Aramsco 1655 Imperial Way Thorofare, NJ 08086 800-666-6933	"Air Powered Tile Removal System" - hose - compressor - spade, chisel
b.	Equipment Development Co., Inc. 100 Thomas Johnson Drive Frederick, MD 21701 301-663-1600 or 800-638-EDCO	"A-LR-5"

C. Stripper Machines:

1. These are walking units with blades at the front, driven by electric motors, and move either in a reciprocating (in and out) or an oscillating orbital motion.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

a.	Crain Cutter Co., Inc. 156 So. Milpitas Blvd. Milpitas, CA 95035 408-946-6100	No. 700 "Bearcat" Stripper - without blades - various blades available
b.	Beno J. Gundlach Company P.O. Box 544 Belleville, IL 62222 618-233-1781	No. 500 No. 525
c.	Inventive Manufacturing 1440 South Seneca Wichita, KS 67213 316-267-2443	"The Big Rip-Off"
d.	Palmer Distributing & Sales Co. P.O. Box 6327 Glendale, CA 91225-0327 818-244-7261 or 800-423-2733	Model 460 Model PG 101 Model PG 102
e.	Roofing Equipment, Inc. 11075 East 47th Avenue Denver, CO 80239 303-371-7667	Taylor Tools
f.	Warner Manufacturing 13435 Industrial Park Blvd. Minneapolis, MN 55441 612-559-4740 or 800-328-0606	No. 7079 Warner Floor Stripper

D. Rotary Cutters:

1. Machine with rotating discs facing flat against the floor with spring-loaded cutters that follow the profile of the floor and removes soft resilient materials by cutting them into thin strips and scraping them from the floor.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

a.	Critical Industries, Inc. 5815 Gulf Freeway Houston, TX 77023 800-624-7030	“Strip-Dek" fitted for connection to HEPA Vac

2.3 THERMAL EQUIPMENT WITH AUTOMATIC CONTROL:

A. Thermal Equipment with Automatic Control:

1. Equipment utilizing controlled infrared radiant heat to make the resilient floor tiles and adhesive soft and pliable for removal.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

a.	Enviromethods, Inc. P.O. Box 6151 Wolcott, CT 06716 203-879-5527	"Delta T" series
b.	UAS Automation Systems, Inc. 4524 Parkway Commerce Blvd. Orlando, FL 32808 407/294-8551 or 800/969-8837	"ATR" (Automated Tile Removal) series

2.4 NOT USED

2.5 OTHER TECHNOLOGIES APPLIED TO THE WORK:

A. Rotary Grinders/Surfacers:

1. Machine with discs facing flat against the floor that removes hard materials with a grinding action.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

a.	Allen Engineering Corporation P.O. Box 819 Paragould, AR 72451 501-236-7751 or 800-643-0095	No. 021006 grinders; diamond (wet cut) with dust extraction kit - gasoline, electric, propane
b.	Equipment Development Co. Inc. 100 Thomas Johnson Drive Frederick, MD 21701 301-663-1600 or 800-638-EDCO	EDCO grinders diamond (wet cut) w/HEPA vac connectors models: SEC, 2EC, 2GC, 411

B. Surfacers/Planers/Scarifiers:

1. Machine with a series of small cutters freewheeling on axles mounted on a drum so that the cutters contact the floor surface with a flailing action.

2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

a.	Allen Engineering Corporation P.O. Box 819 Paragould, AR 72451 501-236-7751 or 800-643-0095	"Thunderbird 8" planer w/dust extraction kit "Multi-Duty Planer" diamond head grinder with dust extraction kit
b.	Aurand 1210 Ellis Street Cincinnati, Ohio 45223 513-541-7200	Handheld units (no vac) and small walking units
c.	Bartell Power Products 56 Harvester Avenue Batavia, NY 14020 716-344-0850 or 800-247-8577	"Surface Preparation System" - machine and cutter individually sold Handheld units (2" path, no vac) models SP86, SP86E Walking units (8" path) with dust extractor models B446, 436, 346
d.	Equipment Development Co. Inc. 100 Thomas Johnson Drive Frederick, MD 21701 301-663-1600 or 800-638-EDCO	EDCO various Surfacers/Planers with HEPA vacs - models CPM 4, 8, CPU 10, 10C, 12
e.	SASE Company P.O. Box 81003 Seattle, WA 98108 206-762-0744	VON ARX various Surfacers/Scarifiers

PART 3 - EXECUTION

3.1 RESILIENT FLOOR COVERINGS:

A. Pre-requisite activities: Before starting removal of ACM using the procedures of this section complete work of the following sections:

1. Temporary Facilities - Asbestos Abatement
2. Temporary Pressure Differential & Air Circulation System
3. Temporary Enclosures - Complete work except delete floor plastic.
4. Regulated Areas
5. Worker Protection - Asbestos abatement
6. Respiratory Protection
7. Decontamination Units

B. Preparation: Prior to beginning the removal of any resilient floor covering complete the following:

1. Remove appliances and furniture from the work area.
2. Where detergent is used, mix a detergent solution (16 ounces (0.5 liters) of liquid dishwashing detergent to 1 gallon (4 liters) of warm water) and pour into a garden sprayer.

C. Seal Floor Penetrations: Before using wet methods to remove resilient flooring, seal openings, and penetrations in the floor to prevent water leakage.

D. Remove Resilient Flooring: Use the three step process described in the following sections:

1. First Step: Removal of Resilient Tile Floor Covering, and/or Removal of Resilient Sheet Flooring. This step involves removal of tiles or the wear layer of sheet flooring.
2. Second Step: Removal of Heavy Residue of Adhesive and/or Removal of Residual Backing. This step involves the removal of the bulk of these residual materials.
3. Third Step: Removal of Adhesive Residue. After completion of the first two steps there will be a thin residue of adhesive left on the floor.
4. At the completion of all work, leave the substrate in such a state as to comply with all requirements and recommendations of manufacturer of replacement flooring.

3.2 STEP ONE

REMOVAL OF RESILIENT TILE FLOOR COVERING:

A. Remove resilient tile floor covering using the following procedure:

1. General:
   a. Remove binding strips or other restrictive molding from doorways, walls, etc. clean and dispose of as non-asbestos waste. Dispose of any materials that have glue or floor mastic on them as asbestos-containing waste.
2. Wet Floor:

   a. Wet floor with amended water, removal encapsulant, or detergent solution, so that entire surface is wet. Do not allow to puddle or run off to other areas. If a removal encapsulant is used, use in strict accordance with manufacturer's instructions. Cover with sheet polyethylene to allow humidity to release tile from floor. Allow time for water or removal encapsulant to loosen tiles prior to removal.

   b. Keep floor continuously wet throughout removal operation.

   c. Remove tiles using a manual or powered spade or stripping machine. Continuously mist floor in area where machine is working with amended water, removal encapsulant or detergent solution. Wet any debris generated as necessary to keep continuously wet. Keep floor where tile has been removed continuously wet until after completion of heavy adhesive residue removal.

3. Where Foam or Viscous Liquid is used:

   a. Distribute dry foam in a uniform manner over floor. Use sufficient powder to form 1 inch (25 mm) of foam. Wet powder to produce foam. Add additional powder and wet as necessary to maintain 1 inch (25 mm) of foam during the entire removal process.

   b. Remove tiles using a manual or powered spade or stripping machine. Add additional dry foam powder and wet as necessary to maintain 1 inch (25 mm) of foam during the entire removal process. Maintain layer of foam on floor where tile has been removed until after completion of heavy adhesive residue removal.

B. Debris and Waste

1. Dispose of all materials in accordance with Section “Disposal of Regulated Asbestos containing Material”.

3.3 NOT USED

3.4 STEP TWO - REMOVAL OF HEAVY RESIDUE OF ADHESIVE:

A. Remove the heavy residue of adhesive left after removal of resilient tile flooring using the following procedure. If the residual adhesive is sufficiently thin that the mastic can be effectively removed, this step may be skipped and step three started.

1. Dampen Floor
   a. Dampen floor by misting with amended water, removal encapsulant, or detergent solution so that entire surface is wet. Do not allow to puddle or run off to other areas. If a removal encapsulant is used, use in strict accordance with manufacturer's instructions.
   b. Keep floor continuously damp throughout removal operation.

2. Where Foam or Viscous Liquid is used:
   a. Add additional foam dry powder and wet as necessary to maintain 1 inch (25 mm) of foam during the entire removal process.

3. Adhesive Removal:
   a. Begin removal at a point farthest from the entrance to the work area. Work of this step may proceed concurrently with work of removal of tile.
   b. Remove heavy residue of adhesive backing. Continuously mist floor in area where machine is working with amended water, removal encapsulant or detergent solution. Wet any debris generated as necessary to keep continuously wet.

4. Disposal and Debris
   a. Dispose of all materials in accordance with Section “Disposal of Regulated Asbestos Containing Material”.

5. Wet vacuum standing water with HEPA wet/dry vacuum.

6. Mop floor with amended water, removal encapsulant, or liquid detergent solution to remove all debris and residue.

7. Continue the above steps until the adhesive is sufficiently reduced in thickness that it can be effectively removed.

8. Start in the corner of the room farthest from the entrance door and moisten an area of the adhesive approximately 3 by 10 feet (1 m by 3 m) with amended water, removal encapsulant, or detergent solution. Wet scrape with a stiff-bladed wall or floor scraper removing ridges and any loose adhesives until only a thin smooth film remains. Where deposits are heavy or difficult to scrape, heat with a hot-air blower prior to scraping.
   a. Dispose of all materials in accordance with Section 02084 Disposal of Regulated Asbestos Containing Material.

9. Wet vacuum standing water with HEPA wet/dry vacuum.

10. Mop floor with amended water, removal encapsulant, or liquid detergent solution to remove all debris and residue.

11. Continue the above steps until the adhesive is sufficiently reduced in thickness that it can be effectively removed.

3.5 NOT USED

3.6 STEP THREE - REMOVAL OF ADHESIVE RESIDUE:

A. After removal of resilient flooring and any heavy residue of adhesive, mastic, or backing material, in the previous step, remove all residue of adhesive from the floor using one of the methods described in the paragraphs below. Prior to beginning removal of adhesive residue, allow floor to dry after completion of the wet removal procedures used in previous steps. Begin removal at a point farthest from the entrance to the work area.

3.7 NOT USED
3.8 NOT USED

3.9 ADHESIVE SOLVENT:

A. **Adhesive:** Where solvents are used, remove adhesive residue by using adhesive removal solvents. Use solvents in accordance with manufacturers' instructions. Saturate adhesive with removal solvent and allow adhesive to soften. Remove by scraping, wet sanding, or wet scrub with floor cleaning machine with abrasive pad. Provide worker protection as required by material safety data sheet (MSDS) for any material used.

1. Mop floor with removal solvent as required by manufacturer's directions as required to completely remove all residue of adhesive.

2. Clean Floor after completion of removal of ACM by wet mopping with amended water. Mop three times allowing a drying time between each mopping.

3. Encapsulate cleaned floor with one coat of an encapsulant. Use an encapsulant that has been determined not to prevent the bond of new resilient flooring. Follow manufacturer's recommendations for new floor covering installation.

4. Dispose of all rags, plastic sheet, etc. in accordance with requirements of Section "Disposal of Regulated Asbestos-Containing Material".

B. Decontaminate Equipment: After the completion of all work, decontaminate all equipment and machinery used for work of this section. Accomplish decontamination as required by the section on Project Decontamination.

3.10 WORK AREA CLEARANCE:

A. After completion of all resilient flooring and adhesive removal work and prior to removal of critical barriers, decontamination units, and shut down of pressure differential and ventilation system; complete project decontamination and clearance in accordance with section "Project Decontamination."

END OF SECTION 02 82 13

SECTION 02 82 15 - REMOVAL OF ASBESTOS-CONTAINING MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 02 Specification Sections, apply to work of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

A. Worker Protection requirements are set forth in Section Worker Protection - Asbestos abatement.

B. Installation of Critical and Primary Barriers, and Work Area Isolation Procedures are set forth in Section Temporary Enclosures.

C. Project Decontamination procedures after removal of the Secondary Barrier are specified in Section Project Decontamination.

D. Disposal of asbestos-containing waste is specified in Section Disposal of Regulated Asbestos-Containing Material.

E. Omitted intentionally.

1.3 SUBMITTALS:

A. **Before Start of Work:** Submit the following to the Engineer for review. Do not start work until these submittals are returned with Engineer's action stamp indicating that the submittal is returned for unrestricted use.

1. **Surfactant:** Submit product data, use instructions and recommendations from manufacturer of surfactant intended for use. Include data substantiating that material complies with requirements.
2. **Removal Encapsulant:** Submit product data, use instructions and recommendations from manufacturer of removal encapsulant intended for use. Include data substantiating that material complies with requirements.
3. **NESHAP Certification:** Submit certification from manufacturer of surfactant or removal encapsulant that, to the extent required by this specification, the material, if used in accordance with manufacturer's instructions, will wet Asbestos-Containing Materials (ACM) to which it is applied as required by the National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M).

B. Before Start of Work submit the following to the Engineer for review. Do not begin work until these submittals are returned with the Engineer's action stamp indicating that the submittal has been' "Received-Not Reviewed."

1. **Material Safety Data Sheet:** Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for the following

i. Surfactants.
ii. Encapsulants.
iii. Solvents.

PART 2 - PRODUCTS:

2.1 MATERIALS

A. Wetting Materials: For wetting prior to disturbance of ACM use either amended water or a removal encapsulant:

B. Amended Water: Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons (19 liters) of water.

C. Removal Encapsulant: Provide a penetrating type encapsulant designed specifically for removal of ACM. Use a material which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of a mixture of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether in five gallons (19 liters) of water.

D. Polyethylene Sheet: A single polyethylene film in the largest sheet size practicable to minimize seams, 6.0 mil (0.15 mm) thick clear, frosted, or black as indicated.

E. Polyethylene Sheet: Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick frosted or black as indicated.

F. Duct Tape: Provide duct tape in 2-inch or 3-inch (50mm or 75 mm) widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

G. Spray Cement: Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

H. Disposal Bags: Provide 6 mil (0.15 mm) thick leak-tight polyethylene bags labeled as required by Section Disposal of Regulated Asbestos Containing Material.

I. Omitted intentionally.

J. Omitted intentionally.

K. Felt: Standard felt approximately 1/16 inch (1.6 mm) thick and 36 inches (900 mm) to 72 inches (1800 mm) in width.

PART 3 - EXECUTION

3.1 SECONDARY BARRIER:

Secondary Barrier: Over the Primary Barrier, install as a drop cloth a clear 6 mil (0.15 mm) sheet plastic in all areas where asbestos removal work is to be carried out. Completely cover floor with sheet plastic. Where the work is within 10 feet (3 m) of a wall extend the Secondary Barrier up wall to ceiling. Support sheet plastic on wall with duct tape, seal top of Secondary plastic to Primary Barrier with duct tape so that debris is unable to get behind it. Provide cross strips of duct tape at wall support as necessary to support sheet plastic and prevent its falling during removal operations.

A. Install Secondary Barrier at the beginning of each work shift. Install only sufficient plastic for work of that shift.

B. Remove Secondary Barrier at end of each work shift or as work in an area is completed. Fold plastic toward center of sheet and pack in disposal bags. Keep material on sheet continuously wet until bagged.

C. Install Walkways of black 6 mil (0.15 mm) plastic between active removal areas and decontamination units to protect Primary Layer from tracked material. Install walkways at the beginning of, and remove at the end of, each work shift.

3.2 WORKER PROTECTION:

Before beginning work with any material for which a Material Safety Data Sheet has been submitted provide workers with the required protective equipment. Require that appropriate protective equipment be used at all times.

3.3 WET REMOVAL:

A. Thoroughly wet to satisfaction of Engineer ACM to be removed prior to stripping and/or tooling to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of amended water or removal encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for amended water or removal encapsulant to penetrate material thoroughly. If amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions. Perforate outer covering of any installation which has been painted and/or jacketed in order to allow penetration of amended water or removal encapsulant, or use injection equipment to wet material under the covering. Where necessary, carefully strip away while simultaneously spraying amended water or removal encapsulant on the installation to minimize dispersal of asbestos fibers into the air.
   1. Mist work area continuously with amended water whenever necessary to reduce airborne fiber levels.
   2. Remove saturated ACM in small sections from all areas. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into disposal bags. Twist neck of bags, bend over and seal with minimum three wraps of duct tape. Clean outside and move to Wash Down Station adjacent to Material Decontamination Unit.

B. Not Used

C. Not Used

D. Not used

3.4 Omitted intentionally.

3.5 Omitted intentionally.

3.6 Omitted intentionally.

3.7 Omitted intentionally.

END OF SECTION 02 82 15

SECTION 02 82 16 - BUILDING COMPONENT DEMOLITION-ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 2 Specification Sections, apply to work of this section.

1.2 DESCRIPTION OF THE WORK

A.The work of this Section includes the demolition of buildings and installations where asbestos containing materials are present.

1.3 RELATED WORK SPECIFIED ELSEWHERE:

A.Work to be completed prior to start of the work of this section are set forth in the following sections:
1. Worker Protection - Asbestos abatement
2. Respiratory Protection
3. Decontamination Units

B. Section "Disposal of Regulated Asbestos-Containing Material" describes the handling and disposal of asbestos-containing waste.

C. Section "Hazardous Waste Management" describes the management and disposal of hazardous waste such as PCB Ballasts, fluorescent light tubes, and mercury containing thermostats encountered during the work of this section.

1.4 SUBMITTALS:

A. Before Start of Work: Submit the following to the Engineer for review. Do not start work until these submittals are returned with Engineer's action stamp indicating that the submittal is returned for unrestricted use.

1. Surfactant: Submit product data, use instructions and recommendations from manufacturer of surfactant intended for use. Include data substantiating that material complies with requirements.

2. Removal Encapsulant: Submit product data, use instructions and recommendations from manufacturer of removal encapsulant intended for use. Include data substantiating that material complies with requirements.

3. NESHAP Certification: Submit certification from manufacturer of surfactant or removal encapsulant that, to the extent required by this specification, the material, if used in accordance with manufacturer's instructions, will wet asbestos-containing materials (ACM) to which it is applied as required by the National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M).

B. Before Start of Work submit the following to the Engineer for review. Do not begin work until these submittals are returned with the Engineer's action stamp indicating that the submittal has been' "Received - Not Reviewed."

1. Material Safety Data Sheet: Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for the following:
a.Surfactants.
b.Encapsulants.

PART 2 - PRODUCTS:

2.1 MATERIALS

A. Wetting Materials: For wetting prior to disturbance of ACM use either amended water or a removal encapsulant.

B. Amended Water: Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons of water.

C. Removal Encapsulant: Provide a penetrating type encapsulant designed specifically for removal of ACM. Use a material which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of 50 percent polyoxyethylene ester and50 percent polyoxyethylene ether mixed with five gallons of water.

D. Reinforced Polyethylene Sheet: Where plastic sheet is the only separation between the Work Area and building exterior, provide translucent, nylon reinforced, laminated, flame resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil (0.15 mm) thick, frosted or black as indicated.

E. Duct Tape: Provide duct tape in 2 inch or 3 inch (51 mm or 76 mm) widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

F.Spray Cement: Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

PART 3 - EXECUTION

3.1 WORKER PROTECTION:

A. Before beginning work with any material for which a Material Safety Data Sheet has been submitted provide workers with the required protective equipment. Require that appropriate protective equipment be used at all times.

3.2 REMOVAL OF ARCHITECTURAL FINISHES, FIREPROOFING, AND THERMAL SYSTEM INSULATION:

A. Isolate Work Area: from the building exterior and other portions of the building. Where existing walls, doors, windows, or other such closure is missing, seal openings
with polyethylene sheet at least 6 mil (0.15 mm) in thickness, mechanically fastened in
place and sealed with duct tape or spray glue. Seal broken windows or other openings to
the building exterior with nylon-reinforced plastic.

B. Drop Cloth: Install a drop cloth consisting of clear 6 mil (0.15 mm) sheet plastic in any area where asbestos removal work is to carried out.

C. Adequately wet ACM to be removed prior to stripping and/or tooling to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of water, amended water or removal encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for water, amended water or removal encapsulant to penetrate material thoroughly. If water or amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's instructions. Perforate outer covering of any installation which has been painted and/or jacketed in order to allow penetration of water, amended water or removal encapsulant, or where necessary, carefully strip away while simultaneously wetting the installation to minimize dispersal of asbestos fibers into the air.

D. Remove Saturated ACM in small sections from all areas. Scrape materials from substrate and remove residue using nylon bristled hand brush. Remove materials in manageable quantities and control the descent to staging or floor below. If height is over 20' use drop chute to contain material during descent. If using water or

amended water spray mist continuously during work process. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into disposal bags. Seal bags, clean outside and move to washdown station adjacent to Material Decontamination Unit.

E. At Completion of Removal Work: Clean all surfaces in the removal area by wet wiping, HEPA vacuuming or washing down with hoses. Clean from top down. At Contractor's option a proportional feed nozzle may be used to add a surfactant to the water. Collect any water runoff and filter through a dual filtration system. Provide first filter that removes fibers 20 microns and larger, and a final filter that removes all fibers 5 microns and larger.

F. Visual Inspection: Visually inspect work area for debris. If any visible debris is noted, clean all surfaces in the Work Area again. Continue this procedure until no visible debris is found in the Work Area.

G. Final Air Testing: If the Work Area is to remain unoccupied prior to demolition or be occupied only by workers wearing the proper respiratory protection then final air testing is unnecessary. If the area is to be occupied prior to demolition by workers not wearing proper respiratory protection, clear the Work Area in accordance with requirements of section “Project Decontamination”.

3.3 HAZARDOUS WASTE MANAGEMENT AND DISPOSAL.

A. Manage and dispose of hazardous waste such as PCB ballasts, fluorescent light tubes, and mercury thermostats in accordance with the requirements of Section 02086 - Hazardous Waste Management.

B. Do not mix potentially hazardous waste streams. Where feasible, separate each type of hazardous waste from other types of hazardous wastes, from asbestos waste and from construction waste.

C. Segregate, package, label, transport and dispose of Hazardous Waste in accordance with DOT, EPA, State and Local regulations.

3.4 DISPOSAL OF WASTE:

A. Pack: All asbestos-containing or contaminated waste material in bags marked as required by Section “Disposal of Regulated Asbestos-Containing Material”.

3.5 REMOVAL OF COMPLETE SYSTEMS:

A. Before Starting Work of This Section: Complete the work set forth in the following specification sections:

1. Regulated Areas
2. Worker Protection
3. Respiratory Protection

B. Completely Seal all components to be removed in 6 mil (0.15 mm) polyethylene sheet sealed with duct tape. Candy stripe surface of plastic as reinforcement. Wrap large items such as boilers, tanks, and converters with nylon reinforced sheet plastic. Install sheet plastic to allow cutting of components into sections where this is necessary for the work.

C. Remove ACM where necessary to allow the cutting components into sections using the procedures set forth in these Specifications.

D. Remove Components: In largest sections possible.

END OF SECTION – 02 82 16

SECTION 02 82 17 REMOVAL AND DISPOSAL OF LEAD-CONTAINING PAINT

PART 1 GENERAL

1.1 SUMMARY

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z9.2	1979 Fundamentals Governing the Design and Operation of Local Exhaust Systems
ANSI Z88.2	1980 Respiratory Protection

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.134	Respiratory Protection
29 CFR 1926.62	Lead
29 CFR 1910.1200	Hazard Communication
29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists
29 CFR 1926.57	Ventilation
29 CFR 1926.62	OSHA Lead Standard
40 CFR 260	Hazardous Waste Management Systems: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Generators of Hazardous Waste
40 CFR 263	Transporters of Hazardous Waste
40 CFR 264	Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 268	Land Disposal Restrictions
49 CFR 172	Hazardous Materials Tables and Hazardous Materials Communications Regulations
49 CFR 178	Shipping Container Specification

MILITARY SPECIFICATIONS (MIL)

MIL-A-22262	(Rev. A) (Am. 2) Abrasive Blasting Media Ship Hull Blast Cleaning

UNDERWRITERS LABORATORIES INC. (UL)

UL 586	1990 High-Efficiency, Particulate, Air Filter Units

1.3 DEFINITIONS

1.3.1 Action Level

A. Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period. As used in this section, "30 micrograms per cubic meter of air" refers to the action level.

1.3.2 Area Monitoring

A. Sampling of lead concentrations within the lead control area and inside the physical boundaries which is representative of the airborne lead concentrations which may reach the breathing zone of personnel potentially exposed to lead.

1.3.3 Physical Boundary

A. Area physically roped or partitioned off around an enclosed lead control area to limit unauthorized entry of personnel. As used in this section, "inside boundary" shall mean the same as "outside lead control area."

1.3.4 Certified Industrial Hygienist (CIH)

A. As used in this section, refers to an Industrial Hygienist employed by the Contractor and is certified by the American Board of Industrial Hygiene in comprehensive practice.

1.3.5 Change Rooms and Shower Facilities

A. Rooms within the designated physical boundary around the lead control area equipped with separate storage facilities for clean protective work clothing and equipment and for street clothes which prevent cross-contamination.

1.3.6 Decontamination Room

A. Room for removal of contaminated personal protective equipment (PPE).

1.3.7 Eight-Hour Time Weighted Average (TWA)

A. Airborne concentration of lead averaged over an 8-hour workday to which an employee is exposed.

1.3.8 High Efficiency Particulate Air (HEPA) Filter Equipment

A. HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint dust. A high efficiency particulate filter means 99.97 percent efficient against 0.3 micron size particles.

1.3.9 Lead

A. Metallic lead, inorganic lead compounds, and organic lead soaps. Excluded from this definition are other organic lead compounds.

1.3.10 Lead Control Area

A. An enclosed area or structure with full containment to prevent the spread of lead dust, paint chips, or debris of lead-containing paint removal operations. The lead control area is isolated by physical boundaries to prevent unauthorized entry of personnel.

1.3.11 Lead Permissible Exposure Limit (PEL)

A. Fifty micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than 8 hours in a work day, the PEL shall be determined by the following formula:

PEL (micrograms/cubic meter of air) = 400/No. hrs worked per day

1.3.12 Personal Monitoring

A. Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with 29 CFR 1926.62. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and the center at the nose or mouth of an employee.

1.4 QUALITY ASSURANCE

1.4.1 Medical Examinations

A. Before exposure to lead-contaminated dust, provide workers with a comprehensive medical examination as required by 29 CFR 1926.62 and 29 CFR 1910.1200. The examination will not be required if adequate records show that employees have been examined as required by 29 CFR 1926.62 within the last year.

1.4.1.1 Medical Records

A. Maintain complete and accurate medical records of employees for a period of at least 40 years or for the duration of employment plus 20 years, whichever is longer.

1.4.2 CIH Responsibilities

a. Certify training.
b. Review and approve lead-containing paint removal plan for conformance to the applicable referenced standards.
c. Inspect lead-containing paint removal work for conformance with the approved plan.
d. Direct monitoring.
e. Ensure work is performed in strict accordance with specifications at all times.
f. Ensure hazardous exposures to personnel and to the environment are adequately controlled at all times.

1.4.3 Training

A. Train each employee performing paint removal, disposal, and air sampling operations prior to the time of initial job assignment, in accordance with 29 CFR 1926.62.

1.4.3.1 Training Certification

A. Submit certificates signed and dated by the CIH and by each employee stating that the employee has received training.

1.4.4 Respiratory Protection Program

A. Furnish each employee required to wear a negative pressure respirator or other appropriate type with a respirator fit test at the time of initial fitting and at least every 6 months thereafter as required by 29 CFR 1926.62.
B. Establish and implement a respiratory protection program as required by ANSI Z88.2, 29 CFR 1910.134, 29 CFR, 1926.62, and 29 CFR 1926.55.

1.4.5 Hazard Communication Program

A. Establish and implement a Hazard Communication Program as required by 29 CFR 1910.1200.

1.4.6 Hazardous Waste Management

A. The Hazardous Waste Management plan shall comply with applicable requirements of federal, state, and local hazardous waste regulations and address:
1. Identification of hazardous wastes associated with the work.
2. Estimated quantities of wastes to be generated and disposed of.
3. Names and qualifications of each contractor that will be transporting, storing, treating, and disposing of the wastes. Include the facility location and a 24-hour point of contact. Furnish two copies of EPA, state, and local hazardous waste permit applications permits and EPA Identification numbers.
4. Names and qualifications (experience and training) of personnel who will be working on-site with hazardous wastes.
5. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.
6. Spill prevention, containment, and cleanup contingency measures to be implemented.
7. Work plan and schedule for waste containment, removal and disposal. Wastes shall be cleaned up and containerized daily.
8. Cost for hazardous waste disposal according to this plan.

1.4.7 Safety and Health Compliance

A. In addition to the detailed requirements of this specification, comply with laws, ordinances, rules, and regulations of federal, state, and local authorities regarding removing, handling, storing, transporting, and disposing of lead waste materials. Comply with the applicable requirements of the current issue of 29 CFR 1926.62. Submit matters regarding interpretation of standards to the Owner for resolution before

starting work. Where specification requirements and the referenced documents vary, the most stringent requirement shall apply. The following local laws, ordinances, criteria, rules and regulations regarding removing, handling, storing, transporting, and disposing of lead-contaminated materials apply:

1. Chapter 15-A of Title 30 of the Louisiana Revised Statues; Lead Hazard Reduction, Licensure and Certification.

1.4.8 Pre-Construction Conference

A. Along with the CIH, meet with the Owner's Representatives to discuss in detail the lead-containing paint removal work plan, including work procedures and precautions for the work plan.

1.5 SUBMITTALS

A. Submit the following in accordance with Section 01301, "Submittals."

1.5.1 Manufacturer's Catalog Data

A. Vacuum filters
B. Respirators

1.5.2 Instructions

A. Paint removal materials. Include applicable material safety data sheets.

1.5.3 Statements

A. Qualifications of CIH
B. Testing laboratory qualifications
C. Lead-containing paint removal plan
D. Rental equipment notification
E. CIH approval of work plan (signature, date, and certification number)
F. Respiratory protection program
G. Hazard communication program
H. EPA approved hazardous waste treatment or disposal facility for lead disposal
I. Hazardous waste management plan.
J. Written Lead Compliance Program.

1.5.3.1 Qualifications of CIH

A. Submit name, address, and telephone number of the CIH selected to perform responsibilities in paragraph entitled "CIH Responsibilities." Provide previous experience of the CIH. Submit proper documentation that the Industrial Hygienist is certified by the American Board of Industrial Hygiene in comprehensive practice, including certification number and date of certification/recertification.

1.5.3.2 Testing Laboratory

A. Submit the name, address, and telephone number of the testing laboratory selected to perform the monitoring, testing, and reporting of airborne concentrations of lead. Provide proper documentation that persons performing the analysis have been judged proficient by successful participation within the last year in the National Institute for Occupational Safety and Health (NIOSH) Proficiency Analytical Testing (PAT) Program. The laboratory shall be accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA documentation along with date of accreditation/reaccreditation.

1.5.3.3 Lead-Containing Paint Removal Plan

A. Submit a detailed job-specific plan of the work procedures to be used in the removal of lead-containing paint. The plan shall include a sketch showing the location, size, and details of lead control areas, location and details of decontamination rooms, change rooms, shower facilities, and mechanical ventilation system. Include in the plan, eating, drinking, smoking and restroom procedures, interface of trades, sequencing of lead related work, collected wastewater and paint debris disposal plan, air sampling plan, respirators, protective equipment, and a detailed description of the method of containment of the operation to ensure that airborne lead concentrations of 30 micrograms per cubic meter of air are not exceeded outside of the lead control area. Include air sampling, training and strategy, sampling methodology, frequency, duration of sampling, and qualifications of air monitoring personnel in the air sampling portion of the plan.

1.5.4 Field Test Reports

A. Monitoring Results

1.5.4.1 Air Monitoring

A. Submit monitoring results to the Owner within 3 working days, signed by the testing laboratory employee performing the air monitoring, the employee that analyzed the sample, and the CIH.

1.5.5 Certificates

A. Vacuum filters

1.5.6 Records

A. Completed and signed hazardous waste manifest from treatment or disposal facility
B. Certification of medical examinations
C. Employee training certification

1.6 REMOVAL

1.6.1 Title to Materials

A. Materials resulting from demolition work, except as specified otherwise, shall become the property of the Contractor and shall be disposed of in accordance with Section 02070, "Demolition and Removal," except as specified herein.

1.7 EQUIPMENT

A. Furnish the Owner with six complete sets of personal protective equipment daily, as required herein, for entry into and inspection of the paint removal work within the lead-controlled area. Personal protective equipment shall include fitted respirators and disposable whole body covering, including appropriate foot, head, and hand protection. PPE shall remain the property of the Contractor.

1.7.1 Respirators

A. Furnish appropriate respirators approved by NIOSH for use in atmospheres containing lead dust. Respirators shall comply with the requirements of 29 CFR 1926.62.

1.7.2 Special Protective Clothing

A. Furnish personnel who will be exposed to lead-contaminated dust with appropriate disposable protective whole-body clothing, head covering, gloves, and foot coverings. Furnish appropriate disposable plastic or rubber gloves to protect hands. Reduce the level of protection only after obtaining approval from the CIH.

1.7.3 Rental Equipment Notification

A. If rental equipment is to be used during lead-containing paint handling and disposal, notify the rental agency in writing concerning the intended use of the equipment. Furnish a copy of the written notification to the Owner.

1.7.4 Vacuum Filters

A. UL 586 labeled HEPA filters.

PART 2 PRODUCTS

2.1 PAINT REMOVAL PRODUCTS

A. Submit applicable Material Safety Data Sheets for paint removal products used in paint removal work. Use the least toxic product acceptable to the Industrial Hygienist.

2.2 Abrasive Materials

A. Abrasive blasting materials shall meet the requirements of MIL-A-22262 for limits on chemical composition and hazardous material ingredients.

2.2.1 Limits on the Composition of Abrasive Materials

A. The soluble metal content and the total metal content shall not exceed values which would cause a material to be classified as a hazardous waste as specified in MIL-A-22262.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Notification

A. Notify the Owner and Wynn L. White Consulting Engineers, Inc. two weeks prior to the start of any paint removal work.

3.1.2 Lead Control Area Requirements

A. Establish a lead control area by completely enclosing with containment screens, the area or structure where lead-containing paint removal operations will be performed.
B. Contain removal operations by the use of a negative pressure full containment system with at least one change room and with HEPA filtered exhaust.

3.1.3 Protection of Existing Work to Remain

A. Perform paint removal work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better.

3.1.4 Boundary Requirements

A. Provide physical boundaries around the lead control area by roping off the area or providing curtains, portable partitions or other enclosures to ensure that airborne concentrations of lead will not reach 30 micrograms per cubic meter of air outside of the lead control area.

3.1.5 Furnishings

A. The Owner will remove furniture and equipment from the work area before lead-containing paint removal work begins.

3.1.6 Heating, Ventilating and Air Conditioning (HVAC) Systems

A. Shut down, lock out, and isolate HVAC systems that supply, exhaust, or pass through the lead control areas. Seal intake and exhaust vents in the lead control area with 6-mil plastic sheet and tape. Seal seams in HVAC components that pass through the lead control area.

3.1.7 Change Room and Shower Facilities

A. Provide clean change rooms and shower facilities within the physical boundary around the designated lead control area in accordance with requirements of 29 CFR 1926.62.

3.1.8 Mechanical Ventilation System

A. Use adequate ventilation to control personnel exposure to lead in accordance with 29 CFR 1926.57.
B. To the extent feasible, use fixed local exhaust ventilation connected to HEPA filters or other collection systems, approved by the industrial hygienist. Local exhaust ventilation systems shall be designed, constructed, installed, and maintained in accordance with ANSI Z9.2.

C. If air from exhaust ventilation is recirculated into the work place, the system shall have a high efficiency filter with reliable back-up filter and controls to monitor the concentration of lead in the return air and to bypass the recirculation system automatically if it fails. Air may be recirculated only where exhaust to the outside is not feasible.

3.1.9 Personnel Protection

A. Personnel shall wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking is not permitted in the lead control area. No one will be permitted in the lead control area unless they have been given appropriate training and protective equipment.

3.1.10 Warning Signs

A. Provide warning signs at approaches to lead control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs shall comply with the requirements of 29 CFR 1926.62.

3.2 WORK PROCEDURES

A. Perform removal of lead-containing paint in accordance with approved lead-containing paint removal plan. Use procedures and equipment required to limit occupational and environmental exposure to lead when lead-containing paint is removed in accordance with 29 CFR 1926.62, except as specified herein. Dispose of removed paint chips and associated waste in compliance with Environmental Protection Agency (EPA), federal, state, and local requirements.

3.2.1 Personnel Exiting Procedures

A. Whenever personnel exit the lead-controlled area, they shall perform the following procedures and shall not leave the work place wearing any clothing or equipment worn during the work day:

1. Vacuum themselves off.

2. Remove protective clothing in the decontamination room, and place them in an approved impermeable disposal bag.

3. Shower.

4. Change to clean clothes prior to leaving the physical boundary designated around the lead-contaminated job site.

3.2.2 Monitoring

A. Monitoring of airborne concentrations of lead shall be in accordance with 29 CFR 1926.62 and as specified herein. Air monitoring, testing, and reporting shall be performed by a CIH or an Industrial Hygiene (IH) Technician who is under the direction of the CIH.

1. The CIH or the IH Technician under the direction of the CIH shall be on the jobsite directing the monitoring, and inspecting the lead-containing paint removal work to ensure that the requirements of the Contract have been satisfied during the entire lead-containing paint removal operation.

a. Take personal air monitoring samples on employees who are anticipated to have the greatest risk of exposure as determined by the CIH. In addition, take air monitoring samples on at least 25 percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.

b. Submit results of air monitoring samples, signed by the CIH, within 48 hours after the air samples are taken. Notify the Owner immediately of exposure to lead at or in excess of the action level of 30 micrograms per cubic meter of air outside of the lead control area.

3.2.2.1 Monitoring During Paint Removal Work

A. Perform personal and area monitoring during the entire paint removal operation. Sufficient area monitoring shall be conducted at the physical boundary to ensure unprotected personnel are not exposed above 30 micrograms per cubic meter of air at all times. If the outside boundary lead levels are at or exceed 30 micrograms per cubic meter of air, work shall be stopped and the CIH shall immediately correct the condition(s) causing the increased levels and notify the Owner immediately. The CIH shall review the sampling data collected on that day to determine if condition(s) requires any further change in work methods. Removal work shall resume when approval is given by the CIH. The Contractor shall control the lead level outside of the work boundary to less than 30 micrograms per cubic meter of air at all times. As a minimum, conduct area monitoring daily on each shift in which lead paint removal operations are performed in areas immediately adjacent to the lead control area. For outdoor operations, at least one sample on each shift shall be taken on the downwind side of the lead control area. If adjacent areas are contaminated, clean and visually inspect contaminated areas. The CIH shall certify that the area has been cleaned of lead contamination.

3.3 LEAD-CONTAINING PAINT REMOVAL

3.3.1 Indoor Lead Paint Removal

3.3.1.1 Selection

A. Select paint removal processes to minimize contamination of work areas with lead-contaminated dust or other lead-contaminated debris/waste. This paint removal process should be described in the lead-containing paint removal plan.

3.3.1.2 Mechanical Paint Removal and Blast Cleaning

A. Perform mechanical paint removal and blast cleaning in lead control areas using negative pressure full containments with HEPA filtered exhaust. Collect paint residue and spent grit (used abrasive) from blasting operations for disposal in accordance with EPA, state and local requirements.

3.4 SURFACE PREPARATIONS

A. Avoid flash rusting or other deterioration of the substrate.

3.5 CLEANUP AND DISPOSAL

3.5.1 Cleanup

A. Maintain surfaces of the lead control area free of accumulations of paint chips and dust. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use compressed air to clean up the area. At the end of each shift and when the paint removal operation has been completed, clean the area of visible lead paint contamination by vacuuming with a HEPA filtered vacuum cleaner and wet mopping the area.

3.5.2 Certification

A. The CIH shall certify in writing that the inside and outside the lead control area air monitoring samples are less than 30 micrograms per cubic meter of air, the respiratory protection for the employees was adequate, the work procedures were performed in accordance with 29 CFR 1926.62, and that there were no visible accumulations of lead-contaminated paint and dust on the worksite. Do not remove the lead control area or roped-off boundary and warning signs prior to the Owner's receipt of the CIH's certification. Reclean areas showing dust or residual paint chips.

3.5.3 Testing of Lead-Containing Paint Residue and Used Abrasive

A. Where indicated or when directed by the Owner's Representative, test lead containing paint residue and used abrasive in accordance with 40 CFR 261 for hazardous waste.

3.5.4 Disposal

A. Collect lead-contaminated waste, scrap, debris, bags, containers, equipment, and lead-contaminated clothing which may produce airborne concentrations of lead particles. Label the containers in accordance with 29 CFR 1926.62. Dispose of lead-contaminated waste material at an approved hazardous waste treatment, storage, or disposal facility.

B. Store waste materials in U.S. Department of Transportation (49 CFR 178) approved 55-gallon drums. Properly label each drum to identify the type of waste (49 CFR 172) and the date the drum was filled. The Owner's Representative or an authorized representative will assign an area for interim storage of waste-containing drums. Do not store hazardous waste drums in interim storage longer than 90 calendar days from the date affixed to each drum.

C. Handle, store, transport, and dispose lead or lead-contaminated waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, and 40 CFR 265. Comply with land disposal restriction notification requirements as required by 40 CFR 268.

3.5.5 Disposal Documentation

A. Submit written evidence that the hazardous waste treatment, storage, or disposal facility (TSD) is approved for lead disposal by the EPA and state or local regulatory agencies. Submit one copy of the completed manifest, signed and dated by the initial transporter in accordance with 40 CFR 262.

3.5.6 Payment for Hazardous Waste

A. Payment for disposal of hazardous waste will not be made until a signed copy of the manifest from the treatment or disposal facility certifying the amount of lead-containing materials delivered is returned and a copy is furnished to the Owner.

END OF SECTION 02 82 17

SECTION 02 82 35 - DISPOSAL OF REGULATED ASBESTOS-CONTAINING MATERIAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. **Drawings and general provisions of Contract**, including General and Supplementary Conditions and Division-2 Specification Sections, apply to work of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

A. **Worker protection requirements** are set forth in Section Worker Protection - Asbestos abatement

B. **Section Codes, Regulations and Standards - Asbestos Abatement** describes applicable federal, state and local regulations.

1.3 DESCRIPTION OF THE WORK:

A. **This section describes the disposal of Regulated Asbestos-Containing Materials (RACM).** Disposal includes packaging of Regulated Asbestos-Containing Materials. Disposal may be accomplished either by land filling or converting Regulated Asbestos Containing Materials to non-Asbestos waste.

1.4 SUBMITTALS:

A. **Before Start of Work:** Submit the following to the Designer for review. Do not start work until these submittals are returned with Designer's action stamp indicating that the submittal is returned for unrestricted use.

1. **Copy of state or local license** for waste hauler.

2. **Name and address of landfill** where Regulated Asbestos Containing Materials are to be buried. Include contact person and telephone number.

3. **Name and address of processor** where Regulated Asbestos-Containing Materials are to be processed into non-asbestos waste if conversion of waste is the disposal method used. Include contact person and telephone number. Also provide the following information about the process and operation used by the processor:

    a. Results of start-up performance testing and performance testing for last 90 days including operating parameters, feed characteristics, and analysis of output materials.
    b. Results of composite analysis required during initial 90 days of operation and results of composite analysis of monthly product composite samples for last 90 days.
    c. Results of continuous monitoring and logs of process operating parameters for the initial 90 days and last 90 days of operation.

d. A description of any deviation from the operating parameters established during performance testing, the duration of the deviation, and steps taken to correct the deviation.
e. Product data on process to be used

4. **Chain of Custody form** and form of waste manifest proposed

5. **Sample of disposal bag** and any added labels to be used.

B. **On a weekly basis** submit copies of all manifests and disposal site receipts to Designer.

C. **Waste Shipment Record:** Maintain a waste shipment record as required by the NESHAP regulation which indicates the waste generator, transporter, and disposal site, and which describes the nature, size, type of container, and form of asbestos waste. Submit to Designer within 35 days of departure from building.

PART 2 - PRODUCTS:

2.1 MATERIALS

A. **Disposal Bags:** Provide 6 mil (0.15 mm) thick leak-tight polyethylene bags labeled with three labels with text as follows:

1. **First Label:** Provide in accordance with 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD
BREATHING AIRBORNE FIBERS IS
HAZARDOUS TO YOUR HEALTH

2. **Second Label:** Provide in accordance with U. S. Department of Transportation regulation on hazardous waste marking. 49 CFR parts 171 and 172. Hazardous Substances

RQ-ASBESTOS WASTE
CLASS 9
NA2212-PG III

3. **Third Label:** Provide the name of the waste generator (Owner's name), the location from which the waste was generated and the names and addresses of the contractor and transporter. This label must be durable, able to repel dirt and moisture (e.g., permanent marker). Label must be placed directly on disposal bag(s) in a legible format. **Peel and stick type labels are expressly prohibited.**

2.2 VITRIFICATION:

A. **If conversion is used, convert Regulated Asbestos-Containing Materials to non-asbestos waste** by thermal conversion in a process including the following principal elements. Comply with all EPA and DOT requirements for asbestos waste until the waste is converted:

1. **Receiving and storage:** areas that are maintained as contained controlled areas isolated by physical barriers and a pressure differential
2. **Melting:** process that is intrinsically safe in that it will not allow unconverted asbestos to appear in the final product under any circumstances

B. **Processor:** Use a processor that meets all the requirements of the EPA NESHAP regulation for an operation that converts regulated asbestos-containing material and asbestos-containing waste material into non-asbestos (asbestos-free) material as set forth in 40 CFR 61 Sub-part A and M section 61.155

C. **Available Processors:** Subject to compliance with requirements, providers of processes include, but are not limited to, the following:

D. **Processors:** Subject to compliance with requirements, utilize process provided by one of the Following:

1. GTS Duratek
   8955 Guilford Rd, Suite 200
   Columbia, MD 21045
   (800) 638-3838
2. Penberthy Electromelt
   631 So. 96th Street
   Seattle, WA 98108

PART 3 - EXECUTION

3.1 SEQUENCE

A. **Comply with the following sections** during all phases of this work:

1. Section Worker Protection - Asbestos Abatement
2. Section Respiratory Protection

3.2 GENERAL:

A. **All waste** is to be hauled by a waste hauler with all required licenses from all state and local authority with jurisdiction.

B. **Liquid waste:** Mix all liquid asbestos-containing waste or asbestos contaminated waste with a bladeable material so that it forms a bladeable (non-liquid) form, and have the concurrence of the landfill operator prior to disposal.

C. **Load all adequately wetted Regulated Asbestos-Containing Material** in disposal bags or leak-tight containers. All materials are to be contained in one of the following:

1. **Two 6 mil (0.15 mm) disposal bags** or
2. **Two 6 mil (0.15 mm) disposal bags and a fiberboard drum** or

3. **Sealed steel drum** with no bag

D. **Protect interior of truck** or dumpster with Critical and Primary Barriers as described in Section "Temporary Enclosures".

E. **Carefully load containerized waste** in fully enclosed dumpsters, trucks or other appropriate vehicles for transport. Exercise care before and during transport, to insure that no unauthorized persons have access to the material.

F. **Warning Signs:** During loading and unloading mark dumpsters, receptacles and vehicles with a sign complying with requirements of the EPA NESHAP regulation (40 CFR Part 61), in a manner and location that a person can read the following legend:

DANGER
ASBESTOS DUST HAZARD
CANCER AND LUNG DISEASE HAZARD
Authorized Personnel Only

G. **Do not store containerized materials outside of the Work Area.** Take containers from the Work Area directly to a sealed truck or dumpster.

H. **Do not transport disposal bagged materials on open trucks.** Label drums with same warning labels as bags. Uncontaminated drums may be reused. Treat drums that have been contaminated as Regulated Asbestos-Containing Material and dispose of in accordance with this specification.

I. **Advise the landfill** operator or processor, at least ten days in advance of transport, of the quantity of material to be delivered.

J. **At disposal site** unload containerized waste:

1. **At a disposal site**, sealed plastic bags may be carefully unloaded from the truck. If bags are broken or damaged, return to work site for rebagging. Clean entire truck and contents using procedures set forth in section Project Decontamination.

2. **At a processing site** truck and loading dock are arranged as a controlled work area and containerized waste is transferred to storage area by site personnel. All bags including broken ones will be transferred. Clean truck, using procedures set forth in section Project Decontamination.

K. **Retain receipts from landfill** or processor for materials disposed of.

L. **At completion of hauling** and disposal of each load submit copy of waste manifest, chain of custody form, and landfill receipt to Designer.

END OF SECTION - 02 82 35

SECTION 02 82 36 - HAZARDOUS WASTE MANAGEMENT

PART 1 - GENERAL

1.1RELATED DOCUMENTS:

A. **Drawings and general provisions of Contract**, including General and Supplementary Conditions and Division 2 Specification Sections, apply to work of this section.

1.2 RELATED SECTIONS

A. **Section "Codes and Regulations - Asbestos Abatement"** describes federal, state and local regulations applicable to asbestos.
B. **Section "Disposal of Regulated Asbestos-Containing Material"** describes the handling and disposal of asbestos-containing waste.

1.3 DESCRIPTION OF THE WORK:

A. **This section describes** the segregation, packaging, labeling, transport, and disposal of waste materials generated by demolition activities and the subsequent shipment of properly packaged and labeled waste materials to an approved disposal site.

1.4 CODES AND REGULATIONS

A. **General Applicability of Codes and Regulations:** Except to the extent that more explicit or more stringent requirements are written directly into the Contract Documents, all applicable codes and regulations have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the Contract Documents, or as if published copies are bound herewith.
B. **Contractor Responsibility:** The Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to hazardous waste management and disposal. Hold the Owner and Engineer harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of the Contractor, the Contractor's employees, or Subcontractors.
C. **Federal Requirements:** which govern the management, hauling and disposal of hazardous waste include but are not limited to the following:
    1. **DOT:** U. S. Department of Transportation, including but not limited to:
        a. Hazardous Substances
           Title 49, Part 171 and 172 of the Code of Federal Regulations
        b. Hazardous Material Regulations General Awareness and Training Requirements for Handlers, Loaders and Drivers
           Title 49, Parts 171-180 of the Code of Federal Regulations
        c. Hazardous Material Regulations Editorial and Technical Revisions
           Title 49, Parts 171-180 of the Code of Federal Regulations

2. **EPA:** U. S. Environmental Protection Agency (EPA), including but not limited to:
    a. Management of Hazardous Wastes Resource Conservation and Recovery Act (RCRA) Title 40, Parts 260- 268 of the Code of Federal Regulations

D. **State Requirements:** Abide by all state requirements which govern the management, hauling and disposal of hazardous waste.

1.5 DEFINITIONS:

A. **Toxicity Characteristic Leaching Procedure (TCLP):** A laboratory test method to determine the mobility of both organic and inorganic analytes present in liquid, solid, and multiphasic wastes performed in accordance with test methods required under 40 CFR Part 268.

1.5 SUBMITTALS:

A. **Before Start of Work:** Submit the following to the Engineer for review. Do not start work until these submittals are returned with Engineer's action stamp indicating that the submittal is returned for unrestricted use.
    1. **Copy of state and local licenses** for waste hauler.
    2. **U.S. EPA Identification Number** of waste hauler.
    3. **Name and address of waste disposal facility** where hazardous waste materials are to be disposed including:
        a. Contact person and telephone number.
        b. Copy of state license and permit
        c. Disposal facility permits
    4. **Specimen copy** of Uniform Hazardous Waste Manifest form.
    5. **Copy** of EPA “Notice of Hazardous Waste activity” form
    6. **Copy** of forms requires by state and local agencies
    7. **Sample** of disposal label to be used.
B. **During Work:** Submit the following as required by the work.
    1. **TCLP test results**, as required to characterize waste for segregation and packaging purposes.
    2. **Submit copies** of all executed manifests and disposal site receipts to the Engineer.

PART 2 - PRODUCTS:

2.1 MATERIALS

A. **Disposal Bags:** Provide 6 mil (0.15 mm) thick leak-tight polyethylene bags.
B. **DOT Hazardous Waste Disposal Drums:** Provide DOT 17-H Open -Top Drums (55 gallon) in accordance with DOT regulations title 49 CFR Parts 173, 178, and 179.
C. **DOT Hazardous Waste Labels:** in accordance with DOT regulations Title 49 CFR parts 173, 178, and 179.

PART 3 - EXECUTION

3.1 GENERAL

A. **Do not mix potentially hazardous waste streams.** Where feasible, separate each type of hazardous waste from other types of hazardous wastes, from asbestos waste and from construction waste.
B. **Segregate, package, label, transport and dispose** of Hazardous Waste in accordance with DOT, EPA, State and Local regulations.

3.2 HAZARDOUS WASTE DESIGNATION

A. **Where not otherwise designated** by the Owner as Hazardous waste, characterize all suspect waste products by conducting representative TCLP testing.
    1. An Environmental Report was completed by Owner's consultant prior to this project.
    2. The reports prepared by Wynn L. White Consulting Engineers, Inc. dated 5/6/2024 and 5/7/2024 are included in the project manual.
    3. Contractor shall include all required TCLP and waste characterization testing in his bid for purposes of contractor's use in fulfilling waste management requirements is at contractor's expense.
B. Representative sampling of waste products shall be in accordance with EPA Document SW 846.
C. TCLP test analysis shall be performed in accordance with EPA Method 1311.

3.3 HAZARDOUS WASTE:

A. The following waste products are designated by the Owner as non-salvageable and as Hazardous Waste Types:
    1. **Waste Type A:** PCB waste.
B. PCB-containing ballasts from fluorescent light fixtures.
    1. **Waste Type B:** Mercury-containing waste.
        a. Thermostats with mercury switches. Individual mercury-containing thermostats.
        b. Fluorescent, and mercury-vapor lamps.

3.4 Hazardous Waste Packaging and Labeling

A. Package each segregated Hazardous Waste Type , A and B, in specified containers as follows. **Do Not Mix Waste Streams:**

B. **Waste Type A**

    1. Package in DOT 17-H Open-Top Drums

2. Fill to capacity only with Waste Type A (Do Not Mix Waste Stream types).
3. Install gasket on lid, apply lock ring, and seal.
4. Apply Hazardous Waste Label to drum side.
5. Enter DOT Shipping Data as follows: RQ Waste Polychlorinated Biphenols, 9, UN-2315, PG-II, (M001).
6. Adjacent to each label, enter the date indicating when waste was first placed in each drum.

C. Waste Type B

1. Package in DOT 17-H Open-Top Drums with Polyethylene disposal Bag liners
2. Fill liner bags only with Waste Type B (Do Not Mix Waste Stream types); then neck liner bags down into DOT 17-H Open-Top Drum and seal with duct tape.
3. Install gasket on lid, apply lock ring, and seal.
4. Apply Hazardous Waste Label to drum side.
5. Enter DOT Shipping Data as follows: RQ Hazardous Waste Solid, NOS, 9, NA3077, PG-III, (D009).
6. Adjacent to each label, enter the date indicating when waste was first placed in each drum.

D. Sealed and Labeled Containers: maintain all containers in a continuously sealed condition after they have been sealed.

1. Do not reopen sealed containers.
2. Do not place additional waste in sealed containers.

3.5 Temporary Storage: Partially filled containers of hazardous waste may be stored at the work site for intermittent packaging provided that:

A. Each container is properly labeled when it is first placed in service;
B. Each container remains closed at all times except when compatible waste types are added; and
C. When moved from site to site, each container remains within the geographic boundaries of the facility without moving nor crossing public access highways.

3.6 Removal of Hazardous Wastes: Immediately seal containers of hazardous waste as each the container is filled. Remove containers of hazardous waste from the work site **within seventy-two (72) hours of being filled.**

A. Transporting filled containers from the work site to an approved disposal site or recycling center.
B. Continuously maintain custody of all hazardous material generated at the work site including security, short-term storage, transportation and disposition until custody is transferred to an approved disposal site or recycling center. Document continuous chain-of custody.

C. Do not remove, or cause to be removed, hazardous waste from Owner's property without a legally executed Uniform Hazardous Waste manifest .

D. At completion of hauling and disposal of each load submit copy of waste manifest, chain of custody form, and landfill receipt to Engineer.

3.7 Recycling and Recovery: Turn over waste which contains materials for which recovery and/or recycling is possible to an approved recycling center.

3.8 Backcharges:

A. Where contractor fails to fulfill packaging, handling, transport or disposal requirements as outlined herein, Owner will charge back to the Contractor all costs associated with insuring that hazardous wastes are segregated, packaged, transported and disposed of in accordance with all applicable Federal and State regulations.

B. Environmental pollution of Owner's property or other environments resulting from Contractor's hazardous waste management activities will be promptly remediated under Owner's direction, to the Owner's sole satisfaction, and at the Contractor's sole expense.

C. Contractor agrees to either reimburse the Owner, or reduce the Contract amount by change order to cover all costs associated with waste re-packaging, waste re-segregation, or pollution remediation efforts.

3.9 Removal of Non-Hazardous Waste Materials:

A. Transport and legally dispose of non-hazardous waste products, materials, residues and refuse at a location not on Owner's property.

B. Non-hazardous waste products, materials, residues and refuse include, but are not necessarily limited to:

1. Materials which are determined to be non-hazardous wastes through objective sampling in accordance with EPA Document SW-846 and laboratory analysis in accordance with EPA Method 1311.

2. Emptied hazardous material containers: containers holding a material with constituents listed on the MSDS as hazardous.

a. When a container is emptied of its hazardous contents by pouring or scraping so that less than one inch of material remains in the bottom of the container, the container is considered "empty" and is not in itself a hazardous waste.

. Emptied hazardous material containers may be disposed of as construction debris waste (i.e. non-hazardous).

3. Personnel protective clothing and safety equipment with de minimis or trace contamination, as determined by visual inspection by Owner's Representative.

C. Keep premises in a clean and orderly condition during performance of abatement work.

D. Place non-hazardous construction debris wastes on a daily basis in secure containers for local landfill disposal.

End of Section 028236

SECTION 02 82 70 - CONTRACT CLOSEOUT - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 2 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **This Section includes** administrative and procedural requirements for contract closeout including, but not limited to, the following:

1. Inspection procedures.
2. Project record document submittal.
3. Submittal of warranties.
4. Final cleaning.

1.3 SUBSTANTIAL COMPLETION

A. **Preliminary Procedures:** Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.

5. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.

a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.

b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.

6. Advise the Owner of pending insurance changeover requirements.

7. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

8. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

9. Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.

10. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.

11. Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.

12. Complete final cleanup requirements, including touch up painting.

13. Touch up and otherwise repair and restore marred, exposed finishes.

B. **Inspection Procedures:** On receipt of a request for inspection, the Designer will either proceed with inspection or advise the Contractor of unfilled requirements. The Designer will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Designer will repeat inspection when requested and assured that the Work is substantially complete.

2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

A. **Preliminary Procedures:** Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.

2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.

3. Submit a certified copy of the Designer's final inspection list of items to be completed or corrected, endorsed and dated by the Designer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Designer.

4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.

5. Submit consent of surety to final payment.

6. Submit a final liquidated damages settlement statement.

7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Reinspection Procedure: The Designer will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Designer.

1. Upon completion of reinspection, the Designer will prepare a certificate of final acceptance. If the Work is incomplete, the Designer will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

2. If necessary, reinspection will be repeated.

1.5 RECORD DOCUMENT SUBMITTALS

A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Designer's reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.

2. Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.

3. Note related change-order numbers where applicable.

4. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.

C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.

1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.

2. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.

3. Note related record drawing information and Product Data.

4. Upon completion of the Work, submit record Specifications to the Designer for the Owner's records.

D. **Record Product Data:** Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.

1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.

2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.

3. Upon completion of markup, submit complete set of record Product Data to the Designer for the Owner's records.

E. **Miscellaneous Record Submittals:** Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Designer for the Owner's records.

All submittals required for project closeout shall be electronic format, latest version of Microsoft Word or Excel, and transmitted electronically (via email or CD-ROM).

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. **General:** The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 1 Section "Construction Facilities and Temporary Controls." The cleaning in this Section is in addition to cleaning which is part of decontamination work. This section is intended to return the facility to the Owner in presentable condition.

B. **Cleaning:** Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.

a. Remove labels that are not permanent labels.

b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials.

c. Replace chipped or broken glass and other damaged transparent materials.

d. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.

e. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

f. 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.

C. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

1. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

END OF SECTION 02 82 70

Post Office Box 83527
Baton Rouge, LA 70884-3527

WYNN L. WHITE CONSULTING ENGINEERS, INC.

May 6, 2024

Mr. Kenny Brown
Calcasieu Parish School Board
3310 Broad Street
Lake Charles, LA 70602
(sent via email)

RE: April 30 & May1, 2024 Westwood Elementary Gym Asbestos Sampling 24035

Dear Kenny:

I have enclosed the analytical results for the asbestos bulk samples Todd Peterson, an accredited asbestos inspector, collected April 30 and May 1, 2024. The building address is 1900 Sampson Street, Westlake, LA 70669. This report is for your review and files.

CA Labs of Baton Rouge, LA analyzed the asbestos bulk samples using Polarized Light Microscopy (PLM). Laboratory analysis detected asbestos in the Brown Vinyl Base in the Gym Lounge Entrance, Roof Decking in room A-144, Transite in A-146 Med Room A-3, Tan TSI Straightrun in A-146 Med room A-3, Tan TSI Elbows (White) in Lounge 137, 9'' Green Floor Tile/Mastic in Lounge 137, White TSI Straightrun in A-144-B Med Room A-4, White TSI Elbows in Lounge 137, 12" Tan Floor Tile/Mastic with Specks in Room A-138, 9" White Floor Tile/Mastic in Room A-140, Window Caulk (frame to wall) on the Exterior, Window Glazing on the Exterior, and in the Corrugated Silver TSI Elbows on the Exterior. We assume window spandrel material contains asbestos.

Materials sampled include:

- Tan Vinyl Flooring in Rooms A-144 and A-139
- Brown Vinyl Base in Gym Entrance, Lounge Entrance, and Women's Restroom
- 2'x2' White Ceiling Tiles with Holes in Loung 137, Gym Entrance, and Room A-138
- 2'x2' White Ceiling Tiles with Rough Surface in Room A-140, Room A-144, and Gym Entrance
- Tan Stage Curtains on Stage
- Blue Stage Curtains on Stage
- Roof Decking in Room A-144
- Transite in A-146 Med Room A-3
- Tan TSI Straightrun in A-146 Med A-3 and Lounge 137
- Tan TSI Elbows (White) in Lounge 137 and A-146 Med Room A-3
- Tectum in Mini Gym 139
- 2'x2' White Ceiling Tile with Lines in Loung Entrance and A-137 Boys Restroom
- 2'x2' White Ceiling Tile with Vinyl Face in A-137-A Women's Restroom and Room A-140
- 9'' Green Floor Tile/Mastic in Lounge 137
- Gray Vinyl Base in Lounge 137, Room A-140, and Room A-143
- White TSI Straightrun in A-144-B Med Room A-4 and Lounge 137
- White TSI Elbows in A-144-B Med Room A-4 and Lounge 137

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- 12” Tan Floor Tile/Mastic with Specks in A-138
- 9” White Floor Tile/Mastic in A-140
- Gypsum and Joint Compound in A-143 and A-144-B Med A-4
- Black Wall Insulation in A-144-B Med RoomA-4
- Door Caulk (frame to wall) on the Exterior
- Window Spandrels (Metal Surface) on the Exterior
- Window Caulk (frame to wall) on the Exterior
- Plaster on the Exterior
- Window Glazing on the Exterior
- Smooth Silver TSI Straightrun on the Exterior
- Smooth Silver TSI Elbows on the Exterior
- Corrugated Silver TSI Elbows on the Exterior

I recommend you have us prepare asbestos abatement and demolition design documents, work with you to select an asbestos abatement contractor, and you have us perform asbestos air monitoring/contractor observation during asbestos abatement work.

If you have questions or would like to discuss the project, please call me at (225) 761-9141 extension 2.

Very truly yours,

Wynn L. White Consulting Engineers, Inc.

Chris White, P.E., LEED AP
Vice President

Enclosures: Homogenous Area Material List 4/30 & 5/1/2024, Building Survey Data Sheet 4/30 & 5/1/2024, Homogeneous Area Sampling Log 4/30 & 5/1/2024, Sample Location Sketch 4/30 & 5/1/2024, CA Labs Report CBR24052902 & CBR24052951

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WYNN L. WHITE
CONSULTING
ENGINEERS, INC.

May 7, 2024

Mr. Kenny Brown
Calcasieu Parish School Board
3310 Broad Street
Lake Charles, LA 70602
(sent via email)

RE: April 29, 2024 Westwood Elementary Gym Lead Survey 24035

Dear Kenny:

I have enclosed the analytical results for the X-Ray Fluorescence (XRF) Survey Todd Peterson, an accredited lead inspector, conducted April 29, 2024. This report is for your review and files. This survey is for the building located at 1900 Sampson Street Westlake, LA 70669.

We used a SciAps X-550 handheld XRF Lead Paint Analyzer, serial #X550-02131.

Samples 216-275 and 280-282 are from the interior and exterior of the building, including exterior painted equipment.

The XRF analyzer detected positive materials in the yellow wall, yellow door frame, and yellow door on the east wall of the gym entrance; gray beam and gray pipe on the west wall of the gym entrance; varnished floor on the stage; varnished wall on the south wall of the stage; white window frame, dark grey heater, gray wall, and dark gray pipe on the west wall of the mini gym 139; white pipe on the south wall of room 135; off- white wall on the north wall of room a-137-b restroom; off-white cabinets on the south wall of lounge room 137; off-white beam on the east wall of lounge room 137; brown door frame on the north wall of lounge room 137; gray wall on the west wall of room 138; sea green pipe, sea green beam, and gray door frame on the east wall of room 139; sea green platform on the south wall of room a-144b med a-4; white window frame on the north wall of room 144; black door frame and yellow door on the west wall of room 144; white window frame on the north wall of the restroom; peach overhang on the east exterior; and gray piping on the north east exterior.

Locations sampled include:

- Yellow Wall, Yellow Door Frame, and Yellow Door on the East Wall of the Gym Entrance
- Gray Door on the South Wall of the Gym Entrance
- Brown Door Frame on the South Wall of the Gym Entrance
- Gray Dark wall, Gray Beam, Gray Heater, and Gray Pipe on the West Wall of the Gym Entrance
- Varnished Floor on the Stage
- Varnished Wall on the South Wall of the Stage
- Gray Wall on the East Wall of Room A-146 (A-3)
- White Window Frame, Off-White Window Screen, Dark Grey Heater, Gray Wall, White Door, Brown Door Frame, and Dark Gray Pipe on the West Wall of the Mini Gym 139
- Red Door on the South Wall of Room 135

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- Brown Door Frame on the South Wall of Room 135
- White Pipe on the South Wall of Room 135
- Off-White Wall on the West Wall of Room 135
- Off- White Wall on the North Wall of Room A-137-B Restroom
- Off- White Cabinet on the East Wall of A-137-B Restroom
- Off-White Heater on the East Wall of Lounge Room 137
- Off-White Cabinets on the South Wall of Lounge room 137
- Off-White Wall on the West Wall of Lounge Room 137
- Off-White Beam on the East Wall of Lounge Room 137
- Brown Wall, Brown Door Frame, and Brown Door on the North Wall of Lounge Room 137
- Gray Wall on the West Wall of Room 138
- Gray Shelves on the North Wall of Room 138
- Sea Green Wall, Sea Green Pipe, Sea Green Beam, Gray Door Frame, and Gray Door on the East Wall of Room 139
- Sea Green Wall on the North Wall of Room 139
- Sea Green Wall on the West Wall of Room 139
- White Wall on the West Wall of Room A-143-Closet
- White Wall on the East Wall of Room A-143-Closet
- Sea Green Platform on the South Wall of Room A-144B Med A-4
- Yellow Wall and White Window Frame on the North Wall of Room 144
- Black Door Frame and Yellow Door on the West Wall of Room 144
- White Window Frame on the North Wall of the Restroom
- Brown Wall on the South Wall of Room 144
- Brown Cabinet on the North Wall of Room 144
- Maroon Door, Brown Window Spandrel, Black Gate, Sea Green Beam, and Gray Wall on the West Exterior
- Sea Green Port on the South Exterior
- Maroon Downspout and Peach Overhang on the East Exterior
- Gray Piping, Maroon Door, Gray Door Frame on the North East Exterior
- Maroon Downspout on the North Exterior

We recommend you have us prepare renovation and demolition design documents for work that will disturb lead containing materials.

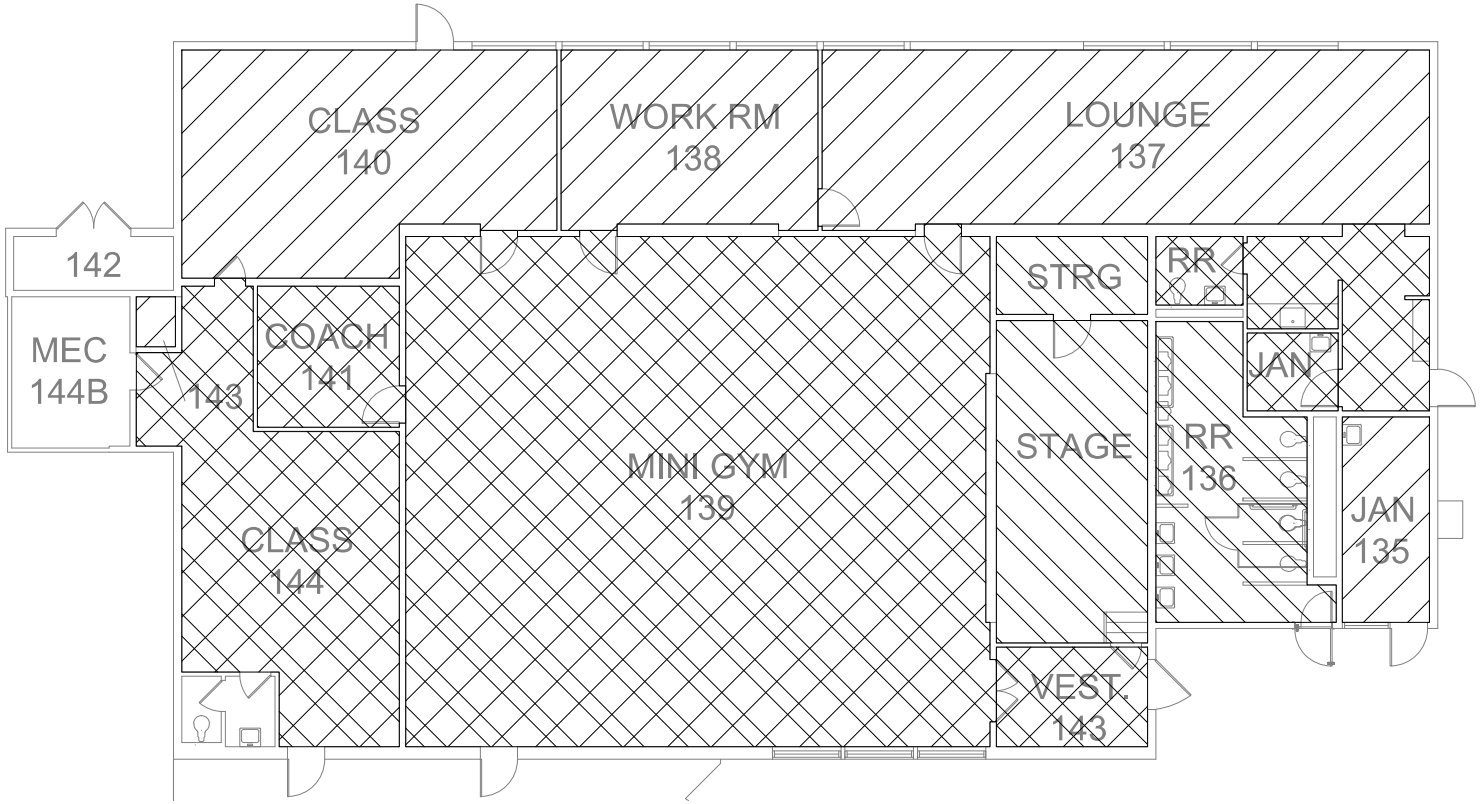
If you have questions or would like to discuss the project, please call me at (225) 761-9141 extension 2.

Very truly yours,

Wynn L. White Consulting Engineers, Inc.

Chris White, P.E., LEED AP
Vice President

Enclosures: Lead Based Paint Testing Data Sheets 4/29/2024 and Sample Locations Sketch 4/29/2024



FLOORING AND CEILING

0' 5' 10' 15'

REMOVE AND DISPOSE OF FLOORING TO SUBSTRATE

REMOVE AND DISPOSE OF ROOF DECKING

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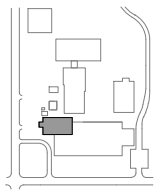


KEY MAP
NOT TO SCALE

WYNN L. WHITE
CONSULTING ENGINEERS, INC.
PHONE: (225) 761 - 9141
WWW.WYNNWHITE.COM

CLIENT: CALCASIEU PARISH SCHOOL BOARD

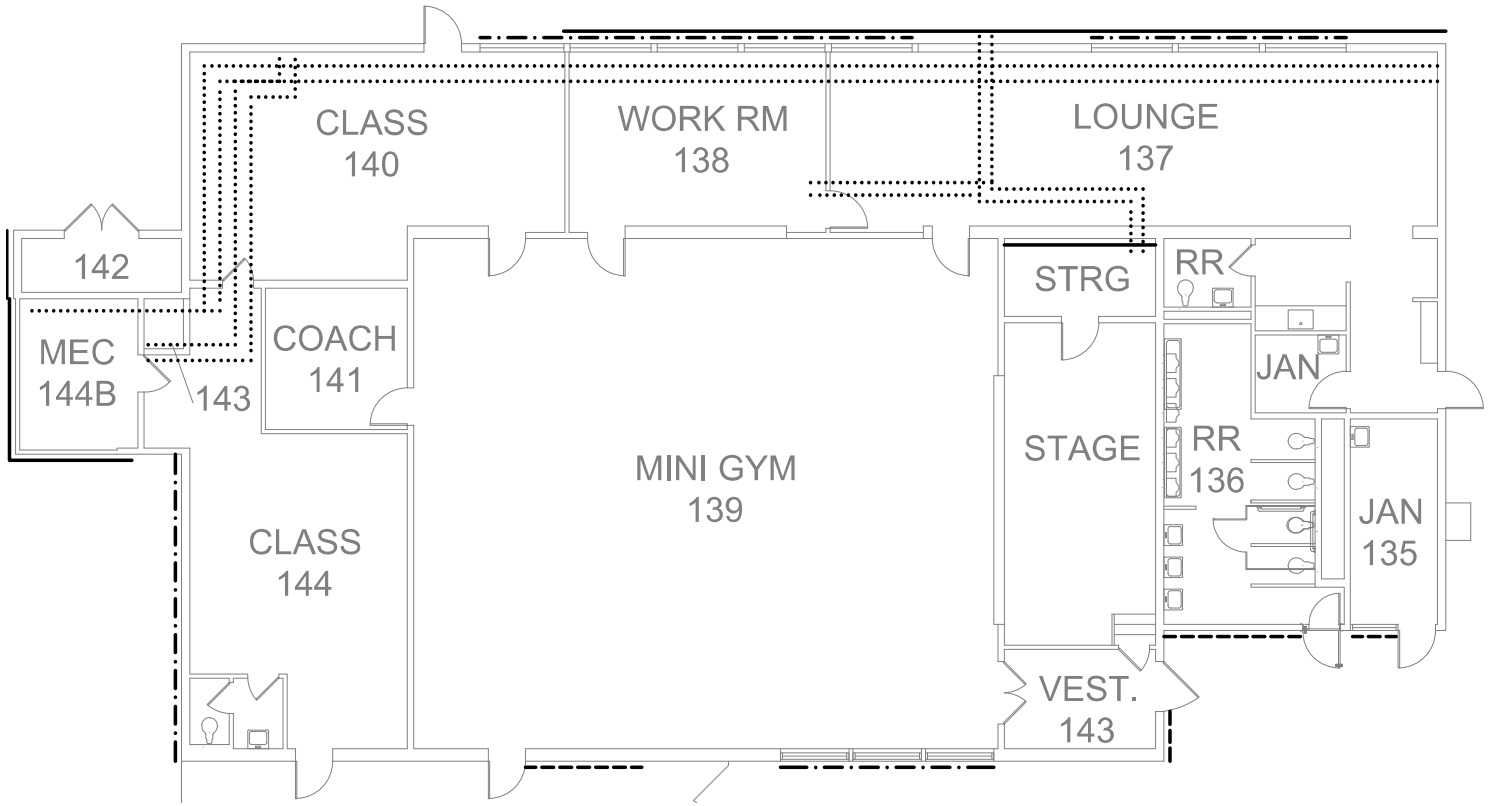
PROJECT: WESTWOOD ELEMENTARY SCHOOL
MINI GYM AREA

SHEET: ASBTESTOS ABATEMENT PLAN
FLOORING AND CEILING

PROJECT NUMBER
24046
FACILITY_BLDG NUMBER
148_2270

REVISION		
NO.	DATE	BY

DRAWN BY:	JLY
CHECKED BY:	CMW
DATE:	6/19/2025
SCALE:	AS NOTED
SHEET	1 OF 3



VERTICAL COMPONENTS AND TSI

0' 5' 10' 15'

REMOVE AND DISPOSE OF TRANSITE

REMOVE AND DISPOSE OF THERMAL SYSTEM INSULATION

REMOVE AND DISPOSE OF SPANDREL WINDOW PANELS

REMOVE AND DISPOSE OF CAULK/GLAZING

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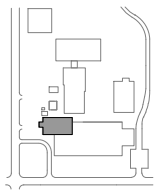

KEY MAP
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CLIENT: CALCASIEU PARISH SCHOOL BOARD

PROJECT: WESTWOOD ELEMENTARY SCHOOL
MINI GYM AREA

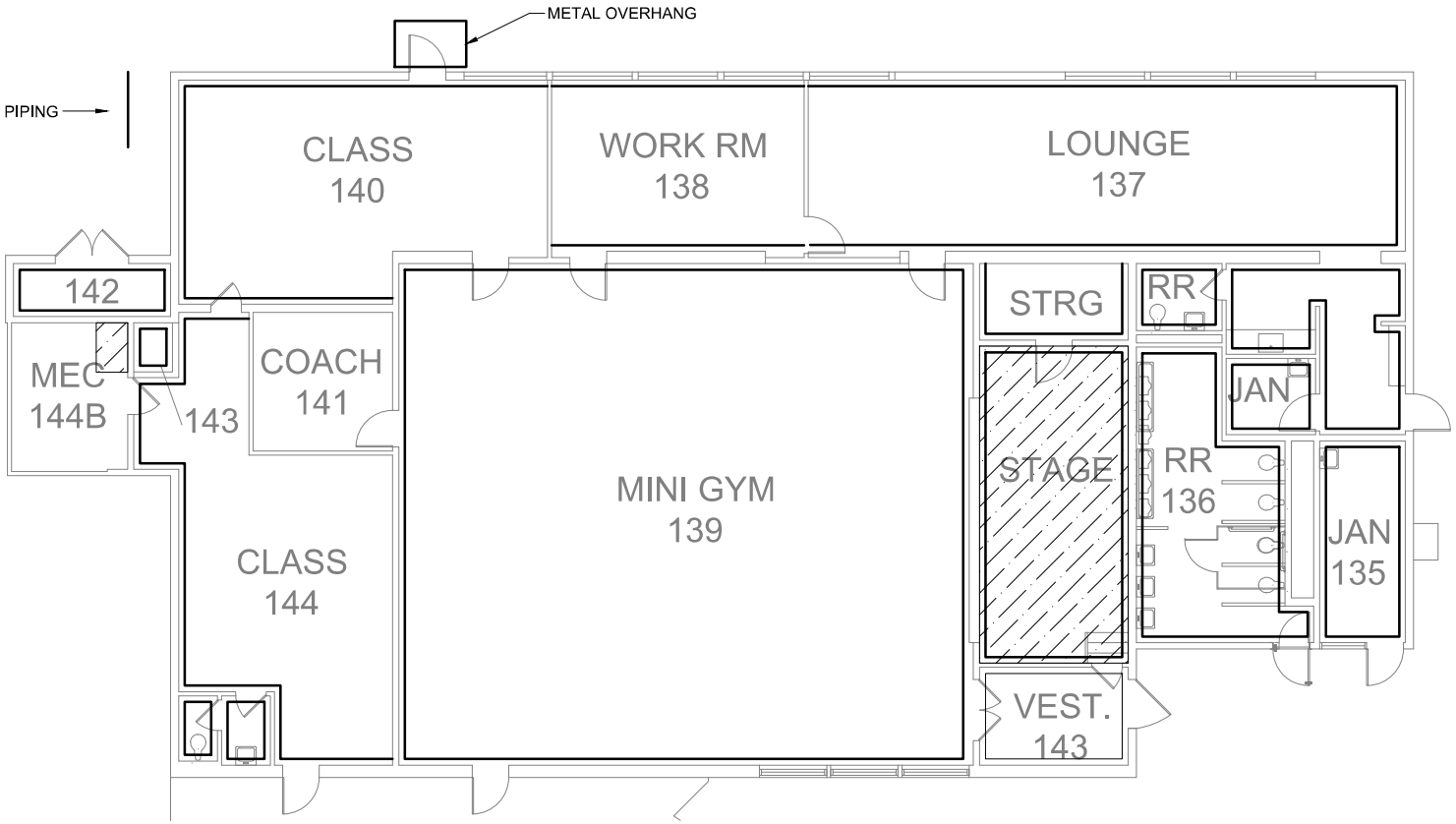
SHEET: ASBTESTOS ABATEMENT PLAN
VERTICAL COMPONENTS & TSI

STATE OF LOUISIANA
CHRISTOPHER M. WHITE
License No.
PROFESSIONAL ENGINEER
CIVIL ENGINEERING
6/20/25

PROJECT NUMBER
24046
FACILITY_BLDG NUMBER
148_2270

REVISION		
NO.	DATE	BY

DRAWN BY:	JLY
CHECKED BY:	CMW
DATE:	6/19/2025
SCALE:	AS NOTED
SHEET	2 OF 3



LEAD ABATEMENT PLAN

0' 5' 10' 15'

LEAD PAINT/GLAZE

LEAD PAINT/GLAZE

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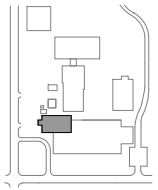

KEY MAP
NOT TO SCALE

WYNN L. WHITE
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CLIENT: CALCASIEU PARISH SCHOOL BOARD

PROJECT: WESTWOOD ELEMENTARY SCHOOL
MINI GYM AREA

SHEET: LEAD ABATEMENT PLAN

STATE OF LOUISIANA
CHRISTOPHER M. WHITE
LICENSED
PROFESSIONAL ENGINEER
CIVIL ENGINEERING
6/20/25

PROJECT NUMBER
24046
FACILITY_BLDG NUMBER
148_2270

REVISION		
NO.	DATE	BY

DRAWN BY:	JLY
CHECKED BY:	CMW
DATE:	6/19/2025
SCALE:	AS NOTED
SHEET	3 OF 3

SECTION 03 00 00 – CONCRETE WORK

PART 1 – GENERAL

A. NON-SKID BROOM FINISH:

All exterior concrete flatwork subject to foot or vehicular traffic including covered walkways, ramps, parking and assembly areas shall receive a non-skid broom finish. Finish shall be applied perpendicular to the intended traffic flow with a stiff, coarse scrub broom or a brooming rake made for this purpose. Interior slabs will be broom finished only as noted on the drawings. Brooming to commence only after floating and when the water sheen is no longer visible.

B. TROWEL FINISH:

After floating and as soon as moisture sheen has disappeared and concrete has hardened sufficiently to prevent drawing moisture and fine materials to the surface, it shall be steel troweled to a smooth, uniform finish. Perform final troweling until surface is so hard that no mortar accumulates on the trowel when it is manipulated. Power troweling may be used in accordance with manufacturer's directions.

C. NON-SLIP DRY AGGREGATE FINISH:

When specified on the drawings, apply dry shake abrasive aggregate in accordance with the manufacturer's directions immediately prior to troweling. After troweling, finish the surface to a sandy texture.

D. SLABS TO RECEIVE OTHER FINISHES:

The contractor shall familiarize himself with requirements for installing other finish materials over concrete sub-floors and supply the workmanship and concrete finish required by the finish material manufacturer. Such finish materials include but not limited to:

12"x12" Resilient Flooring
Carpet
Sealed Wood Athletic Flooring
24"x24" Porcelain Floor Tile
Stain for Concrete
Existing to Remain (Patch & Repair)

END OF SECTION 03 00 00

SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

B. Related Requirements:

1. Section 033000 “Cast-in-Place Concrete”
2. Section 321313 "Concrete Paving"

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review the following:

a. Testing and inspecting agency procedures for field quality control.
b. Construction, contraction, and isolation joints.
c. Steel-reinforcement installation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Bar supports.

B. Shop Drawings: Comply with ACI 315-19 (Manual of Standard Practice for Detailing Reinforced Concrete Structures) and CRSI MSP-1 (Manual of Standard Practice), 29th Edition:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of Engineer.

a. Include locations of contraction joints; spacing not to exceed 15’c./c u.n.o. on drawings.
b. Coordinate with sensitive architectural features as required.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For testing and inspection agency.

B. Field quality-control reports.

C. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615, Grade 60, deformed.

B. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064, flat sheet.

2.2 REINFORCEMENT ACCESSORIES

A. Smooth (plain) dowel bars conforming to ASTM A615 Grade 60 or ASTM A36, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.

1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," as follows:

a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

C. Steel Tie Wire: ASTM A1064, annealed steel, not less than 0.0508 inch in diameter.

1. Finish: Plain.

2.3 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:

1. Do not cut or puncture vapor retarder.
2. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times the maximum nominal aggregate size, whichever is greater.

D. Provide concrete coverage as incicated on Drawings and in accordance with ACI 318.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Splices: Provide lap splices as indicated on Drawings. Where not indicated, comply with ACI 318.

1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 48 bar diameters at splices, or 24 inches, whichever is greater.
2. Stagger splices in accordance with ACI 318.

G. Install welded-wire reinforcement in longest practicable lengths.

1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."

a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches.

2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
4. Lace overlaps with wire.

3.3 JOINTS

A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

A. Comply with ACI 117 (latest edition).

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

B. Inspections:

1. Steel-reinforcement placement.

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Concrete materials.
2. Admixtures.
3. Vapor retarders.
4. Curing materials.
5. Accessories.
6. Repair materials.
7. Concrete mixture design requirements
8. Concrete placement and curing
9. Concrete mixing.
10. Work identified on drawings

B. Related Requirements:

1. Section 032000 "Concrete Reinforcing"
2. Section 072600 “Vapor Retarder”
3. Section 312000 "Earth Moving"

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with fly ash; materials subject to compliance with requirements.

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following.

1. Portland cement.
2. Fly ash.
3. Aggregates.
4. Admixtures:

a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.

5. Vapor retarders.
6. Curing materials.
7. Joint Fillers
8. Repair Materials

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Placement location
3. Minimum 28-day compressive strength.
4. Maximum w/cm.
5. Slump limit or slump flow limit.
6. Air content.
7. Nominal maximum aggregate size.
8. Intended placement method.
9. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:

1. As specified in Section 032000 “Concrete Reinforcing”.

2. Construction Joint Layout: If not shown on Drawings, indicate proposed construction joints required to construct the structure.

a. Location of construction joints is subject to approval of the Engineer.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.
2. Ready-mixed concrete manufacturer.
3. Testing agency: Include documentation indicating compliance with ASTM E329 or ASTM C1077 and copies of applicable ACI certificates for testing technicians or ACI Concrete Construction Special Inspector - MH, ASCC.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Floor and slab treatments
5. Bonding agents.

6. Adhesives
7. Vapor retarders.
8. Semirigid joint filler.
9. Joint-filler strips.
10. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Fly ash.
3. Aggregates.
4. Admixtures.

D. Preconstruction Test Reports: For each mix design.

E. Field quality-control reports.

F. Minutes of preinstallation conference.

1.6 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.
d. Concrete Subcontractor.
e. Special concrete finish Subcontractor.

2. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction joints, control joints, isolation joints, and joint-filler strips.
c. Semirigid joint fillers.
d. Vapor-retarder installation.
e. Anchor rod and anchorage device installation tolerances.
f. Cold and hot weather concreting procedures.
g. Concrete finishes and finishing.
h. Curing procedures.
i. Forms and form-removal limitations.
j. Shoring and reshoring procedures.
k. Methods for achieving specified floor and slab flatness and levelness.
l. Floor and slab flatness and levelness measurements.
m. Concrete repair procedures.
n. Concrete protection.

o. Initial curing of standard-cured and field curing of field test cylinders (ASTM C31.)
p. Protection of field cured field test cylinders.
q. Distribution of test reports.

1.7 QUALITY ASSURANCE

A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94 requirements for production facilities and equipment.

B. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94 and ACI 301.

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.

1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
2. Concrete is not to be placed if temperature is below or expected to fall below 40 deg F. Place concrete only when temperature is 40 deg F or higher and rising.
3. Do not use frozen materials or materials containing ice or snow.
4. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:

1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
3. Obtain aggregate from single source.
4. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150, Type I/II.
2. Portland Cement: ASTM C595, Type IL.
3. Fly Ash: ASTM C618, Class C or Class F.

C. Normal-Weight Aggregates: ASTM C33, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 1 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C260.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494, Type A.
2. Retarding Admixture: ASTM C494, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017, Type II.

F. Water and Water Used to Make Ice: ASTM C94, potable.

2.3 VAPOR RETARDERS

A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A; not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape. Comply with requirements of Section 072600 “Vapor Retarder.”

2.4 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Manufacturers: Subject to compliance with requirements, providers include, but are not limited to, the following:

    a. BASF Corporation.
    b. Dayton Superior.
    c. Euclid Chemical Company (The); an RPM company.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.

1. Color:

    a. Ambient Temperature Below 50 deg F: Black.
    b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
    c. Ambient Temperature Above 85 deg F: White.

D. Water: Potable or complying with ASTM C1602.

E. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.

1. Basis of Design: W.R. Meadows, 1100-CLEAR or approved equal.

2. Alternatives that are shown to meet or exceed specifications of the basis of design product will be acceptable.

2.5 RELATED MATERIALS

A. Metal Keyed Joint System: 24 gauge, hot dipped galvanized with removable cap for formation of sealant reservoir.

1. Basis of Design: QuicKey by BoMetals, Inc. or approved equal.

B. Expansion- and Isolation-Joint-Filler: Nomaflex polypropylene joint filler or approved equal. Locations, width and details as indicated on drawings.

C. Bonding Agent: ASTM C1059, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:

1. Types I and II, non-load bearing and Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.6 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations. To be used at slab areas to receive floor coverings.

1. Cement Binder: ASTM C150 portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4000 psi at 28 days when tested in accordance with ASTM C109.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations. To be used at exposed slab surfaces.

1. Cement Binder: ASTM C150 portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109.

2.7 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.

1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: Class C or F, 15 percent by mass. The use of fly ash is an option, not a requirement.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

2.8 CONCRETE MIXTURES

A. Normal-weight concrete.

1. Exposure Class: ACI 318; F0, S0, W0, C0.
2. Minimum Compressive Strength: 3000 psi at building slabs, 4000 psi at grade beams and spread footings at 28 days.
3. Maximum w/cm:
   a. 0.48 (air-entrained 4000 psi concrete)
   b. 0.58 (non-air entrained 3000 psi concrete)
4. Slump Limit: 4 inches, plus or minus 1 inch; 8 inches, plus or minus 1 inch for concrete with verified slump of 3 inches, plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site.
5. Air Content:
   a. No entrained air for interior steel trowel finished slabs
   b. 5.0 percent, plus or minus 1.5 percent at point of delivery for all other locations

6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

7. “Performance” type mixes with variances in the (above) parameters of 3 and 4 (only) submitted with satisfactory testing and performance documentation will be considered.

2.9 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94 (90 minutes), and furnish batch ticket information.

1. When air temperature is between 85 and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:

1. Daily access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 TOLERANCES

A. Comply with ACI 117.

3.4 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3.5 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions. Comply with requirements of Section 072600 “Vapor Retarder.”

3.6 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Construction Joints in Slab-on-Grade: Coordinate with floor slab pattern and concrete placement sequence.

1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Engineer. Submit layout plan for review if not indicated on drawings.

2. Form doweled and keyed joints with sealant reservoir using metal keyed joint system as indicated on drawings. Embed keys at least 1-1/2 inches into concrete or otherwise to depth indicated on drawings.
   a. Install dowel bars as indicated on Drawings.
   b. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane control joints, sectioning concrete into areas as indicated. Contraction joints to be a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks. Timing of cutting shall be performed so as to not damage concrete but also prior to cracking of concrete. Any damage to the concrete resulting from cutting (or not cutting) of joints at appropriate times shall be repaired by the Contractor with no modifications to the contract amount or duration.
2. Construction joints, as specified above, may be used as contraction joints at Contractor's option.

D. Isolation Joints in Slabs-on-Ground: Install joint-filler at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings. Use manufacturer's cutter to score material to depth required for installation of joint material.
2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
3. Remove scored section of joint-filler after placement of concrete and provide joint sealant as specified.

3.7 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Engineer and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer in writing, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.

3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.

    a. Do not use vibrators to transport concrete inside forms.
    b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
    c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
    d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Level concrete, cut high areas, and fill low areas.
5. Slope surfaces uniformly to drains where required.
6. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
7. Do not further disturb slab surfaces before starting finishing operations.

3.8 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.

    a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
    b. Remove projections larger than 1 inch.
    c. Tie holes do not require patching.
    d. Surface Tolerance: ACI 117 Class D.
    e. Apply to concrete surfaces not exposed to public view.

2. ACI 301 Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.

    a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
    b. Remove projections larger than 1/4 inch.
    c. Patch tie holes.
    d. Surface Tolerance: ACI 117 Class B.
    e. Locations: Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

B. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.9 FINISHING FLOORS AND SLABS

A. Verify all finishes with architectural drawings prior to placement of concrete.

B. Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

C. Scratch Finish:

1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch in one direction.
3. Apply scratch finish to surfaces to receive concrete floor toppings and to receive mortar setting beds for bonded cementitious floor finishes.

D. Float Finish:

1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
3. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

E. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a hard trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:

a. Slabs on Ground:

1) Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft. long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch and 1/16 inch in 2 feet.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Architect before application.

3.10 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.
4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:

a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
b. Continuous Sprinkling: Maintain concrete surface continuously wet.
c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.

1) Recoat areas subject to heavy rainfall within three hours after initial application.
2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:

    a. Floors to Receive Curing Compound:

        1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
        2) Recoat areas subjected to heavy rainfall within three hours after initial application.
        3) Maintain continuity of coating, and repair damage during curing period.
        4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer, unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

3.11 JOINT FILLING

A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month(s).
2. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and as indicated on drawings at formed or keyed joints.

D. Overfill joint, and trim joint filler flush with top of joint after hardening.

E. Joint filler installation shall comply with manufacturer’s printed directions; consult manufacturer as required for specific technical questions and additional required instruction.

3.12 CONCRETE SURFACE REPAIRS

A. Defective Concrete:

1. Repair and patch defective areas when approved by Engineer.
2. Remove and replace concrete that cannot be repaired and patched to Engineer’s approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.

a. Limit cut depth to 3/4 inch.
b. Make edges of cuts perpendicular to concrete surface.
c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
d. Fill and compact with patching mortar before bonding agent has dried.
e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.

a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
b. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Engineer.

D. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.

a. Correct low and high areas.
b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
3. After concrete has cured at least 14 days, correct high areas by grinding.
4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.

a. Finish repaired areas to blend into adjacent concrete.

5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.

a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
b. Feather edges to match adjacent floor elevations.

6. Correct other low areas scheduled to remain exposed with repair topping.

a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.

    a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
    b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
    c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
    d. Place, compact, and finish to blend with adjacent finished concrete.
    e. Cure in same manner as adjacent concrete.

8. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.

    a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
    b. Dampen cleaned concrete surfaces and apply bonding agent.
    c. Place patching mortar before bonding agent has dried.
    d. Compact patching mortar and finish to match adjacent concrete.
    e. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.13 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31.
2. Testing agency shall immediately report to Architect, Engineer, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.

    a. Test reports shall include reporting requirements of ASTM C31, ASTM C39, and ACI 301, including the following as applicable to each test and inspection:

        1) Project name.
        2) Name of testing agency.
        3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
        4) Name of concrete manufacturer.
        5) Date and time of inspection, sampling, and field testing.
        6) Date and time of concrete placement.

7) Location in Work of concrete represented by samples.
8) Date and time sample was obtained.
9) Truck and batch ticket numbers.
10) Design compressive strength at 28 days.
11) Concrete mixture designation, proportions, and materials.
12) Field test results.
13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
14) Type of fracture and compressive break strengths at seven days and 28 days.

B. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

C. Inspections:

1. Notify Architect a minimum of twenty-four (24) hours prior to scheduling concrete pours to allow for a pre-pour inspection. Defective work will be rejected.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172 shall be performed in accordance with the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143:

a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
b. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C231 pressure method, for normal-weight concrete.

a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C1064:

a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C31:

a. Cast and laboratory cure three sets of two standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C39.

   a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days. Retain one set of two specimens in reserve for later testing if required.
   b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi .
9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
10. Additional Tests:

    a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42 or by other methods as directed by Engineer.

       1) Acceptance criteria for concrete strength shall be in accordance with ACI 301, section 1.6.6.3.

11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.14 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.

7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 033000

SECTION 03 35 00 – CONCRETE FINISHING

PART 1 – GENERAL

1.01 SECTION INCLUDES:

A. Pigmented interior and exterior wall coating.

B. Pigmented interior and exterior floor coatings.

C. Interior and exterior clear floor sealers.

D. Decorative floor and wall overlay techniques to mimic pattern, texture and color of natural occurring materials and artistic designs.

1.02 RELATED SECTIONS:

A. Section 03 30 00 - Cast In-Place Concrete: Concrete mix designs and additives.

1.03 REFERENCES

A. AASHTO T260 - Standard Method of Test for Sampling and Testing for Chloride Ion In Concrete and Concrete Raw Materials.

B. AASHTO T259 - Standard Method of Test for Resistance of Concrete to Chloride Ion Penetration.

C. ANSI A 118.4 - Specifications for Latex Portland Cement Mortar.

D. ASTM C23 - Determination of Particle Size Distribution of Soils in Forensic Science Using Classical and Modern Instrumental Methods.

E. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.

F. ASTM C78 - Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading).

G. ASTM C97 - Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.

H. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens).

I. ASTM C170 - Standard Test Method for Compressive Strength of Dimension Stone.

J. ASTM C190 - Method of Test for Tensile Strength of Hydraulic Cement Mortars.

K. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

L. ASTM C348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars.

M. ASTM C482 - Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement.

N. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

O. ASTM C666 - Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.

P. ASTM C880 - Standard Test Method for Flexural Strength of Dimension Stone.

Q. ASTM C882 Modified - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.

R. ASTM C944 - Standard Test Method for Abrasion Resistance of Concrete or Mortar Surfaces by the Rotating-Cutter Method.

S. ASTM C979 - Standard Specification for Pigments for Integrally Colored Concrete.

T. ASTM C1185 - Standard Test Methods for Sampling and Testing Non-Asbestos Fiber-Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards.

U. ASTM C1186 - Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets.

V. ASTM D1849 - Standard Test Method for Package Stability of Paint.

W. ASTM D3359 - Standard Test Methods for Measuring Adhesion by Tape Test.

X. ASTM D3363 - Standard Test Method for Film Hardness by Pencil Test.

Y. ASTM D4946 - Standard Test Method for Blocking Resistance of Architectural Paints.

Z. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

AA. ASTM G53 - Practice for Operating Light- and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings:

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Five years experience.

B. Installer Qualifications:
   1. Five years experience.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.

3. Refinish mock-up area as required to produce acceptable work.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.'

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: SureCrete Design Products, which is located at: 15246 Citrus Country Dr. ; Dade City, FL 33523; Toll Free Tel: 800-544-8488; Tel: 352-567-7973; Email: request info (jackthomas@surecretedesign.com); Web: www.surecretedesign.com.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 25 00.

2.02 STAMP OVERLAY

A. Stamp Topping/Overlay: SureStamp by SureCrete Design Products.
1. Performance:
a. Thickness: 1/4 inch to 3/8 inch (6.35 mm to 9.5 mm).
b. Compressive Strength (ASTM C109): 7 day 3580 psi (24,683. kPa), 28 day 4350 psi (29,972 kPa).
c. Flexural Strength (ASTM C78): 9 day 880.7 psi (6063 kPa), 28 day 1494.3 psi (10,296 kPa).
2. Pigment Color: Color Packs as manufactured by SureCrete Design Products, with selection from manufacturer's 30 standard colors.

B. Topping/Overlay Bonding Agent: SureBond as manufactured by SureCrete Design Products.

C. Tool Release Agent: Liquid Release as manufactured by SureCrete Design Products.

D. Stamping Tool: Standard and custom fabricated concrete stamping tools to achieve required surface profile, texture and design required. Urethane materials compatible with products as manufactured by SureCrete Design Products.

2.03 SPRAY TEXTURES

A. Copolymer Modified Cementitious Spray Texture Finish: SureCrete SureTex as manufactured by SureCrete Design Products:
1. Performance:
a. Compressive Strength (ASTM C109): 28-day 3965 psi (27319 kPa).
b. Abrasion Resistance, Modified Taber: 28 days percent loss - 500 cycles - <1 percent.
c. Tensile Strength (ASTM C190): 28-day 390 psi (2687 kPa).
d. Flexural Strength (ASTM C348): 28-day 885 psi (6098 kPa).
e. Mosaic Shear (ANSI A 118.4): 28-day 268 psi (1847 kPa).
f. Density: 126.10 lb/cf (2020 kgm/cu. m).
2. Base Coat Tint: As selected from manufacturer's standard tints.
3. Finish Coat Tint: As selected from manufacturer's standard tints.

4. Finish Coat Texture: Trowel.

B. Copolymer Modified Cementitious Spray Texture Finish:
1. Performance:
a. Abrasion Resistance, Modified Taber: 28 days percent loss - 500 cycles - < 0.40 percent.
b. Tensile Strength (ASTM C190): 28-day 430 psi (2963 kPa).
c. Flexural Strength (ASTM C48): 28-day 980 psi (6752 kPa).
d. Mosaic Shear (ANSI A 118.4): 28-day 275 psi (1895 kPa).
e. Density: 126.10 lb/cf (2020 kgm/cu. m).
2. Product: SureCrete SureSpray as manufactured by SureCrete Design Products.
a. Base Coat Tint:
b. Finish Coat Tint:
c. Finish Coat Texture: Trowel.
d. Finish Coat Texture: Knock-down.
e. Finish Coat Texture: Bubble texture.

2.04 CONCRETE RESTORATION PRODUCTS

A. Copolymer Modified Cementitious Topping: SureBroom as manufactured by SureCrete Design Products. Trowelable or squeegee applied cementitious topping for leveling and retexturing interior and exterior concrete surfaces.
1. Performance:
a. Compressive Strength (ASTM C-109): 7-day 3750 psi (25,838 kPa), 28 day 6100 psi (42,029 kPa).
b. Abrasion Resistance (ASTM C-944): 1 day 1 gram lost, 7 day 1 grams lost.
c. Tensile Strength (ASTM C-190): 1 day 280 psi (1929 kPa), 7-day 560 psi (kPa), 28 day 890 psi (6132 kPa).
d. Flexural Strength (ASTM C-78): 7-day 850 psi (5857 kPa), 28 day 1500 psi (10335 kPa).
e. Shear Bond (ASTM C-882 Modified): 7-day 1100 psi (7579 kPa), 28 day 1650 psi (11,369 kPa) (Mortar scrubbed into substrate).
2. Finish: Texture that resembles freshly poured and broomed concrete.

B. Acrylic Modified Micro-Topping: Product: SureCrete Feather Finish as manufactured by SureCrete Design Products. Base and topcoat system to achieve predictable results.

2.05 SEALERS / ANTI-SLIP / FINISH

A. Waterborne Epoxy Sealer: Water based epoxy sealer/primer for vertical or horizontal cementitious surfaces.
1. Performance:
a. Appearance (cured): Clear sheen.
b. Water Resistance: Excellent, Beads water.
c. Mechanical Stability: Excellent.
d. Light Stability: Yellows.
e. Solids: 52 percent.
f. VOC content: 175 gm/L.
g. Set to Touch: 5 to 8 hours.
h. Pot life: Approx. 20 minutes.
i. Chemical Resistance: Refer to manufacturer's data.
2. Product: SureCrete Dura-Kote WB Color Epoxy as manufactured by SureCrete Design Products.
a. Color: As selected by Architect.
3. Product: SureCrete Dura-Kote WB Epoxy as manufactured by SureCrete Design Products.

B. Color: Clear.

2.06 CRACK TREATMENT

A. Epoxy Kit

B. 2-part Urethane

2.07 MAINTENANCE FLOOR SYSTEM

A. Maintenance Solution: SureFinish as manufactured by SureCrete Design Products. Diethylene glycol monoethyl ether in suspension.

PART 3 EXECUTION

3.01 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.

3.02 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.

C. Prepare exterior surfaces with chemical cleaner/profiler followed by rinsing with 3000-psi (20670 kPa) (minimum) pressure washer equipped with a turbo-tip to remove loose surface matrix and loose aggregate.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.04 SEALERS

A. Surface Preparation: Surface shall be dry and clean of dust, dirt, oils, and other surface contaminants. Provide surface profiling on concrete deck surfaces that are smooth, hard, and dense per manufacturer's recommendations.
1. Provide chemical profiling with products compatible and manufactured by sealer manufacturer.

B. Coverage Verification:
1. Coverage is dependent upon porosity of substrate. Provide RILEM and similar test to verify application to achieve stated product performance. Adjust application, coverage, and methods to comply with manufacturer's product specifications.

C. Application: Apply when air and surface temperatures are between 60º F (16º C) and 90º F (32º C) with relative humidity below 85 percent during application and cure time. High humidity (above 75 percent) will slow cure rates and affect gloss. Substrate shall be a minimum of 5 degrees above dew point.

D. Abrasive Agent: Broadcast between coats of sealer on a deck surface at coverage rate recommended by manufacturer.

3.05 CONCRETE RESTORATION / CONCRETE REPAIR

A. Remove all laitance, efflorescence, chemical contaminants, grease, oil, old paint, and other foreign matter. The surface shall require profiling. Sand blasting, grinding or abrasive blasting may be necessary achieve bare concrete.

B. The prepared surface shall be clean and structurally sound.

C. Substrate must be 40º F (4º C) and rising before installation. Surface at 90º F (32º C) and above shall be cooled before installation. Dampen area with fog tipped sprayer before using, leaving no puddles.

D. Mix consistency shall be maintained throughout application process. Do not apply in layers greater than 2 inches (51 mm). No tempering with additional water is allowed. Begin application immediately after mixing with water and work thoroughly into surface of area to be filled. Do not overwork. Minimize troweling.

3.06 CONCRETE RESTORATION / CEMENTITIOUS TOPPING

A. Base Coat: Mix product with water per manufacturer's instructions. Mechanically mix to a lump-free consistency.
1. Begin by saturating area to be covered with water. Before application of base coat, remove any excess water leaving no puddles. The surface shall be saturated, surface dry (SSD).
2. Place the base coat with a brush, broom, or squeegee and force into surface completely covering existing concrete. Lightly broom to obtain profile.

B. Finish Coat: Mix finish coat same as the base coat mix ratios.
1. Begin by saturating the base coat with water, leaving no standing puddles, SSD.
2. Place material with steel squeegee and lightly broom. As product dries, scrape and use leaf blower to remove loose material.

C. Apply two coats of selected sealer.

D. Curing: Allow to air cure after application.
1. Prevent the overlay from drying out too quickly. Provide favorable application conditions by working during cooler hours, keeping all materials shaded prior to mixing and setting up plastic or temporary walls to block wind.

3.07 STAMP OVERLAY / CEMENTITIOUS TOPPING

A. Bond Coat: Begin by saturating area to be covered with water. Before application of bond coat, remove any excess water leaving no puddles. The surface should be saturated, surface dry (SSD). Place the bond coat with a squeegee and force into surface completely covering existing concrete with this slurry. Apply only in sections that may be covered with stamp mix while maintaining a wet edge.

B. Stamp Coat: While the bond coat is still wet apply stamp coat. Mix water and integrally tint if required. Mechanically mix to a lump-free consistency. Use a gauge rake to apply stamp coat at 1/4 to 3/8 inch (6 mm to 9.5 mm), then steel trowel, fresno, or steel squeegee to a smooth and slick surface. Use surface retarder in hot and/or windy conditions to slow initial evaporation of surface. Allow stamp coat to set until material does not stick easily to the finger when touched but yields to pressure.

C. Apply stamps, texture to affect pattern desired. Use clear liquid release agent.

D. Clean-up and detail double lines from stamping tools.

E. Apply secondary coloring and 2 coats of selected sealer.

3.08 SURFACE TREATMENTS

A. Dry Shake Surface Hardeners:
1. Hand broadcast evenly to the surface of freshly placed concrete when the concrete reaches the point where no bleed water remains on the surface.
2. Do not spray water on the treated substrate.

3. Apply in two shakes, with two-thirds being applied in the first shake and one-third in the second shake (holding back a small amount for touch up work).
4. After the first shake, the surface is floated. Do not trowel between applications.
5. Apply the second shake perpendicular to the first application in a uniform manner. Float in and trowel to the final finish desired.
6. Install construction or control joints as soon as possible. Prevent trowel burns, especially at tooled joints and edges, when hard steel troweling.

3.09 STAMPED CONCRETE

A. Place concrete, screed, float with magnesium or wood according to industry standards. Allow bleed water to disappear and trowel with steel fresno.

B. Apply stamps, texture to affect pattern desired. Use release agents.

C. After the slab is sufficiently cured, carefully sweep up and contain excess powder release. Rinse the remaining excess with hose equipped with trigger nozzle and soft broom. Keep masking in place during clean-up. Best results are achieved by leaving the release color in the lower recesses of patterns, especially grout lines. Release shall be removed to allow the subsequent sealer to adhere to the finished product.

3.10 STAINING

A. Eco-Stain Application:
1. Apply first coat with SP sprayer on dry surface using caution to avoid track lines from the spray pattern. A circular motion with the wand is desired. Eco-Stain may be applied full strength or diluted with water to desired rate.
2. Applying additional coats is optional. Supplementary colors may be combined at desired rates and number of coats. Customarily apply lighter colors first. In addition to spraying some contractors employ mopping, sponging, and ragging, especially for accenting.
3. No clean-up or neutralization is required prior to sealing.

B. Earth Tone Application:
1. Apply first coat with SP sprayer on dry surface using caution to avoid track lines from the spray pattern. A circular motion with the wand is desired. Earth Tones may be applied full strength or diluted with water to desired rate. The first coat may be brushed or brushed into the surface. Use color-fast, acid resistant brushes or brooms. If stain is brushed, maintain a wet edge, never allow a wet broom to drag across a dry slab, as it may leave a permanent streak or brush stroke.
2. Areas that may call for brushing are sloped surfaces, slabs with "bird baths," stamped concrete, and overlays. Do not walk on the wet surface. Footprints will appear darker than the adjacent areas. If stepped on by accident, the footprints should be brushed out immediately. Allow the first coat to dry to the touch.
3. Apply second coat in the same manner as the first coat, as described above. Do not brush the second coat. Allow to dry overnight.

C. Multiple Colors:
1. Colors may be layered or alternated as desired. For crisp, distinct, and separate color changes, a score line should be utilized. Chemical stain will bleed across traditional masking. Shielding or masking at a score line will prevent the bleeding of colors as long as the stain is not puddled heavily at score lines.
2. Where both Earth Tones and Vivid Tones are part of the same application, apply Earth Tones first and complete cleanup before applying Vivid Tones.

D. Translucent Highlighting Application:
1. Allow stamp overlay or stamped to cure for a minimum of 12 hours before the application of highlighting. In cooler temperatures below 50 degrees F (10 degrees C) cure times may have to be extended. After drying sufficiently to be tack-free highlighting shall be sealed as scheduled.

2. Thoroughly mix pigment to maintain suspension. Highlighting may be sprayed from a solvent resistant (Viton seals) pump-up sprayer. For very small areas, vertical surfaces, or intricate tight work highlighting may be brushed or sponged.

E. Sealer:

1. Two coats of sealer are required. The surface shall be clean, completely dry and at least 40 degrees F (4 degrees C) during the sealing application. To apply with roller use an appropriate roller sleeve. Apply one thin coat forcing the sealer into the surface. Allow sealer to dry, and then repeat the process with a second coat of sealer.

3.11 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 03 35 00

SECTION 03 39 35 – CONCRETE DENSIFIER/SEALER/HARDENER

GENERAL

1.1 SECTION INCLUDES

A. Concrete sealer/densifier/hardener.

1.2 RELATED SECTIONS

Section 03 30 00 - Cast-in-Place Concrete: Cast-in-Place Concrete.

1.3 REFERENCES

A. Corps of Engineers Spec: CEGS 03300 4-79.

B. USDA approved.

C. Department of Navy, GSA, VA approved.

1.4 SYSTEM

A. Description: A sealer/densifier/hardener that will react with concrete surfaces to produce a dense, hydrophobic, insoluble, moisture barrier to seal out contaminants, while hardening and densifying surface.

B. Design Criteria:
1. ACI 302 Class 1 through 4 concrete floors.
2. May be used on Class 5 and 6 floors when used with mineral or metallic aggregate hardeners and toppings, and Class 9, Super-flat floors.
3. Complies with all Federal and State VOC requirements.
4. Independent Test Data, ASTM C 779, Procedure A, reduction of surface abrasion by 50% or more at the 30-minute time interval.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Samples: Furnish representative samples if requested by the Architect.

D. Project Specific Information:
1. Test reports.
2. Certificate of rate of application.
3. Signed warranty.

E. Application Rate: From Installer, based on project requirements.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5-year experience manufacturing similar products.

B. Installer Qualifications: Minimum 2-year experience installing similar products.
1. Approved in writing by manufacturer.

Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship is approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.7 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

B. At the Architect's request, technical personnel shall be available for a pre-job conference to review installation procedures.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver to jobsite in sealed, labeled containers.

B. Store and handle to prevent damage to product and environment.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

B. Environmental requirements: Comply with applicable VOC and EPA requirements.

1.10 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.11 WARRANTY

A. Warranty: Provide written warranty signed jointly by applicator, manufacturer and contractor. Warrant installation for a period of 10 years from date of substantial completion against dusting from abrasion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: L&M™ Construction Chemicals, which is located at: 1 LATICRETE Park N.; Bethany, CT 06524-3423; Toll Free Tel: 800-362-3331; Tel: 402-453-6600; Email:request info (info@lmcc.com); Web:www.laticrete.com/lmcc

Requests for substitutions will be considered in accordance with provisions of Division 01.

2.2 CONCRETE SEALER/DENSIFIER/HARDENER

A. Product: SEAL HARD by L&M Construction Chemicals; a solution of 100% active ingredient chemicals which penetrate concrete to seal, densify, dustproof and harden to resist water and oil penetration, and contamination.
1. Active ingredients: 100 percent.
2. Type: Alkali Siliconate.
3. Flash Point: None.
4. Specific Gravity: 1.155.
5. VOC: gm/L: 0.
6. Solids minimum: 30 percent.

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.

C. Assure surfaces are clean and free of all contaminants, and any film forming curing compounds or sealers.

D. Existing conditions, prior to installation:
1. Assure concrete has been cured a minimum of 3 days.
2. Assure concrete is clean and free of membrane forming curing compounds and/or other sealers.
3. Concrete is free of laitance, grease, oil and contaminants.

E. Protect concrete from construction activity staining.

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.

C. Protection: Protect adjacent surfaces/areas from damage due to over spray; especially glass and painted surfaces.

3.3 INSTALLATION

A. Apply in accord with manufacturer's instructions:
1. Apply directly from sealer container onto prepared surfaces, undiluted.
2. Application equipment: Mechanical "walk-behind" or riding scrubber.
3. Apply at minimum rate of 1 gallon per 150-200 sq. ft.
4. Allow surfaces to remain wet with sealer for 30-60 minutes.
5. Remove excess sealer at end of application procedure by water flushing and then squeegee dry.
6. Apply in 1 coat typical.
7. Apply 2 coats to porous or rough concrete surfaces.
8. Apply 2 coats to floor areas that will be exposed to frequent oil spills.

B. Leave area broom clean.

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 03 39 35

SECTION 03 52 16.13 – LIGHTWEIGHT CELLULAR INSULATING CONCRETE

PART 1 - GENERAL

1.01 SCOPE

A. Over the roof areas, provide a lightweight insulating cellular concrete deck system as part of the overall roofing system. This section and the roofing system are the responsibility of a single trade contract. Minimum 2.0” thickness of cellular concrete at a minimum slope of 1/8”:12”.

1.02 RELATED WORK

A. Section 06 10 00 - Rough Carpentry

B. Section 07 01 50.19 – Preparation for Reroofing

C. Section 07 52 00 - Modified Bitumen Roofing

D. Section 07 60 00 – Sheet Metal

1.03 SUBMITTALS

A. Comply with all Submittal requirements.

B. Product Data. Manufacturer's specifications and technical data.

C. Mix Design. Indicate materials and properties of proposed mix.

1.04 QUALITY ASSURANCE

A. Applicator: Approved in writing by manufacturer to install the roof lightweight insulating concrete deck system with 5 years experience with this type of deck and 3 previous application of this size.

B. Agency Approvals: Provide products, execution, and material thickness to conform to the applicable code requirements for the required fire resistance ratings, wind uplift classifications, insulation values, and diaphragm values.

C. Diaphragm Construction: Incorporate minimum compressive strength of the lightweight cellular insulating concrete to achieve diaphragm design values for edge and field conditions as specified to meet applicable code requirements.

D. Fire Resistance Classifications: Provide a lightweight insulting concrete system meeting the following fire resistance standards:
1. Tested by UL in accordance with the procedures of ASTM E119 and listed in the UL “Fire Resistance Directory”.
2. Classified according to ANSI/UL No. 1256 and listed in the UL “Roofing Materials Directory”.

E. Wind Uplift Classifications: Provide a lightweight insulating concrete system meeting the following wind uplift standards:
1. Tested by UL in accordance and listed in the UL “Roofing Materials Directory” for wind uplift resistance.
2. Tested by Factory Mutual Research and listed in the FM “Approval Guide” as 1-90 rated system.

F. Building/Construction Components: Meet or exceed established standards.

1.05 REFERENCES

A. American National Standards Institute (ANSI)

B. American Society for Testing and Material (ASTM)
1. A525, Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
2. C150, Standard Specification for Portland Cement

3. C177, Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by means of the Guarded-Hot-Plate apparatus.
4. C332, Specification for Lightweight Aggregates for Insulating Concrete.
5. C495, Test Method for Compressive Strength of Lightweight Insulating Concrete.
6. C578, Specification for Rigid, Cellular Polystyrene Thermal Insulation.
7. E119, Standard Test Methods for Fire Tests of Building Construction and Materials.

C. Factory Mutual (FM)
1. Provide FM Global Roof Nav # for the exact roof assembly as specified.
2. Non-combustible and Class I Roof Deck Construction.

D. National Roofing Contractors Association (NRCA)

E. Occupational Safety and Health Administration (OSHA)

F. Underwriter's Laboratories (UL)
1. Fire Ratings
2. Fire Resistance Directory Listing

G. National Roof Deck Contractors Association (NRDCA)

1.06 WARRANTY

A. Must be acceptable to roofing system manufacturer as specified in Section 07536 Modified Bitumen Roof Membrane and warranted for the same about of time as specified in Section 07536.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Elastizell or equal.

2.02 MATERIALS

A. Portland Cement: Shall conform to ASTM C150, Type I, II, or III.

B. Foaming Agent: ASTM C869.

C. Insulation Board: Expanded polystyrene insulation board having a nominal density of one (1) pcf and defined as Type I by ASTM C578 and containing approximately three (3) percent open area.

D. Water Purity: Potable water as defined by US Department of Health, containing no more than 250 ppm of free chloride ions or other substances that would affect the set of Portland cement. Provide water with sufficient pressure and volume to meet the roof application schedule.

E. Expansion Joint Material: One (1) inch thick of type recommended by insulating concrete material supplier for expansion joints in structural system and around perimeter forms.

F. Accessories: Provide accessories necessary to comply with manufacturer's recommendations and/or to meet fire resistance and code requirements.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Ensure that all surfaces to receive lightweight insulting concrete are free of oil, grease, paints/primers, loose mill scale, dirt, or other foreign substances which may impair proper adhesion to the substrate. If necessary, cleaning or other

corrections of surfaces to receive lightweight insulating concrete is the responsibility of the party causing the unacceptable condition of the substrate.

B. Do not begin placement of the lightweight insulating concrete system until the Owner's Representative and Roofing Material Manufacturer have examined surfaces to receive the roof lightweight insulating concrete system and determined that the surfaces are acceptable. Contractor shall begin work only after he has received in writing from the Owner's Representative the substrate is acceptable.

3.02 PREPARATION

A. Prior to placement of the lightweight insulating concrete system, inspect existing roof assembly to ensure that they it is free of lose debris and blisters.

B. Remove standing water and other substances that would interfere with bonding of the lightweight insulating concrete system.

C. Protect permanently exposed walls, floors or special surfaces while placing insulting concrete.

D. Notify other trades of dates of pouring in ample time for each to install his work.

E. Just prior to the application of the slurry the contractor must apply water to the concrete deck ensuring it is wet during the entire application.

3.03 INSTALLATION

A. Expansion Joint Material: Install at the following locations.
1. Changes in direction of roof deck.
2. Structural expansion joints.
3. Across dimensions exceeding 200 feet.

B. Mix Portland cement and cellular agent in a Range II Mix design with water in accordance with manufacturer's instructions to achieve the following:
1. Wet density: minimum 40 pcf
2. Minimum dry density: 27 pcf
3. Minimum compressive strength: 250 min psi

C. Install lightweight insulating concrete over existing roof system minimum thickness of 2.0" inches.

D. Avoid roof-top traffic over the lightweight insulating concrete deck system until 24 hours have elapsed after last placement of lightweight insulating concrete.

E. Allow lightweight insulating concrete to dry as thoroughly as possible before application of roofing, within 36 to 72 hours (not more than five (5) days).

3.04 FIELD QUALITY ASSURANCE

A. The Owner will select the independent testing laboratory and pay for the cost of tests in accordance with Division 1 if required.

B. The independent testing laboratory will randomly sample and verify the following:
1. Thermal insulation value in accordance with ASTM C177.
2. Mix design compressive strength in accordance with ASTM C495.
3. Mix design wet and dry density range in accordance with ASTM C495.
4. Polystyrene insulation density in accordance with ASTM C578.

C. Retests for work which fail initial tests or contractor shall pay inspections.

D. Results of all tests will be made available to all concerned parties.

E. Water Test: If requested lightweight insulating concrete applicator shall run water on the finished deck for the roofing material manufacturer's observation. The lightweight insulating concrete shall slope to drain and no ponding of water will be accepted.

F. Certification: On completion of installation, furnish Owner with a certificate signed by a representative of the applicator stating that insulating concrete was prepared and applied in accordance with manufacturer's recommendations.

G. Pull Out Test: Contractor shall conduct pull out test and meet a minimum of 95lbs/fastener. This test shall be witnessed and recorded by the Owner's Representative and Prime Roofing Material Manufacturer.

3.05 CLEANING

A. Remove equipment, excess materials, debris, and trash at the completion of installation of the lightweight insulating concrete deck system.

B. Remove visible lightweight insulating concrete from underside of deck where it is exposed to normal view.

C. If necessary, wash floors below the lightweight insulating concrete deck system after each day's installation or as necessary and remove wash water.

3.06 PATCHING AND REPAIRING

A. Perform all patching and repairing of lightweight insulating concrete using the same materials specified in this Section or materials approved by the system manufacturer.

B. The party responsible for damage will be charged for repairs.

3.07 PROTECTION

A. Roofing Contractor shall be responsible for protection of roof deck from other trades until it has been approved for traffic by installer.

END OF SECTION 03 52 16.13

SECTION 04 05 13 – MASONRY MORTARING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Mortar for masonry work specified in Section 04 21 13.

1.02 REFERENCES

A. Industry Standards: The Industry Standards listed below refer to the latest date of issue or edition, unless otherwise indicated.

B. Requirements, abbreviations and acronyms for reference standards are defined in Section 01 42 19.

C. ASTM C91 - Masonry Cement

D. ASTM C144 - Aggregate for Masonry Mortar

E. ASTM C150 - Portland Cement

F. ASTM C207 - Hydrated Lime for Masonry Purposes

G. ASTM C270 - Mortar for Unit Masonry

H. ASTM C387 - Packaged, Dry, Combined Materials for Mortar and Concrete

I. ASTM C476 - Grout for Reinforced and Non-Reinforced Masonry

1.03 SUBMITTALS

A. Submit product data in accordance with Section 01 33 23.

B. Include design mix, environmental conditions, and admixture limitations.

C. Submit manufacturer's installation instructions in accordance with general conditions.

PART 2 – PRODUCTS

A. MATERIALS:
1. Portland Cement: ASTM C150, Type I. (Type III may be used for cold weather laying.)
2. Masonry Cement: ASTM C91, Type II.
3. Sand: ASTM C144, standard masonry type; clean natural sand; dry; protected against dampness, freezing, and foreign matter; well graded from coarse to fine; containing 5 to 15% of fines
4. Portland Cement Grout Aggregate:
   a. ASTM C33
   b. Coarse Aggregate: Pea gravel uniformly graded from 3/8 inch to 1/2 inch.
5. Lime: ASTM C207, Type S, Hydrated or quick lime, slaked to form lime putty conforming to ASTM C5.
6. Water: Clean and free from injurious amounts of oil, alkali, organic matter or other deleterious material.
7. Calcium Chloride: Not permitted

B. MIXES
1. Mortar for exterior work: ASTM C270, Type S.
2. Mortar for interior work: ASTM C270, Type N.
3. Pointing Mortar: ASTM C270, Type N, 750 PSI at 28 days with maximum 2 percent ammonium stearate or calcium stearate per cement weight.
4. Mortar for masonry below grade and/or in contact with earth: ASTM C270, Type M.

5. Mortar shall be pre-mixed by manufacturer and shall be complete except for sand and water. Job mixing of mortar shall not be allowed.
6. Mortar color: Standard gray.

C. GROUT FILL
1. For Lintels: Transit or job mixed, to produce minimum 2,500 PSI strength at 28 days, 7-8 inches slump.

PART 3 – EXECUTION

A. MORTAR MIXING
1. Thoroughly mix mortar ingredients in quantities needed for immediate use. Use approved measuring box method.
   a. Measure and batch materials either by volume or weight such that the required proportions for mortar can be accurately controlled and maintained. Measurement of materials exclusively by shovel will not be permitted.
   b. Mix mortar ingredients for a minimum of 5 minutes in a mechanical batch mixer.
   c. Place two-thirds of the required mixing water and one-half of the sand in the mixer. Next, add the masonry cement. Then add the remaining sand. Allow to mix for two minutes to permit the fluidizing effect of the air-entraining agent to become effective. Then add remaining water to obtain the desired flow.
   d. At no time should the amount of material in the mixer cover the top two inches of the mixer blades when they are at the apex of their travel.
   e. Mix mortars with the minimum amount of water, consistent with workability to provide maximum tensile strength within the capacity of the mortar.
2. Do not use anti-freeze compounds to lower the freezing point of mortar or grout.

B. RETEMPERING

1. To minimize re-tempering, do not mix mortar more than 15 minutes prior to use.
2. If water is lost by evaporation, retemper within one hour of mixing. Do not use or retemper mortar more than one hour after mixing. Do not use mortar which has begun to set.

C. INSTALLATION
1. Refer to Section 04 21 13, Brick Masonry

END OF SECTION 04 05 13

SECTION 04 21 13 – BRICK MASONRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Modular face brick.
2. Standard concrete masonry units.
3. Reinforcement, anchorage, and accessories.
4. Thru-wall flashings.

B. Products installed but not supplied under this section:
1. Section 04 05 13 - Mortar and Grout: Testing Requirements
2. Section 05 50 00 - Metal Fabrications: Loose steel lintels

C. Related sections:
1. Section 03 30 00 - Cast-In-Place Concrete: Reinforcing bars
2. Section 05 12 00 - Structural Steel: Steel Shelf Angles
3. Section 05 31 33 - Cold-Formed Metal Framing: Metal Stud Back-Up for Brick Veneer
4. Section 07 19 00 - Water Repellents: Water Repellents Applied to Face Brick and Exterior Split Face CMU Surfaces.
5. Section 07 92 00 - Joint Sealers: Backer Rod and Sealant at Control Joints
6. Section 08 41 13 - Aluminum Entrances and Storefronts: Storefront System.

1.02 REFERENCES

A. Industry Standards: The Industry Standards listed below refer to the latest date of issue or edition, unless otherwise indicated.
1. ASTM A82 - Cold-Drawn Steel Wire for Concrete Reinforcement.
2. ASTM C216 - Facing Brick (Solid Masonry Units Made From Clay or Shale).
3. ASTM A525 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process.
4. ASTM A615 - Deformed and Plain Billet Steel bars for Concrete Reinforcement.
5. ASTM C90 - Hollow Load Bearing Concrete Masonry Units.
6. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

1.03 QUALITY ASSURANCE

A. Single-Source Responsibility: Each type of unit masonry shall be obtained from one manufacturer.
B. Qualifications of Workmen: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

C. Supervision: At least one skilled journeyman mason shall be present at all times during masonry work to personally supervise all work of this Section.

1.04 SUBMITTALS

A. Product Data: Submit product data for all masonry units and fabricated wire reinforcements and accessories.

B. Samples: Submit four samples of each type of masonry unit to illustrate color, texture and extremes of color range.
1. Color shall match Architect’s control sample.

C. Shop Drawings: Submit drawings showing locations of all masonry control and expansion joints.

D. Certificates: Submit manufacturer’s certificate that products meet or exceed specified requirements.

1.05 MOCK-UP

A. Mock- Up: Provide a 4' x 6' Mock-up of a typical masonry veneer wall system.
   1. Mock-up shall illustrate veneer wall system showing typical control joints, insulation, damp proofing, masonry ties, column ties, shelf-angles, thru-wall flashings, sealants, weep holes and accessories.
   2. Verify actual configuration and components with Architect prior to construction of mock-up.
   3. When accepted, mock-up will demonstrate minimum standard for the Work Mock-up may NOT remain as part of the Work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store and protect mortar materials in accordance with manufacturer's recommendations.
   1. Maintain temperature and humidity within ranges required by manufacturer's instructions.
   2. Maintain cementitious materials and aggregates clean, dry and protected against dampness, freezing and foreign matter.

1.07 PROTECTION

A. Protection During Erection: Maintain protective boards at exposed external corners which may be damaged by construction activities. Provide such protection without damaging completed work.
   1. At end of each day's work, cover top of walls with heavy waterproof sheets. Extend sheets 24 inches on each side of walls. Secure in place.
   2. Cover partially completed structures when work is not in place.

B. Cold Weather Protection for Work in Progress:
   1. When air temperature is from 40°F to 32°F, heat sand and mixing water to produce mortar temperature between 40°F and 120°F.
   2. When air temperature is from 32°F to 20°F, heat sand and mixing water to produce mortar temperature between 40°F and120°F. Maintain temperature of mortar on boards above freezing.

C. Cold Weather Protection for Completed Work: Provide protection as required to maintain minimum 32°F for a minimum of 24 hours.

D. Frozen Units: Remove all masonry units determined to be frozen or damaged by freezing conditions.

E. Hot Weather Construction: When air temperature exceeds 100°F (or 90°F with wind over 8 mph), do not spread mortar more than 4 feet ahead of masonry, and set units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.01 BRICK UNITS

A. Modular Face Brick: ASTM C216, Type FBS, Grade SW modular velour brick.
   1. Description: Standard modular, 3-5/8" x 7-5/8" x 2-1/4"
   2. Color: Match existing buildings. Final determination of match by Architect.

2.02 STANDARD CONCRETE MASONRY UNITS

A. Concrete Masonry Units: ASTM C90, Grade N, Type I for hollow load bearing.
   1. Size: Nominal 8" x 16" x thicknesses as indicated; center scored.
   2. Weight: Lightweight classification
   3. U.L. Rated C.M.U.: 2 or 4 hour as required, see Drawings for locations.

B. Solid Load-Bearing Concrete Masonry Units: ASTM C145, Grade N.

C. Concrete Building Brick: ASTM C55

D. Provide special units for bond beams, lintels, corners, jambs, control joints, headers, bonding, and other special conditions.

2.03 HORIZONTAL JOINT REINFORCEMENT

A. General: Horizontal joint reinforcement specified below shall be prefabricated for embedment in horizontal mortar joints of masonry, manufactured and welded in 10 foot lengths from cold-drawn steel wire conforming with ASTM A82 requirements.
   1. Prefabricated Corners and Tees: Required for each type of wall reinforcing.

B. Single-Wythe CMU Walls:
   1. Reinforcement Type: 2-wire system, truss design; “D/A 310, Truss” as manufactured by DUR-O-WAL, INC. or approved equal.
   2. Wire Gage/Size: Standard 9 gage side rods, 9 gage cross rods, width 2" less than wall thickness.
   3. Finish at Exterior Walls: Hot-dipped galvanized after fabrication, ASTM A153 Class B2.
   4. Finish at Interior Walls: Mill-galvanized, ASTM A641 Class 3.

C. Face Brick/CMU Cavity Walls:
   1. Reinforcement Type: 2-wire system, truss design, with adjustable tab ties at 16" o.c.; “D/A 370, Dur-O-Eye” as manufactured by DUR-O-WAL, INC. or approved equal.
   2. Wire Gage/Size: Standard 9 gage side rods, 9 gage cross rods, width 2" less than concrete block thickness.
   3. Finish: Hot-dipped galvanized after fabrication, ASTM A153 Class B2

D. Substitutions: (Upon compliance with all requirements)
   1. AA Wire Products, Co.
   2. Heckman Building Products, Inc.
   3. Hohmann & Barnard, Inc.
   4. Masonry Reinforcing Corp. of America
   5. National Wire Products Corp.

2.04 COLUMN TIES

A. Column Ties: 3/16" diameter, hot-dipped galvanized triangular ties with 5/16" x 5" long hot-dipped galvanized column anchors welded to steel columns for anchorage of C.M.U. walls. Provide sizes to fit field conditions. Refer to Drawings.
   1. Heckman, Inc. - #316
   2. Hohmann & Barnard, Inc. - #VWT.
   3. Dur-O-Wal - #D/A 701

2.05 COLUMN ANCHORS

A. Column Anchors: 1 1/4" wide x 12 gauge thick, hot-dipped galvanized column anchors for anchoring masonry to structural column when masonry is perpendicular to column flange. Provide flange widths and lengths to fit field conditions. Refer to Drawings.
   1. Heckman, Inc. - #197
   2. Hohmann & Barnard, Inc. - #353
   3. Dur-O-Wal - #D/A 606

2.06 NOTCHED COLUMN ANCHORS

A. Notched Column Anchors (Corrugated Type): 1½" wide x 12 gauge thick, hot-dipped galvanized column anchors for anchoring masonry to structural column when masonry is parallel to column flange. Provide flange widths and lengths to fit field conditions. Refer to Drawings.
   1. Heckman, Inc. - #189 L-type.
   2. Hohmann & Barnard, Inc. - #354
   3. Dur-O-Wal - #D/A 601

2.07 JOINT STABILIZATION ANCHORS

A. Joint Stabilization Anchors: Used for bridging vertical control joints; Dur-O-Wal - #D/A 2200 or approved equal. Space at 16" o.c. maximum.

2.08 THRU-WALL FLASHINGS

A. Copper-Fabric Laminate Flashing: 5 ounce copper sheet bonded with asphalt between two layers of glass-fiber cloth.
1. Manufacturers/Products:
a. Cop-A-Cote; AFCO Products, Inc.
b. Type ACC-Asphalt Bituminous Coated; Phoenix Building Products.
c. Coated Copper Flashing; Sandell Manufacturing Co., Inc.
d. Copperseal; York Manufacturing, Inc.

2.09 RIGID ANCHORS (As Required)

A. Fabricate from steel bars as follows:
1. 1½ " (38 mm) wide by 1/4" (6.4 mm) thick by length required with ends turned up 2" (50 mm) or with cross pins. Refer to drawings for locations and sizes.

2.10 ACCESSORIES

A. Preformed Control Joints (where applicable): Extruded rubber conforming to ASTM D-2000 2AA-805 with 80 durometer conforming to ASTM D2240, designed for use in control joints in solid or cavity wall construction to provide resilient resistance to cracking under stress of expansion and contraction.
1. Size and Configuration: As required for compliance with drawings.

B. Horizontal (Soft Joint) Expansion Joint: 1/4" x 2 3/4" adhesive on one side with compression up to 35%, closed cell neoprene per ASTM D-1056, Class RE41.

C. Vertical Expansion Joint: 3/8" x 3", no adhesive with compression up to 35%, closed cell neoprene conforming to ASTM D-1056, Class RE41.

D. Mortar/Grout Screen: 1/4 square monofilament screen fabricated from high-strength, non-corrosive polypropylene polymers; 4", 6", or 10 widths, as required.

E. Sealant and Backer Rods: Exterior quality in accordance with Section 07900.

1. Color: To be selected by Architect.

F. Sealant: Sonneborn Hydrocide Black Damp Proofing *No. C.S. 2-5* applied to cover total wall surface without voids in accordance with manufacturer's recommendations.

G. Weep Holes: 3/8" braided cotton sash cord; run up 16" high over flashing membrane.

H. Cleaning Solutions: As recommended by manufacturer of masonry units.

2.11 LINTELS

A. Steel Lintels:
1. Type: Loose type steel angles as specified in Section 05500.
2. Size: As indicated on Drawings.

PART 3 - EXECUTION:

3.01 EXAMINATION

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

B. Other Work: Verify items provided by other Sections of work are properly sized and located.

C. Built-in Items: Verify that built-in items are in proper location, and ready to roughing into masonry work.

1. Confirm that steel shelf angles are NOT continuous masonry control and expansion joints.

3.02 PREPARATION

A. Metal Anchors: 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. Bond, CMU: Lay concrete masonry units in running bond. Course one unit and one mortar joint to equal 8 inches.
1. Typically, form concave mortar joints in all areas.

D. Bond, Brick Units: Lay brick units in running bond. Course three brick units and three mortar joints to equal 8 inches.
1. Form concave mortar joints.

3.04 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.

D. Remove excess mortar as work progresses.

E. Interlock intersections and external corners.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Job site cutting: Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

I. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with a compressible joint filler.

3.05 WEEPS

A. Install weep holes in veneer at 24" on center horizontally above through-wall flashing, and at bottom of walls.

3.06 CAVITY WALLS

A. Mortar Droppings: Do not permit mortar on drop or accumulate into cavity air space or to plug weep holes.

3.07 REINFORCEMENT AND ANCHORAGES - SINGLE WYTHE MASONRY

A. Install horizontal joint reinforcement 16" o.c.

B. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 16" each side of opening.

C. Place joint reinforcement continuous in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6". Extend minimum 16" each side of openings.

E. Embed anchors attached to structural steel members in every second block joint.

F. Prefabricated Corners: Reinforce joint corners and intersections with prefabricated corners and ties.

3.08 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

A. Install horizontal joint reinforcement 16" o.c.

B. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 16" each side of opening.

C. Place joint reinforcement continuous in first joint below top of walls. Lap joint reinforcement ends minimum 6". Extend minimum 16" each side of openings.

D. Embed anchors attached to structural steel members in every second block joint.

E. Strap Anchors: Reinforce joint corners and intersections with strap anchors 16" o.c.

3.09 MASONRY FLASHINGS

A. Extend flashings through veneer, turn up minimum 8" and bed into mortar joint of masonry or seal to sheathing over steel stud back-up.

B. Lap end joints minimum 6" and seal watertight.

C. Flashing Adhesive: Use flashing manufacturer’s recommended adhesive and sealer.

3.10 LINTELS

A. Install loose steel lintels over window and door openings.

B. Install reinforced unit masonry lintels over openings where steel lintels are not scheduled.

C. Openings up to 78" Wide: Place two, No. 4 reinforcing bars 1" from bottom web, unless otherwise indicated.

D. Openings over 78": Reinforce openings as detailed.

E. Reinforcing: Use single piece reinforcing bars only.

F. Support and secure reinforcing bars from displacement. Maintain position with ½” of dimensioned position.

G. Grout Fill: Place and consolidate grout fill without displacing reinforcing.
1. Allow masonry lintels to attain specified strength before removing temporary supports.

H. Maintain minimum 8" bearing on each side of opening.

3.11 GROUTED COMPONENTS

A. Bond Beam Reinforcement: Reinforce bond beam with 2, No. 5 bars.

B. Bar Splices: Lap splices minimum 24 bar diameters.

C. Support and secure reinforcing bars from displacement. Maintain position with ½" of dimensioned position.

D. Place and consolidate grout fill without displacing reinforcing.
   1. Place grout fill in maximum 4 foot lifts.

E. Openings: At bearing locations, fill masonry cores with grout for a minimum 12" either side of opening.
   1. Provide one, No. 5 bar full height in first cell unless noted otherwise.

3.12 CONTROL AND EXPANSION JOINTS

A. Control/Expansion Joints: Do not continue horizontal joint reinforcement through control and expansion joints.

B. Form control joints with a preformed control joint material as specified in Part 2 using sash block. Rake joint at exposed unit faces for placement of backer ord and sealant.

C. Control Joints: Size control joint in accordance with Section 07900 for sealant performance.

D. Form expansion joints as detailed.

3.13 BUILT-IN WORK

A. Built-In Items: As work progresses, build in metal door frames, fabricated metal frames, window frames, anchor bolts, plates and other items furnished by other Sections.

B. Build in items plumb and level.

C. Door Jambs: Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout. Fill adjacent masonry cores with grout minimum 12" from framed openings.

D. Do not build in organic materials subject to deterioration.

3.14 PARTITION IDENTIFICATION

A. Stenciling: Stencil the wall rating on each side of wall above the ceiling. Letters shall be minimum 2" high and labeled at 20-foot centers.
   1. Label as “FIRE”, “SMOKE”, and “NO. OF HOURS”
   2. Non-rated walls which extend to deck shall be labeled “NO WALL RATING REQUIRED”.

3.15 TOLERANCES

A. Maximum Variation From Alignment of Columns: 1/4"

B. Maximum Variation From Unit to Adjacent Unit: 1/32"

C. Maximum Variation From Plane of Wall: 1/4" in 10 feet and ½" in 20 feet or more.

D. Maximum Variation From Plumb: 1/4" per story non-cumulative; ½" in two stories or more.

E. Maximum Variation From Level Coursing: 1/8" in 3 feet and 1/4" in 10 feet and ½" in 30 feet.

F. Maximum Variation of Joint Thickness: 1/8" in 3 feet.

G. Maximum Variation From Cross Sectional Thickness of Walls: 1/4"

3.16 CUTTING AND FITTING

A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other Sections of work to provide correct size, shape and location.

B. Obtain Architect’s approval prior to cutting or fitting masonry work not indicated or where appearance or strength of

masonry work may be impaired.

3.17 CLEANING

A. Remove excess mortar and mortar smears.

B. Clean soiled surfaces with cleaning solution.

C. Use non-metallic tools in cleaning operations.

3.19 PROTECTION OF FINISHED WORK

A. Protection: Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

END OF SECTION 04 21 13

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. All concrete unit masonry construction shall comply with TMS 402/602-16, except as modified by the Contract Documents.

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Mortar and grout.
3. Steel reinforcing bars.
4. Masonry-joint reinforcement.
5. Miscellaneous masonry accessories.
6. Embedded flashing materials, paint, coatings, and other architectural components are specified elsewhere.

B. Products Installed, but Not Furnished, under This Section:
1. Steel lintels and steel shelf angles in accordance with Section 051200 “Structural Steel Framing” in concrete unit masonry.

C. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete"
2. Section 051200 "Structural Steel Framing"

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

C. Exposed: Weather-exposed side of a constructed wall.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars.

    a. Comply with TMS 402/602-16 and project drawing requirements for detailing of masonry reinforcement.
    b. Show full height and full length elevations of all reinforced walls.
    c. Shop drawing shall include locations of control joints.
    d. Shop drawings not complying with these requirements will be returned for correction and resubmittal.

C. Material Certificates: For each type and size of the following:

1. Masonry units.

    a. Include data on material properties and material test reports substantiating compliance with requirements.
    b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
2. Cementitious materials. Include name of manufacturer, brand name, and type.
3. Mortar admixtures.
4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
5. Grout mixes. Include description of type and proportions of ingredients.
6. Reinforcing bars.
7. Joint reinforcement.
8. Anchors, ties, and metal accessories.

D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C780 for mortar properties as applicable. Not required if proportion method of ASTM C 270 is used.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
3. Submit a proposed work plan and quality-control/quality-assurance plan prepared in conjunction with the testing agency to demonstrate compliance with these requirements and ASTM C270.

E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined in accordance with TMS 402/602-16.

1.5 INFORMATIONAL SUBMITTALS

A. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Contractor shall submit required masonry documentation and submittals for Engineer’s review prior to the preinstallation conference.
2. Contractor’s superintendent, masonry superintendent, masonry foreman, and testing agency field technician shall attend.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops 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 of walls, 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 three 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. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings 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.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements of TMS 402/602-16.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements of TMS 402/602-16.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

C. Source Limitations for Integral Water Repellent: Obtain integral water-repellent admixtures for CMU and mortar from manufacturers with documented compatibility.

2.2 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 402/602-16.

B. Regulatory Requirements: Comply with the provisions of the following codes, specifications, and standards, except as otherwise shown or specified:

1. TMS 402/602-16:

a. Maintain one copy of the standard in Project field office at all times during construction. Contractor's supervisory personnel are to be thoroughly familiar with this material as it applies to Project.

2.3 CONCRETE UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 402/602-16 except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

2.4 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide square-edged units for outside corners unless otherwise indicated.

B. Integral Water Repellent: Provide units made with integral water repellent for exposed units.

1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514 as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.

a. Manufacturers: Subject to compliance with requirements, providers include, but are not limited to the following:

1) BASF Corporation.
2) Euclid Chemical Company (The); an RPM company.
3) GCP Applied Technologies Inc.

C. CMUs: Load-bearing ASTM C 90.

1. Density Classification: Normal weight.
2. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.
3. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

2.5 MASONRY LINTELS

A. Masonry Lintels: Built-in-place masonry lintels made from lintel beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as

indicated and filled with grout. Temporarily support built-in-place lintels until cured. Knockout blocks will not be acceptable.

2.6 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.

B. Masonry Cement: ASTM C 91.

1. Manufacturers: Subject to compliance with requirements, providers include, but are not limited to, the following:

a. Holcim (US) Inc.
b. Lafarge North America Inc.

C. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

D. Aggregate for Grout: ASTM C 404.

E. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing an integral water repellent and supplied by a manufacturer documenting compatibility with the CMU admixture.

1. Manufacturers: Subject to compliance with requirements, providers include, but are not limited to, the following:

a. BASF Corporation.
b. Euclid Chemical Company (The); an RPM company.
c. GCP Applied Technologies Inc.

F. Water: Potable.

2.7 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615, Grade 60.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

1. Manufacturers: Subject to compliance with requirements, providers include, but are not limited to, the following:

    a. Dur-O-Wal; a Hohmann & Barnard company.
    b. Heckmann Building Products, Inc.
    c. Hohmann & Barnard, Inc.

C. Masonry-Joint Reinforcement, General: Truss type as indicated complying with ASTM A 951.

1. All Locations: Hot-dip galvanized carbon steel.
2. Wire Size for Side Rods: 0.148-inch diameter.
3. Wire Size for Cross Rods: 0.148-inch diameter.
4. Spacing of Cross Rods: Not more than 16 inches o.c.
5. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

2.8 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into masonry but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82, with ASTM A 153, Class B-2 coating.
2. Steel Plates, Shapes, and Bars: ASTM A 36, Hot-Dip Galvanized.

C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Tie Section: Triangular-shaped wire tie made from 0.187-inch diameter, hot-dip galvanized steel wire.

2.9 EMBEDDED FLASHING MATERIALS

A. As indicated by the Architect.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

A. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

B. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D 226/D 226M, Type I (No. 15 asphalt felt).

2.11 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use masonry cement unless otherwise indicated.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
1. For reinforced masonry, use Type S.
2. For interior non-load-bearing partitions, Type O may be used instead of Type S.

D. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 402/602-16 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C 476, Table 1 for specified 28-day compressive strength indicated.
3. Provide grout with a slump of 10 to 11 inches as measured according to ASTM C 143.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Verify that substrates are free of substances that would impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Build chases and recesses to accommodate items specified in this and other Sections.

B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch .
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.
2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.
3. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
4. Joint Sealants: Comply with ASTM C1193 for use of joint sealants, including acoustic sealants as applicable to materials, applications and Project conditions.

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Where applicable, set masonry trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

1. Clean soiled surfaces in accordance with manufacturer recommendations.
2. Wet joint surfaces thoroughly before applying mortar.
3. Rake out mortar joints for pointing with sealant.

D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

E. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.
2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 16 inches beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.

3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.8 CONTROL JOINTS

A. General: Install control joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry as follows:

1. Install preformed control-joint gaskets designed to fit standard sash block.

C. Joint location to be by masonry sub-contractor; center to center spacing of joints shall not exceed 20'. Submit plan to engineer for review during shop drawing review process.

3.9 LINTELS

A. Provide masonry lintels where shown and where openings of more than 24 inches for block-size units are shown without structural steel or other supporting lintels.

B. Provide minimum bearing of 16 inches at each jamb unless otherwise indicated.

3.10 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 402/602-16.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 402/602-16 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches or distance to next bond beams, whichever is smaller.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense. Compressive strength determination shall be in accordance with the Unit Strength Method of TMS 402/602-16.

1. General Contractor responsible for timely and appropriate distribution of testing and observation reports.
2. General Contractor responsible for coordinating a proposed testing and inspection plan in conjunction with the testing agency. Plan to be reviewed by Engineer at pre-installation meeting.

B. Inspections: Special inspections according to Level B in TMS 402/602-16.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests for each masonry assembly or material combination specified.

D. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

E. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

F. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.12 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.13 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Excess Masonry Waste: Remove excess clean masonry waste, and other masonry waste, and legally dispose of off the Owner's property.

END OF SECTION 042200

SECTION 05 05 00 – COMMON WORK RESULTS FOR METALS

PART 1 - GENERAL

The extend of this work is as shown on the drawings, specified, and required by the general construction.

1.01 QUALITY ASSURANCE

A. Codes and Standards: Comply with the provisions of the following codes, standards, and specifications, except as otherwise shown and specified:

1. *AISC* "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings," including "Commentary of the *AISC* Specification."
2. *AISC* "Specifications for the Design of Cold-Formed Steel Structural Members."
3. *AWS* "Structural Welding Code."

B. Qualification For Welding Work: Qualify welding processes and welding operators in accordance with *AWS* "Standard Qualifications Procedure."

C. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to insure proper fittings of the work. However, do not delay job progress; allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the work.

D. Shop Assembly: Preassemble items in the shop to the greatest extent possible, so as to minimize field splicing and assembly of unit at the project site. Disassemble units only to the extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.02 SUBMITTALS

A. Manufacturer's Data; Miscellaneous Metal, General: For information only, submit *two (2) copies* of manufacturer's specifications, load tables, dimension diagrams, anchor details and installation instructions for products to be used in miscellaneous metal work, including paint products. Indicate by transmittal that copy of instructions has been distributed to the installer.

B. Shop Drawing; Miscellaneous Metal, General: Submit shop drawings for the fabrications and erection of all assemblies of miscellaneous metal work, which are not completely shown by the manufacturer's data sheets. Include plans, elevations, and details of sections and connections. Show anchorage and accessory items. Include setting drawings and templates for location and installation of miscellaneous metal items and anchorage devices.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Metal Surfaces: For the fabrication of miscellaneous metal work items which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness. Remove such blemished by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes including zinc coatings:

B. General Metal Materials:

1. Rolled Steel Plates, Shapes, and Bars: *ASTM A 36*.
2. Cold-Formed Steel Tubing: *ASTM A 500, Grade B.*
3. Hot-Formed Steel Tubing: *ASTM A 501.*
4. Steel Pipe: *ASTM A 53, Type E or S, Grade B.*
5. Steel Castings: *ASTM A 27, Grade 65-35, medium strength carbon steel.*
6. Unfinished Bolts and Nuts: *ASTM A 307, Grade A.*
7. High-Strength Bolts and Nuts: *ASTM A 325 or A 490*.
8. Electrodes for Welding: *Comply with AWS Code*.

C. Anchors:

1. Threaded-Type Concrete Inserts: Galvanized ferrous castings, internally threaded to receive *3/4"* diameter machine bolts, either malleable iron complying with *ASTM A 47* or cast steel complying with *ASTM A 27;* hot-dip galvanized.
2. Wedge-Typed Concrete Inserts: Galvanized box-type ferrous casting, designed to accept *3/4"* diameter bolts having special wedge-shaped heads; either malleable iron complying with *ASTM A 47* or cast steel complying with *ASTM A 27;* hot-dip galvanized.
3. Provide carbon steel bolts having special wedge shaped head, nuts, washers and shims; all galvanized in compliance with *ASTM A 153.*
4. Slotted-Typed Concrete Inserts: *Galvanized 1/8*" thick pressed steel plate complying with *ASTM A 283;* box-type welded construction with slot designed to receive *3/4"* diameter square head bolt and with knockout cover; hot-dip galvanized.

D. Fasteners: Provide zinc-coated fasteners, with galvanizing complying with *ASTM A 153,* for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required for the installation of miscellaneous metal items.

1. Standard Bolts and Nuts: *ASTM A 307, Grade A, regular hexagon head.*
2. Lag Bolts: *FS FF-B-561, square head type.*
3. Wood Screws: *FS FF-S-111, Flat head carbon steel.*
4. Machine Screws: *FS FF-S-92, Cadmium plate steel.*
5. Plain Washers: *FS FF-W-92, round, general assembly grade carbon steel.*
6. Lock Washers: *FS FF-W-84, helical spring type carbon steel.*
7. Masonry Anchorage Devices: Expansion shields: *FS FF-S-325.*
8. Toggle Bolts: Tumble-wing type: *FS FF-B-588, type, class,and style as required.*

E. Non-metallic Shrinkage-Resistant Grout: Pre-mixed, non-metallic, non-corrosive, none-staining product containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with *CRD-C621.*

2.02 FABRICATION, GENERAL

A. Workmanship: Use materials of the size and thicknesses shown, or if not shown, of the required size and thickness to produce adequate strength and durability in the finished product for the intended use. Work to the dimensions shown or accepted on ship drawings, using proven details of fabrication and support. Use the type of materials shown or specified for the various components of work. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately *1/32"* unless otherwise shown. Form bent metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work.

1. Weld corners and seams continuously and in accordance with the recommendations of *AWS.* At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
2. Form exposed connections with hairline joints which are flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of the type shown or, if not shown, use Phillips flathead *(countersunk)* screws or bolts. Provide for anchorage of the type shown, coordinated with the supporting structure and the progress schedule. Fabricate and space anchoring devices to provide adequate support for the intended use of the work. Cut, reinforce, drill and tap miscellaneous metal work indicated to receive finish hardware and similar items of work.
3. Galvanizing: Provide a zinc coating for those items shown on the drawings or specified to be galvanized, using the hot-dip process after fabrication.

   ASTM A 153 for galvanizing of iron and steel hardware.
   ASTM A 123 for galvanizing of rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier.
   ASTM A 386 for galvanizing of assembled steel products.

B. Fabrication: Fabricate items of steel in accordance with *AISC* Specifications and as indicated on the final shop drawings. Properly mark and match-mark all materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling.

1. Connections: Combinations of bolts and welds in the same connections are not permitted, unless otherwise detailed. Weld or bolt shop connections, unless otherwise shown. Bolt field connections, except where welded connections or other connections are indicated. Provide high- strength bolts and nuts if required.
2. Welded Constructions: Comply with *AWS Code* for procedures, appearance, and quality of welds, and for methods used in correcting welding work.
3. Build up welded door frames attached to structural steel framing. Weld exposed joints continuously and grind smooth. Plug weld steel bar stops to frames, except where shown removable. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than *10" o.c.*, unless otherwise shown.
4. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for the passage of other work through steel framing members as indicated. Provide threaded nuts welded to framing, and other specialty items as shown to receive other work. 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 PAINT:

A. Metal Primer Paint: Zinc yellow iron oxide primer complying with *SF TT-P-57, Type II.* Primer paint selected must be compatible with the required finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in *Division 9* of these specifications.

B. Galvanizing Repair Paint: High zinc dust content paint for re-galvanizing welds in galvanized steel, complying with *Military Specifications MIL-P-21035 (Ships).*

C. Shop Painting: Shop paint all structural steel work, except members or portions of members to embedded in concrete or mortar. Paint embedded steel on exposed portions and initials *2"* of embedded areas only. Do not paint contact surfaces which are to be welded or high strength bolted. Do not paint surfaces which are scheduled to receive sprayed-on fireproofing. Apply *2* coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

1. Surface Preparation: After inspection and before shipping, clean steelwork to be painted complying with *Steel Structures Painting Council (SSPC) SP-2 "Hand Tool Cleaning," or SSPC SP-3 "Power Tool Cleaning," or SSPC SP-7 "Brush Off Cleaning."* Remove oil, grease and similar contaminates, complying with *SSPC SP-1* "Solvent Cleaning."
2. Application: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide a uniform dry film thickness of *2.0 mils.*

END OF SECTION 05 05 00

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel.
2. Loose lintels and shelf angles
3. Embeds
4. Shrinkage-resistant grout.

B. Scope:

1. Provide, fabricate, and erect all structural steel, including loose lintels, embeds, anchor bolts, baseplates, hangers, framed openings, etc. as indicated on the plans or otherwise specified herein.

2. Frames for all roof openings shall be provided under this section. Refer to Architectural, Mechanical, and Electrical plans for sizes and locations. All openings over 12” square shall be framed unless noted otherwise on the plans.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303. Definition to include lintels, embeds, shelf angles, and other items typically specified under section 055000 “Metal Fabrications”.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Structural-steel materials.
2. High-strength, bolt-nut-washer assemblies.
3. Anchor rods.

4. Threaded rods.
5. Shop primer
6. Galvanized steel primer
7. Galvanized repair paint.
8. Shrinkage-resistant grout.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
5. Identify members not to be shop primed.
6. Identify members to be galvanized.
7. Identify members to be painted.
8. Transmit and maintain shop drawing submittals in PDF format.
9. Manually generated ("hand / board") drawings are not acceptable.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers and galvanized material, certifying that shop primers and galvanization are compatible with topcoats.

C. Field quality-control reports.

D. Pre-installation meeting minutes.

1.6 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.7 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with applicable provisions of the following specifications and documents:

1. ANSI/AISC 303.
2. ANSI/AISC 360.
3. RCSC's "Specification for Structural Joints Using High-Strength Bolts."

B. Connection Design Information:

1. Option 1: Connection designs have been completed and connections indicated on the Drawings.

   For connections not detailed, the connection shall be detailed for ½ of the total allowable uniform load (Wc/L) given in the tables of uniform load constants in the AISC Manual for the given member profile.

   Unless otherwise detailed on the plans, the fabricator shall design frames for roof and floor openings for the appropriate live and dead load requirements and in conformance with the applicable allowable stress and deflection limits.

2.2 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A992/A992M ASTM or A572/A572M, Grade 50

B. Channels, Angles: ASTM A36/A36M or ASTM A572/A572M, Grade 50 where specifically indicated.

C. Plate and Bar: ASTM A36/A36M ASTM or A572/A572M, Grade 50 where specifically indicated.

D. Cold-Formed Hollow Structural Sections: ASTM A1085/ASTMA1085M structural tubing.

E. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

B. Zinc-Coated High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip or mechanically deposited zinc coating.

2.4 RODS

A. Unheaded Anchor Rods: ASTM F1554, Grade 36 or ASTM F1554, Grade 55, weldable, where indicated

1. Configuration: Straight with welded nut at embedded end.
2. Nuts: ASTM A563 heavy-hex carbon steel.
3. Plate Washers: ASTM A36/A36M carbon steel.
4. Washers: ASTM F436, Type 1, hardened carbon steel.
5. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

B. Headed Anchor Rods: ASTM F1554, Grade 36 ASTM F1554, or Grade 55, weldable, straight, where indicated

1. Nuts: ASTM A563 heavy-hex carbon steel.
2. Plate Washers: ASTM A36/A36M carbon steel.
3. Washers: ASTM F436, Type 1, hardened carbon steel.
4. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

C. Threaded Rods: ASTM A36/A36M.

1. Nuts: ASTM A63 heavy-hex carbon steel.
2. Washers: ASTM F436, Type 1, hardened carbon steel.
3. Finish: Plain or Hot-dip zinc coating, ASTM A153/A153M, Class C, as indicated.

2.5 PRIMER

A. Steel Primer:

1. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer compatible with topcoat if specified.

B. Galvanized-Steel Primer:

1. Compatible with topcoat if specified.
2. Etching Cleaner: MPI #25, for galvanized steel
3. Galvanizing Repair Paint: ASTM A780/A780M.

2.6 SHRINKAGE-RESISTANT GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.7 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.

1. Camber structural-steel members where indicated.
2. Mark and match-mark materials for field assembly.
3. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill,or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.8 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

2.9 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize all lintels, shelf angles, and any other members exposed to exterior conditions. Request clarification during bidding process as appropriate.
3. All anchor rods to be hot dip galvanized.

2.10 SHOP PRIMING

A. Shop prime steel surfaces, except the following:

1. Galvanized surfaces unless indicated to be painted.

B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:

1. SSPC-SP 2.

C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner or in accordance with SSPC-SP 16.

D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.

B. Baseplates Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.

C. Maintain erection tolerances of structural steel within ANSI/AISC 303.

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Beams, lintels, and any other members that are to be wall bearing shall be erected in normal sequence and shall extend over the wall a minimum of 8” unless shown otherwise on the plans. Coordinate with architectural requirements as required. Contractor responsible for bending lintels as required to achieve architectural conditions.

I. The structural system and individual members are designed to be self-supporting only after all structural members are in place and fully connected. Bracing, falsework, sequencing of erection, and all effort necessary to achieve the final conditions are the responsibility of the contractor.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs~~,~~ back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

3.5 REPAIR

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.

B. Touchup Painting:

1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

C. Touchup Priming: Cleaning and touchup priming according to manufacturer’s directions.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

1. Bolted Connections: Inspect and test bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.

a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1) Liquid Penetrant Inspection: ASTM E165/E165M.

2) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
3) Ultrasonic Inspection: ASTM E164.
4) Radiographic Inspection: ASTM E94/E94M.

END OF SECTION 051200

SECTION 052100 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. LH-series long-span steel joists.
   2. Steel joist accessories.

B. Related Requirements:

   1. Section 033000 "Cast-in-Place Concrete" for installing bearing plates in concrete.
   2. Section 042200 "Unit Masonry" for installing bearing plates in unit masonry.
   3. Section 051200 "Structural Steel Framing" for field-welded connectors.

1.3 DEFINITIONS

A. SJI's "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."

B. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

1.4 ACTION SUBMITTALS

A. Product Data: For each type of joist, accessory, and product.

B. Shop Drawings:

   1. Include layout, designation, number, type, location, and spacing of joists.
   2. Include joining and anchorage details; bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.
   3. Indicate locations and details of bearing plates to be embedded in other construction.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications."

1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's "Specifications."

B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, allowable providers include, but are not limited to, the following:

1. CMC Joist & Deck.
2. New Millennium Building Systems, LLC.
3. Vulcraft; Nucor Vulcraft Group.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated.

1. Use ASD; data are given at service-load level.
2. Design special joists to withstand design loads with live-load deflections no greater than the following:
   a. Roof Joists: Vertical deflection of 1/240 of the span.

2.3 STEEL JOISTS

A. Long-Span Steel Joist: Manufactured steel joists according to "Standard Specification for Longspan Steel Joists, LH-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members; of joist type and end and top-chord arrangements as indicated on Drawings.

1. Joist Type: LH-series long-span steel joists.
2. End Arrangement: Underslung.
3. Top-Chord Arrangement: Parallel.
4. Provide holes in chord members for connecting and securing other construction to joists.
5. Camber long-span steel joists according to SJI's "Specifications."
6. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches.

2.4 PRIMERS

A. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15 and compatible with Architect’s specified finish.

2.5 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.

B. Fabricate steel bearing plates from ASTM A36 steel with integral anchorages of sizes and thicknesses indicated. Shop prime bearing plates at interior locations and hot-dip galvanize in accordance with ASTM A123 at exterior locations.

C. Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of of sufficient strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface unless otherwise indicated.

1. Finish: Plain, uncoated at interior locations and Hot-dip zinc coating, ASTM A153, Class C at exterior locations.

D. High-Strength Bolts, Nuts, and Washers: ASTM F3125, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436, Type 1, hardened carbon-steel washers.

1. Finish: Plain at interior locations and Hot-dip zinc coating, ASTM A153, Class C at exterior locations.

E. Welding Electrodes: Comply with AWS standards.

F. Galvanizing Repair Paint: ASTM A780.

G. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.6 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.

B. Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written instructions, requirements in this Section, and AISC requirements.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
4. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads are applied.
5. All joists shall be erected in strict accordance with the specification requirements of the AISC and SJI. All bridging shall be completely installed and the joists permanently fastened into place before the application of any loads. Sequence of bridging shall be in compliance with SJI and OSHA requirements for erection.
6. Space all joists equally between column lines or otherwise as noted on the plans. Coordinate spacing of joists under mechanical units, skylights, hatches, ducts, etc. with other trades.
7. Where joists butt over a beam, the beam flange shall be wide enough so as to provide the minimum bearing required by the AISC and SJI Specifications, otherwise, the joist ends shall be welded across the tops as required by AISC and SJI Specifications.
8. Where joists frame into a beam from one side only, the centroid of the end bearing plate shall fall over the centerline of the beam.
9. Minimum bearing over masonry supports shall be provided in accordance with AISC and SJI Specifications.
10. Special conditions shall be as noted on the plans.
11. All joist ends shall be anchored as required by the AISC and SJI Specifications or as noted on the plans.
12. Where joists are to be exposed to view in the completed building, special care shall be taken so that all joists and rows of bridging are spaced uniformly and straight. Joints in bridging shall occur at the joists.

13. During the construction period, care shall be exercised to avoid excessive concentrated loads. Loads shall be distributed so that the carrying capacity of any steel joist is not exceeded.

C. Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Visually inspect field welds according to AWS D1.1.

C. Visually inspect bolted connections.

D. Prepare test and inspection reports.

3.4 PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.

1. Clean and prepare surfaces by hand-tool cleaning according to SSPC-SP 2 or power-tool cleaning according to SSPC-SP 3.
2. Apply a compatible primer of same type as primer used on adjacent surfaces.

END OF SECTION 052100

SECTION 05 21 19 – OPEN WEB STEEL JOIST FRAMING

PART 1 - GENERAL

1.01 SCOPE

Furnish and erect all open web steel joists including bridging, etc., as indicated on the plans as hereinafter specified.

Refer to Architectural and Mechanical plans for openings for skylights, hatches, ducts, fans, etc., and space joists as required for proper clearance. Joists supporting mechanical units shall be spaced to suit the dimensions of the units being furnished.

Any openings requiring spacing in excess of that indicated on the plans shall be brought to the attention of the Architect prior to installation of the joists.

1.02 APPLICABLE STANDARDS

A. Applicable portions of the current edition of the following Standards are a part of these specifications:

1. American Institute of Steel Construction (AISC):
AISC Manual of Steel Construction

2. Steel Joist Institute (SJI)):
SJI Standard Specifications for Open Web Steel Joists - “K Series”
Standard Specifications for Open Web Steel Joists - “LH Series”

1.03 SHOP DRAWINGS

Submit for review detailed shop drawings showing layout, sizes, arrangements, details, bridging, etc., for all open web steel joists in accordance with the requirements of the Supplementary Conditions. Submit one extra set of blueline prints for the Structural Engineer with all submittals.

1.04 STORAGE OF MATERIALS

Store above ground on suitable supports and keep free of foreign materials and corrosion as far as practicable.

PART 2 - PRODUCTS

2.01 MATERIALS

1. Open Web Steel Joists: “K-Series” joists based on allowable stress of 30,000 psi. “LH Series joists based on allowable stress of 30,000 psi.”

2. Paint: Zinc chromate, alkyd type paint standard with the manufacturer. Thickness shall be at least 1 mil. dry film.

PART 3 - ERECTION

3.01 FABRICATION

A. Each joist shall be tagged to show it’s size. Strut joists, indicated on the plans by “S.J.”, are joists having a bottom chord the same size as the top chord.

B. Ceiling extensions shall be provided where required and extended ends shall be provided as noted on the plans.
C. Camber shall be provided in accordance with the AISC and SJI Specifications or as otherwise noted on the plans.

D. Bridging shall be in accordance with AISC and SJI Specifications or as noted on the plans.

E. Joists bearing plates shall be sloped for even bearing at all supports where the slope is in excess of 1/4" per linear foot.

F. Provide one shop coat of paint to all joists and bridging. Thickness shall be at least 1 mil.. dry film. Joist steel shall be power wire-brushed prior to fabrication. Clean all joists of weld slag after fabrication prior to painting. Joists shall be painted as soon as possible after fabrication to prevent rusting.

3.02 ERECTION

A. All open web steel joists shall be erected in strict accordance with the specification requirements of the AISC and SJI.

B. Space all joists equally between column lines or as noted otherwise on the plans. Coordinate spacing of joists under mechanical units, skylights, hatches, ducts, etc., with other trades.

C. Where joists butt over a beam, the beam flange shall be wide enough so as to provide the minimum bearing required by the AISC and SJI Specifications, otherwise, the joist ends shall be welded across the tops as required by AISC and SJI Specifications.

D. Where joists frame into a beam from one side only, the centroid of the end bearing plate shall fall over the centerline of the beam.

E. Minimum bearing over masonry supports shall be provided in accordance with AISC and SJI Specifications.

F. Special conditions shall be as noted on the plans.

G. All joist ends shall be anchored as required by the AISC and SJI Specifications or as noted on the plans.

H. As soon as joists are erected, all bridging shall be completely installed and the joists permanently fastened into place before the application of any loads.

I. Where joists are to be exposed to view in the completed building, special care shall be taken so that all joists and rows of bridging are spaced uniformly and straight. Joints in bridging shall occur at the joists.

J. During the construction period, care shall be exercised to avoid excessive concentrated loads. Loads shall be distributed so that the carrying capacity of any steel joist is not exceeded.

3.03 FIELD PAINTING

A. All field painting called for below is specifically excluded from this section of the specifications and is included under the Architectural

B. After erection, all rust spots shall be removed, and then, the clean surface, as well as all damaged spots, bolts, etc., shall be touched up with one coat of the same material as the shop coat.

C. Refer to Architectural Specifications for PAINTING for finished coats on exposed surfaces.

END OF SECTION 05 21 19

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof deck.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete"
2. Section 042200 “Concrete Unit Masonry”
3. Section 051200 "Structural Steel Framing"
4. Section 052100 “Steel Joist Framing”

1.2 ACTION SUBMITTALS

A. Product Data:

1. Roof deck.

B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product Certificates: For each type of steel deck.

C. Test and Evaluation Reports:

1. Product Test Reports: For tests performed by a qualified testing agency, indicating that each of the following complies with requirements:

a. Power-actuated mechanical fasteners.

2. Research Reports: For steel deck, from ICC-ES showing compliance with the building code.

D. Field Quality-Control Submittals:

1. Field quality-control reports.

E. Qualification Statements: For welding personnel and testing agency.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with SDI QA/QC and the following welding codes:

1. AWS D1.1/D1.1M.
2. AWS D1.3/D1.3M.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Store products in accordance with SDI MOC3. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. AISI Specifications: Comply with calculated structural characteristics of steel deck in accordance with AISI S100.

2.2 ROOF DECK

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Epic Metals Corporation.
2. New Millennium Building Systems, LLC.
3. Vulcraft Group; Division of Nucor Corp.
4. CSM Metal Deck (metaldecking.com) Houston, TX

B. Fabrication of Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with SDI RD and with the following:

1. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 80, G90 zinc coating.
2. Deck Profile: Type WR, wide rib (“B” Deck)

a. Profile Depth: 1-1/2 inches
b. Design Uncoated-Steel Thickness: 0.0295 inch (22 gauge)
c. Span Condition: **Double span**.
d. Side Laps: **Overlapped**.

2.3 ACCESSORIES

A. Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws (#12-14 Tek screws).

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile indicated or otherwise as recommended by SDI standards for overhang and slab depth if not indicated.

G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.

H. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch thick (16 gauge), with factory-punched hole of 3/8-inch minimum diameter. Use weld washers for deck thicknesses of 22 gauge or less.

I. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.

J. Galvanizing Repair Paint: ASTM A780.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories in accordance with SDI C, SDI NC, and SDI RD, as applicable; manufacturer's written instructions; and requirements in this Section.

B. Install temporary shoring before placing deck panels if required to meet deflection limitations.

C. Locate deck bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install in accordance with deck manufacturer's written instructions. Submit mechanical fastening system for Engineer’s review.

3.3 INSTALLATION OF ROOF DECK

A. Fasten roof-deck panels to structural steel and open web joist supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:

1. Weld Diameter: 5/8 inch, nominal.
2. Weld Spacing: As indicated on drawings
3. Weld Washers: Install weld washers at each weld location. Use only for decks thicker than 0.0295 inches (22 gauge).

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-third of the span, 18 inches, or as indicated on drawings and as follows:

1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
2. Mechanically clinch or button punch.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

1. End Joints: Lapped 2 inches minimum.

D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and mechanically fasten flanges to top of deck. Space mechanical fasteners not more than 12 inches apart with at least one weld or mechanical fastener at each corner.

1. Install reinforcing channels or zees in ribs to span between supports and mechanically fasten.

E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels in accordance with deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.

1. Weld or mechanically fasten cover plates at changes in direction of roof-deck panels unless otherwise indicated.

F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive in accordance with manufacturer's written instructions to ensure complete closure.

3.4 REPAIR

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint in accordance with ASTM A780 and manufacturer's written instructions.

B. Repair Painting:
1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
2. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
3. Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

3.5 FIELD QUALITY CONTROL

A. Testing Agency: **Owner will engage** a qualified testing agency to perform tests and inspections.

B. Tests and Inspections:

1. Special inspections and qualification of welding special inspectors for cold-formed steel floor and roof deck in accordance with quality-assurance inspection requirements of SDI QA/QC.

a. Field welds shall be subject to inspection.

C. Prepare test and inspection reports.

END OF SECTION 053100

SECTION 05 40 13 – LIGHT GAUGE STEEL FRAMING

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. This Section includes the following:

1. Exterior wall framing.

B. Related Sections include the following:

1. Division 5, Section “05 12 00 - Structural Steel”

1.03 DEFINITIONS

A. Minimum Uncoated Steel Thickness: Minimum uncoated thickness of cold-formed framing delivered to the Project site shall be not less than 95 percent of the thickness used in the cold-formed framing design. Lesser thicknesses shall be permitted at bends due to cold forming.

B. Producer: Entity that produces steel sheet coil fabricated into cold-formed members.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to the following:

1. Allied American Studco, Inc.
2. Angeles Metal Systems
3. California Expanded Metal Products Co.
4. California Metal Systems, Inc.
5. Clark Steel Framing Industries
6. Consolidated Fabricators Corp.
7. Consolidated Systems, Inc.
8. Dale Industries, Inc.
9. Design Shapes in Steel
10. Dietrich Industries, inc.
11. Knorr Steel Framing Systems
12. MarinoWare; Div. of Ware Industries, Inc.
13. Scafco Corp.
14. Steel Construction Systems
15. Steel Developers, LLC
16. Steeler, Inc.

17. Studco of Hawaii, Inc.
18. Super Stud Building Products, Inc.
19. Unimast, Inc.
20. United Metal Products, Inc.
21. Western Metal Lath.

2.02 MATERIALS

A. Steel Sheet: ASTM A 653A/ 653M, structural steel, zinc coated, of grade and coating as follows:

1. Coating: G90

2.03 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 50,000 psi

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, to include but not limited to the following:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. End clips.
5. Gusset plates.
6. Stud kickers, knee braces, and girts.
7. Joist hangers and end closures.
8. Hole reinforcing plates.
9. Backer plates.

2.04 ANCHORS, CLIPS, AND FASTENERS

A. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

B. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

C. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.

D. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

E. Welding Electrodes: Comply with AWS standards.

2.05 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: [SSPC-Paint 20 or DOD-P-21035] [ASTM A 780].

2.06 FABRICATION

A. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.

B. Fabricate truss assemblies using jigs or templates. Cut framing members by sawing or shearing; do not torch cut.

C. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire typing of framing members is not permitted.

D. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

2.07 FIELD QUALITY CONTROL

A. Remove and replace Work that does not comply with specified requirements.

END OF SECTION 05 40 13

SECTION 05 42 13 - COLD FORMED METAL FRAMING

PART 1. - GENERAL REQUIREMENTS

1.01 RELATED DOCUMENTS

The requirements of *Division 01* and of documents under BIDDING REQUIREMENTS and CONDITIONS OF THE CONTRACT apply to this work.

1.02 DESCRIPTION OF WORK

Furnish and install cold formed metal framing complete with accessories as required for exterior walls and raised platforms.

1.02 RELATED WORK

For non-structural interior partition and ceiling framing and furring, see *Section. 09100.*

1.03 SUBMITTALS:

Conform to procedures specified in *Division 01* and to requirements below.

A. Product data - All framing members and accessories, including properties and loading tables.

B. Shop drawings - Show layout of framing and installation dimensions and details.

1.04 DESIGN

A. Non-bearing exterior wall stud, and joist sizes and spacing, shown are nominal minimums.

B. Supplier shall provide calculations signed and stamped by a State licensed registered professional engineer determining the final sizing and spacing in accordance with codes, which shall be not less than shown.

C. Floor loading as shown on structural drawings.

1.05 WORKMANSHIP

Framing shall be tested with a straight edge both ways to establish that planes are true, plumb and level.

1.06 MANUFACTURER RECOMMENDATIONS

Provide all additional supplemental framing, bracing, bridging, and accessories recommended by the manufacturer for each system and condition not included or shown.

1.07 STANDARDS

Unless they are modified or exceeded by the requirements of this Specification, conform to framing system manufacturer's recommendations and then to the following specifications of the Gypsum Association:

A. For framing-"Installation of Screw-Type Steel Framing Members to Receive Gypsum Board."

B. Fire rated assemblies - Assemblies of materials for fire rated installation shall meet or exceed requirements of the referenced rating authority for the required Time-Design.

1.08 RELATION WITH OTHER TRADES:

Mechanical, plumbing, electrical - Coordinate location of members of framing systems so that fixtures, outlets, ducts, grilles,

access doors, etc., may be properly installed in locations shown.

1.09 WELDING

Shall be performed in accordance with *American Welding Society Specification D1.3* for welding sheet steel in structures by currently certified workers.

PART 2 - MATERIALS

2.01 MEMBERS

Cold formed *ASTM A446 33 KSI* yield minimum, *G60* galvanized steel, designed in accordance with *AISI Spec. for Design of Cold Formed Steel Structural Members,* having minimum properties and/or gauges shown.

2.02 FASTENERS

A. Screws - Power driven self tapping zinc plated steel *1/2* inch and longer as required by gauges fastened and service required.
B. Welding - In accordance with *AWI CI.3* Recommended Practice for Resistance Welding Low Carbon Steels, and *AWI D1.3* Specifications for Welding Sheet Steel in Structures.

2.03 MANUFACTURERS

A. Products of or approved for use by:

1. U.S. Gypsum Co.
2. Or approved equal.

PART 3 – EXECUTION

3.01 STUD TRACKS

A. Members: Un-punched, deep leg channel, mating with tracked studs and matching in gauge to *16 ga.* and lighter.

B. General: Provide top and bottom track for all stud framing.

C. Layout: Layout continuous between corners and intersections except through openings. Lap corners and intersections and butt spliced to line. Reinforce track span at splices and at corner braces with stud inserts.

D. Fastenings: Shot fasten to concrete, shot fasten or weld to steel, screw to wood. Fasten not over stud spacing centers to continuous bearings, to every bearing of discontinuous bearings, with fasteners staggered, and a fastener at each end of every piece.

3.04 SUPPLEMENTAL FRAMING

Provide modified and special members required to complete the framing systems, and all additional bridging, bracing and reinforcement required for strength and stability. Also provide framing shown or required to support or back up other work that is attached to or beats against framing. Form specially shaped members of same material as framing. Fasten supplemental framing to main framing systems. Modify main framing members if necessary so that supplemental framing is in direct contact with sheathing. Coordinate this work with details and other trades to provide accurate location and required strength. Provide secondary structural channel or angle framing where required to provide hanger spacings shown.

END OF SECTION 05 42 13

SECTION 05 50 00 – METAL FABRICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and *Division -1 Specification sections,* apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Definition: Metal fabrications include items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.

B. Extent of metal fabrications is indicated on drawings and schedules.

C. Types of work in this section include metal fabrications for:
1. Miscellaneous framing and supports.
2. Lavatory counter-top supports.
3. Edge angles.
4. Lintels.
5. Pipe handrails and brackets.
6. Metal Pan Stairs.

1.03 QUALITY ASSURANCE

A. 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. Clearly mark units for reassembly and coordinated installation.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.

B. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.

Where materials or fabrications are indicated to comply with certain requirements for design loadings include structural computations, material properties and other information needed for structural analysis.

PART II - PRODUCTS

2.01 MATERIALS

A. Ferrous Metals:

B. Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.

C. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washer and shims as required, hot-dip galvanized, ASTM A 153.

2.02 FABRICATION, GENERAL

A. Workmanship: Use materials of size and thickness indicated or, if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.

B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately *1/32"* useless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

C. Weld corners and seams continuously, complying with *AWS* recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.

D. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

2.03 MISCELLANEOUS FRAMING AND SUPPORTS

A. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.

B. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate form structural steel shapes and shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

2.04 STEEL FRAMED STAIRS

A. General: Provide stair units of sizes and arrangements shown. Design and construct entire assembly to support the specified loads. Provide metal framing, hangers, struts, clips, brackets, bearing plates, and other components as required for the support of stairs and platforms. Erect stair work to line, plumb, square and true with runs registering level with floor and platform levels. Fabricate units so that bolts and other fastenings do not appear on finish surfaces. Make joints true and tight and make connections between parts light-proof tight. Provide continuous welds ground smooth where exposed.

B. Stair Framing: Fabricate stringers of structural steel channels or plates or a combination thereof. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members.

C. Metal Plan Units: Form metal pans of *0.1045"* thick *(12 gage)* minimum steel sheets complying with *ASTM A 245,* or *ASTM A 570, Grade 30.* Shape pans to conform to the configuration shown. Construct riser and sub-tread metal pans with steel angle supporting brackets welded to stringers. Weld metal pans to brackets. Weld sub-platform metal pans to platform frames.

D. Steel Floor Plate Risers, Treads, and Platforms: Form risers, tread, and platforms from floor plate complying with *FS QQ-F-461, Class 1,* thickness as required to support specified loads. Shape floor plate to conform to the configuration shown. Construct riser and tread floor plate with steel angle supporting brackets welded to stringers. Weld floor plate to brackets. Weld platform floor plate to platform frames.

2.05 STAIR RAILINGS, HANDRAILS AND GUARDRAILS

A. Pipe Railings:

1. Provide steel pipe railings: consisting of top rail, intermediate rails, and posts, and handrails at walls. Unless otherwise shown, provide *1-1/4"* nominal size.

B. Join posts, rails and corners by the following methods as indicated: Provide flush-type steel wall return and railing fittings, welded and ground smooth.

C. Provide railing splice locks secured with *3/8"* hexagonal-recessed-head set screws.

D. Miter and weld joints made by fitting post to top rail and intermediate rail to post, groove weld joints, and grind smooth.

E. Bend railings at corners with constant radius, and bend railings at curved radius indicated with constant radius, and with cylindrical cross-section of pipe maintained throughout the entire bend.

F. Adjust railings prior to securing in place to insure proper matching at butting joints and correct alignment throughout

their length. Plumb posts in each direction. Secure posts and rail-ends to building construction as indicated.

G. Secure handrails to walls by means of wall brackets as indicated.

H. Locate brackets not more than *60" o.c.* Secure wall brackets to building construction as follow:
1. For concrete and solid masonry anchorage, use bolt anchor expansion shields and lag bolts.
2. For hollow masonry and stud partition anchorage, use toggle bolts having square heads.

PART III - EXECUTION

3.01 PREPARATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Coordinate and furnish anchorage, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

PART IV - INSTALLATION

4.01 GENERAL

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

B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in form-work for items which are to be built into concrete masonry or similar construction.

C. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

D. Field Welding: Comply with *AWS* Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

END OF SECTION 05 50 00

SECTION 06 10 00 – ROUGH CARPENTRY

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

Definition: Carpentry includes carpentry work, which is generally not exposed, except as otherwise indicated on the drawings.

1.02 REFERENCES

A. Lumber Standards: Comply with *PS 20* and with applicable rules of the respective grading and inspecting agencies and products indicated.

B. Plywood Products Standards: Comply with PS 1 (ANSI A 199.1) or, for products not manufactured under *PS 1* provisions, with applicable *APA* Performance Standard for type of panel indicated.

1.03 PRODUCT HANDLING

A. Delivery and Storage: Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood, and provide air circulation with stacks.

1.04 JOB CONDITIONS

A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate tight fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Lumber, General: Factory mark each piece of lumber with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual size as required by *PS 20* for moisture content specified for each use. Provide dressed lumber with *15%* maximum moisture content at time of dressing.

B. For structural framing, provide the following grade and species or approved equal by Architect in writing.

Select Structural Grade
No.2 grade or better
Southern Pine (SPIB)
Fb (minimum extreme fiber stress in bending): 1500 PSI
E (minimum modulus of elasticity); 1,500,000

C. Miscellaneous Lumber: Provide wood for support or attachment or other work including cant strips, bucks, nails, blocking, furring, grounds, stripping and similar members. Provide lumber of sizes indicated, worked into shape shown and as follows:

Moisture Content: *19%* maximum for lumber items not specified to receive wood preservative treatment. *Grade No. 2 S.Y.P.* or better

.

D. Plywood: Trademark: Identify each plywood panel with appropriate APA trademark. All plywood to be a face grade on exposed surface and have exterior glue rating.

2.02 MISCELLANEOUS MATERIALS

A. Fasteners and Anchorages: Provide size, type, materials, and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, and washer and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommending nails. Where rough carpentry work is exposed to weather, in

ground contact, or in area of high relative humidity, provide fasteners and anchorages with a hot-dip zinc coating *(ASTM A 153).*

B. Building Paper: Asphalt saturated felt, non-perforated, *ASTM 226.*

2.03 WOOD TREATMENT

A. Preservative Treatment: Where lumber or plywood is indicated as "Treated"or is specified herein to be treated, comply with the applicable requirements of *AWPA Standard C2 (lumber) and C9 (plywood) and of AWPB Standards* listed below. Mark each treated item with *AWPB Quality Mark Requirements.*

1. Pressure-treat above-ground items with water-borne preservatives complying with *AWPB LP-2.* After treatment, kiln-dry to a maximum moisture content of 15%. Treat indicated items and the following:
   a. Wood cants, nailers, curbs, blocking, stripping and similar concealed members in contact with masonry or concrete.
   b. Wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.
2. Pressure-treat the following with water-borne preservatives for ground contact use complying with *AWPB LP-22.*
   a. Wood members in contact with ground.
   b. Wood members in contact with fresh water.
3. Complete fabrication of treated items prior to treatment where possible. If cut after treatment, coat cut surfaces with heavy brush coat of some chemical used for treatment. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

B. Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.

PART 3 - EXECUTION

3.01 GENERAL

A. Discard units of materials with defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.

B. Set carpentry work accurately to require levels and lines, with members plumb, and true and accurately cut and fitted.

C. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by required by recognized standards. Countersink nail heads and exposed carpentry work and fill holes. Use common wire nails, except as otherwise indicated. Use finishing nails for finish work. Select fasteners or size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood, pre-drill as required.

3.02 WOOD GROUNDS, NAILERS, BLOCKING AND SLEEPERS

A. Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level or work to be attached. Coordinate location with other work involved.

B. Attach to substrate as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry during installation of masonry work. Where possible, anchor to form-work before concrete placement.

C. Provide permanent grounds of dressed, preservative treated, key-beveled lumber not less than *1-1/2"* wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

3.03 WOOD FURRING

A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finished

work.

B. Furring: Unless otherwise shown, provide *1"x 4"* furring at *16" o.c.* maximum spacing.

C. Suspended Furring: Provide size and spacing shown, including hangers and attachment devices. Level to a tolerance of *1/8" in 10'.*

3.04 WOOD, FRAMING, GENERAL

A. Provide framing members of sizes and on spacing shown, and frame openings as shown, or if not shown, comply with recommendations of "Manual for House Framing" of National Forest Products Association. Do not splice structural members between supports.

B. Anchor and nail as shown, and to comply with "Recommended Nailing Schedule" of "Manual for House Framing" and other recommendations of *NFPA.*

C. Fire stop concealed spaces with wood blocking not less than *2"* thick, if not blocked by other framing members. Provide blocking at third points of and at each building story level and at ends of joist spans.

3.05 JOIST FRAMING

GENERAL:

A. Provide framing of sizes and spacing shown. Install with crown edge up and support ends of each member with not less than *1-1/2"* of bearing members by toe nailing or metal, or *3"* on masonry. Attach to wood bearing members by toe nailing or metal connectors; frame to wood supporting members with wood ledgers as shown, or if not shown, with metal connectors. Fire-cut members built into masonry *(if any).* Frame opening with headers and trimmers where span or headers exceeds *4".* Do not notch in middle third of joist; limit notches to *1/6 depth of joist; 1/3 at ends.* Do not bore holes larger than *1/3 depth* of joist or located closer than *2"* from top or bottom. Provide solid blocking *(2" thick by depth of joist)* at ends of joists unless nailed to header or brand member.

B. Lap members framing from opposite sides of beams, griders or partitions not less than *4"* or securely tie opposing members together. Provide solid blocking *(2" thick by depth of joist)* over supports.

C. Under jamb studs at openings, provide solid blocking between joist.

D. Under non-load bearing partitions, provide double joists separated by solid blocking equal to depth of studs above. Provide triple-joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures, unless otherwise shown.

E. Provide bridging between joists where nominal depth-to-thickness ratio exceeds *4'* at intervals of *8'.* Use bevel cut *1"x 4"* or *2"x 3"* wood bracing, double-crossed and nailed both ends to joists or use solid wood bridging *2"* thick by depth of joist, end nailed to joist.

3.06 SUB-FLOORING

A. Install boards with end joints staggered over supports, and with each piece extending over at least *two (2) spaces* between supports. Nail with *8d* common nails, space *two (2) per* support for board widths of *6"* and less, *three (3) per* support for widths of *8"* or more.

B. Cover sheathing with building paper, lapped and nailed with roofing nails.

3.07 INSTALLATION OF PLYWOOD

GENERAL: Comply with applicable recommendations contained in *Form No. E 304.*"APA Design/Construction Guide-Residential and Commercial", for types of plywood products and applications indicated.

A. Fastening Methods: Fasten panels as indicated below:

1. Subflooring: Staple or nail to framing
2. Plywood Backing Panels: Nail to supports

END OF SECTION 06 10 00

SECTION 06 20 00 – FINISH CARPENTRY

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Finish carpentry work.

B. Millwork items, other than modular laminate casework specified in Division 12.

C. Shelving other than for modular casework.

D. Laminate Clad windowsills.

1.02 REFERENCE STANDARDS

A. Requirements, abbreviations and acronyms for reference standards are defined in Section 01 42 16.

B. AWI Quality Standards

C. FS L-P-508 Plastic Sheet, Laminated, Decorative and Non-Decorative

D. FS MMM-A-130A Adhesive, Contact

E. PS1 Construction and Industrial Plywood

F. PS 20 American Softwood Lumber Standard.

G. NFPA National Forest Products Association National Design Specification for Stress Grade Lumber and Its Fastening.

H. PS 51 Hardwood and Decorative Plywood

I. PS 58 Basic Hardwood

1.03 QUALITY ASSURANCE

A. Millwork to be in accordance with AWI Quality Standards - Section 400, custom grade, except as modified herein.

1.04 SHOP DRAWINGS

A. Submit shop drawings in accordance with Section 01 33 23.

B. For millwork: Indicate materials and wood species, thicknesses of materials, component profiles, fastening, jointing details, finishes and accessories to a minimum scale of 3/4 inch to one foot.

C. For finish carpentry items: Indicate materials, component profiles, fastening methods, joining details, finishes and accessories, to a minimum scale of 1½ inch to one foot.

D. Submit manufacturer’s instructions for use of adhesive and hardware.

1.06 DELIVERY AND STORAGE

A. Deliver materials in accordance with Section 01 60 00.

B. Store indoors, in ventilated areas with constant but minimum temperature of 16°C and maximum relative humidity of 25 to 55%.

1.07 GUARANTEE / WARRANTY

A. Provide a written guarantee in accordance with Section 01 33 00.

B. Guarantee shall provide for making good or replacing, at no cost to the Owner, millwork and finish carpentry items specified herein which exhibit defects in material and workmanship within a minimum period of 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MILLWORK

A. Quality of Fabrication: AWI's Custom Grade construction - Section 400
1. Provide plastic laminate clad shelving units where indicated on drawings.

B. Framing: C and better #2 Southern or Parana Pine, S4S.

C. Shelving Units: B-D interior DFPA covered with 1/16" thick plastic laminate of type specified. Splash and edges to be covered with same material as top.
1. Provide heavy duty shelving supports.
2. Provide 3mm plastic molded edge banding at all edges for shelving.

2.02 WINDOW SILLS

A. Provide 3/4" thick plastic laminate clad windowsills.

B. Provide 3mm plastic molded edge banding at all edges of windowsills.

C. Fabrications shall comply with AWI's custom grade construction Section 400

2.03 WOOD FOR HANDRAILS

A. Solid stock select white oak handrail with matching plugs at fasteners where indicated.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with approved shop drawings.

B. Set and secure materials and components in place rigid, plumb and square.

C. Verify mechanical, electrical and building items affecting this Section are placed and ready to receive this work.

D. Prime paint surfaces or items of assemblies in contact with cementuous materials.

E. Fit exposed edges of plywood and particle board shelving and site-made millwork with 3/8" thick hardwood edging. Width is thickness of plywood or particle board.

F. Apply plastic laminate finishes where indicated. Adhere with adhesive over entire surface. Make joints and corners hairline. Match pattern. Slightly bevel arises. Cap exposed edges with plastic trim. Apply laminate backing on reverse side of plastic laminate finished surfaces.

G. Trim and Moldings: Install in single, unjointed lengths for openings and for runs less than maximum length of lumber available. For longer runs, use only one piece less than maximum length available in any straight run. Stagger joints in adjacent members cope at returns and miter at corners.

3.02 HANDRAIL INSTALLATION

A. Drill holes for fasteners using forstner-type drill bit.

B. Cut plugs from surplus handrail. Match grain and color of handrail.

C. Install plugs flush with top of handrail. Align grain.

D. Secure handrail to steel wall bracket at 4'0" o.c. max spacing.

3.03 HARDWARE INSTALLATION

A. Install finish hardware in accordance with manufacturer's instructions. Adjust hardware to ensure smooth and correct operation.

B. Finish hardware of all types shall be fitted and secured to prevent looseness and rattle but shall not be fitted so tightly as to result in binding.

C. In fitting hinges, locks, etc. allow for thickness of finishes.

D. Set all hinges, lock plates, and other similar elements exactly so as to be flush with surrounding surfaces.

E. Drive pilot holes so as to avoid loosely set screws.

3.04 PREPARATION OF FINISHING

A. Sand work smooth and set exposed rails and screws. Apply wood filler in exposed nail and screw indentations.

END OF SECTION 06 20 00

SECTION 07 19 23 – SILOXANE WATER REPELLENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A This section covers the preparation, materials, services, and equipment required in conjunction with the application of a clear water repellent on all above grade, vertical, exterior exposed surfaces of masonry, concrete, brick, or stucco.

1.02 RELATED SECTIONS

A. Section 03 01 30.91 - Concrete Restoration & Cleaning.

B. Section 03 30 00 - Cast In Place Concrete.

C. Section 03 40 00 - Precast Concrete.

D. Section 04 01 20.91 - Masonry Restoration & Cleaning.

E. Section 04 20 00 – Unit Masonry.

F. Section 04 40 00 – Stone Assemblies.

G. Section 07 18 00 - Traffic Coatings.

H. Section 09 63 00 - Masonry Flooring.

I. Section 09 91 00 - Painting.

J. Section 09 93 0 – Stains and Transparent Finishing.

K. Section 09 96 00 - High Performance Coatings.

L. Section 09 97 23 –Concrete and Masonry Coatings.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00 - Submittals.

B. Product Specification Data: Submit manufacturer's technical literature, specifications, and application instructions for the specified clear water repellent material.

C. Samples: Obtain liquid samples of the specified clear water repellent for sample application. Sample application is covered in section

1.04 QUALITY ASSURANCE

A. Manufacturer: A firm with no less than ten (10) years experience in manufacturing the products specified in this section.

B. Applicator Qualification: A firm with no less than three (3) years experience in the application of the products specified in this section. In addition, applicator must state the intended use of the proper application equipment and that it has been well maintained.

C. Mock-Up:

1. Apply water repellent per manufacturer's application instructions as directed by the Architect to substrate material that matches actual job conditions. Determine the acceptability of appearance and optimum coverage rate required for application.
2. After sample treatment has cured in accordance with manufacturers recommendations, water test to verify that substrate is coated with sufficient water repellent to effectively repel liquid water from the surface.
3. Obtain Architect and/or Project Owner approval prior to full scale application of water repellents.

D. Pre-Application Meeting: Convene a pre-application meeting prior to the start of application of the specified material. Attendance by a representative of each of the following organizations is requested; the application firm, the architectural firm, and the water repellent manufacturer. Notify each of the attendees at least three (3) days prior to the meeting time.

1.05 PRODUCT DELIVERY

A. Material Delivery: Deliver materials to the job site in original sealed containers, clearly marked with manufacturer's name, brand name, and type of material. Verify the product matches that of the original sample applied on the mock - up wall.

B. Record Keeping: Contractor / applicator shall record product batch number or lot number for warranty purposes.

C. Storage & Protection: Store materials inside if possible, away from sparks and open flame. Store in a secure area to avoid tampering and contamination. Water based materials must be kept from freezing. Store and handle in accordance with manufactures written instructions.

1.06 PROJECT CONDITIONS

A. Surface Preparation: Surface must be free of cracks, dirt, oils, paint or other contaminants which may affect the appearance or performance of the water repellent material.

B. Environmental Requirements:
1. Air and substrate temperature must be above 45° F (7° C) or below 95° F (35° C) unless otherwise specified by manufacturer.
2. Do not proceed with application if the substrate is wet or contains frozen water.
3. Do not apply material when rain is predicted within 48 hours; or earlier that five (5) days after the substrate became wet.
4. Do not apply materials in high or gusty winds.

C. Protection:
1. Special precautions should be taken to avoid vapor transmission (fumes) from entering the building being treated. Ventilation systems and fresh air intakes should be turned off and closed.
2. Protect shrubs, metal, wood trim, glass, asphalt and other building hardware during application from over-spray.
3. Do not permit spray mist or liquid to drift onto surrounding properties.

1.07 SCHEDULING

A. Architect shall be notified not less than 48 hours before each application of water repellent is scheduled.

1.09 PERFORMANCE REQUIREMENTS

A. Provide water repellents with the following properties based on testing manufacturer's standard products, according to test methods indicated, applied to substrates simulating Project conditions using same materials and application methods to be used for Project.
1. Water-Vapor Transmission: Maximum 8 percent reduction in rate of vapor transmission in comparison of treated and untreated specimens, per ASTM E-96.
2. Water Penetration and Leakage through masonry: Minimum 90 percent reduction in leakage rate in comparison of treated and untreated specimens, per ASTM E-514.

3. Durability Maximum 5 percent loss of water repellency after 2500 hours of weathering in comparison to specimens before weathering, per ASTM G-53.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Chemprobe Coating Systems, L.P.
Masonry Division of Tnemec Company, Inc.
2805 Industrial Lane
Garland, TX 75041
PH: 800/760-6776
PH: 972/271-5551
FX: 972/271-5553

B. Or approved equal.

2.02 WATER REPELLENT

A. GENERAL: All products shall be carried in solvent and contain siloxane and hydrophobic fumed silica (defused quartz carbide). No fillers, sterates, or paraffins. Products shall be a minimum of seven (7) percent solids.
1. PRIME A PELL 200: Solvent based 7% solids siloxane coupled with diffused quartz carbide.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify the following:
1. The required joint sealants have been installed.
2. New masonry and mortar have cured a minimum of twenty-eight (28) days.
3. Surface to be treated is clean, dry and contains no frozen water.
4. Environmental conditions are appropriate for application.

3.02 PREPARATION

A. Protection:
1. Special precautions should be taken to avoid vapor transmission (fumes) from entering the building being treated. Ventilation systems and fresh air intakes should be turned off and closed.
2. Protect shrubs, metal, wood trim, glass, asphalt and other building hardware during application from over-spray.
3. Do not permit spray mist or liquid to drift onto surrounding properties or parking lots.

B. Other:
1. Verify lawn sprinklers are turned off, where applicable, so as to avoid water contact prior to cure times required by the manufacturer.

3.03 APPLICATION

A. Apply specified water repellent at a rate in accordance with manufacturer's written application instructions.

B. Material must be applied using solvent resistant, low-pressure application equipment designed for water repellent application.

C. Apply material as shipped by the manufacturer. Do not dilute or thin.

D Apply a saturating application of the product working from the bottom up. On porous substrates such as concrete masonry units, allow a slight rundown (less than three inches). On high density materials such as pre-cast concrete

panels or GFRC, do not allow any run-down. On all substrates allow the product to penetrate the substrate for approximately 5 - 7 minutes, then apply again in the same manner. This second pass will require less material.

3.04 FIELD QUALITY CONTROL

A. The architect shall be contacted 48 hours prior to application so as to provide supervision as required. The architect or the architect's representative shall inspect the progress as the work proceeds. Do not apply any water repellent that is not specified by the architect.

B. After water repellent has cured for six (6) days at low humidity and temperature between 70°-90° F or eight (8) days at high humidity and low temperature between 50°-69° F, all surfaces shall be tested with a light water spray. Recoat any area that indicates water absorption after the water test has completely dried.

3.05 CLEANING

A. Remove protective coverings from adjacent surfaces and other protected areas.

B. Immediately clean water repellent coating from adjoining surfaces and surfaces soiled by water-repellent application as work progresses.

C. At completion, remove from the job site, all excess material, debris, and waste resulting from this work. Dispose of water repellent containers according to state and local environmental regulations.

END OF SECTION 07 19 23

SECTION 07 22 00 – ROOF AND DECK INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:
1. Polyisocyanurate Roof Insulation.
2. Gypsum Roof Deck Board
3. Acoustical Batting

B. Related sections:
1. Division 07 Section “Preparation for Reroofing”.
2. Division 07 Section “Sheet Metal Flashing and Trim”.
3. Division 07 Section “SBS Modified Bituminous Membrane Roofing”.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

B. ASTM C1396 Standard Specification for Gypsum Wallboard.

C. ASTM C1289 Standard Specification for Faced Rigid Polyisocyanurate Thermal Insulation

D. ASTM D5 Standard Test Method for Penetration of Bituminous Materials.

E. ASTM D5147 Standard Sampling and Testing Modified Bituminous Sheet Material.

F. Cast Iron Soil Pipe Institute, Washington, D.C. (CISPI)

G. Factory Mutual Research (FM):
1. Roof Assembly Classifications.

H. National Roofing Contractors Association (NRCA):
1. Roofing and Waterproofing Manual.

I. Underwriters Laboratories, Inc. (UL):
1. Fire Hazard Classifications.

J. Warnock Hersey (WH):
1. Fire Hazard Classifications.

K. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

L. Steel Deck Institute, St. Louis, Missouri (SDI)

M. Southern Pine Inspection Bureau, Pensacola, Florida (SPIB)

N. Insulation Board, Polyisocyanurate (FS HH-I-1972)

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's specification data sheets for each product.

B. Roofing System Certification: Submit written certification that the roof deck insulation is acceptable for use by the SBS manufacturer as a component of their roofing system.

C. Provide a sample of each insulation type.

1.5 SHOP DRAWINGS

A. Submit manufacturer's shop drawings indicating complete installation details of tapered insulation system, including identification of each insulation block, sequence of installation, layout, drain locations, roof slopes, thicknesses, crickets and saddles.

B. Shop drawing shall include: Outline of roof, location of drains, a complete board layout of tapered insulation components, thickness and the average "R" value for the completed insulation system.

C. Certification:
1. Submit roof manufacturer's certification that insulation fasteners furnished, are acceptable to roof manufacturer.
2. Submit insulation fasteners, fastening pattern layout(s), and deck/substrate penetration depth(s) that resist the uplift pressures as per the specified SBS modified roofing system.
3. Submit roof manufacturer's certification that insulation furnished and installed is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.
4. Submit written certification that the roof deck insulation is acceptable for use as a component of the SBS manufacturer’s roofing system.
5. Submit written certification that the roof deck insulation, used in conjunction with the SBS modified roofing system, passes the UL1256 test for a fire rated assembly, if required.

1.6 QUALITY ASSURANCE

A. Fire Classification, ASTM E-108.

B. Manufacturer's Certificate: Certify that the roof system is adhered properly to resist the uplift pressures as per the specified SBS roofing system.

C. Pre-installation Meeting: Refer to Division 07 roofing specifications for pre-installation meeting requirements.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged.

B. Store all insulation materials in a manner to protect them from the wind, sun and moisture damage prior to and during installation. Any insulation that has been exposed to any moisture shall be removed from the project site.

C. Keep materials enclosed in a watertight, ventilated enclosure (i.e. tarpaulins).

D. Store materials above the ground. Any warped, broken or wet insulation boards shall be removed from the site.

1.14 WARRANTY

A. Special Warranty: Modified Manufacturer agrees to repair or replace components of the insulation assembly within specified warranty period. Total system warranty required (Insulation, Membrane and Metal Flashings).
   1. Warranty Period: Thirty (30) Year, "No Dollar Limit" "Edge to Edge" Warranty from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ROOF DECK INSULATION

A. Polyisocyanurate Board Insulation (MONOLITHIC unless indicated elsewhere): ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
   1. Qualities: Rigid, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers, both sides.
   2. Thickness: Base Layer 2.5" minimum.
   3. R-Value: 15.0 minimum.
   4. Size: 48 inches square maximum size when installed using adhesive.
   5. Size: 48 inches x 96 inches maximum size when installed using mechanical fasteners.
   6. Subject to compliance with requirements, provide one of the following:
      a. Commercial Innovations CI Flat.
      b. Hunter Panels; H-Shield.

B. Tapered Polyisocyanurate Roof Insulation, including Tapered Sumps; ASTM C1289:
   1. Qualities: Factory Tapered, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.
   2. Thickness: 1/2" minimum, see section details for particular thicknesses.
   3. Size: 48 inches square maximum size when installed using adhesive.
   4. Size: 48 inches x 96 inches maximum size when installed using mechanical fasteners.
   5. Tapered Slope: 1/4": 12" per foot.
   6. Tapered Sump Slope: 1/2" per foot.
   7. Tapered Crickets: 1/2": 12" per foot.
   8. Subject to compliance with requirements, provide one of the following:
      a. Commercial Innovations Tapered CI-GC.
      b. or approved equal.

C. Gypsum Roof Deck Board: ASTM C 1177 or ASTM C 1278, water-resistant gypsum substrate, Class A Fire Rated, 1/2 inch thick.
   1. Subject to compliance with requirements, provide one of the following:
      a. Commercial Innovations Gypsum Fiber Board.
      b. or approved equal.
   2. Size: 48 inches square maximum size, installed using adhesive.

2.2 RELATED MATERIALS

A. Fiber Cant and Tapered Edge Strips: Performed rigid insulation units of sizes/shapes indicated, matching insulation board or of perlite or organic fiberboard, as per the approved manufacturer.
   1. Acceptable Manufacturers:
      a. Johns Manville
      b. GAF

B. Provide preformed saddles, crickets, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

C. Insulation Adhesive: Dual component high rise foam adhesive as recommended by the insulation manufacturer and membrane manufacturer: Insul-Lock HR by The Garland Company, Inc. or approved equal.

1. Tensile Strength (ASTM D412), 250 psi
2. Density (ASTM D1875), 8.5 lbs. /gal.
3. Viscosity (ASTM D2556), 8,000 to 32,000 cP.
4. Peel Strength (ASTM D903), 17 lb. /in.
5. Flexibility (ASTM D816), Pass @ -70°F

D. Fasteners: Corrosion resistant screw fastener as recommended and approved by the SBS roofing system manufacturer.
1. Factory Mutual Tested and Approved #14 fasteners with three (3) inches coated disc, length required to penetrate metal deck one inch by Trufast or equal.

PART 3 - EXECUTION

3.1 EXECUTION, GENERAL

A. Comply with requirements of Division 01 Section and all project requirements.

B. Install one lapped base-sheet course and mechanically fasten to substrate according to roofing system manufacturer's written instructions.

C. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of roofing system with vertical surfaces or angle changes greater than 45 degrees.

D. Install tapered insulation under area of roofing to conform to slopes indicated.

E. Install insulation with long joints of insulation in a continuous straight line, with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

F. Install insulation under area of roofing to achieve specified thicknesses and slopes. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

G. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

H. Install tapered edge strips at perimeter edges as necessary to fill between the roof deck board and the top of blocking, to direct water away from vertical surfaces , and that do not terminate at vertical surfaces.

3.2 INSPECTION OF SURFACES

A. Roofing contractor shall be responsible for preparing an adequate substrate to receive insulation.

B. Verify that work which penetrates roof deck has been completed.

C. Verify that wood nailers are properly and securely installed.

D. Examine surfaces for defects, rough spots, ridges, depressions, foreign material, moisture, and unevenness. Do not proceed until defects are corrected.

E. Do not apply insulation until substrate is sufficiently dry.

F. Broom clean substrate immediately prior to application.

G. Use additional insulation to fill depressions and low spots that would otherwise cause ponding water.

H. Verify that temporary roof, if required, has been completed.

I. Proceeding with installation means acceptance of substrate.

3.3 PROTECTION

A. During execution of work covered in this section, the Contractor shall provide protections for the roof insulation from water and wind penetration at the end of each day's work.

B. Protect the roof insulation in areas that will receive excessive traffic.

C. All personnel shall wear clean, soft rubber soled shoes for any application work where they may be walking on insulation boards.

3.4 INSTALLATION

A. Attachment with Mechanical Fasteners:
1. Approved insulation board shall be fully attached to the deck with an approved mechanical fastening system. As a minimum, fastening shall be in accordance with the SBS modified roofing system specification to resist the specified uplift pressures at corners, perimeter, and field of roof.
   a. Attach insulation with #14 HD fasteners.
   b. Consult with SBS roofing system manufacturer for density and fastening patterns required for securing the insulation to the wood roof deck.
   c. Fastening patterns shall resist the wind uplift pressures per IBC 2015 and ASCE7-10.
2. Placement pattern(s) of fasteners shall be in accordance with the SBS modified roofing system specification to resist the specified uplift pressures. Zone 1 – 16 fasteners per 4x8 board, Zone 2 – 24 fasteners per 4x8 board and Zone 3 – 32 fasteners per 4x8 board. The greater of the two patterns shall be utilized.
3. Minimum fastener penetration depth into deck shall meet or exceed the same pull- out requirements set forth as stated above for uplift pressure resistance. There is a one (1) inch minimum for metal decks.

B. Attachment with Insulation Adhesive:
1. Ensure all surfaces are clean, dry, free of dirt, debris, oils, loose ore embedded gravel, unadhered coatings, deteriorated membrane and other contaminants that may inhibit adhesion.

2. Apply insulation adhesive directly to the substrate using a ribbon pattern with one half (1/2) inch wide beads 12 inches o.c. in Zone 1, 6 inches o.c. in Zone 2 and 3 using either the manual applicator or an automatic applicator. Adhesive pattern(s) shall be in accordance with the SBS modified roofing system specification to resist the specified uplift pressures. The greater of the two patterns shall be utilized.

3. Immediately place insulation boards into wet adhesive. Do not slide boards into place. Do not allow the adhesive to skin over before installing insulation boards.

4. Briefly step each board into place to ensure contact with the adhesive. Substrates with irregular surfaces may prevent the insulation board from making positive contact with the adhesive. Relief cuts or temporary weights may be required to ensure proper contact.

5. All boards shall be cut and fitted where the roof deck intersects a vertical surface. The boards shall be cut to fit a minimum of one quarter (¼) inch away from the vertical surface.

6. At the Contractor's option, set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.5 CLEANING

A. Remove debris and cartons from roof deck. Leave insulation clean and dry, ready to receive roofing membrane or roof deck board.

3.6 CONSTRUCTION WASTE MANAGEMENT

A. Remove and properly dispose of waste products generated during installation. Comply with requirements of authorities having jurisdiction.

END OF SECTION 07 22 00

SECTION 07 25 00 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Commercial weather barrier assemblies.
2. Flexible flashing.
3. Weather barrier flashing.
4. Fluid-applied flashing.
5. Weather barrier accessories.
6. Drainage material.

B. Related Requirements:
1. Section 072100 "Thermal Insulation" for installation of exterior insulation.
2. Section 072413 "Polymer-Based Exterior Insulation and Finish System (EIFS)" for installation of exterior insulation and finish system.
3. Section 072419 "Water-Drainage Exterior Insulation and Finish System (EIFS)" for installation of exterior insulation and finish system.
4. Section 074646 "Fiber-Cement Siding" for installation of fiber-cement board siding.

1.3 DEFINITIONS

A. Weather Barrier: A combination of materials and accessories that do the following:
1. Prevent the accumulation of water as a water-resistive barrier.
2. Minimize the air leakage into or out of the building envelope as a continuous air barrier.
3. Provide sufficient water vapor transmission to enable drying as a vapor-permeable membrane.

B. Water-Resistive Barrier: A combination of materials and accessories that prevent the accumulation of water within the wall assembly per International Building Code Section 1403.2.

C. Continuous Air Barrier: The combination of interconnected materials, assemblies, and sealed joints and components of the building envelope that minimize air leakage into or out of the building envelope per ASHRAE 90.1 section 5.4.3.1.

D. Vapor Diffusion: A slow movement of individual water vapor molecules from regions of higher to lower water vapor concentration (higher to lower vapor pressure).

E. Vapor Permeable Membrane: The property of having a water-vapor permeance rating of 10 perms (575 ng/Pa x s x sq. m) or greater, when tested in accordance with the desiccant method using Procedure A of ASTM E96 per definition in International Building Code. Vapor permeable material permits the passage of moisture vapor through vapor diffusion.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. For weather barrier, include data on air and water-vapor permeance based on testing in accordance with referenced standards.

B. Sustainable Design Submittals:
1. Test Reports: Envelope testing and verification of the following:
a. Water-Spray Test.
b. Air Infiltration Test.
c. Water Penetration Test.
2. Product Data: Including the following information:

a. Provide Environmental Product Declarations (EPDs)
b. Provide SDS (formerly MSDS), third-party certifications, or product technical data confirming that systems meet or exceed emissions guidelines for volatile organic compounds (VOCs) and hazardous air pollutants (HAPs), as follows:
    1) Commercial weather barrier complies with California Department of Public Health (CDPH) Standard.
    2) Adhesives and sealants wet-applied on-site are to meet/exceed VOC content requirements for wet-applied products and comply with SCAQMD Rule 1168.
    3) Flashing systems comply with SCAQMD Rule 1168 on VOC limits.

C. Shop Drawings: Show details of weather barrier at terminations, openings, and penetrations. Show details of flexible flashing applications.

D. Preconstruction Laboratory Mockup Testing Submittals:
1. Owner will engage in a third-party testing program: Develop**[ed]** specifically for Project.
2. Test Reports: Prepared by a qualified preconstruction testing agency for each mockup test.
3. Record Drawings: As-built drawings of preconstruction laboratory mockups showing changes made during preconstruction laboratory mockup testing.

1.5 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For weather barrier, from ICC-ES.

B. Manufacturer's Instructions: For installation of each product specified.

C. Qualification Data: For Installer field testing agency.

D. Sample Warranty: For manufacturer's warranty.

E. Reports: Field test and inspection reports.

F. Installer's weather barrier manufacturer-training certificate.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is certified by weather barrier system manufacturer to install manufacturer's product.

B. Laboratory Mockup Testing Agency Qualifications: Qualified in accordance with ASTM E699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement in compliance with ISO/IEC 17025.

C. Manufacturer's Field Service: Register Project with weather barrier manufacturer prior to installation of weather barrier and comply with weather barrier manufacturer's Project registration and observation process.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not store near heat source or open flame.

1.8 WARRANTY

A. Manufacturer's Product Warranty: To repair or replace weather barrier product that fails in materials within specified warranty period.
1. Warranty Period: 10 years from date of purchase.

B. Manufacturer's Product and Labor Warranty: Manufacturer agrees to repair or replace weather barrier that fails in materials within specified warranty period, including removal and replacement of affected construction up to manufacturer's limits.
1. Warranty Period: 10 years from date of purchase.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain weather barrier assembly components, including weather barrier flashing and foam insulation from same manufacturer as weather barrier.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed weather barrier and accessories shall withstand specified wind pressures, liquid water penetration, and water vapor pressures without failure due to defective manufacture of products.

B. High-Performance Installations:
1. For installation with one of the following building envelope performance or structural characteristics:
   a. Exceeding 65 mph (100 km/h) equivalent structural load.
   b. Exceeding 15 mph (24 km/h) equivalent wind-driven rainwater infiltration.
   c. Buildings with 60 ft. (18 m) or more total height above grade plane, as defined in the International Building Code.
   d. Construction with gypsum or cement-based exterior sheathing.
   e. Non-wood based primary structure such as steel, light gage steel, masonry, or concrete.

2.3 WEATHER BARRIER

A. Commercial Building Wrap: ASTM E2357 passed, ABAA (Air Barrier Association of America) evaluated air barrier assembly, and assembly water resistance per ASTM E331; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested in accordance with ASTM E84; UV stabilized for nine-month exposure; and acceptable to authorities having jurisdiction.
1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; **Tyvek CommercialWrap D** or comparable product by one of the following:
   a. Or approved equal.
2. System Description, Single-Layer Weather Barrier: Single-layer weather barrier, including flashing and sealing of penetrations and seams.
3. System Description, Single-Layer Drainable: Single-layer weather barrier with integral drainage, including flashing and sealing of penetrations and seams.
4. System Description, Double-Layer Drainable: Double-layer weather barrier, including flashing and sealing of penetrations and seams, arranged as follows:
   a. Primary Layer: Commercial building wrap with integral drainage installed closest to building interior.
5. Drainability: 98 percent or greater when tested in accordance with ASTM E2273.
6. Air Permeance, Product: Not more than 0.004 cfm/sq. ft. at 1.57 lbf/sq. ft. (0.02 L/s x sq. m at 75 Pa) when tested in accordance with ASTM E2178.
7. Air Permeance, Assembly: Not more than 0.04 cfm/sq. ft. at 1.57 lbf/sq. ft. (0.2 L/s x sq. m at 75 PA) when tested in accordance with ASTM E 2357 and evaluated by ABAA.
8. Water Penetration Resistance, Product: Hydrostatic head resistance greater than 7.7 ft. (2.35 m) in accordance with AATTC 127.
9. Water Penetration Resistance, Assembly: Assembly wall specimen described in ASTM E2357 to water resistance in accordance with ASTM E331 to [**2.86 lbf/sq. ft. (137 Pa)**] [**6.24 lbf/sq. ft. (300 Pa)**] [**10.4 lbf/sq. ft. (500 Pa)**] [**12.5 lbf/sq. ft. (575 Pa)**] [**15 lbf/sq. ft. (718 Pa)**].
10. Water-Vapor Permeance: Not less than 23 perms (1300 ng/Pa x s x sq. m) per ASTM E96/E96M, Desiccant Method (Procedure A) or not less than 28 perms (1600 ng/Pa x s x sq. m) per ASTM E96/E96M, Water Method (Procedure B).
11. Water-Vapor Permeance: Not less than 30 perms (1700 ng/Pa x s x sq. m) per ASTM E96/E96M, Desiccant Method (Procedure A) or not less than 46 perms (2600 ng/Pa x s x sq. m) per ASTM E96/E96M, Water Method (Procedure B).
12. Allowable UV Exposure Time: Not less than nine months when tested in accordance with ASTM G155 (Accelerated Weathering).
13. Flame Propagation Test: Materials and construction shall be as tested in accordance with NFPA 285.
14. Heat and Visible Smoke Release Rates: Maximum rates in accordance with NFPA 285.
   a. Peak Heat Release: 13,217 Btu/sq. ft. (150 kW/sq. m).
   b. Total Heat Release: 1762 Btu/sq. ft. (20 MJ/sq. m)
   c. Effective Heat of Combustion: 7744 Btu/lb (18 MJ/kg)
15. Weather barrier system to have a VOC content of 30 g/L or less.

2.4 WEATHER BARRIER ACCESSORIES

A. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by weather barrier manufacturer for sealing joints and penetrations in commercial building wrap.
1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; Tyvek Tape or comparable product.

B. Closed-Cell Polyurethane Foam Insulation: Low-pressure, low-expansion, single-component polyurethane foam, with maximum flame-spread and smoke-developed indexes of 15 and 25, respectively, per ASTM E84.
1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; GS Pro or comparable product.

C. Fasteners with Self-Gasketing Washers: Commercial building wrap manufacturer's recommended pneumatically or hand-applied fasteners with **1-inch- (25-mm-)** diameter, high-density polyethylene cap washers with UV inhibitors.
1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; Tyvek Wrap Caps or comparable product.

D. Primer for Flashings: Synthetic rubber-based product; spray applied. Strengthen adhesive bond at low temperature applications between weather products such as self-adhered flashing products, commercial building wraps, and common building sheathing materials.
1. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont de Nemours, Inc.; DuPont Adhesive Primer or comparable product.
2. Peel Adhesion Test: Passes in accordance with ASTM D3330, Test Method F, for the following.
a. Peel Angles: 0, 25, 72, and 180 degrees.
b. Substrates: Concrete masonry units (CMUs), exterior gypsum sheathing, oriented strand board (OSB), aluminum, and vinyl.
3. Chemical Compatibility: Pass; AAMA 713.
4. Flame Spread Index: 5; ASTM E84.
5. Smoke Development Index: 0; ASTM E84.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements.

B. Verify that substrate and surface conditions are in accordance with commercial weather barrier manufacturer recommendations prior to installation.
1. Verify that rough sill framing for doors and windows is sloped downwards towards the exterior and is level across width of the opening.

C. Verify that surfaces to receive weather barrier flashing are clean, dry, and free of frost.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Direct water onto an acceptable weather barrier drainage plane with an unobstructed path to exterior of wall.
1. Provide a drainage path for water intrusion through window and door attachment system that collects at window and door sills and directs water to the exterior or weather barrier.

3.3 COMMERCIAL BUILDING WRAP INSTALLATION

A. General: Comply with weather barrier manufacturer's written installation guidelines and warranty requirements.

B. Cover exposed exterior surface of sheathing with weather barrier securely fastened to framing immediately after sheathing is installed.
1. Maintain continuity of air and water barrier assemblies.

2. Start weather barrier installation at a building corner, leaving 12 inches (300 mm) of weather barrier extended beyond corner to overlap.
3. Install weather barrier horizontally starting at lower portion of wall surface.
4. Provide minimum 6 inches (150 mm) overlap at horizontal- and vertical-wrap seams in a shingle manner to maintain continuous downward drainage plane and air and water barrier.

C. Seams: Seal seams with building wrap tape per manufacturer's recommended installation instructions.
1. Shiplap horizontal seams in weather barrier to facilitate proper drainage.

D. Fasteners: Use weather barrier manufacturer's recommended fasteners to secure weather barrier and install fasteners according to weather barrier manufacturer's installation guidelines.
1. Do not use temporary fasteners to permanently attach weather barrier.
2. Do not place fasteners with gasketing washers where weather barrier flashing will be installed.
3. Install fasteners with gasketing washers through flashing where recommended by manufacturer.

E. Openings: Completely cover openings with weather barrier, then cut weather barrier membrane to openings in accordance with weather barrier manufacturer's installation guidelines.

1. Provide head and jamb flaps and seam overlaps to maintain continuous drainage.
2. Repair damage to weather barrier using method recommended by weather barrier manufacturer.
3. Install flashing in accordance with weather barrier manufacturer's installation guidelines.

3.4 DRAINAGE MATERIAL INSTALLATION

A. Install drainage material with grooves or channels running vertically in compliance with manufacturer's written instructions.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to train installers and observe subject test-wall areas and installations.

B. Testing Agency: Owner will engage a qualified third-party testing agency to perform tests and inspections.

C. Test Area: Perform tests on one bay at least 30 ft. (9.15 m), by one story.

D. Field Quality Control Testing: Perform the following test on representative areas of structural-sealant-glazed curtain walls:
1. Air Infiltration Whole Building: ASTM E779 at not more than 0.40 cfm/sf (2.00 L/s per sq. m).
2. Water Penetration: ASTM E1105 at a minimum uniform static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft. (300 Pa). No water penetration shall occur as defined in ASTM E1105.
   a. Perform a minimum of two tests in areas as directed by Architect.
   b. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 30, and 70 percent completion.

E. Prepare test and inspection reports.

3.6 CLEANING

A. Immediately remove release paper and scrap from work area and dispose of material in accordance with requirements of Section 017300 "Execution" and Section 017419 "Construction Waste Management and Disposal."

3.7 PROTECTION

A. Protect installed weather barrier from the following:
1. Damage from cladding, structure, or a component of the structure (for example, window, door, or wall system).
2. Contamination from building site chemicals, premature deterioration of building materials, or nonstandard use or application of products.
3. Foreign objects or agents, including the use of materials incompatible with weather barrier products.
4. UV exposure in excess of products' stated limits.

END OF SECTION 07 25 00

SECTION 07 52 16 – SBS MODIFIED BITUMEN MEMBRANE ROOFING

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. (SBS) Modified Bituminous Membrane Roofing.

B. Related Requirements:
1. Division 07 Section "Sheet Metal Flashing and Trim"
2. Division 07 Section “Preparation for Re-Roofing”
3. Division 07 Section "Joint Sealants"
4. Division 07 Section “Roof Deck Insulation”
5. Division 07 Section “Gypsum Roof Deck Board”

C. Scope of Work:
1. This project consists of removing existing roofing and insulation, installing a new, high performance, fire retardant, SBS modified roofing membrane system. The finished system shall be complete including installation of sheet metal related items, edge metal and base flashings. The finished system shall result in a water-tight installation with all components covered by specified warranty.

1.03 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.04 REFERENCES
1. ASTM D 41, Specification for Asphalt Primer Used in Roofing, Damp-proofing, and Waterproofing
2. ASTM D 312, Specification for Asphalt Used in Roofing
3. ASTM D 451, Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products
4. ASTM D 1079, Terminology Relating to Roofing, Waterproofing, and Bituminous Materials
5. ASTM D 1227, Specification for Emulsified Asphalt Used as a Protective Coating for Roofing
6. ASTM D 1863, Specification for Mineral Aggregate Used on Built-Up Roofs
7. ASTM D 2178, Specification for Asphalt Glass Felt Used in Roofing and Waterproofing
8. ASTM D 2822, Specification for Asphalt Roof Cement
9. ASTM D 2824, Specification for Aluminum-Pigmented Asphalt Roof Coating
10. ASTM D 3019, Specification for Lap Cement Used with Asphalt Roll Roofing
11. ASTM D 4601, Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing
12. ASTM D 5147, 1991 Test Method for Sampling and Testing Modified Bituminous Sheet Materials
13. ASTM E 108, Test Methods for Fire Test of Roof Coverings
14. FM, Factory Mutual
15. NRCA, National Roofing Contractors Association

1.05 PRE-APPLICATION MEETING

A. Approximately 2 weeks before the scheduled commencement of the modified bitumen sheet roof system and associated work, meet at Project site with Installer, installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in the around roofing that must precede or follow roofing work (including mechanical work if any), Architect/Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of the Work, including

(where applicable) Owner's insurers, test agencies, and governing authorities. Objectives to include:

1. Review foreseeable methods and procedures related to roofing work.
2. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades.
3. Review structural loading limitations of deck and inspect deck for deflections and for required attachment.
4. Review roofing systems requirements (drawings, specifications, and other contract documents).
5. Review required submittals, both completed and yet to be completed.
6. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
7. Review required inspection, testing, certifying, and material usage accounting procedures.
8. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).
9. Record discussion of the pre-application meeting, including decisions and agreements reached. Furnish a copy of this record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.
10. Review notification procedures for weather or non-working days.
11. Perform pull out test(s) with the specified fasteners, if not performed prior to the meeting, to verify the actual pull-out capacity of the fasteners, and adjust engineering calculations and fastener sizes/ layouts accordingly.

1.06 SUBMITTALS

A. The following items shall be submitted in a letter issued by the Roof Manufacturer, along with the roofing submittals, prior to the Roofing Pre-Installation Conference:
   1. Certification by the Roofing Manufacturer that the installer is an “Approved Applicator”, in good standing, and specifically stating that the installer is both acceptable and authorized to install the proposed roofing system(s), including all required warranties.
   2. Certification by the Roofing Manufacturer that the proposed system will comply with the manufacturer’s requirements, in order to qualify the project for all specified warranties and guarantee(s).
   3. Letter from the Manufacturer stating that a FULL-TIME employee of the Manufacturer will provide site inspections a minimum of three days a week at no additional charge to the Owner. That the Manufacturer will provide the specified 30 YR NDL Warranty to include damage caused by wind up to the design wind speed. The letter must be signed by a Corporate Officer and the Corporate Seal affixed.

B. Product Data:
   1. Manufacturer's Design Standards and other data for each item or product provided, as needed to prove compliance with specified requirements.
   2. Manufacturer's installation instructions.

C. Shop Drawings:
   1. The Roofing Manufacturer shall prepare Shop Drawings,
      a. Include all typical and non-typical roof system details, including, but not limited to: details of edge conditions, joints, corners, transitions, trim, flashing, closures, penetrations, supports, anchorages, and special details related to the project.
      b. Detail and specify locations for attachments included in the Engineering Calculations.
   2. Shop Drawings shall be stamped by a Professional Engineer, licensed in the State of Louisiana.

D. Calculations:
   1. The Roofing Manufacturer shall calculate the wind uplift pressures for each zone and exposure, from the specified Design Wind Speed.
   2. Roofing system shall be designed in accordance with IBC-2015, and the wind uplift requirements of ASCE 7-10, for the geographical location.
   3. Calculations defining wind loads on all roof areas, based on the specified Building Codes, allowable fastener loads, and required number of fasteners required to secure the roof system to the designated substructure.
   4. Engineering Calculations shall be stamped by a Professional Engineer, licensed in the State of Louisiana.

E. Certifications:
   1. Letter of certification from the Roofing Manufacturer that materials provided for the project have been produced in accordance with the strictest applicable standards to ensure quality.
   2. Certified test results by a nationally recognized testing laboratory or a manufacturer's laboratory, and witnessed and certified by a professional engineer, in accordance the specified performance test methods and criteria for each product or system.
   3. Roofing Manufacturer's certification that materials are in compliance with the specifications.
   4. Manufacturer's affidavit that materials provided for and used in the Project contain no Asbestos.

F. Testing Reports: Showing that the roof system been tested in accordance with specified performance testing requirements.

G. Field Reports: As prepared by the Roofing Manufacturer's Technical Field Representative and required to ensure conformance with the warranty and Weathertightness requirements specified herein and be distributed on a weekly basis to all parties involved. Failure to deliver reports on a weekly basis may result in the job being shut down. Days resulting from the shutdown are NOT eligible to be claimed as "Rain Days".

1.07 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Manufacturer's Certificates: Signed by roofing manufacturer certifying that roofing system complies with specified performance requirements, will provide inspections, and issue the specified warranty.

C. Sample Warranties: For manufacturer's special warranties.

D. Class of Roofing System: Certification of Class A Roofing System.

1.08 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.09 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is authorized and approved by the roofing system manufacturer to install the manufacturer's product and that is eligible to receive manufacturer's special warranty. A minimum of five (5) years of experience is required.

B. Manufacturer Qualifications: Roofing system manufacturer shall have a minimum of 10 years of experience in manufacturing modified bitumen roofing products in the United States and be ISO 9001 certified.

C. Roofing products or methods to be considered must have a minimum of ten (10) years successful performance in roofing and re-roofing applications.

D. It is the intent of this specification to provide a roof system with an ASTM E 108 Class A fire rating.

E. Installer's Field Supervision: The roofing system installer is required to maintain a full-time Superintendent on the job site during all phases of modified bituminous sheet roofing work and at any time roofing work is in progress. Proper supervision of workmen shall be maintained. A copy of the specification shall be in the possession of the Supervisor/Foremen and on the roof at all times.

F. It shall be the Contractor's responsibility to respond immediately to correction of roof leakage during construction.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store and handle roofing sheets in a dry, well-ventilated, weather-tight place to ensure no possibility of significant moisture exposure. Store rolls of felt and other sheet materials on pallets or other raised surface. Stand all roll materials on end and cover these materials with a canvas tarpaulin or other breathable material (not polyethylene).

C. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

D. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

E. Do not leave unused rolled goods on the roof overnight or when roofing work is not in progress. These items must be stored as mentioned above.

F. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.11 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

B. Weather Condition Limitations: Do not apply roofing membrane during inclement weather or remove roofing when a 40% chance of precipitation is expected.

C. Do not apply roofing insulation or membrane to damp deck surface.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

E. Proceed with roofing work only when existing and forecasted weather conditions will permit unit of work to be installed in accordance with manufacturer's recommendations and warranty requirements.

1.12 INSPECTIONS AND TESTS

A. The Architect, Owner’s Representative, Project Manager and Roofing Manufacturer’s Technical Field Representative shall at all times have access to the job site and work areas.

B. The Contractor shall provide proper and safe facilities for such access and inspection, in accordance with applicable Federal, State, and Local laws and regulations.

C. Inspections.
1. The Architect, Owner’s Representative, and/or Project Manager’s Inspections:
   a. The Architect, Owner’s Representative, and/or Project Manager will perform periodic inspections throughout the duration of the project.
   b. The Architect, Owner’s Representative, and/or Project Manager shall inspect the work after the completion of each major phase of construction.
2. Manufacturer’s Inspections:
   a. An Authorized Technical Field Representative of the Roofing Material Manufacturer shall make a site visit and inspection, no less than three (3) times each week, for the duration of the performance of Work, to ensure that the installation is installed in strict accordance with the Roofing Manufacturer's requirements, the Contract Documents, the Project Specifications, the approved Shop Drawings and Engineering Data, and the Roofing Manufacturer’s standard details.

b. A written report of each site visit and inspection, consisting of photos and written documentation, shall be prepared by the Roofing Manufacturer's Authorized Technical Field Representative, and shall be forwarded over to the Architect, the Owner's Representative, and/or the Project Manager on each Monday following the prior week.

c. The Roofing Manufacturer's Authorized Technical Field Representative shall be responsible for:

1) Keeping the Architect, the Owner's Representative, and/or the Project Manager informed after periodic inspections as to the progress and quality of the work observed.

2) Calling to the attention of the Contractor those matters observed which are considered to be in violation of the Contract requirements.

3) Reporting to the Architect, the Owner's Representative, and/or the Project Manager, in writing, of any failure or refusal of the Contractor to correct unacceptable practices called to his attention.

4) Confirming, after completion of the work, and based on his observations and tests, that he has observed no application procedures, or other issues in conflict with the Roofing Manufacturer's requirements, the Contract Documents, the Project Specifications, the approved Shop Drawings and Engineering Data, and/or the Roofing Manufacturer's standard details.

D. Any failure by the Architect, the Owner's Representative, the Project Manager, or the roofing manufacturer's Technical Field Representative to observe , detect, pinpoint, or object to any defect or noncompliance with the requirements of the Roofing Manufacturer's requirements, the Contract Documents, the Project Specifications, the approved Shop Drawings and Engineering Data, and/or the Roofing Manufacturer's standard details – of work in progress or completed work – shall not relieve the Contractor of, or reduce, or in any way limit, his responsibility of full performance of the work required of him under the requirements of the Roofing Manufacturer, the Contract Documents, the Project Specifications, the approved Shop Drawings and Engineering Data, and/or the Roofing Manufacturer's standard details.

E. The Architect, the Owner's Representative, an/or the Project Manager, on behalf of the Owner, may require tests and inspections as necessary to verify the quality of the roofing materials and/or workmanship of installation.

1. The Owner shall select the Testing Laboratory and shall pay for all costs associated with initial testing.
2. The costs for any initial tests meeting the applicable requirements shall remain the responsibility of the Owner.
3. The costs for any initial tests not meeting the applicable requirements shall become the responsibility of the Contractor, and shall be deducted by the Owner from the Contractor's payment for the work.
4. The costs for re-testing of any work not meeting the applicable requirements shall be the responsibility of the Contractor, and shall be deducted by the Owner from the Contractor's payment for the work.
5. Subsequent non-compliance with applicable requirements will result in the Owner assigning a full time, Third-Party Quality Control Representative to the project. The costs for the Third-Party Quality Control Representative shall be the responsibility of the Contractor, and shall be deducted by the Owner from the Contractor's payment for the work.
6. Laboratory tests shall be performed in accordance with the applicable ASTM standard testing procedures.

1.13 SEQUENCING AND SCHEDULING

A. Sequence installation of modified bituminous sheet roofing with related units of work specified in other sections to ensure that roof assemblies, including roof accessories, flashing, trim, and joint sealers, are protected against damage from effects of weather, corrosion, and adjacent construction activity.

B. All work must be fully completed on each day. Phased construction will not be accepted. Begin and apply as much roofing in one day as can be completed that same day.

1.14 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of the roofing system that fail in materials, workmanship, and aesthetics within specified warranty period. Warranty shall include damage up the to design wind speed. Warranty shall include insulation, membrane and edge metal.

1. Warranty Period: Thirty (30) Year, "No Dollar Limit" "Edge to Edge" Warranty from date of

Substantial Completion.

B. Contractor Warranty: Submit roofing Installer's warranty, signed by Installer, covering the Work of this Section, including all components of roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, and walkway products, for the following warranty period:
1. Warranty Period: Two years from date of Substantial Completion.

C. Annual Inspections: Membrane manufacturer will provide, free of charge, at the annual request of the Owner, annual inspections for the life of the warranty.

PART 2 - PRODUCTS

2.01 PRODUCTS

A. Description: fully-adhered 2-ply SBS modified bitumen system suitable for application method required, cap sheet to be mineral granule surface with UL Class A and FM Global wind uplift criteria, as required to meet the wind speed requirements of IBC-2015 and ASCE 7-10 (specified herein, above).

B. Approved manufacturers are as listed below:
1. The Garland Company, Inc.
2. Prior-approved equal.

C. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

D. Substitutions: Submit requests per Specification Section 01350.

2.02 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation or other defects in construction. Roofing and base flashings shall remain watertight.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Roofing System Design: The roofing system shall resist the following uplift pressures based upon the following:
1. Wind Speed: 140mph.
2. Occupancy Category: III.
3. Importance Factor: 1.15.
4. Exposure Category: B.
5. Height: 25 feet.

D. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A. Identify products with appropriate markings of applicable testing agency.

2.03 ROOFING SHEET MATERIALS

A. Base Ply: ASTM D 5147, Grade S, 110 mil minimum thickness, SBS- modified asphalt sheet (reinforced with glass fibers); smooth surfaced; heat fusible; suitable for application method specified. HPR Torch Base by The Garland Company, Inc. or prior-approved equal.

B. Top Ply: ASTM D 6162, Grade G, Type III, 135 mil minimum thickness; SBS-modified asphalt sheet (reinforced with glass fibers; white granule surfaced; heat fusible; suitable for application method specified. Stressply IV Plus Mineral

by The Garland Company, Inc. or prior-approved equal.

2.04 BASE FLASHING SHEET MATERIALS

A. Base Ply Sheet: ASTM D 5147, Grade S, 90 mil minimum thickness, SBS-modified asphalt sheet (reinforced with glass fibers); smooth surfaced; heat fusible; suitable for application method specified.

B. Granule-Surfaced Flashing Sheet: ASTM D 6162, Grade G, Type III, 135 mil minimum thickness; SBS-modified asphalt sheet (reinforced with glass fibers; white granule surfaced; heat fusible; suitable for application method specified.

2.05 AUXILIARY ROOFING MATERIALS

A. Roof Coating: Acylic Roof Coating acrylic coating ASTM G 26, Gray in Color. Pyramic Plus Base Coat by The Garland Company, In. or pre-approved equal.

B. Asphalt Primer: ASTM D 41.

C. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.

D. Quick Setting Grout: Pitch pocket base filler as provided by prime material supplier.

E. Mastic Sealant: Polyisobutylene, plain or modified bitumen; non-hardening, non- migrating, non-skinning, and nondrying.

F. Nails and Fasteners: Non-ferrous metal or galvanized steel, except that hard copper nails shall be used with copper; aluminum or stainless-steel nails shall be used with aluminum; and stainless-steel nails shall be used with stainless steel. Nails and fasteners shall be flush- driven through flat metal discs of not less than 1-inch diameter. Metal discs may be omitted when one piece composite nails or fasteners with heads not less than 1-inch diameter are used. Fasteners shall be designed for fastening roofing components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.

G. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained on No. 40 sieve, color to match roofing.

H. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements specified in the appropriated steel deck specifications.
4. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane relative to adjoining deck.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Refer to Division 7 “Preparation for Reroofing”

B. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

C. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.03 INSTALLATION, GENERAL

A. Comply with roofing system manufacturer's written instructions.

B. Substrate-Joint Penetrations: Prevent adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.04 ROOFING INSTALLATION, GENERAL

A. Start installation of roofing in presence of manufacturer's technical personnel.

B. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing modified bitumen sheet system.

C. If applicable, where roof slope exceeds 3/4 inch per 12 inches, install roofing membrane sheets parallel with slope.
1. Back nail roofing sheets to substrate according to roofing system manufacturer's written instructions.

D. Coordinate installation of roofing system so insulation and other components of the roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
1. Provide tie-offs at end of each day's work to cover exposed roofing sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt, with joints and edges sealed.
2. Complete terminations and base flashings, and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

3.05 MECHANICAL COORDINATION

A. Roof top mounted equipment shall be mounted level.
1. Provide curbs with sloped bases, as required to match the roof deck or structural framing slope. Where roof structure is level, provide level base curbs.
2. Provide curbs with level tops, to allow equipment to be installed level.
3. Provide curb types & heights as required to achieve required minimum base flashing criteria.
4. Unless noted otherwise, curbs shall be fabricated from galvanized steel.
5. Unless specifically noted otherwise, provide insulated curbs.

B. Gas Equipment heights as required to achieve minimum 3" vertical clearance between roof surface and bottom of drip leg piping cap.

C. For safety, ease of maintenance, and to minimize damage to roof system components, no equipment located within 5 feet of roof expansion joints and/or roof divider joints, vertical parapets; no equipment within 10 feet of roof edges.

D. Roof system thermal insulation values based on HVAC system design.

E. Coordinate the removal or relocation of mechanical equipment with the Owner's Representative, and/or Project Manager.

F. Where roofing work involves removal, relocation, or replacement of existing mechanical equipment, coordinate and phase work to maintain climate control on building at all times.

G. DO NOT DISCONNECT OR REMOVE MECHANICAL UNITS WITHOUT OWNER'S PRIOR APPROVAL.

3.06 BASE-PLY SHEET INSTALLATION

A. Heat Fused Base: Install one layer of SBS heat fused base sheet to a properly prepared insulation or roof deck board.
1. Shingle in proper direction to shed water on each area of roofing.
2. To a suitable substrate, lay out the roll in the course to be followed and unroll six (6) feet.
3. Using a roofing torch, heat the surface of the coiled portion until the burn-off backer melts away. At this point, the material is hot enough to lay into the substrate. Progressively unroll the sheet while heating and press down with your foot to insure a proper bond.
4. After the major portion of the roll is bonded, re-roll the first six (6) feet and bond it in a similar fashion.
5. Repeat this operation with subsequent rolls with side laps of four (4) inches and end laps of eight inches.
6. Give each lap a finishing touch by passing the torch along the joint and spreading the melted bitumen evenly with a rounded trowel to insure a smooth, tight seal.
7. Extend underlayment two (2) inches beyond top edges of cants at wall and projection bases. Install base flashing ply to all perimeter and projections details.

3.07 MISCELLANEOUS ROOFING COMPONENTS

A. Metal Edge (Shop Fabricated, ANSI/SPRI ES-1):
1. Inspect the wood nailer to assure proper attachment and configuration.
2. Run base ply over to the outside of blocking.
3. Install metal cleat and fasten as called for.
4. Prime metal edge at a rate of one hundred (100) square feet per gallon and allow surface to dry.
5. Mechanically attach metal flashing at 3" c/c staggered.
6. Strip in flange with base flashing ply covering entire flange in bitumen with six (6) inches on to the field of roof. Assure ply laps do not coincide with metal laps.
7. Install a second ply of modified flashing ply over the base flashing ply, nine (9) inches onto the field of the roof.
8. Install cover plates as detailed.

B. Expansion Joint:
1. Run base ply over to the expansion area. Cut prior to installing expansion joint.
2. Prime metal edge at a rate of one hundred (100) square feet per gallon and allow for drying.
3. Strip in flange with base flashing ply covering entire flange in bitumen with six (6) inches on to the field of roof. Assure ply laps do not coincide with metal laps.
4. Install a second ply of modified flashing ply over the base flashing ply, nine (9) inches on to the field of the roof.

C. Roof Drains:
1. Plug drain to prevent debris from entering plumbing.
2. Taper insulation to drain minimum of twenty four (24) inches from center of drain.
3. Run base ply over drain. Cut out plies inside drain bowl.
4. Set lead flashing (thirty (30) inch square minimum) in ¼ inch bed of mastic. Run lead/copper into drain a minimum of two (2) inches. Prime lead/copper at a rate of one hundred (100) square feet per gallon and allow for drying.

5. Install stripping ply forty (40) inches square minimum.
6. Install modified membrane (forty-eight (48) inches square minimum).
7. Install clamping ring and assure that only the base ply, lead and stripping membrane are under the clamping ring.
8. Remove drain plug and install strainer.
9. Provide pitch damns at all drains where aggregate surfacing is being installed.

D. Curb Type Penetrations:
1. Minimum curb height is eight (8) inches. Prime vertical at a rate of 100 square feet per gallon and allow for drying
2. Set cant in insulation adhesive. Run base ply over cant a minimum of two (2) inches.
3. Install base flashing ply covering curb set in bitumen with six (6) inches on to field of the roof.
4. Install a top ply of modified flashing over the base flashing ply, nine (9) inches on to the field of the roof. Attach top of membrane to top of curb and nail at eight (8) inches c/c. Heat fuse six (6) inch strip of modified cap sheet at all vertical seams prior to coating.
5. Install pre-manufactured cover. Fasten sides at 24 inches c/c with fasteners and neoprene washers. Furnish all joint cover laps with butyl tape between metal covers.
6. Set equipment on neoprene pad and fasten as required by equipment manufacturer.

E. Plumbing Vent:
1. Minimum vent height shall be eight (8) inches.
2. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.
3. Prime flange of new sleeve. Install properly sized sleeves set in ¼ inch bed of roof cement.
4. Install base flashing ply by torch.
5. Install membrane by torch.
6. Caulk the intersection of the membrane with elastomeric sealant.
7. Turn sleeve a minimum of one (1) inch down inside of stack.

F. Flange Type Vents:
1. New vents shall match existing size and profile.
2. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.
3. Prime flange of new vent and set in ¼ inch bed of elastomeric roof cement.
4. Install base flashing ply by torch.
5. Install membrane by torch.
6. Caulk the intersection of the membrane with elastomeric sealant.

G. Flashing At Wall:
1. Minimum flashing height is 8". Install insulation and roof deck board as detailed.
2. Set cant in bitumen. Run all roofing plies over cant a minimum of 2".
3. Prepare all walls and penetrations to be flashed with asphalt primer at the rate of ½ gallon per square.
4. Heat fuse bottom ply of flashing membrane.
5. The heat fused flashing membrane will be adhered to an underlying base ply of glass felt bonded in asphalt when torching near wood nailers or combustible surfaces.
6. After the laps have been tested, and a complete positive bond has been achieved, the applicator shall heat the seam edge and trowel along the seam edge. Troweling shall continue until a sloped, beveled edge has been produced.
7. Heat fuse top ply of flashing membrane.
8. After the laps have been tested, and a complete positive bond has been achieved, the applicator shall heat the seam edge and trowel along the seam edge. Troweling shall continue until a sloped, beveled edge has been produced.
9. Install a termination bar at the top of all base flashing. The termination bar shall be mechanically attached every 8” on center. Apply a three-course application of mastic and reinforcing mesh over the term bar and onto the wall.
10. All vertical laps in base flashing system shall receive a six (6) inch wide reinforcement utilizing the specified cap sheet.

3.08 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION

A. Heat Fused or Torch Applied:
1. Over the SBS torch base sheet underlayment, lay out the roll in the course to be followed and unroll six (6) feet. Seams for the top layer of modified membrane will be staggered over the SBS torch base sheet seams.
2. Using a roofing torch, heat the surface of the coiled portion until the burn-off backer melts away. At this point, the material is hot enough to lay into the substrate. Progressively unroll the sheet while heating and press down with your foot to insure a proper bond.
3. After the major portion of the roll is bonded, re-roll the first six (6) feet and bond it in a similar fashion.
4. Repeat this operation with subsequent rolls with side laps of four (4) inches and end laps of eight (8) inches.
5. Give each lap a finishing touch by passing the torch along the joint and spreading the melted bitumen evenly with a rounded trowel to insure a smooth, tight seal.

B. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.
1. Repair tears and voids in laps and lapped seams not completely sealed.
2. Apply roofing granules to cover exuded bead at laps while bead is hot.

C. Install roofing sheets so side and end laps shed water.

3.09 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:
1. Prime substrates with asphalt primer if required by roofing system manufacturer.
2. Flashing-Sheet Application: Torch apply flashing sheet to substrate.

B. Extend base flashing up walls or parapets a minimum of 8 inches above roofing membrane and 6 inches onto field of roofing membrane.

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
1. Install a termination bar at the top of all base flashing. The termination bar shall be mechanically attached every 8” on center. Apply a three-course application of mastic and reinforcing mesh over the term bar and onto the wall.
2. All vertical laps in base flashing system shall receive a 6-inch-wide heat fused reinforcing ply of mineral surfaced base flashing.

D. Install roofing cap-sheet stripping where metal flanges and edgings are set on roofing according to roofing system manufacturer's written instructions.

3.10 SURFACING

A. Bleed Out:
1. Immediately broadcast new clean minerals into the bleed out of the modified roof membrane.
2. The overall appearance of the finished roofing application is a standard requirement for this project. The Roofing Contractor shall make necessary preparations, utilize recommended application techniques (i.e. to immediately apply the specified granules into the bleed out) to ensure that the finished application is acceptable to the Owner. The Architect and Owner will be the sole judge as to whether the finished surface is acceptable.

B. Roof Coating:
1. After a final inspection has been performed and all items have been corrected on the punch list, Contractor shall apply specified coating.

2. Apply two applications of the specified coating at rate of 1.5 gallons per square per coat. First pas shall be North and South. Second pass shall be East and West.

3.11 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
1. Notify Architect and Owner 48 hours in advance of date and time of inspection.
2. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party.
3. The Architect reserves the right to request a thermographic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The thermographic scan shall be provided for the Owner by the Roofing Material Manufacturer at a negotiated price.
4. If water and/or moisture is discovered beneath the cap and/or base sheets as a result of improper installation, all membranes must be removed and replaced with new at no additional cost to the Owner. This includes any damaged roof deck board and/or insulation boards.
   a. If the deck system has sustained damage as a result of water and/or moisture as a result of improper installation. The Contractor must replace and/or make repairs to the deck at no additional cost to the Owner.
   b. Conduct proper sequencing to eliminate water and moisture prior to reinstallation.
5. If core cuts verify the presence of damp or wet materials, the Roofing Contractor shall be required to replace the damaged areas at his own expense and reimburse the Owner for the cost of the scan.
6. Replace deteriorated or defective work found during inspections to a condition free of damage and deterioration at time of Substantial Completion.
7. The SBS roofing membranes (including the cap sheet) must be free from, but not limited to, ripples, fish mouths, blisters, air pockets, bubbles, etc. The surface must be smooth, flat, and aesthetically pleasing for a finished appearance. The cap sheet surface must be free from, but not limited to, adhesives, mastics, smears, foot tracks of substances, and any other substance that will detract from and cause an unpleasing and unacceptable aesthetic appearance.
   a. The SBS roofing membrane system will not be accepted if these type conditions are experienced.
8. The Contractor is to notify the Architect upon completion of corrections.
9. Following the final inspection, acceptance will be made in writing by the material manufacturer.

3.12 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period.
When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 52 16

SECTION 07 71 23 – GUTTERS AND DOWNSPOUTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Gutters and Downspouts.

B. Related Accessories.

1.2 RELATED SECTIONS

A. Section 07 61 13 – Standing Seam Metal Roof.

B. Section 07 21 00 – Insulation.

C. Section 07 60 00 – Sheet Metal Flashing and Trim.

D. Section 07 92 00 – Joint Sealers

1.3 REFERENCES

A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

B. SMACNA - Architectural Sheet Metal Manual.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. Conform to applicable code for size and method of rainwater discharge.

B. American Architectural Manufacturers Association (AAMA) Specification 1405.1 "Specification for Aluminum Raincarrying Systems".

C. FHA Minimum Property Standard 4900.1 for One- and Two-Family Dwellings.

D. FHA Minimum Property Standard 4910.1 for Multi-Family Dwellings.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00 – Submittal Procedures.

B. Product Data: Manufacturer's catalog data, detail sheets, and specifications.

C. Shop Drawings: Prepared specifically for this project; showing dimensions of metal gutters and accessories, fastening details and connections and interface with other products.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

G. Manufacturer’s warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:

B. Installer Qualifications: Certified and approved installer of the sheet metal roofing manufacturer Englert, Inc.

C. Perform Work in accordance with SMACNA Manual or CDA Handbook.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products to prevent twisting, bending, and abrasion, and to provide ventilation. Slope stored materials to drain.

C. During storage prevent contact with materials capable of causing discoloration, staining, or other damage.

1.8 PROJECT CONDITIONS

A. Coordinate installation with installation of adjacent roofing, siding, and related materials.

1.9 WARRANTY

A. Provide the Manufacturer's Limited 20-Year, pro-rated and non-transferable Warranty covering labor materials.

1.10 COORDINATION

A. Coordinate Work with other operations and installation of floor finish materials to avoid damage to installed underlayment and membrane materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Englert, Inc., which is located at: 1200 Amboy Ave. ; Perth Amboy, NJ 08861; Toll Free Tel: 800-364-5378; Tel: 732-826-8614; Fax: 732-826-8865; Email: request info; Web: www.englertinc.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 25 00.

2.2 COMPONENTS

A. Gutters: Aluminum sheet, ASTM B 209, Alloy 3105-H24. Minimum tensile strength 26,000 psi, minimum yield strength 25,000 psi or equivalent. Continuous and seamless sheet aluminum, roll formed.
1. Thickness:
   a. 0.027 inch (0.69 mm).
   b. 0.032 inch (0.81 mm).

B. Downspouts: Aluminum sheet, ASTM B 209, Alloy 3105-H24. Minimum tensile strength 26,000 psi, minimum yield strength 25,000 psi or equivalent.
1. Thickness:
   a. 0.019 inch (0.48 mm).
2. Size:
   a. 3 inches by 4 inches (76 mm by 102 mm).
   b. 2 inches by 3 inches (51 mm by 76 mm).

C. Endcaps: Aluminum sheet, ASTM B 209, Alloy 3105-H24, thickness 0.027 inch (0.69 mm).

D. Inside and Outside Mitres: Aluminum sheet, ASTM B 209, Alloy 3105-H24, thickness 0.027 inch (0.69 mm).

E. Gutter Hangers and Anchors: Aluminum sheet, ASTM B 209, Alloy 3105-H24, thickness 0.063 inch (1.60 mm). Provide types required to suit project requirements.

F. Downspout Anchors: Aluminum. Provide types required to suit project requirements.

G. Elbows: Aluminum sheet, ASTM B 209, Alloy 3105-H24. Minimum tensile strength 26,000 psi, minimum yield strength 25,000 psi or equivalent.
1. Thickness:
   a. 0.019 inch (0.48 mm).
2. Size: To match downspouts.

H. Gutter Guard:

1. Size:
   a. Aluminum mesh, 5 inch (127 mm) by 3 foot (914 mm).
   b. Aluminum mesh, white, 5 inch (127 mm) by 3 foot (914 mm).
   c. Aluminum mesh, 6 inch (152 mm) by 3 foot (914 mm).

I. Gutter Screen:
1. Size:
   a. Aluminum screen, brown, 5 inch (127 mm) by 3 foot (914 mm).
   b. Aluminum screen, white, 5 inch (127 mm) by 3 foot (914 mm).

J. Aluminum Finish: CastleClad, two-coat system applied in a continuous baked-on process in a single operation, comprising of an acid-based primer and baked-on high performance linear polyester topcoat on exposed surfaces. Concealed surfaces finished with a polyester gold backer or wash coat.
1. Color: To be selected by Architect.

K. Sealant: Provide as specified in Section 07 92 00 – Joint Sealers.

L. Fasteners: Same material and finish as gutters and downspouts.

2.3 FABRICATION

A. Continuously form seamless gutters to the profiles and sizes specified.

B. Form downspouts of profiles and sizes specified.

C. Hem exposed edges of metal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify governing dimensions at building.

C. Verify surfaces are ready to receive gutters and downspouts.

D. 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. Clean and repair if necessary, any adjoining work on which this work is in any way dependent for its proper installation.

C. 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 in accordance with manufacturer's instructions.

B. Install gutters using appropriate hangers to allow normal expansion and contraction.

C. Install gutter hangers using two 1-1/4-inch (32 mm) screw shank nails and fastened into solid lumber.

D. All gutters shall be in continuous length for each elevation (run). No end laps are allowed.

E. Exercise care in placing aluminum in contact with other dissimilar metals or materials that are not compatible with aluminum.

F. Providing adequate insulation/separation wherever necessary, such as by painting or otherwise protecting when they

are in contact with aluminum or when drainage from them passes over aluminum surfaces.

G. Install sealants where indicated to clean dry surfaces only without skips or voids.

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 07 71 23

SECTION 07 72 00 – ROOF ACCESSORIES

PART 1 – GENERAL

1.01 WORK INCLUDED

A. Provide roof scuttles for access to roof where indicated on drawings.

1.02 SUBMITTALS

A. Submit shop drawings for roof scuttle. Indicate profiles, dimensions, and method of anchorage. Include manufacturer's specifications and installation instructions.

PART 2 – PRODUCTS

2.01 ROOF SCUTTLE AND LADDER

A. For ladder access. Complete with integral curb and counter-flashing, and pre-drilled roof flange.

B. 14-gauge galvanized steel cover and curb, with 22-gauge galvanized steel cover liner. 1" insulation at cover and curb.

C. Size: 2'-6" x 3'-0"

D. Provide positive latching device for inside and outside operation, and for locking from the inside.

E. Provide aluminum ladder with extra heavy duty 3" I-beam extensions.

F. Manufacturers / Products:

1. The Bilco Co., New Haven, Conn., "No S-20"
2. Dur-Red Products, Cudahy, CA, "Type LH"

PART 3 – EXECUTION

3.01 PREPARATION

A. Examine surfaces and conditions to receive roof scuttle. Do not begin installation of scuttle if unsatisfactory conditions are present.

3.02 INSTALLATION

A. Install scuttle and aluminum ladder according to manufacturer's recommendations, detail drawings, and shop drawings.

B. Anchor scuttle to roof securely to withstand 31 p.s.d. uplift load.

END OF SECTION 07 72 00

SECTION 07 92 00 – JOINT SEALANTS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The work of this section includes all exterior sealant work and all interior caulking work which is not specified as the work of a particular section.

1.02 RELATED WORK

A. Flashing sealant is a part of Section 07 60 00, “Flashing and Sheet Metal”.

1.03 REFERENCE STANDARDS

A. Requirements for reference standards are defined in Sections 01 42 00.

1.04 PRODUCT DATA AND APPROVAL

A. Before ordering any material, submit for Architect’s approval complete manufacturer’s specifications of all materials specified in this section, including surface preparation and installation requirements.

1.05 QUALITY ASSURANCE

A. Applicator shall be experienced and trained in the techniques of caulking and sealant applications and shall be thoroughly familiar with recommendations of the manufacturer for the specified caulking and sealants.
   1. Selection of the proper sealant and caulking compound for particular joints shall be in accordance with current recommendations published by the manufacturer.

1.06 DELIVERY AND STORAGE

A. Deliver materials to job in original, unopened containers with manufacturer’s brand name clearly marked on all containers. Handle and store materials in original packages in accordance with manufacturer’s recommendations.

1.07 GUARANTEE

A. Upon completion and acceptance of the project, furnish the Owner through the Architect a written guarantee. Guarantee all items and work included in this section for a period of two (2) years from date of acceptance against defective workmanship and materials.

B. Defects resulting from faulty materials and/or workmanship during the guarantee period shall be repaired or replaced by the Contractor at his expense.

PART 2 - PRODUCTS

2.01 CAULKING COMPOUND (FOR INTERIOR USE ONLY)

A. Type: Oil-base, one part component non-hardening, gun grade, paintable.

B. Acceptable Manufacturers / Products:
   1. Dow Corning, Midland, Mich., “790 Silicone Building Sealant, one-component silicone”.
   2. General Electric Co., Waterford, NY, “Silpruf, one-component silicone”.
   3. Pecora, “Synthacalk GC-9, one-component polysulfide base”.

2.02 PREPARATORY MATERIALS

A. Primer: Non-staining type recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive type recommended by sealant manufacturer; compatible with joint forming materials.

C. Backer Rod for Exterior Sealant: Compressible rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foram, neoprene foam or other flexible, permanent, durable non-absorptive material as recommended for compatibility with sealant by sealant manufacturer.
1. Thickness before compression: twice thickness of joint.
2. Manufacturers / Products:
   a. Sandell Manufacturing Co., Inc., Cambridge, MA, “Poly-Tite Standard”.
   b. Williams Products, Inc., Troy, MI, “Everlastic”.

D. Backer Rod for Expansion Joints: Extruded foamed polyurethane strip saturated with polybutylene material.
1. Manufacturers / Products:
   a. Sandell “Poly-Tite Standard”
   b. Williams “Everlastic”

E. Bond Breaker: Pressure sensitive type recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.01 PREPARATION / INSTALLATION

A. Perform all sealant work in accordance with caulking and sealant manufacturer’s published instructions.

B. Clean and prepare joints in accordance with caulking and sealant manufacturer’s recommendations. Remove any loose materials and other foreign matter which might impair adhesion of sealant.

C. Ensure that joint forming materials are compatible with sealant and caulking compound.

D. Examine joint dimensions and size materials to achieve required width/depth ratios. Use approved joint backer rod to achieve required joint depths to allow sealants to perform properly.
1. Use bond breaker where required.

E. Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature ranges.

F. Form joints slightly concave and straight edges. Sealant must be free of air pockets, embedded matter, ridges and sags.

3.02 CLEANING

A. As work progresses, remove excess materials adjacent to joints. Leave finished work in neat, clean condition with no evidence of spillovers onto adjacent surfaces.

END OF SECTION 07 92 00

SECTION 072600 – UNDER-SLAB VAPOR BARRIER

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Vapor barrier and installation accessories for installation under concrete slabs.

B. Related Requirements:

1. Section 033000 “Cast-in-Place Concrete”

1.2 REFERENCES

A. ASTM International:

1. ASTM E1745 (latest edition) Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
2. ASTM E1643 (latest edition) Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

B. Technical Reference - American Concrete Institute (ACI):

1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
2. ACI 302.1R-15 Guide to Concrete Floor and Slab Construction.

1.3 SUBMITTALS

A. Quality Control/Assurance:

1. Summary of test results per paragraph 9.3 of ASTM E1745.
2. Manufacturer’s samples and literature.
3. Manufacturer’s installation instructions for placement, seaming, penetration prevention and repair, and perimeter seal per ASTM E1643.
   a. Annotate submittal indicating specific details to be used.
   b. Submittal to consider all conditions (typical and unique) on the project.
4. Provide documentation that required ASTM E1745 testing was performed on a single production roll in accordance with ASTM E1745 Section 8.1.

B. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Vapor barrier shall have all of the following qualities:

1. Water vapor permeance not exceeding 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
    c. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1

B. Vapor barrier products:

1. Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC., (877) 464-7834 www.stegoindustries.com.
2. Perminator 15 Mil Underslab Vapor Barrier by WR Meadows
3. Substitutions shall comply with Division 01 requirements and must meet or exceed all specified performance criteria.

2.2 ACCESSORIES

A. General:
1. Provide accessories compatible with the specified vapor barrier system and as recommended by the vapor barrier manufacturer.
2. All accessories shall be provided by a single manufacturer and shall be fully compatible with the vapor barrier.

B. Seaming Materials: Provide seam tape as recommended by vapor barrier manufacturer.

1. Basis of Design: Stego Tape by Stego Industries, LLC.
2. Acceptable Manufacturers: WR Meadows or approved equal.

C. Penetration Sealing Materials: Provide mastic, tape, or prefabricated boots as recommended by vapor barrier manufacturer for sealing penetrations.

1. Basis of Design: Stego Mastic and Stego Tape by Stego Industries, LLC.
2. Acceptable Manufacturers: WR Meadows or approved equal.

D. Perimeter and Edge Sealing Materials: Provide termination system for sealing vapor barrier to vertical surfaces and slab edges.

1. Basis of Design: Stego Crete Claw, Stego Term Bar, and StegoTack Tape by Stego Industries, LLC.
2. Acceptable Manufacturers: WR Meadows or approved equal.

E. Repair Materials: Provide patching materials compatible with vapor barrier for repair of punctures and damage.
   1. Basis of Design: Stego Tape and Stego Mastic by Stego Industries, LLC.
   2. Acceptable Manufacturers: WR Meadows or approved equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify that subgrade preparation complies with Section 312000 and has been approved prior to installation.

   1. Level and compact base material.

3.2 INSTALLATION

A. Install vapor barrier in accordance with ASTM E1643.

   1. Install vapor barrier in accordance with manufacturer's instructions using manufacturer's standard details. Consult with manufacturer for any unique conditions not addressed with manufacturer's standard details and directions.
   2. Install vapor barrier with seams oriented away from the direction of concrete placement where practicable.
   3. Extend vapor barrier to slab perimeter and seal to vertical elements as indicated.

      a. Seal vapor barrier to the entire slab perimeter using Stego Crete Claw, per manufacturer's instructions.
   4. Overlap joints a minimum of 6 inches and seal with manufacturer's seam tape.
   5. Apply seam tape/Crete Claw to a clean and dry vapor barrier.
   6. Seal all penetrations (including pipes) per manufacturer's instructions.
   7. For interior forming applications, avoid the use of non-permanent stakes driven through vapor barrier. Use Beast Form Stake and Beast Foot as a vapor barrier-safe forming system. Ensure Beast Foot's peel-and-stick adhesive base is fully adhered to the vapor barrier.
   8. If non-permanent stakes must be driven through vapor retarder, repair as recommended by vapor retarder manufacturer.
   9. Use reinforcing bar supports with base sections that eliminate or minimize the potential for puncture of the vapor barrier.
   10. Repair damaged areas with vapor barrier material of similar (or better) permeance, puncture and tensile.
   11. For vapor barrier-safe concrete screeding applications, install Beast Screed (vapor barrier-safe screed system) per manufacturer's instructions prior to placing concrete.

END OF SECTION 072600

SECTION 08 11 13 – HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The extent of standard doors and frames is shown and schedule on drawings.

1.02 QUALITY ASSURANCE

A. Provide door and frames complying with Steel Door Institute specified. "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein.

B. Manufacturer: Provide standard steel doors and frames by a single firm specializing in production of this type of work. Provide steel doors and frames by one of the following:
1. Amweld Building Products Div.
2. Ceco Corp.
3. Republic Builders Prod. Corp.

C. Fire-Rated Assemblies: Provide fire-rated doors and frames investigated and tested as fire door assemblies, complete with type of hardware to be used. Identify each fire door and frame with recognized UL testing laboratory labels, indicating applicable fire rating of steel doors and frames, construct and install assemblies to comply with NFPA Standard No 80, and as herein specified.

D. Temperature Rise Rating: At stairwell enclosure provide door which have Temperature Rise Rating of 450 degrees F. (232 degrees C.) maximum in 30 minutes of fire exposure.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's specifications for fabrication and installation, including data substantiating those products comply with requirements.

B. Shop Drawings: Submit for fabrications and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcement, and details of joints and connections. Show anchorage and accessory items.

C. Provide schedule of doors and frames using some reference numbers for details and opening as those on contract drawings.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver hollow metal work packed in a carton or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory finished doors.

B. Inspect hollow metal work upon delivery for damage. Minor damage may be repaired provided finish items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

C. Store doors and frames at building site under cover. Place units wood sills at least 4" high, or otherwise store on floors in a manner that will prevent rust and damage. Avoid use of vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to permit air circulation.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Hot-Rolled Steel Sheets and Strip Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.

B. Cold Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366, and ASTM A 568.

C. Galvanized Steel Sheets: (Exterior doors and frames) Zinc coated carbon steel sheets of commercial quality, complying ASTM A 536, with ASTM A 526, with ASTM A 525, G60 zinc coating, mill phosphating.

D. Supports and Anchors: Fabricate 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 wall complying with ASTM A 153, Class C or D as applicable.

F. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints.

2.02 FABRICATION, GENERAL

A. Fabricate steel door and frame units to be rigged, neat in appearance and free from defects, warp, or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site.

B. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only cold-rolled steel.

C. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold-rolled or hot-rolled steel (at fabricator's option).

D. Fabricate exterior doors, panels, and frames from galvanized sheet steel. Close top and bottom edges of exterior doors as integral part of door construction or by addition of inverted steel channels.

E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

2.03 FINISH HARDWARE PREPARATION

A. Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirement of ANSI A 115 series specifications for door and frame preparation for hardware.

B. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.

C. Locate finish hardware as shown on final shop drawings or, it not shown in accordance with "Recommended Locations for Builder's Hardware", published by Door and Hardware Institute.

2.04 SHOP PAINTING

A. Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.

B. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.

C. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

2.05 STANDARD STEEL DOORS

A. Heavy Duty 1 3/4" Thick (Type III) (Style 3):

B. Stile and Panel Construction: Minimum 20-gauge styles are butted against a full 16-gauge panel. Panels interlock with stiles or are joined to the stiles by internal welding. Stiles and panels closed at top and bottom of door with recessed end channels. Door face sheet are formed from one sheet of metal with no seams on door fascias or vertical edges. Doors to receive closures shall have 12-gauge reinforcement, 6-gauge hinge reinforcements and 14-gauge lock reinforcements.

C. Provide metal doors indicated on drawings and/or schedules.

2.06 STANDARD STEEL FRAMES

A. Provide 16-gauge metal frames for doors, transoms, sidelights, borrowed lights, and other openings of types and styles as shown on drawings and/or schedules. Conceal fastenings unless otherwise indicated.
1. Fabricate frames for masonry construction with mitered and welded corners.
2. Fabricate frames for dry wall construction with mitered corners knocked down for field assembly.

B. Form exterior frames of hot dip galvanized steel.

C. Door Silencers: Except on weather-stripped frames, drill stops to receive 2 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.

PART 3 - EXECUTION

3.01 INSPECTION

A. Installer must examine substrate and conditions under which steel doors and frames are to be installed and must notify Contractor in writing of any conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION

A. Install standard steel doors, frames, and accessories in accordance with final shop drawings and manufacturer's data, and as herein specified.

3.03 PLACING FRAMES

A. Comply with provision of SDI-105 "Recommended Erection Instructions for Steel Frames" unless otherwise indicated. Except for frames located in-place concrete or masonry and at drywall installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

B. In plaster or masonry walls constructed with antifreeze additives, protect inside (concealed) faces of door frames using fibered asphalt emulsion coating. Apply approximately 1/8" thick over shop primer and allow to thoroughly dry before handling.

C. In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels. Building-in of anchors and grouting of frames is required.

D. At in-place concrete or masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.

E. Install fire-rated frames in accordance with NFPA std. No. 80.

F. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In open steel stud partitions, place studs in wall anchor notches and wire tie. In closed steel stud partitions, attach wall anchors to studs with tapping screws.

3.04 DOOR INSTALLATION

A. Fit hollow metal doors accurately in frames, within clearances specified in ADI-100.

B. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

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. Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from pre-finished doors.

C. Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION 08 11 13

SECTION 08 14 00 – WOOD DOORS

PART 1 - GENERAL

1.01 EXTENT AND LOCATION of each type of wood door is shown on drawing and in schedules.

1.02 FACTORY FITTING to frame (pre-fitting) and factory preparation for hardware (pre-matching) for wood doors is included in this section.

1.03 QUALITY ASSURANCE

A. General: Comply with requirements of the following standard unless otherwise indicated.

B. Non-Fire-Rated Wood Doors: NWMA Industry Standard I.S.-1 "Wood Flush Doors" of the National Woodwork Manufacturer's Association. Stile and rail doors quality standards of A.W.A

C. Fire-Rate Wood Doors: Where fire-resistance classifications are shown or scheduled for wood door assemblies, provide doors which comply with requirements of NFPA NO.80 "Standard for Fire Doors and Windows" and which have been tested and rated with single point hardware by UL. Provide UL label on each door and panel.

1.04 SUBMITTALS

A. Product Data: Submit door manufacturer's product data, specifications, and installation instructions for each type of wood door. Include details of core and edge construction, trim for openings and louvers (if any) and similar components. Include certifications as may be required to show compliance with specifications.

B. Shop Drawings: Submit shop drawings indicating locations and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, requirements for factory finishing and other pertinent data.

C. Specific Product Warranty: Submit written agreement indoor manufacturer's standard form signed by Manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors which have warped (bow, cup, or twist) or which show photographing of construction below in face veneers, or do not conform to tolerance limitations of NWMA. The warranty shall also include refinishing and reinstallation which may be required due to repair or replacement of defective doors. Warranty shall be in effect during following period of time after date of substantial completion.
1. Solid Core Flush Interior Doors: Five years
2. Solid Core Flush Exterior Doors: Five years
3. Hollow, Core Flush Interior Doors: Two years
    a. Solid Wood Stile and Rail Doors: One year

D. Submit in accordance with Section 01 33 00 – Submittal Procedures.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

Product wood doors during transit, storage, and handling to prevent damage, soiling and deterioration. Comply with the "On-Site Care" recommendations of NWMA pamphlet. "Care and Finishing of Wood Doors" and with manufacturer's installations.

PART 2 - PRODUCTS

2.01 MATERIALS AND COMPONENTS

General: Provide wood doors complying with applicable requirements of VWMA I.S.-1 for kinds and types of doors indicated and as specified.

A. Face Panels: Manufacturer's standard 2 or 3 ply face panels, unless otherwise indicated.

B. Exposed Surfaces: Provide kind shown or scheduled and as further specified. Provide same exposed surface material on both faces of each door, unless otherwise indicated.

C. Fire-rated Doors: Provide exposed faces and edges to match none fire-rated doors in same area of building, unless otherwise indicated. Provide trim for openings (if any) which have been tested and listed for kind of door and rating indicated.

D. Metal Louvers: Size, type, and profile shown and fabrication from 20 gauge, galvanized and factory primed for paint finish.

2.02 GENERAL FABRICATION REQUIREMENTS

A. Transom and Slide Panels: Wherever transom panels or side panels of wood are shown in same framing systems as wood doors, provide panels which match quality and appearance of associated wood doors, unless otherwise indicated. Fabrication matching panels with same construction, exposed surfaces and finish as specified for associated doors.

B. Openings: Cut and trim openings through doors and panels as shown. Comply with applicable requirements of referenced standard for kind(s) of doors required.
1. Light openings: Factory cut openings. Trim openings for non-fire-rated doors with solid wood moldings.
2. Metal Louvers: Factory cut openings. When standard service of door manufacturer, factory install metal louvers in prepared openings; otherwise install only flush wood beads in prepared openings.

2.03 EXTERIOR FLUSH WOOD DOORS

A. Solid Core Wood Doors: Where shown or scheduled, provide exterior solid core wood doors complying with applicable requirements of referenced standards and as follows:
1. Type 1 adhesive bond
2. Core Type: At contractor's option, provide continuous wood block, stile and rail block, of particle board, as required by manufacturer to meet specified warranty period.

B. Preservative Treatment: Dip-treat exposed wood for not less than 3 minutes in a 5% solution of pentachlorophenol with water repellent added.

C. Flashing: Flash bottom of light openings (if any) and top of out-swinging doors (if any) with flexible non-corrosive metal set in white lead.

D. Exposed Surfaces for Paint Finish: Where exterior flush wood doors are shown or scheduled for paint finish, provide standard thickness rotary cut birch complying with NWMA I.S.-1 good grade, or medium density overlay (MDO) applied over standard thickness hardwood face veneers, and any close-grain hardwood for exposed edges and other solid wood components, as required by manufacturer to meet specified warranty period.

2.04 INTERIOR FLUSH WOOD DOORS

A. Solid Core Wood Doors:
1. Type II water resistant bond.
2. Core Construction: Solid wood block, wood particle board, or mineral with wood lock blocks, as required by door manufacturer to comply with specified warranty period.
3. Face Panels Manufacturer's standard 2-or 3-ply face panels.
4. Exposed Surfaces for Paint Finish where solid core interior wood doors are shown or scheduled to receive paint finish, provide either medium density overlay (MDO) complying with PS-1 applied over manufacturer's standard thickness hardwood face veneers; or standard thickness, rotary-cut birch face veneers complying with NWMA I.S.-1, good grade. Provide any close-grain hardwood for exposed edges and other exposed solid wood components. Standard thickness, rotary-cut birch complying with NWMA I.S.-1, sound grade for face veneers any species of wood for exposed edges and other exposed solid wood components.
5. Exposed Surface for Transparent Finish: Where solid core interior wood doors are shown or scheduled to receive a transparent finish, provide manufacturer's standard thickness face veneers of NWMA I.S.-1, good grade face veneers of the species scheduled. #1 Sharp contrast not permitted at veneer joints. Provide exposed edges and other exposed solid wood components of any species of wood.
#1 If species is not scheduled, supply natural Birch, rotary cut.

B. Hollow Core Wood Doors:
1. Core Construction: As required by manufacturer to meet warranty period.
2. Core Construction: Any type of core complying with the requirements of NWMA I.S.-1 for hollow core flush doors.
3. Face Panels: Manufacturer's standard 2-or 3-ply face panels.
4. Exposed Surfaces for Paint Finish: Where hollow core interior wood doors are shown or scheduled to receive a paint finish, provide standard thickness, rotary-cut birch face veneer complying with NWMA I.S.-1 good grade face veneers and any species of wood for exposed edges and other exposed solid wood components.
5. Exposed Surface for Transparent Finish: Where hollow core interior wood doors are shown or scheduled to receive a transparent finish, provide manufacturer's standard thickness face veneers of NWMA I.S.-1 good grade face veneers of species scheduled. #1 Sharp contrast not permitted at veneer joints. Provide exposed edges and other solid wood components of any species of wood.

2.05 PRE-FITTING AND PREPARATION FOR HARDWARE

A. Pre-fit and pre-machine wood doors at factory.

B. Comply with tolerance requirements of NWMA for prefitting. Machine doors for hardware requiring cutting of doors. Comply with final hardware schedules and door frame shop drawings and with hardware templates and other essential information required to ensure proper fit of doors and hardware. Take accurate field measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with machining in factory.

PART 3 - EXECUTION

3.01 INSPECTION:

A. Installer must examine door frames and verify that frames are correct type and have been installed as required for proper hanging of corresponding doors and notify Contractor in writing of conditions detrimental to proper and timely installation of wood doors. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to Installer. Install fire-rated doors in corresponding fire-rated frames in accordance with requirements of NFPA No. 80.

3.02 INSTALLATION

A. Condition doors to average prevailing humidity in installation area prior to hanging.

B. Hardware: For installation see Division 8 "Builders Hardware" section of these specifications.

C. Manufacturer's Instructions: Install wood doors in accordance with manufacturer's instructions and as shown.

D. Job Fit Doors: (Only if approved in writing by Architect) Align doors to frames for proper fit and uniform clearance at each edge and matching for hardware. Seal cut surfaces after fitting and machining.
1. Bevel non-fire rated doors 1/8" in 2" at lock and hinge edges.
2. Bevel fire-rated doors 1/16" in 2" at lock edge.

E. Pre-fit Doors: Fit to frames and machine for hardware to whatever extent not previously worked at factory as required for proper fit and uniform clearance at each.

F. Clearance: For non-fire doors provide clearances of 1/8" at jambs and head; 1/8" at meeting stiles for pairs of doors; and 1/2" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4" clearance from bottom of door to top of threshold.
1. For fire-rated doors, provide clearances complying with the limitations of the authority having jurisdiction.

G. Job Site Finished Doors: See painting sections in Division 9 of these specifications for requirements for finishing wood doors.

3.03 ADJUST AND CLEAN

A. Operation Rehang or replace doors which do not swing or operate freely, as directed by Architect.

B. Finished Doors: Refinish or replace doors damages during installation, as directed by Architect.

C. Protection and Completed Work: Advise Contractor of proper procedures required for protection of installed wood doors from damage or deterioration until acceptance work.

END OF SECTION 08 14 00

SECTION 08 41 13 – ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Extent of aluminum entrances and storefronts as indicated on drawings and schedules.

B. Manually operated aluminum/glass doors, complete with glass, glazing and finish hardware.

C. Aluminum framing for exterior windows.

D. Aluminum casement windows with all related hardware.

E. Aluminum framing for interior openings as indicated on drawings and schedules.

F. Sealant work required for watertight installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 08 80 00, “Glass and Glazing”

B. Section 08 70 00, “Finish Hardware”

1.03 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including the General and Supplementary Conditions and Division No. 1 Specifications, apply to work of this section.

1.04 REFERENCE STANDARDS

A. Requirements for reference standards are defined in Sections 01 42 00 and 01 42 16.

1.05 DESIGN / PERFORMANCE REQUIREMENTS

A. Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with applicable code.
   1. Doors shall meet a minimum of 140 mph rating.
   2. Impact Resistance shall be in compliance with IBC 2021, ASCE 7-16, Risk Category III.

1.05 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 01 33 00. Indicated complete elevations of doors, framing, assemblies, installation and assembly conditions, details of construction; finishes, location, and installation of hardware; size, shape and thickness of materials, joints and connections, and details of joining with other work. Indicate hardware types, styles, finish, and shape.

B. Submit manufacturer’s product data for doors and framing system with shop drawings indicating complete instruction for installations.

C. Provide certified test results showing that entrance and storefront systems have been tested by a recognized testing laboratory or agency and comply with specified performance characteristics.

D. Must be stamped/sealed by an independent Engineering firm.

1.06 QUALITY ASSURANCE

A. Provide entrances doors and storefront framing system by a single manufacturer capable of showing prior production

of units similar to those required.

B. Provide doors and framing systems produced by a single manufacturer with not less than 5 years successful experience in the fabrication of assemblies of the type and quality required.

C. Entrances and storefront shall be installed by a firm that has not less than 5 years successful experience in the installation of systems similar to those required.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Aluminum Members: Provide alloy and temper recommended for strength, corrosion resistance, and applications of required finish; comply with ASTM B221 for extrusions and ASTM B209 for sheet or plate.

B. Fasteners: Provide fasteners of aluminum, non-magnetic stainless steel, or other materials warranted by the manufacturer to be non-corrosive and compatible with aluminum components, hardware, anchors, and other components.

C. Reinforcement: Where fasteners screw anchor into aluminum less than 0.125" thick reinforce the interior with aluminum or non-magnetic stainless steel to receive screw threads or provide standard non-corrosive pressed-in splinted grommet nuts.

D. Exposed Fasteners: Except where unavoidable for application of hardware, do not use exposed fasteners. For the application of hardware, use fasteners that match the finish of member or hardware being fastened.
1. Provide Phillips flat-head screw for the exposed fasteners.

E. Concealed Flashing: Provide 26 gauge minimum dead-soft stainless-steel or 0.026" minimum extruded aluminum alloy and type selected by manufacturer for compatibility with other components.

F. Brackets and Reinforcement: Provide high-strength aluminum brackets and reinforcements; otherwise provide non-magnetic steel or hot dip galvanized steel complying with ASTM A386.

G. Concrete/Masonry Inserts: Provide concrete and masonry inserts fabricated from cast-iron, malleable iron, or hot-dip galvanized steel complying with ASTM A386.

H. Compression Weather Stripping: Provide the manufacturer’s standard replaceable compressible weather stripping gaskets of molded neoprene complying with ASTM D2000 or molded PVC complying with ASTM D2287.

I. Sliding Weatherstripping: Provide the manufacturer’s standard replaceable weatherstripping of wool, poly propylene, or nylon woven pile, with nylon fabric or aluminum strip backing, complying with AAMA 701.2.

J. Sill Flashing: Provide .040 aluminum brake metal sill flashing.

2.02 FABRICATION

A. General: Sizes of doors, windows, framing systems, etc. are indicated on drawings. All dimensions shall be field verified.

B. Prefabrication: Before shipment to the project site, complete fabrication, assembly, finishing, hardware application, and other work to the greatest extent possible.
1. Do not drill and tap for surface mounted hardware until time of installation at project site.

C. Welding: Comply with AWS recommendations; grind exposed welds smooth and restore mechanical finish.

D. Reinforcing: Install reinforcing as required for hardware and necessary for performance requirements, sag resistance and rigidity.

E. Dissimilar Metals: Separate dissimilar metals with zinc chromate primer, bituminous paint, or other separator that will prevent corrosion.

F. Fasteners: Conceal fasteners wherever possible.

G. Weatherstripping: For exterior doors, provide compression weatherstripping against fixed stops, at other edges, provide sliding weatherstripping retained in adjustable strip mortises into door edge.
1. Provide EPDM in vinyl blade gasket weatherstripping in bottom door rail, adjustable for contact with threshold.

H. Aluminum pocket filler: for exterior frames with no glass.

2.03 FINISHES

A. Clear Anodized Finish: Provide NAAMM AA-M12 C22 A31, Class I (Non-specula as fabricated mechanical finish; chemical etch, medium matte, min. thickness 0.7 mil) clear anodized finish.

2.04 ALUMINUM STOREFRONT SYSTEM

A. Storefront Framing System: Provide inside outside matched resilient flush-glazed storefront framing systems with provisions for glass replacement. Shop fabricate and preassemble frame components where possible.

B. Glazing: Provide 1" thick insulated unit in accordance with Section 08800.

C. Manufacturers
1. United State Aluminum Corporation; 450 Flush Glazing System
2. Kawneer Company, Inc. Niles, MI, “Tri-FAB” 450 for 1" Glazing.

2.05 ALUMINUM ENTRANCE DOORS

A. Type: Medium STILE, manually operated, finish to match aluminum glass wall system.

B. Provide manufacturer’s standard threshold at exterior doors and where so noted on drawings.

C. Manufacturer (must be same as for storefront system)
1. United States Aluminum Corp.
2. Kawneer Company, Inc.

2.06 ALUMINUM CASEMENT WINDOWS

A. Type: Aluminum commercial grade casement windows as indicated on drawings. Aluminum finish to match storefront framing.

B. Windows shall be provided with a full egress arms to open 90 degrees.

C. Window units shall be provided with necessary accessories to provide a complete and weatherproof installation.

D. Qualifications: Window manufacturer shall have been regularly engaged in fabrication of windows of this type for not less than 10 years. Windows shall conform to AAMA P-C50 specs.

2.07 HARDWARE

A. General: Refer to hardware (Section 08700) for requirements for hardware items other than those indicated to be provided by aluminum entrance manufacturer.

B. Provide manufacturer’s heavy-duty hardware units as indicated, scheduled, or required for operation of each door, including the following items of sizes, number and type recommended by manufacturer for service required; finish and color to match door.

C. Offset Pivot Sets: Provide offset pivot assemblies complying with ANSI A456.4, Grade1; provide exposed parts of cast aluminum alloy; provide intermediate pivot for doors over 7'-6" high.

D. Surface Mounted Overhead Closers: Provide surface-mounted overhead closure, modern type with cover, for hinge side installation; comply with ANSI A156.4, Grade i. Comply with manufacturer's recommendations for size closer, depending on door size, exposure to weather and anticipated frequency of use. Comply with ADA requirements. Include the following:
1. Hold-Open arm
2. Delayed-Action closing

E. Deadlocks: Provide max. security type deadlocks with min. 1" pivoted bolt and stainless steel, strike bos; Comply with ANSI A156.5, Grade 1 with thumb turn latch. Rim cylinder by others.

F. Panic Hardware: Provide heavy-duty concealed rod type flush bolts complying with UL 305. Von DuPrin 3547. Exit Device shall match style used on all other doors.

G. Flush bolts: Provide standard edge mortised lever extension type flush bolts complying with ANSI A156.16 for inactive leaves of pairs of doors. Provide flush bolts at both the top and bottom of doors.

H. Pull handles: Provide 1" diameter, 3-1/4" projection extruded aluminum pull handle with stanchions spaced 18" apart.

I. Thresholds: Provide extruded aluminum threshold in mill finish, complete with anchors and clips, coordinated with pivots.

2.08 SEALANT

A. Type: Of exterior quality specified in Section 07 92 00.

PART 3 - EXECUTION

3.01 PROJECT CONDITIONS

A. Field Measurements: Check openings by field measurements before fabrication to ensure proper fitting of work: show measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay in the work. Where necessary, proceed with fabrication without field measurements, coordinate fabrication tolerances to ensure proper fit.

3.02 INSTALLATION

A. Install aluminum framing, windows, and doors in accordance with manufacturer's recommendations and approved shop drawings. Ensure assemblies are plumb, level and free of wrap or twist. Maintain dimensional to leresis and alignment with adjacent work.

B. Use sufficient anchorage devices to securely and rigidly fasten door and frame assemblies to building.

C. Coordinate glass and glazing work with Section 08800.

D. Install hardware in accordance with manufacturer's recommendations using proper templates. Coordinate this work with Section 08 70 00 - Finish Hardware.

E. Install abut insulation in slim spaces around perimeter of door and frame assemblies to maintain continually of thermal barrier.

F. Install perimeter sealant and related backing materials in accordance with workmanship and installation requirements indicated in Section 07 92 00.

G. Install aluminum pocket filler in exterior frames with no glass.

3.03 PROTECTION

A. Protect aluminum surfaces that will abut masonry, concrete, wood, or steel from contact by neoprene gaskets or bituminous paint to prevent galvanic or corrosive: action. Protect as recommended by door manufacturer. Comply with requirements specified under “Dissimilar Materials” in the Appendix of AAMA 101-85.

3.04 TOUCH UP PAINT

A. Upon completion of the work, deliver to the Owner a minimum of one pint of paint of type and quality especially formulated to touch up the specified metal and finish.

END OF SECTION 08 41 13

SECTION 08 70 00 – BUILDING HARDWARE

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Definition: "Builders Hardware" includes items known commercially as builder's hardware which are required for swing, sliding and folding doors.

1.02 QUALITY ASSURANCE

A. Manufacturer: Obtain each kind of hardware (latch and lock sets, hinges, closers, etc.) from only one manufacturer, although several may be indicated as offering products complying with requirements.

B. Supplier: A recognized builders hardware supplier who has been furnishing hardware in the project's vicinity for a period of not less than *2 years,* and who is, or has in employment, an experienced hardware consultant who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor.

C. Fire - Rated Openings: Provide hardware for fire-rated openings in compliance with *NFPA Standard No. 80.* Provide only hardware which has been tested and listed by *UL* for types and sizes of doors required and complies with requirements of door and door frame label. Where emergency exit devices indicating "Fire Exit Hardware".

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical information for each item of hardware. Include whatever information may be necessary to show compliance with requirements and include instructions for installation and for maintenance of operating parts and finish. Transmit copy of applicable data to Installer.

B. Hardware Schedule: Submit final hardware schedule in the manner and format specified complying with the actual construction progress schedule of requirements. Hardware Schedules are intended for coordination of work.

C. Final Hardware Schedule: Based on builder hardware indicated, organize hardware schedule into "hardware sets" indicated, complete designations of every item required for each door or opening. Include the following information:
1. Type, style, function, size, and finish of each hardware item.
2. Name and manufacturer of each item.
3. Fastenings and other pertinent information.
4. Location of hardware set cross - referenced to indications on Drawings both on floor plans and in door and frame schedule.
5. Explanation of all abbreviations, symbols, codes, etc., contained in schedule.

D. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work *(e.g., hollow metal frames)* which is critical in the project constriction schedule. Include with schedule the product data, samples, ship drawings of other work affected by builder's hardware, and other information essential to the coordinated review of hardware schedule.

E. Keying Schedule: Submit separate detailed schedule indication clearly how the Owners of builders' hardware, submit one sample of each type of exposed hardware unit, finished as required and tagged with full description for coordination with schedule.

F. Submit in accordance with Section 01 33 00 – Submittal Procedures.

1.04 PRODUCT HANDLING

A. Packaging of hardware, on a set by set basis, is the responsibility of the supplier. As material is received by the hardware supplier from the various manufacturers, sort and repackage in containers marked with the hardware set number. Two or more identical sets may be packed in the same container.

B. Inventory hardware jointly with representatives of the hardware supplier and the hardware installer until each is satisfied that the count is correct.

C. Provide secure lock-up for hardware delivered to the project but not yet installed. Control and handling and installation of hardware items which are not immediately replaceable, so that the completion of the work will not be delayed by hardware losses, both before and after installation.

1.05 JOB CONDITIONS

A. Coordination: Coordinate hardware with other work. Tag each item or package separately, with identification related to the final hardware schedule, and include basic installation instructions in the package. Furnish hardware items of proper design for use on doors and frames of the thicknesses, profile, swing, security, and similar requirements indicated, as necessary for proper installation and function. Deliver individually packaged hardware items at the proper times to the proper locations *(shop or project site)* for installation.

B. Templates: Furnish hardware templates to each fabricator of doors, frames, and other work to be factory-prepared for the installation of hardware. Upon request, check the shop drawings of such other work, to confirm that adequate provisions are made for the proper installation of hardware.

PART 2 - PRODUCTS

2.01 SCHEDULED HARDWARE

A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of builders' hardware is indicted in the Builders Hardware Data Sheet and Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following.

B. Manufacturer's product designations: One or more manufacturers are listed for each hardware type required. Provide either the product designated, or where more than one manufacturer is listed, the comparable product of one of the other manufacturer is listed, the comparable product of one of the other manufacturers which comply with requirements including those specified elsewhere in this section.

2.02 MATERIALS AND FABRICATION

A. Hand of door: The drawings show the direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of the door movement as shown.

B. Manufacturer's Name Plate: Do not use manufacturer's products which have manufacturer's name or trade name displayed in a visible location *(omit removable nameplates)*, except in concoction with required *UL* labels and as otherwise acceptable to the Architect. Manufacturer's identification will be permitted on rim of lock cylinders only.

C. Base Metals: Product hardware units of the basic metal and forming method indicated, using the manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser *(commercially recognized)* quality than specified for the applicable hardware units by *FS FF-H-106, FS FF-G111, GS GG-H-116 and FS F-H-121.*

Do not provide furnish "optional" materials of forming methods for those indicated, except as otherwise specified.

D. Fastener: Manufacture hardware to conform to published templates, generally prepared for machine screw published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

E. Furnish screws for installation, with each hardware item. Provide Phillips flathead screws except as otherwise indicated. Finish exposed *(exposed under any condition)* screws to match the hardware finish or, if exposed in surfaces of other work, to match the finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

F. Provide concealed fasteners for hardware units which are exposed when the door is closed, except to the extent no standard units of the type specified are available with concealed fasteners. Do not use through bolts for installation where the bolt head of the nut on the opposite face is exposed in other work, except where it is not feasible to

adequately reinforce the work.

G. Tools for Maintenance: Furnish a complete set of specialized tools as needed of Owner's continued adjustment, maintenance, and removal and replacement of builder's hardware.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by the Architect.

B. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as otherwise directed by Architect.

C. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever surfaces which are later to be painted or finished in another way. Coordinated removal, storage and reinstallation or application of surface protections with finishing work specified in the Division 9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.

D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

3.02 ADJUST AND CLEAN

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating ventilating equipment.

C. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

END OF SECTION 08 70 00

SECTION 08 80 00 – GLASS AND GLAZING

PART 1 - GENERAL

1.01 EXTENT of glass and glazing work is indicated on drawings and schedules. All exterior classroom windows shall be operable per the current NFPA 101 Life Safety Code 14.2.11.

1.02 SYSTEM PERFORMANCES

A. Provides glass and glazing that has been produced, fabricated, and installed to withstand normal temperature changes, wind loading, 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.

1.03 QUALITY ASSURANCE

A. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section of other referenced standards.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each glazing material and fabricated glass product required, including installation and maintenance instructions.

B. Certificate: Submit certificates from respective manufacturers attesting that glass and glazing materials furnished for project comply with requirements.

C. Separate certification will not be required for glazing materials bearing manufacturer’s permanent labels designation type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authorities having jurisdiction.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect glass and glazing materials during delivery, storage, and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects to moisture including condensation, of temperature changes, or direct exposure to sun, and from other causes.

1.06 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation, or other causes. Install glazing sealants only when temperatures are in middle third of manufacturer's recommended installation temperature range.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but at not limited to, the following:
1. AFG Industries, Inc.
2. Libbey-Owens-Ford Co.
3. PPG Industries, Inc.
4. Or approved equal.

2.02 GLASS PRODUCTS, GENERAL

A. Primary Glass Standard: Provide primary glass which complies with FS DD-G-451 requirements, including those indicated by reference to type, class, quality, and form.

B. Heat-Treated Glass Standard: Provide heat-treated glass which complies with FS DD-G-1403 requirements, including those indicated by reference to grade, style, type, quality, and class.

C. Sizes: Fabricated glass to sizes required for glazing openings indicated, with edges clearances and tolerances complying with recommendations of glass manufacturer. Provide thickness indicated or, if not otherwise indicated, as recommended by glass manufacturer for application indicated.

2.03 PRIMARY GLASS PRODUCTS

A. Clear Float Glass: Class 1 (transparent), quality q3 (glazing select).

B. Tinted Float Glass: Type I, Class 2 (heat absorbing and light reducing), Quality q3 (glazing select).

2.04 PRIMARY GLASS PRODUCTS

A. General: Refer to primary and heat-treated glass requirements relating to properties of un-coated glasses make up laminated glass products.

B. Plastic Interlayer: Provide glass fabricator's standard polyvinyl butyral interlayer for laminating panels of glass, with a proven record of showing no tendency to bubble, discolor or lose physical or mechanical properties after laminating and installation, in clear or colors and of thickness indicated.
1. Product: Subject to compliance with requirements, provide "Saflex" by Monsanto Co.

C. Laminating Process: Fabricate laminated glass using laminator's standard heat-plus-pressure process to produce glass free from foreign substances and air/glass pockets.

D. Laminated Safety Glass: Two panes of glass of equal thickness, laminated together with a 0.030" thick plastic interlayer and complying with requirements indicated below:
1. Glass Characteristics: Float glass, complying with requirements for class, tint, grade, and thickness of each pane (ply) indicated on drawings.

E. Mirror Glass: 1/4" thick, Type I, Class 1, Quality q2, conforming to FS DD-G-451, with silvering, copper coating, and protective organic coating complying with FS DD-M-411.

2.05 GLAZING SEALANTS

A. General: Comply with recommendations of sealant and glass manufacturers for selection of glazing sealants which have performance characteristics suitable for applications indicted and conditions at time of installation.

B. Compatibility: Select sealants with proven compatibility with surfaces contacted in the installation and under service conditions indicated, as demonstrated by testing and field experience.

C. Colors: Provide color of exposed sealants indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.

D. Silicone Glazing Sealant: Single components elastomeric silicone sealant complying with FS TT-S-001543, Class A, nonsag; and with ASTM C 920, Type S, Grade NS, Class 25, Use G and, as applicable to use indicated.

2.06 GLAZING GASKETS

A. Lock-Strip Gaskets: Neoprene extrusions of size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C 542, black.

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.

2.07 MISCELLANEOUS GLAZING MATERIALS

A. Compatibility: Provide materials with proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primer, and Sealers: Type recommended by sealant or gaskets manufacturer.

C. Setting Blocks: Neoprene, EPDM or silicone blocks as required or compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.

D. Compressible Filler Rods: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi compression strength for 25% deflection.

PART 3 - EXECUTION

3.01 INSPECTION

A. Require Glazier to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearance, and for effective sealing of joinery. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. 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-GENERAL

A. Comply with combined printed recommendations of glass manufacturers, of sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

B. Glazing channel dimensions as indicated in details are intended to provide or necessary bite on glass, minimum edge and face clearances, and adequate sealant thickness', with reasonable tolerances. Adjust as required by job conditions to time of installation.

C. Protect glass from edge damage during handling and installation; use a rolling block on rotating glass units to prevent damage to glass corners. Do not impact glass units to 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 to 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.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by pro-construction sealants, as determined by pro-construction sealant-substrate testing.

3.04 GLAZING

A. Install setting blocks of proper size in sill rabbit, located one quarter of glass width from each corner, but no closer than 6", unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.

B. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches, 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 with sealant tape use thickness slightly less than final compressed thickness of tape.

C. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.

D. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.

E. Provide compressible filler rods or equivalent back-up materials, 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.

F. Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.

G. Tool exposed surfaces of sealants to provide a substantial "wash" way from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

3.05 PROTECTION AND CLEANING

A. Protect exterior glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contamination substance resolution from construction operations. If, despite such protection, contamination substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.

D. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents and vandalism.

E. Wash glass on both faces not more than four (4) days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Wash glass by method recommended by glass manufacturer.

END OF SECTION 08 80 00

SECTION 09 50 00 – ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.2 SUMMARY

A. Section Includes

1. Acoustical ceiling panels
2. Exposed grid suspension system
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings
4. Perimeter Trim

B. Related Sections

1. Section 09 51 00 - Acoustical Ceilings
2. Section 09 51 13 - Acoustical Fabric-Faced Panel Ceilings
3. Section 09 53 00 - Acoustical Ceiling Suspension Assemblies
4. Section 09 20 00 - Plaster and Gypsum Board
5. Section 01 81 13 - Sustainable Design Requirements
6. Section 01 81 19 - Indoor Air Quality Requirements
7. Section 02 42 00 - Removal and Salvage of Construction Materials
8. Divisions 23 - HVAC Air Distribution
9. Division 26 - Electrical

C. Alternates

1. Prior Approval: Unless otherwise provided for in the Contract documents, proposed product substitutions may be submitted no later than TEN (10) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent upon the Architect's review of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products that have not been approved by Addenda, the specified products shall be provided without additional compensation.
2. Submittals that do not provide adequate data for the product evaluation will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: Single source materials suppliers (if specified in Section 1.5); Underwriters' Laboratories Classified Acoustical performance; Panel design, size, composition, color, and finish; Suspension system component profiles and sizes; Compliance with the referenced standards.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings

6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
7. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
8. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
9. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material-A. Armstrong Fire Guard Products
10. ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
11. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems
12. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
13. ASTM E 1264 Classification for Acoustical Ceiling Products

B. International Building Code

C. ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality

D. NFPA 70 National Electrical Code

E. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures

F. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components

G. International Code Council-Evaluation Services Report - Seismic Engineer Report

1. ESR 1308 - Armstrong Suspension Systems

H. International Association of Plumbing and Mechanical Officials - Seismic Engineer Report

1. 0244 - Armstrong Single Span Suspension System

I. California Department of Public Health CDPH/EHLB Emission Standard Method Version 1.1 2010

J. LEED - Leadership in Energy and Environmental Design is a set of rating systems for the design, construction, operation, and maintenance of green buildings

K. International Well Building Standard

L. Mindful Materials

M. Living Building Challenge

N. U.S. Department of Agriculture BioPreferred program (USDA BioPreffered).

1.4 SYSTEM DESCRIPTION

A. Continuous/Wall-to-Wall

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

B. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.

C. Shop Drawings: Layout and details of acoustical ceilings show locations of items that are to be coordinated with or supported by the ceilings.

D. Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

1. If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.6 SUSTAINABLE MATERIALS

A. Transparency: Manufacturers will be given preference when they provide documentation to support sustainable requirements for the following: Material ingredient transparency, Removal of Red List Ingredients per LBCV3, Life Cycle impact information, Low-Emitting Materials, and Clean Air performance.

1. Health Product Declaration. The end use product has a published, complete Health Product Declaration with disclosure at a minimum of 1000ppm of known hazards in compliance with the Health Product Declaration Open Standard.
2. Declare Label. The end use product has a published Declare label by the International Living Future Institute with disclosure of 100 ppm with a designation of Red List Free or Compliant (less than 1% proprietary ingredients).
3. Low Emitting products with VOC emissions data. Preference will also be given to manufacturers that can provide emissions data showing their products meet CDHP Standard Method v1.1 (Section 01350).
4. Life cycle analysis. Products that have communicated lifecycle data through Environmental Product Declarations (EPDs) will be preferred.
5. End of Life Programs/Recycling: Where applicable, manufacturers that provide the option for recycling of their products into new products at end-of-life through take-back programs will be preferred.
6. Products meeting LEED V4 requirements including:
    a. Storage & Collection of Recyclables
    b. Construction and Demolition Waste Management Planning
    c. Building Life-Cycle Impact Reduction
    d. Building Product Disclosure and Optimization Environmental Product Declarations
    e. Building Product Disclosure and Optimization Sourcing of Raw Materials
    f. Building Product Disclosure and Optimization Material Ingredients
    g. Construction and Demolition Waste Management

1.7 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

1. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
2. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 Classification.
3. Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory

B. Acoustical Panels: As with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection engineer, NFPA 13, or their local codes for guidance where automatic fire detection and suppression systems are present.

C. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.9 PROJECT CONDITIONS

A. Space Enclosure:

1. Standard Ceilings: Do not install interior ceilings until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are continuously maintained at values near those intended for final occupancy. Building areas to receive ceilings shall be free of construction dust and debris.
2. HumiGuard Plus Ceilings: Building areas to receive ceilings shall be free of construction dust and debris. Products with HumiGuard Plus performance and hot dipped galvanized steel, aluminum or stainless steel suspension systems can be installed up to 120°F (49°C) and in spaces before the building is enclosed, where HVAC systems are cycled or not operating. Cannot be used in exterior applications where standing water is present or where moisture will come in direct contact with the ceiling.
3. HumiGuard Max Ceilings: Building areas to receive ceilings shall be free of construction dust and debris. Ceilings with HumiGuard Max performance can be installed in conditions up to 120°F (49°C) and maximum humidity exposure including outdoor applications, and other standing water applications, so long as they are installed with either SS Prelude Plus, AL Prelude Plus, or Prelude Plus Fire Guard XL suspension systems. Products with Humiguard Max performance can be installed in exterior applications, where standing water is present, or where moisture will come in direct contact with the ceiling. Only Ceramaguard with AL Prelude Plus suspension system can be installed over swimming pools.

1.11 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:

1. Acoustical Panels: Sagging and warping
2. Grid System: Rusting and manufacturer's defects

B. Warranty Period:

1. Acoustical panels: Ten (10) years from date of substantial completion
2. Suspension: Ten (10) years from date of substantial completion
3. Ceiling System: Thirty (30) years from date of substantial completion

C. 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 the requirements of the Contract Documents.

1.12 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.
2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Ceiling Panels:

1. Armstrong World Industries, Inc.

B. Suspension Systems:

1. Armstrong World Industries, Inc.

C. Perimeter Systems

1. Armstrong World Industries, Inc.

2.2 ACOUSTICAL CEILING UNITS

A. Acoustical Panels Type AP

1. Surface Texture: Medium
2. Composition: Mineral Fiber
3. Color: White
4. Size: 24 in x 24 in
5. Edge Profile: Angled Tegular 15/16 in for interface with PRELUDE XL 15/16" Exposed Tee grid.
6. Noise Reduction Coefficient(NRC): ASTM C 423; Classified with UL label on product carton 0.70
7. Ceiling Attenuation Class (CAC) : ASTM C 1414; Classified with UL label on product carton 40
8. Sabin:N/A
9. Articulation Class (AC):
10. Flame Spread: ASTM E 1264; Class A (UL)
11. Light Reflectance (LR) White Panel: ASTM E 1477; 0.82
12. Dimensional Stability: HumiGuard Plus
13. Recycle Content: Post-Consumer - 1% Pre-Consumer - 55%
14. Acceptable Product: FINE FISSURED, 1717 as manufactured by Armstrong World Industries

2.3 METAL SUSPENSION SYSTEMS

A. Components:

1. Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
   a. Structural Classification: ASTM C 635 Intermediate Duty duty
   b. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
   c. Sustainability: Environmetal Product Declaration (EPD), Health Product Declaration (HPD)
   d. Acceptable Product: PRELUDE XL 15/16" Exposed Tee as manufactured by Armstrong World Industries

B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations. (Exception: HumiGuard Max Ceilings)

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 INSTALLATION

A. Follow manufacturer installation instructions.

B. Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.

C. Suspend main beam from overhead construction with hanger wires spaced 4-0 on center along the length of the main runner. Install hanger wires plumb and straight.

D. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

E. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

F. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.4 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any ceiling products that cannot be successfully cleaned and or repaired. Replace with attic stock or new product to eliminate evidence of damage.

END OF SECTION 09 50 00

SECTION 09 91 00 – PAINTING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The extent of painting work is shown on drawings and schedules, and as herein specified.

B. The work includes painting and finishing of interior and exterior exposed items and surfaces throughout project, except as otherwise indicated.
   1. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.

C. The work includes field painting of exposed bare and covered pipes and ducts (including color coding), and of hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under mechanical and electrical work, except as otherwise indicated.

D. “Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime intermediate or finish coats.

E. Paint exposed surfaces whether or not colors are designated in "schedules", except where natural finish of material is specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint same as adjacent similar materials or areas. If color or finish is not designated, Architect will select these from standard colors available for materials systems specified.

F. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer finishing is specified for such items as (but not limited to) metal toilet enclosures, refinished partition systems, acoustic materials, architectural woodwork and casework, finished mechanical and electrical equipment including light fixtures, switchgear and distribution cabinets, elevator entrance frames, doors and equipment.

G. Concealed Surfaces: Unless otherwise indicated, such as back priming of all exterior wood trim, painting is not required on surfaces such as walls or ceiling in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.

H. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting, unless otherwise indicated.

I. Operating Parts and Labels: Moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting, unless otherwise indicated. Do not paint over any code-required labels, such as Underwriters Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature panels.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.

B. Samples: Submit samples for Architect's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.
   1. On 12"x 12" hardboard, provide two samples of each color and material, with texture to simulate actual conditions. Resubmit samples as requested by Architect until acceptable sheen, color, and texture is achieved.

1.03 DELIVERY AND STORAGE

Deliver materials to job site in original, new, and unopened packages and containers bearing manufacturer’s name and label and following information.

A. Name or title of material. Fed. Spec. number if application instructions. Color name and number.

1.04 JOB CONDITIONS

A. Apply water-based paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 degrees F (10 degrees C.) And 90 Degrees F (32 degrees C.) Unless otherwise permitted by paint manufacturer's printed instructions.

B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F (7 degrees C.) And 95 degrees F (35 degrees C.), unless otherwise permitted by paint manufacturer's printed instruction.

DO NOT APPLY PAINT in snow, rain, fog, or mist; or when relative humidity exceeds 85% or damp or wet surfaces: Unless otherwise permitted by paint manufacturer's printed instructions. Painting may be continued during inclement weather if areas and surfaces to be painted are closed and heated within temperature limits specified by paint manufacturer during application and drying periods.

C. Paint Coordination: Provide finish coats which are compatible with prime paints used. Review other sections of these specification in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information on characteristics of finish materials proposed for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify Architect in writing of any anticipated problems using specified coating systems with substrates primed by others.

PART 2 - PRODUCTS

2.01 MATERIAL QUALITY

A. Provide best quality grade of various types of coating as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.
1. Proprietary names used to designate colors or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers.
2. Federal Specifications establish minimum acceptable quality for paint materials. Provide written certification from paint manufacturer that materials provided meet or exceed these minimums.
3. Manufacturer's products which comply with coating qualitative requirements of applicable Federal Specifications, yet differ in quantitative requirements, may be considered for use when acceptable to Architect. Furnish material data and manufacturer's certificate of performance to Architect for any proposed substitutions.

B. Provide undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer and use only within recommended limits.

C. Pint Coordination: Provide finish coats which are compatible with prime

D. A "Schedule of Paint Systems" is at the end of this section.

PART 3 - EXECUTION

3.01 INSPECTION: Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Applicator's acceptance of surfaces and conditions within any particular area. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

3.02 SURFACE PREPARATION

A. General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as

herein specified for each particular substrate condition. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary for complete painting of painting of each space or area, reinstall removed items. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and process will not fall onto wet, newly painted surfaces.

B. Cementitious Materials: Prepare Cementitious surfaces of concrete, concrete block, cement plaster and cement-asbestos board to be painted by removing efflorescence, chalk, dust, dirt, grease, oils and by roughening as required to remove glaze. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

Clean concrete floor surfaces scheduled to be painted with commercial solution of muriatic acid, or another etching cleaner. Flush floor with clean water to neutralize acid and allow drying before painting.

C. Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of while shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.
1. Prime, stain or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces-undersides, and backsides of such wood, including cabinets, counters, cases, paneling.
2. When transparent finish is required, use spar varnish for back-priming.
3. Back-prime paneling on interior partitions only where masonry plaster, or other wet wall construction occurs on backside.
4. Seal tops, bottoms, and cut-outs of un-primed wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.

D. Galvanized Surfaces: Clean free of oil and surface contamination with non-petroleum-based solvent.

3.03 MATERIALS PREPARATION

A. Mix and prepare painting materials in accordance with manufacturer's directions.
1. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.
2. Stir materials before application to produce a mixture of uniform density and stir as required during application. Do not stir surface film into material. Remove film, if necessary, strain material before using.

3.04 APPLICATION

A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.
3. Paint interior surfaces of ducts, where visible through registers or grilles, with flat, non-specular black paint.
4. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.
5. Finish exterior doors on tops, bottoms, and side edges same as exterior faces, unless otherwise indicated.
6. Sand lightly between each succeeding enamel or varnish coat.
7. Omit first coat (primer) on metal surfaces which have been shop-primed, and touch-up painted, unless otherwise indicated.

B. Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pre-treated, or otherwise prepared

for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. Allow sufficient time between successive coatings to permit proper drying. Do not re-coat until paint has dried to where it feels firm, does not deform, or feel sticky under moderate thumb pressure and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.

D. Prime Coats: Apply prime coat of material, which is required to be painted or finished, and which has not been prime coated by others.

1. Re-coat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat to assure a finish coat with no burn-through or other defects due to insufficient sealing.

E. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage. Cloudiness, color spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

F. Transparent (Clear) Finishes: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity; runs brush marks, orange peel, nail holes, or other surface imperfections.

G. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not in compliance with specified requirements.

3.05 FIELD QUALITY CONTROL

The right is reserved by Owner to invoke material testing procedure at any time, and any number of times during period of field painting.

3.06 CLEAN-UP AND PROTECTION

A. Clean-Up: During progress of work remove from site discarded paint materials, rubbish, cans and rags at end of each workday.

1. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping using care not to scratch or otherwise damage finished surfaces.

B. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing or work. Correct any damage by cleaning, repairing, or replacing, and repainting, as acceptable to Architect.

1. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
2. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

3.07 EXTERIOR PAINT SCHEDULE

A. General: Provide the following paint systems for the various substrates, as indicated. Concrete Masonry Units

B. Lusterless (Flat) Acrylic Finish: 2 coats over filler coat with total dry film thickness not less than 2.5 mils, excluding filler coat.

1. Filler Coat: 100% Acrylic Block Filler (Volume Solids Minimum 53%) (Required if new or porous existing block)
   PPG Paints: Speedhide Masonry Block Filler, 6-15XI
   Sherwin Williams: Heavy Duty Block Filler, B42W00046.
2. First and Second Finish Coats: Acrylic Elastomeric.
   PPG Paints: Perma-Crete Pitt-Flex Elastomeric Coating 4-110 XI @ 5.4 – 7.2 mils D.F.T.
   Sherwin Williams: A05W00151 Sherlastic® Elastomeric Coating @ 8.0 – 12.0 mils D.F.T.

C. Ferrous Metal (Miscellaneous Metal):

1. Full Gloss Acrylic Enamel: 2 Finish coats over primer.
2. Prime Coat:
3. PPG Paints: Pitt-Tech Plus 4020 Primer/Finish 4020-0100
4. Sherwin Williams: B66W00310 Pro-Cryl® Universal Primer.
5. First and Second Finish Coats: Semi-Gloss High Performance Acrylic Finish.
6. PPG Paints: Pitt-Tech Plus 4216 HP 4216-0100
7. Sherwin Williams: B66W00351 SherCryl® HPA Acrylic Semi-Gloss Finish.

D. Ferrous Metal (Handrails):
1. Full Gloss Alkyd Enamel: 2 Finish coats over primer.
2. Prime Coat:
3. PPG Paints: Multi-Prime 4160 Rust Inhibitive Fast Drying Primer 4160-6120
4. Sherwin Williams: B66W00310 Pro-Cryl® Universal Primer.
5. First and Second Finish Coats: Semi-Gloss High Performance Urethane Modified Finish.
6. PPG Paints: HPC Industrial Alkyd Urethane Enamel 4308-0100
7. Sherwin Williams: B54W00151 Industrial Urethane Alkyd Enamel.

E. General Painted Wood:
1. Prime Coat: Exterior Primer Coating (Back prime all wood).
PPG Paints: Seal Grip Exterior Acrylic Universal Primer Sealer 17-921XI
Sherwin Williams: B42W00041 Exterior Latex Wood Primer.
2. First and Second Finish Coat: Exterior Latex Satin.
PPG Paints: Sun Proof 100% Acrylic Satin 76-45XI
Sherwin Williams: A82W00151-A-100® Exterior Latex Satin.

F. Zinc-Coated Metal: Water based Rust Inhibitive Primer.
1. Prime Coat:
PPG Paints: Pitt-Tech Plus 4020 Primer/Finish 4020-0100
Sherwin Williams: B66W00310 Pro-Cryl® Universal Primer.
2. First and Second Finish Coats: High Performance Acrylic Finish.
PPG Paints: Pitt-Tech Plus 4216 HP 4216-0100
Sherwin Williams: B66W00351 SherCryl® HPA Acrylic Semi-Gloss Finish.

3.08 INTERIOR PAINT SCHEDULE

A. General: Provide the following paint systems for the various substrates, as indicated.

B. Concrete Masonry Units & Gypsum Board: (omit filler coat on gypsum board)

C. Interior Water Based Precatalyzed Epoxy in Egg-Shell Finish: Coats with total dry film thickness not less than 3.0 mils.

D. Lusterless (Flat) Emulsion Finish: 2 Finish coats over filled surface.
1. Filler Coat: Acrylic Block Filler. Apply filler coat at a rate to ensure complete coverage with pores filled.
PPG Paints: Speedhide Masonry Block Filler, 6-15XI
Sherwin Williams: B25W00025 PrepRite® Block Filler.
2. Prime Coat: Interior Latex Emulsion.
PPG Paints: Speedhide Interior Zero VOC Latex Primer/Sealer 6-4900XI
Sherwin Williams: B28W08200 ProMar® 200 Interior Latex Primer.
3. Second and Third Coats: Water Based Precatalyzed Epoxy.
PPG Paints: Pitt Glaze WB1 Pre-Catalyzed Water Borne Eggshell Epoxy 16-310
Sherwin Williams: K45W00151 Pro Industrial Pre-Catalyzed Water Based Eggshell Epoxy.

E. Lusterless (Flat) Emulsion Finish: 2 Finish coats over filled surface.
1. Filler Coat: Acrylic Block Filler. Apply filler coat at a rate to ensure complete coverage with pores filled.
PPG Paints: Speedhide Masonry Block Filler, 6-15XI
Sherwin Williams: B25W00025 PrepRite® Block Filler.

2. First and Second Finish Coats: Interior Latex Emulsion.

PPG Paints: Speedhide Zero VOC Interior Latex Flat 6-4110XI
Sherwin Williams: B28W08200 ProMar® 200 Interior Latex Primer.

F. Semi-Gloss Latex Enamel Finish: 2 Coats over filled surface with total dry film thickness not less than 3.0 mils. excluding filler coat.
1. Filler Coat: Acrylic Block Filler. Apply filler coat at a rate to ensure complete coverage with pores filled.
PPG Paints: Speedhide Masonry Block Filler, 6-15XI
Sherwin Williams: B25W00025 PrepRite® Block Filler.
2. First Coat: Latex Enamel.
PPG Paints: Speedhide Zero VOC Interior Latex Semi-Gloss 6-4510XI
Sherwin Williams: B28W08200 Pro-Mar 200 Latex Semi-Gloss.
3. Second Coat:
PPG Paints: Speedhide Zero VOC Interior Latex Semi-Gloss 6-4510XI
Sherwin Williams: B28W08200 Pro-Mar 200 Latex Semi-Gloss.

G. Zinc-Coated Metal & Primed Ferrous Metal: Semi-Gloss Pre-Catalyzed Epoxy 2 Finish coats over primer.
1. Prime Coat: Omit prime coat on primed ferrous metal.
PPG Paints: Pitt-Tech Plus 4020 Primer/Finish 4020-0100
Sherwin Williams: B66W00310 Pro-Cryl® Universal Primer.
2. First and Second Finish Coats: Semi-Gloss Pre-Catalyzed Epoxy.
PPG Paints: Pitt Glaze WB1 Pre-Catalyzed Water Borne Semi-Gloss Epoxy 16-510
Sherwin Williams: K46W00151 Pro Industrial Pre-Catalyzed Epoxy, Semi-Gloss.

H. Painted Woodwork and Hardboard: Semi-Gloss Enamel Finish: 3 Coats.
1. First Coat: Interior Enamel Undercoat.
PPG Paints: Seal Grip Primeline Fast Dry Wood Undercoat 17-9517
Sherwin Williams: B28W08111 Premium Interior Wall & Wood Primer.
2. Second and Third Coats: Interior Semi-Gloss Enamel.
PPG Paints: Advantage 900 Interior/Exterior Waterborne Acrylic Enamel Semi-Gloss 919-10
Sherwin Williams: K46W00151 Pro-Classic Waterborne Semi-Gloss.

I. Stained Woodwork: Stained-Varnish Rubbed Finish: 3 Finish Coats over stain plus filler on open grain wood.
1. Stain Coat: Interior Oil Stain.
PPG Paints: Deft Interior Oil Stain DFT-400
Sherwin Williams: A49V00200 Wood Classics® Interior Oil Stain.
2. First Coat: Bleached Shellac.
PPG Paints: Deft Interior Oil Based Polyurethane DFT226
Sherwin Williams: A66F00390 Wood Classics® FastDry Varnish Hand Rubbed Satin Clear.
3. Filler Coat on Open Wood: Paste Wood Filler. Wipe before first varnish coat.
PPG Paints: DAP Plastic All Purpose Wood Filler
Sherwin Williams: Sherwood Filler.
4. Second and Third Coats: Oil Rubbing Varnish.
PPG Paints: Deft Interior Oil Based Polyurethane DFT 224
Sherwin Williams: Wood Classic Varnish.

3.09 EXTERIOR WATER PROOFING SYSTEM

A. Features: Apply directly to fresh concrete (less than 28 days old), Can be applied over high pH (up to 13) substrates, No Primer required.

B. General Characteristics: Perma-Crete PITT-FLEX Elastomeric Coating 4-110XI is specifically designed for interior and exterior, above ground, masonry substrates that require the ultimate match of flexibility and durability. The new and improved formula offers exceptional dirt resistance, alkali resistance and allows for application to concrete at 7 days old and a pH of less than 13 as well as application down to 35 degrees F. The 100% Acrylic formula bridges cracks and masks surface imperfections as well as protecting against wind driven rain.

General Characteristics: Loxon XP is a high build coating that provides excellent flexibility, durability and weather

resistance. This product will protect against wind-driven rain when used on tilt-up, precast, or poured-in-place concrete, CMU, and stucco. It is highly alkali and efflorescence resistant. This may be applied to a surface with a pH of 6 to 13.

C. Physical Properties: Perma-Crete PITT-FLEX Elastomeric Coating 4-110XI

1. Wind-Driven Rain Test……Passes
   ASTM D6904-3
   Two coats Perma-Crete Topcoat @ 14-16 mils WFT per coat

2. Elongation…… 340%
   ASTM D2370

3. Tensile Strength……...300 psi
   ASTM D2370

4. Flexibility…….. Passes
   ASTM D522 Method B

5. Mildew Resistance…….. No Growth
   ASTM D5590

6. Water Vapor Permeance……21 perms @ 12 mils DFT – 2 coats
   ASTM D1653

1. Wind-Driven Rain Test……Passes
   ASTM D6904-03
   2 cts Loxon XP at 6.4 – 8.3 mils dft/ct
7. Water Vapor Permeance……13.4 perms
   Based on ASTM D1653
   1 ct Loxon XP at 9.4 mils dft,
   14-day cure @ 77°F & 50% RH
8. Elongation……..350%
   ASTM D2370
   1 ct Loxon XP at 9.4 mils dft,
   14-day cure @ 77°F & 50% RH
9. Tensile Strength…….350 psi
   ASTM D2370
   1 ct Loxon XP at 9.4 mils dft,
   14-day cure @ 77°F & 50% RH
10. Flexibility……Passes
    ASTM D522
11. Alkali Resistance……..Passes
    Based on DSTM D1308
12. Mildew Resistance……..Passes
    ASTM D3273/D3274

D. Product Specifications:
   Perma-Crete PITT-FLEX Elastomeric Coating 4-110XI
   1. Colors-Most Colors

2. Coverage: 137-183 square ft per gallon at 12-16 mils Wet. Coverage will vary with substrate.
3. For proper Wind Driven Rain/Water Resistance: 2 coats pinhole free at 5.4-7.2 mils DFT per coat.
4. Drying time @ 77 degrees F and 50% RH:
    a. Touch 1 hour
    b. Recoat 24 hours

1. Colors – Most colors
2. 1 coat system, brush, roller, or spray applied, coverage per coat> 14-18 mils wet, 6.4 – 8.3 mils dry, 90 – 115 sq ft/gal
3. Can be applied up to 40 mils wet.
4. Coverage will vary with the substrate and the texture.
5. Coverage on porous and rough stucco 80 square feet per gallon.
6. Drying time @ 77°, 50% RH:
    a. Touch: 4 hours
    b. Recoat: 24 hours
7. For proper waterproofing performance and to resist alkalis, 2 coats of the coating MUST be applied between 14.0 – 18.0 mils wet per coat.
8. A total dry film thickness of 12 – 16 mils of topcoat and a surface with 10 or less pinholes per square foot is required for a waterproofing system.

3.10 SURFACE PREPARATION

A. Surface must be clean and sound, free of chalk, peeling paint, form oils, efflorescence, and mildew. Remove chalk, surface deposits, and loose or scaling paint by scraping, sanding, and preferably power washing. Repair all cracks and structural defects which could allow the intrusion of moisture. If mildew is evident, remove all traces by application of a commercial mildew wash following manufacturer's directions. CAUTION: Use rubber gloves, work goggles and protective clothing when applying mildew wash.
    1. Loose, sandy masonry should be hosed down thoroughly to remove surface particles, allowed to dry.
    2. A common exterior paint failure on masonry construction is peeling and scaling, often caused by painting over heavy chalk deposits. The most practical and efficient way to remove this substance is with high pressure spray equipment. Multiple coats of paint that are in advanced state of deterioration or prior applications of cement-based coatings must be removed to a sound substrate. Sand blasting or using a mechanical grinder are effective means of preparation.

3.11 PRIMER/FINISH SYSTEMS

A. Masonry, New and Unpainted (Including Unglazed Brick): Poured and precast concrete must be allowed to cure for 7 days; block construction should be allowed to cure for 7 days. All surfaces must be thoroughly brushed with stiff fiber bristles to remove loose particles.

B. Rough or Pitted Masonry: 2 Coats of Perma-Crete PITT-FLEX Elastomeric Coating 4-110XI
One or two coats of Sherwin Williams Loxon XP.

C. Smooth Poured or Precast Concrete: 2 Coats of Perma-Crete PITT-FLEX Elastomeric Coating 4-110XI
One or two coats of Sherwin Williams Loxon XP.

D. Masonry, Weathered and Unpainted (Including Unglazed Brick):
    1. Primer: Perma-Crete Interior/Exterior Alkali Resistant Primer 4-603XI
    Sherwin Williams Loxon Conditioner.
    2. Finish: Sun Proof 100% Acrylic Satin 76-45XI or Perma-Crete PITT-FLEX Elastomeric Coating 4-110XI
    Sherwin Williams A-100 House Paint, or use Sherwin Williams Loxon XP, A24W451.

E. Masonry Repaint (Including Unglazed Brick):
    1. Primer: Perma-Crete Interior/Exterior Acrylic Masonry Surface Sealer
    Sherwin Williams Loxon Conditioner.
    2. Finish: Sun Proof 100% Acrylic Satin 76-45XI or Perma-Crete PITT-FLEX Elastomeric Coating 4-110XI
    Sherwin Williams A-100 House Paint, or use Sherwin Williams Loxon XP, A24W451.

3.12 APPLICATION

A. Mixing of Paint: Stir thoroughly prior to use.

B. Do not apply when air and surface temperatures are below 50 degrees F (10 degrees C).

C. Work well into crevices and holes to ensure adequate penetration and sealing.

D. Brush: Stir thoroughly and apply as received in the container with a nylon/polyester brush.

E. Roller: Stir thoroughly and apply as received in the container with a ½"to 1 ½" nap synthetic roller cover.

F. Spray, Airless: Pressure, minimum 2,300 PSI;
Tip, minimum .012"

G. Thinning/Cleanup: Do not reduce. Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spay equipment with mineral spirits to prevent rusting of the equipment.

3.13 USE COMPLETELY OR DISPOSE OF PROPERLY. This product contains organic solvents which may cause adverse effects to the environment if handled improperly. Disposal of wastes containing either organic solvents or free liquids in landfills is prohibited. Dry, empty containers may be recycled in a can recycling program. Local disposal requirements vary; consult your sanitation department or state-designated environmental agency for more information on disposal options.

3.14 ENVIRONMENTAL AND SAFETY INFORMATION

A. Warning! Harmful if inhaled

B. Contains glycol ether and crystalline silica.

C. May affect the brain or nervous system causing dizziness, headache, or nausea. Causes eye, skin, nose, and throat irritation.

3.15 IMPORTANT: Designed to be mixed with other components. Mixture will have hazards of both components. Before opening packages, read all warning labels.

3.16 NOTICE: Repeated and prolonged exposure to solvents may lead to permanent brain and nervous system damage. Eye watering, headaches, nausea, dizziness, and loss of coordination are signs that solvent levels are too high. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal. To avoid breathing vapors or spray mist, open window and doors or use other means to ensure fresh air entry during application and drying. Cancer Hazard: Contains crystalline silica which can cause cancer when in respirable form (spray mist or sanding dust).

A. Keep away from heat and flame. Use only with adequate ventilation. Do not breathe vapors or spray mist. Do not get in eyes or on skin.

B. Wear a properly fitted vapor/particulate respirator approved by NIOSH/MSHA for use with paints, eye protection, gloves, and protective clothing during application and until all vapors and spray mist are exhausted. In confined places or where continuous spray operations are typical, or if proper respirator approved by NIOSH/MSHA. In all cases follow respirator manufacturer's directions. Do not permit anyone without protection in the painting area. Close container after each use.

3.17 FIRST AID: If affected by inhalation of vapors or spray mist, remove to fresh air. In case of eye contact, flush immediately with plenty of water for at least 15 minutes and call a physician; for skin, wash thoroughly with soap and water. In case of ingestion, DO NOT INDUCE VOMITING. Get medical help immediately.

3.18 IN CASE OF: FIRE - Use foam, CO2, dry chemical, or water fog.
SPILL - Absorb with inert material and dispose of in accordance with applicable regulations.

END OF SECTION 09 91 00

SECTION 10 14 16 – PLAQUE

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish and install building plaque.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with *Section 01 33 23.* Indicate materials, thickness, overall dimensions, fasteners, and installation method.

B. Furnish full-size layout of plaque.

C. Contractor shall not proceed with fabrication of any signage without Architect's written approval of layouts.

PART 2 - PRODUCTS

2.01 PLAQUE

A. Material: Bronze.

B. Plaque shall be cast from virgin ingots *(85-5-5-5 standard U.S. Bronze alloy).* Casting shall be free of pits and gas holes.
1. All letters and symbols shall be sharp and hand tooled.
2. Border and faces of raised letters are to be satin finish.

C. Background: Stipple finish.

D. Finish:
1. Background shall be oxidized.
2. Plaque shall be chemically cleaned and sprayed with two coats of clear acrylic lacquer.

E. Layout: Size and layout per sketch at end of this Section.
1. Plaque thickness: *1/2".*
2. Letters and Symbols: *Raised.*
3. Plaque size: *18"x30".*

F. Manufacturers/Products:
1. *A.R.K. Ramos, Oklahoma City, OK., "Bronze Plaque".*
2. *Southwell, San Antonio, TX., "Bronze Plaque".*

PART 3 - EXECUTION

3.01 PLAQUE MOUNTING

A. Location: Verify location with Architect prior to mounting.

B. Anchor plaque using flat-head fasteners, countersunk, with rosette trim.

C. Mount plaque plumb and level. Anchor securely to partition per manufacturer's recommendations.

3.02 PROTECTION

A. Do not install signage until all painting work in the immediate area has been completed. Do not install signage over painted surface which has not adequately dried.

B. Protect signage from damage by other trades.

END OF SECTION 10 14 16

SECTION 10 14 23 – PANEL SIGNAGE

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Forms of specialty signs required include the following:

1. Panel Signs.

1.02 QUALITY ASSURANCE

A. Uniformity of Manufacturer: For each sign form and graphic image process indicated furnish products of a single manufacturer.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required.

B. Samples: Submit samples of each sign form and material showing finishes, colors, surface textures and qualities of manufacturer and design of each sign component including graphics.

PART 2 - PRODUCTS:

2.01 ACCEPTABLE MANUFACTURERS

A. Available manufacturers: Subject to compliance with requirements manufacturer offering products which may be incorporated in the work includes, but are not limited to, the following:

1. Architectural Graphics Inc.
2. Best Manufacturing Co.
3. A. C. Davenport & Son Co.

2.02 MATERIALS, GENERAL

A. Plastic Laminate: High pressure plastic laminate engraving stock with face and core plies in contrasting color, in finish and color combinations indicated or, if not indicated as selected from manufacturer's standard.

B. Fasteners: Use concealed fasteners, unless otherwise indicated which are fabricated from metals which are non-corrosive to either sign materials or mounting surface.

C. Anchors and Inserts: Use non-ferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.03 FABRICATION OF PANEL SIGNS

A. Fabricate panel signs to comply with requirements indicated for materials, thickness', finishes, colors, design, shapes, sizes and details of construction.

B. Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16" measured diagonally form corner to corner.

C. Unframed Panel Signs: Fabricated unframed panel signs with edges mechanically and smoothly finished to conform with following requirements:

1. Edge Condition: Beveled.

2. Edge Color for Plastic Laminate: Same as copy.

2.04 GRAPHIC IMAGE PROCESS

A. Graphic Content and Style: Provide sign copy to comply with requirements indicated for sizes, styles, spacings, content, position, materials, finishes and colors of letter, numbers, symbols, and other devices.

B. Engraved Copy: Machine engrave letters, numbers, symbols, and other graphic devices into sign panel on face indicated to produce precisely formed copy, incised to a uniform depth. Use high speed cutters mechanically linked to master templates in a pantographic system or equivalent process capable of producing characters of style indicated with sharply formed edges.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Located Sign Units and accessories where shown or scheduled using mounting methods of type described and in compliance with manufacturer's instruction, unless otherwise indicated.

B. Install sign units level, plumb and at height indicated, with sign surfaces free from distortion of other defects of appearance.

3.02 PANEL SIGNS

A. Wall Mounted Units: Attach panel signs to wall surfaces using methods indicated below:

1. Vinyl-Tape Mounting (VTM): Use double sided foam tape, of thickness indicated to mount signs to smooth non-porous surfaces.

3.03 CLEANING AND PROTECTION

A. At completion of installation, clean soiled sign surfaces in accordance with manufacturer's instructions. Protect units from damage until acceptance by owner.

3.04 GENERAL

A. One (1) inch high letter on Two (2) inch high plastic, length to average 12".

B. Provide signage quantity based on total number of rooms shown on Finish Schedule.

C. All signage to comply with ADAAG. With Braille etc.

D. Provide universal symbol signage at all restroom locations. ADA Comply.

E. Provide low level exit signage that meets a previous criteria. Exit signage to be provided at all exit egress locations.

END OF SECTION 10 14 23

SECTION 10 21 13.19 – SOLID PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Solid plastic toilet compartments including the following: (Hiny Hiders)
   1. Floor mounted overhead-braced toilet compartments.
   2. Floor-to-ceiling toilet compartments.
   3. Ceiling hung toilet compartments.
   4. Privacy screens.
   5. Shower and dressing compartments.
   6. Vanities.

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications.

B. Section 06 10 00 - Rough Carpentry.

1.3 REFERENCES

A. ASTM A 666 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

B. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

C. National Fire Protection Association (NFPA) 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

E. United States EPA (Environmental Protection Agency) Registration - Bactericidal Surfaces Registered with the U.S. EPA to Legally Make Claims that these Materials Kill Infectious Bacteria.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00 – Submittal Procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Provide layout drawings and installation details with location and type of hardware required.

D. Verification Samples: For each finish product specified, two samples representing actual product, color, and patterns.

E. Sustainable Design Submittals:
   1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
   2. Regional Materials: Certify distance between manufacturer and Project.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.

B. Installer Qualifications: A company regularly engaged in installation of products specified in this Section, with a minimum of 5 years experience.

C. Materials: Doors, panels and pilasters, constructed from high density polyethylene (HDPE) resins. Partitions to be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof,

nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. Cover all plastic components with a protective plastic masking.

D. Performance Requirements:
1. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with ASTM E 84:
a. Class A flame spread/smoke developed rating.
b. Class B flame spread/smoke developed rating.
2. Material Fire Ratings:
a. National Fire Protection Association (NFPA) 286: Pass.
b. International Code Council (ICC): Class B.
3. Antimicrobial Touch Surfaces: Hardware touch surfaces shall be manufactured from substrates that are registered with the U.S. EPA to kill specific bacteria tested according to U.S. EPA protocols.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Manufacturer guarantees its plastic against breakage, corrosion, and delamination under normal conditions for 25 years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge. Labor not included in warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Scranton Products, which is located at: 801 E. Corey St.; Scranton, PA 18505; ASD Toll Free Tel: 800-445-5148; Fax: 855-376-6161; Email:request info (info@scrantonproducts.com); Web:https://www.scrantonproducts.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 25 00 – Substitution Procedures.

2.2 MATERIAL

A. Plastic Panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent, and graffiti-resistant textured surface.

B. Zinc Aluminum Magnesium and Copper Alloy (Zamac): ASTM B 86.

C. Stainless Steel Castings: ASTM A167, Type 304.

D. Aluminum: ASTM 6463-T5 alloy.

2.3 SOLID PLASTIC TOILET COMPARTMENTS

A. Basis of Design: Hiny Hiders Toilet Partitions as manufactured by and supplied by Scranton Products.
1. Style: Floor mounted overhead-braced toilet compartments.

B. Doors, Panels, and Pilasters: 1 inch (25 mm) thick with all edges rounded to a radius. Mount doors and dividing panels based on height of specified system.
1. Door and Panel Height: 55 inches (1397 mm).
2. Aluminum heat sink fastened to bottom edges.
3. Panel Edge: Standard.
4. Pilasters: 82 inches (2083 mm) high and fastened to floor.

C. Panel Color: To be selected by Architect from manufacturer's full line of colors.

D. Pilaster Shoes: 3 inches (76 mm) high one-piece molded HDPE. Secured to pilasters with a stainless steel tamper resistant Torx head sex bolt.
1. Pilaster Plastic Shoe Color: Mocha.
2. Pilaster Plastic Shoe Color: Black.
3. Pilaster Plastic Shoe Color: Grey.
4. Pilaster Plastic Shoe Color: Linen.
5. Pilaster Plastic Shoe Color: Beige.
6. Pilaster Plastic Shoe Color: Blueberry.

E. Headrail: Heavy-duty extruded 6463-T5 alloy aluminum with anti-grip design. Finish to be clear anodized. Fastened to headrail brackets with stainless steel tamper resistant Torx head sex bolt, and fastened at the top of the pilaster with stainless steel tamper resistant Torx head screws.
1. Headrail Brackets: 20 gauge stainless steel with satin finish. Secured to the wall with stainless steel tamper resistant Torx head screws.

F. Wall Brackets:
1. Bracket Type: Continuous plastic, full length.

G. Door Hardware:
1. Wrap-Around Hinges: 8 inches (203 mm) and fabricated from heavy-duty extruded aluminum. Hinges are through-bolted to pilasters and doors with stainless steel tamper resistant Torx head sex bolts. Hinges operate with field adjustable nylon cams. Cams can be field set in 30, 60 or 9 degree increments.
2. Door Strike/Keeper: Heavy-duty extruded aluminum 6436-T5 alloy with a bright dip anodized finish. Secured to pilasters with stainless steel tamper resistant Torx head sex bolts. Bumper shall be made of extruded black vinyl.
a. Style: 6 inches (152 mm) aluminum.
3. Latch Mechanism: Healthy Hardware Slide Bolt, Pulls and Coat Hook: Made from U.S. EPA registered materials by manufacturer currently holding U.S. EPA Company Number, U.S. EPA Establishment Number and California Broker's License. Satin finish.
4. Doors supplied with one coat hook/bumper and door pull made of chrome plated Zamak.
5. Equip outswing handicapped doors with second door pull and door stop.

2.4 SOLID PLASTIC PRIVACY SCREENS

A. Provide plastic privacy screens in urinal and entry toilet room applications as indicated or scheduled.

B. Panels, and pilasters, if required, 1 inch (25 mm) thick with edges rounded to a radius. Screens to be mounted at 14 inches (356 mm) above the finished floor. Color as selected by Architect from manufacturer's full line of current colors.
1. Aluminum heat sink fastened to bottom edges.

C. Screen Type: Wall mounted.
1. Urinal Screens: 24 inches (610 mm) wide by 42 inches (1067 mm) high.

D. Wall Brackets: Extruded PVC plastic. Fastened to the panel/pilaster with stainless steel tamper resistant torx head screws and fastened to wall with stainless steel tamper resistant torx head sex bolts.
1. Length of Wall Brackets: 41 inches (1041 mm).

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.

C. Examine areas to receive toilet partitions, screens, and shower compartments for correct height and spacing of anchorage/blocking and plumbing fixtures that affect installation of partitions. Report discrepancies to the architect.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install partitions rigid, straight, plumb, and level manor, with plastic laid out as shown on shop drawings.

C. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/8 inch (9.5 mm).

D. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.

E. Finished surfaces shall be cleaned after installation and be left free of imperfections.

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 10 21 13.19

SECTION 10 44 16.13 – PORTABLE FIRE EXTINGUISHERS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Definition: *"Portable Fire Extinguishers"* include units which can be hand carried as opposed to those which are equipped with wheels or to fixed fire extinguishing systems, unless otherwise indicated.

1.02 QUALITY ASSURANCE

A. Provide portable fire extinguisher and accessories by one manufacturer, unless otherwise acceptable to Architect.
1. Manufacturers offering products to comply with the requirements include the following:

LARSEN'S UL Rated 3-A: 40-B: C 6# ABC Dry Chemical in semi-recessed rolled edge cabinets (mount top of cabinet at 5'-0" A.F.F.)

B. Portable Fire Extinguisher Standard: Provide new portable fire extinguishers which comply with applicable *UL* standard and are labeled by *UL.*

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for all portable fire extinguishers required. For fire extinguisher cabinets include roughing-in dimensions, and details showing mounting methods, relationships to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, style, and materials. Where color selections by Architect are required include color charts showing full range of manufacturer's standard colors and designs available.

PART 2 - PRODUCTS

2.01 FIRE EXTINGUISHERS

A. General: Provide fire extinguisher for each location whether or not indicated as required by the Architect, in colors and finishes selected by Architect from manufacturer's standard which comply with requirements of governing authorities. Provide a minimum of *(1)* one fire extinguisher for each *2,500 sq. ft.* of floor space;
also provide one in each mechanical room and cooking space. Fill and service extinguishers to comply with requirements of governing authorities and manufacturer's requirements.
1. Abbreviations indicated below to identify extinguisher types relate to UL classification and ratings system and not necessarily, to type and amount of extinguishing material contained in extinguisher.

B. Multi-Purpose Dry Chemical Type (4A-60BC-FE): *UL* rated *4-A; 60-BC,10 lb.* nominal capacity, in enameled steel container for *Class A, Class B, and Class C fires.*

2.02 MOUNTING BRACKETS

Provide manufacturer's standard bracket designed to prevent accidental dislodgment of extinguisher, or proper size for type and capacity of extinguisher indicated, in manufacturer's standard plated finish.

PART 3 - EXECUTION

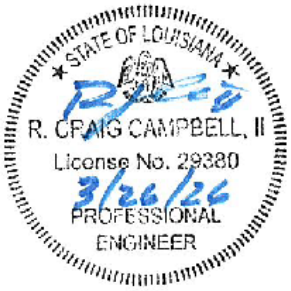
3.01 INSTALLATION

Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.

3.02 IDENTIFICATION

Identify bracket-mounted extinguishers with red letter decals spelling "*FIRE EXTINGUISHER"* applied to wall surface. Letters size, style, and location as selected by Architect.

END OF SECTION 10 44 16.13



SECTION 22 00 00 – PLUMBING GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. Furnish all labor and material necessary to provide and install the complete plumbing portion of this Contract as called for herein and on accompanying drawings. Parts of the plumbing division may be bid separately or in combination, at the Contractor's option; however, it shall be the responsibility of the General Contractor to assure himself that all items covered in the Plumbing Division have been included if he chooses to accept separate bids.

B. It is the intent of this specification that all materials with temperatures below ambient conditions or conveying any fluid/gas at temperatures below 70 deg. F be insulated to completely eliminate the potential for condensation. Unless specified elsewhere in these specifications, for materials that do not require and requiring occasional access, use 2" thick closed cell rubberized insulation with re-sealable fabric joints (hook and loop type).

C. Contractor shall refer to the Architectural and Structural drawings and install equipment, piping, etc. to meet building and space requirements. No equipment shall be bid on or submitted for approval if it will not fit in the space provided.

D. It is the intention of these specifications that all plumbing systems shall be furnished complete with all necessary valves, controls, insulation, piping devices, equipment, etc. necessary to provide a satisfactory installation that is complete and in good working order.

E. Contractor shall visit the site and acquaint himself thoroughly with all existing facilities and conditions which would affect his portion of the work. Failure to do so shall not relieve the Contractor from the responsibility of installing his work to meet the conditions.

F. This Contractor shall protect the entire system and all parts thereof from injury throughout the project and up to acceptance of the work. Failure to do so shall be sufficient cause for the Architect to reject any piece of equipment.

1.3 DEMOLITION

A. The contractor shall visit the site prior to bid to determine the extent of work required to complete the project.

B. Contractor shall coordinate demolition with owner. All equipment shall be salvaged for owner. Locate equipment as directed by owner. All equipment and materials not salvaged by the owner shall be removed from the site and discarded at the contractor’s expense.

C. Contractor shall coordinate all work with general contractor and phase work as required by project.

D. All equipment piping, etc. required to be removed to accommodate the modifications shall be removed.

E. Contractor shall maintain services to existing facilities which shall remain during and after construction is complete.

F. Contractor shall coordinate any shutdown of services with the owner. It is intended that the building will remain occupied during construction. Contractor shall schedule shut down of services with the owner in order to prevent disruption of building occupancy.

G. Contractor shall be responsible for draining down of existing systems to complete demolition. All work shall be scheduled with the owner. Contractor shall also be responsible for refilling system and removing all air in order to return the systems to proper operating conditions.

H. All shutdown of services shall be done at night during a time period approved by owner. The systems shall be required to be back up and running each morning unless otherwise approved by the owner.

1.4 GROUNDS AND CHASES

A. This Contractor shall see that all required chases, grounds, holes and accessories necessary for the installation of his work are properly built in as the work progresses; otherwise, he shall bear the cost of providing them.

1.5 CUTTING AND PATCHING

A. Initial cutting and patching shall be the responsibility of the General Contractor, with the various trades being responsible for laying out and marking any and all holes required for the reception of his work. No structural beams or joists shall be cut or thimbled without first receiving the approval of the Architect. After initial surfacing has been done, any further cutting, patching and painting shall be done at this Contractor's expense.

1.6 FILL AND CHARGES FOR EQUIPMENT

A. Fill and charge with materials or chemicals all those devices or equipment as required to comply with the manufacturer's guarantee or as required for proper operation of the equipment.

1.7 BIDDING REQUIREMENTS AND RESPONSIBILITIES

A. Prime bidder is responsible for all work, of all trades and sub-contractors bidding this project. It is the prime bidder’s responsibility, prior to submitting a bid to ensure that sub-contractors coordinate all aspects of the work between trades, sub-contractors, etc. to the fullest extent possible.

B. Prime bidder shall ensure that all sub-contractors, suppliers, equipment vendors, etc., obtain all necessary and pertinent contract document information pertaining to their work prior to the submission of a bid. Contractor shall realize that different sub-contractors may furnish equipment, accessories, devices, etc. necessary for a complete and working installation that require provision of services by another sub-contractor or trade.

C. Bidders of all or any portions of this section or division are required to review all contract documents including but not limited to Architectural drawings, Structural drawings, Mechanical drawings, Plumbing drawings, Electrical drawings, etc. to coordinate requirements and responsibilities with and through prime bidder.

D. Bidders of all or any portions of this section or division, by furnishing a bid on a portion of the prime contract are indicating that they have received all contract documents and coordinated services provided under their portion of the work with the prime bidder; they are indicating that they have expressed any pertinent questions (which would result from a detailed, thorough review of the entire set of contract documents) to the prime bidder in accordance with Division 00 & 01 requirements, prior to bidding.

E. All timely, pertinent, questions provided in writing prior to bids, in accordance with Division 00 & 01 requirements, will be clarified, defined, or otherwise explained in a written addendum and/or addendums prior to bids, in accordance in Division 00 & 01 requirements.

F. It is not the intention of these contract documents to leave any issue relating to coordination between trades or sub-contractors vaguely defined. The intention is to define all issues, coordination matters, equipment requirements, sizes, routing, etc. to the satisfaction of the prime bidder, prior to receipt of bids.

G. Bidders of all or any portions of this section or division, by virtue of the submission of a bid to the prime bidder, are indicating that they have reviewed the entire set of contract documents with due diligence and regard for the Owner's desire for a comprehensive and complete bid proposal; that they have expressed all concerns or questions requiring clarification on matters of coordination between trades and/or sub-contractors; that they have expressed any such concerns or questions in writing in accordance with Division 00 & 01 requirements.

H. Prime bidders, by submission of a comprehensive bid on the project are indicating that the subcontractors selected in their bid have complied with all Division 00 & 01 requirements, that they have indicated in writing, prior to bidding, all questions or concerns requiring clarification and/or explanation and have documented any and all specific exclusions involving work that would generally be considered to be work of their trade. The prime bidder shall coordinate all work so that anything excluded by the bidder of all or any portions of this section or division, have been addressed prior to bids in one of the following manners:

1. The work has been confirmed, by the prime bidder, to be work of another trade or subcontractor (whose proposal is also being accepted).
2. Clarification of the matter has been made through the prime design professional via written addendum and is clearly and mutually understood by the prime bidder and the party raising the issue/question, or seeking clarification.
3. The work has been accepted as the responsibility of the prime contractor directly.

1.8 MATERIAL AND EQUIPMENT

A. The term "provide" when used in the Contract Documents includes all items necessary for the proper execution and completion of the Work.

B. Specific reference in the Specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the Contractor, in such cases, may at his option use any article, device, product, material, fixture, form or type of construction which in the judgment of the Architect expressed in writing is equal to that specified.

C. Coordinate and properly relate all Work of this Division to building structure and work of all other trades.

D. Visit premises and become thoroughly familiar with existing conditions; verify all dimensions in field. Advise Architect of any discrepancies prior to Bid Date in accordance with Division 00.

E. Do not rough-in for any item or equipment furnished by others or noted "Not in Contract" (NIC), without first receiving rough-in information from physically examining the existing equipment, receiving specific cut sheet information from the Owner's representative, other trades and/or Architect. Rough-in services for "NIC" equipment as required, as the work progresses.

F. Provide storage and protection for all equipment and materials in accordance with requirements of Division 00 & 01. Replace any equipment and materials damaged by improper handling, storage, or protection, at no additional cost to Owner.

G. Keep premises clean in accordance with requirements of Division 00 & 01.

1.9 SUBSTITUTIONS

A. Substitutions are only allowed by approval of the Architect prior to Bid Date as stipulated in Division 00 & 01.

B. Design of systems is based on specific equipment. If the use of other manufacturer's equipment, even though approved by Architect, involves additional cost due to space requirements, foundation requirements, increased mechanical or electrical services, the cost of such extra work shall be borne by Contractor. Even though a manufacturer's name appears in the Contract Documents as having acceptable equipment, their equipment with different model numbers shall be classified as being a substitute to the equipment originally designed for and named in the Contract Documents. Substitute equipment, materials, etc., will not be allowed to deviate from Contract Document requirements. Furnish all options specified or reasonably implied from the contract documents. Specifically identify any variance in regard to submittal versus specified performance on the cover sheet of each submittal.

1.10 POST-BID VALUE ENGINEERING (V/E):

A. While it may be in the project Owner's interest to consider the first cost money saving that may be generated via alternatives and options generated via participation in Value Engineering, Division 22 contractor shall realize that substantive offers of Value Engineering (V/E), if accepted by the Owner, constitute a design-build agreement (offer and acceptance) with the owner, and drastically change the design concept of the project, as developed by the Professional of Record identified on the Contract Documents.

B. Should contractor offer, and the owner accept value engineering options that alter aspects of the system design, equipment, performance and/or performance verification or monitoring of respective systems, Division 22 contractor shall provide duly licensed professional engineering consultants working on behalf of the Division 22 contractor (including sub-contractors and equipment vendors/manufacturers) to review, approve and take professional responsibility for performance and suitability of V/E hybrid systems, materials or operational changes related to respective V/E items. The Division 22 contractor's licensed professional engineering consultants and the Division 22 contractor assume any and all responsibility for the design and suitability in terms of performance, of hybrid systems installed, as Division 22 contractor's Professional of Record, absolving the original project Professional of Record (identified on the original Contract Documents, released for the original project Bid/Negotiation) from responsibility for the V/E hybrid systems portion of the work.

C. Division 22 contractor, via the offer and acceptance of value engineering items on the project agrees to provide professional engineering design services and take full and complete responsibility for the hybrid design. Further, the Division 22 contractor's (V/E Items) professional of record (either employees, or independent consultants to the Division 22 contractor) through the offer and acceptance of V/E items, agree to indemnify and hold

harmless the project owner, the owner's original A/E team (Professional of Record on behalf of the owner for the original Contract Documents) their heirs and assigns in regard to the V/E changes and their impact on the Division 22 systems altered, affected or modified, in whole or in part. The Professional of Record shown on the original Contract Documents in regard to the systems altered, adjusted, revised, modified or otherwise affected by the value engineering items implemented, shall be absolved of design responsibility as a result of implementation of V/E items, and their original use of Engineering Seals used for original Contract Documents, shall not apply.

1.11 DRAWINGS AND SPECIFICATIONS

A. The specific intent of these Contract Documents is to provide the various systems, equipment, etc. to the Owner complete and in a thoroughly calibrated functional condition.

B. The Drawings shall not be construed as shop drawings. In the event of a possible interference with piping or equipment of another trade, items requiring set grade and elevations shall have precedence over other items should any major interference develop, immediately notify the Architect.

C. In laying out Work, refer to mechanical, electrical, structural, and architectural drawings at all times in order to avoid interference and undue delays in the progress of the Work.

1.12 CODES AND REGULATIONS

A. Work shall be in full accord with the most stringent interpretation of the State Sanitary Code, local ordinances, building codes, and other applicable national, local, and state regulations.

B. Equipment shall conform to requirements and recommendations of the National bureau of Fire Underwriters and National Fire Protection Association (NFPA).

C. Items provided under this Division shall comply with the American National Standards Institute (ANSI) "Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People," ANSI A 117.1

D. In the possible event of conflict between codes or regulations and Contract Documents, the most stringent interpretation of either shall govern (provided if exceeds the requirements of other codes). In the event of an irreconcilable difference between codes or regulations notify the Architect/Engineer immediately.

E. In addition to the codes heretofore mentioned, all work and equipment shall conform to the applicable portions of the following specifications, codes and/or regulations:

1. National Electrical Code (NEC)
2. National Fire Protection Association (NFPA)
3. American Society of Mechanical Engineers (ASME)
4. American Gas Association (AGA)
5. Underwriters Laboratories (UL)
6. International Plumbing Code (IPC) with Louisiana Amendments

F. All materials, equipment and accessories installed under this Contract shall conform to all rules, codes, etc. as recommended by National Associations governing the manufacturer, rating and testing of such materials, equipment and accessories. All materials shall be new and of the best quality and first class in every respect. Whenever directed by the Architect, the Contractor shall submit a sample for approval before proceeding.

G. Where laws or local regulations provide that certain accessories such as gauges, thermometers, relief valves and parts be installed on equipment, it shall be understood that such equipment be furnished complete with the necessary accessories, whether or not called for in these Specifications.

H. All unfired and fired pressure vessels shall be built in accordance with the A.S.M.E. Code and so stamped. Furnish shop certificates for each vessel. Contractor shall provide and pay for first operating certificate as per State Fire Marshal Regulations.

1.13 FEES, PERMITS, AND TAXES

A. Obtain and pay for permits required for the Work of this Division. Pay fees in connection therewith, including necessary inspection fees.

B. Pay any and taxes levied for Work of this Division, including municipal and/or state sales tax where applicable.

C. All permits, fees, certificates, etc. for the installation, inspections, plan review, service connections locations, and/or construction of the work which are required by any authority and/or agencies having jurisdiction, shall be obtained and paid for by the Contractor.

D. The Contractor shall make all tests required by the Architect, Engineer or other governing authorities at no additional cost to the Owner.

E. The Contractor shall notify the Architect and local governing authorities before any tests are made, and the tests are not to be drawn off a line covered or insulated until examined and approved by the authorities. In event defects are found, these shall be corrected and the work shall be retested.

F. Prior to requesting final inspection by the Architect, the Contractor shall have a complete coordination and adjustment meeting of all of his sub-contractors directly responsible for the operation of any portion of the system. At the time of this meeting, each and every sequence of operation shall be checked to assure proper operation. Notify the Architect in writing ten (10) days prior to this meeting, instructing him of the time, date and whom you are requesting to be present.

G. This project shall not be accepted until the above provisions are met to the satisfaction of the Architect.

1.14 MANUFACTURER'S DIRECTIONS

A. Install and operate equipment and material in strict accord with manufacturer's installation and operating instructions. The manufacturer's instructions shall become part of the Contract Documents and shall supplement Drawings and Specifications.

1.15 SUBMITTAL DATA

A. Submit shop drawings, project data, and samples in accordance with requirements of Division 00 & 01.

B. Shop drawings shall consist of published ratings or capacity data, detailed construction drawings for fabricated items, wiring and control diagrams, performance curves, installation instructions, manufacturer's installation drawings, and other pertinent data. Submit drawings showing revisions to equipment layouts due to use of alternate or substitute equipment.

C. Where approved manufacturers and suppliers of equipment, materials, etc. are unable to fully comply with Contract Document requirements, specifically call such deviations to attention of Architect on submittals. Type deviations on a separate sheet; underlined statements or notations on standard brochures, equipment fly sheets, etc. will not be accepted.

D. Approval of submittals shall not relieve Contractor from furnishing required quantities and verifying dimensions. In addition, approval shall not waive original intent of Contract Documents.

E. Failure to obtain written approval of equipment shall be considered sufficient grounds for rejection of said equipment regardless of the stage of completion of the project.

1.16 REVIEW OF MATERIALS:

A. Whenever manufacturers or trade names are mentioned in these Plans or Specifications, the words "or approved equivalent" shall be assumed to follow whether or not so stated. Manufacturers or trade names are used to establish a standard of quality only, and should not be construed to infer a preference. Equivalent products which meet the Architect's approval will be accepted; however, these products must be submitted to the Architect a minimum of ten (10) days prior to the Bid Date.

B. Submission shall include the manufacturer's name, model number, rating table and construction features.

C. Upon receipt and checking of this submittal, the Architect will issue an addendum listing items which are approved as equivalent to those specified. The contractor shall base his bid solely on those items specified or included in the "prior approval addendum", as no other item will be acceptable.

D. Prior approval of a particular piece of equipment does not mean automatic final acceptance and will not relieve the Contractor of the responsibility of assuring himself that this equipment is in complete accord with the Plans and Specifications and that it will fit into the space provided. Shop drawings must be submitted on all items of equipment for approval as hereinafter specified.

E. Before proceeding with work and/or within thirty (30) days after the award of the General Contract for this work, the Contractor shall furnish to the Architect complete shop and working drawings of such apparatus, equipment, controls, insulation, etc. to be provided in this project. These drawings shall give dimensions, weights, mounting data, performance curves and other pertinent information.

F. The Architect's approval of shop drawings shall not relieve the Contractor from the responsibility of incorrectly figured dimensions or any other errors which may be contained in these drawings. Any omission from the shop drawings or specifications, even through approved by the Architect, shall not relieve the Contractor from furnishing and erecting same.

G. Shop drawings shall be submitted in accordance with Section 013300. These submittals shall be supplied as part of this Contractor's contract. Any drawings not approved shall be resubmitted until they are approved. Submit all shop drawings at the same time. No separate items will be accepted.

1.17 PROJECT RECORD DOCUMENTS

A. Keep Project Record Documents in accordance with requirements of Division 00 & 01.

B. During construction period, keep accurate records of installations made under this Division, paying particular attention to major interior and exterior underground and concealed piping, ductwork, etc.

C. The Contractor shall obtain at his cost, two sets of blueline prints of the original bid documents by the Architect. One set shall be kept on the site with all information as referenced below, and shall update same as the work progresses. The other set will be utilized to record all field changes to a permanent record copy for the Owner.

D. If the Contractor elects to vary from the Contract Documents and secures prior approval from the Architect for any phase of the work, he shall record in a neat and readable manner, all such variances on the blueline print in red. The original bluelines shall be returned to the Architect for documentation.

E. Provide electronic (PDF) copies of all documentation included in Final Report.

F. All deviations from sizes, locations, and from all other features of the installations shown in the Contract Documents shall be recorded.

G. In addition, it shall be possible using these drawings to correctly and easily locate, identify and establish sizes of all piping, directions and the like, as well as other features of the work which will be concealed underground and/or in the finished building.

H. Locations of underground work shall be established by dimensions to columns, lines or walls, locating all turns, etc., and by properly referenced centerline or invert elevations and rates of fall.

I. For work concealed in the building, sufficient information shall be given so it can be located with reasonable accuracy and ease. In some cases, this may be by dimension. In others, it may be sufficient to illustrate the work on the drawings in relation to the spaces in the building near which it was actually installed. The Architect's/Engineer's decision in this matter will be final.

J. The following requirements apply to all "As-Built" drawings:

1. They shall be maintained at the Contractor's expense.
2. All such drawings shall be done carefully and neatly, and in a form approved by the Architect/Engineer.
3. Additional drawings shall be provided as necessary for clarifications.
4. These drawings shall be kept up-to-date during the entire course of the work and shall be available upon request for examination by the Architect/Engineer; and when necessary, to establish clearances for other parts of the work.
5. "As-built" drawings shall be returned to the Architect upon completion of the work and are subject to approval of the Architect/Engineer.

1.18 EXCAVATING AND BACKFILLING

A. Provide excavating and backfilling necessary for Work of this Division. Comply with provisions of Division 02, Site Work, if applicable.

B. Trenches shall be inspected by Code Authorities and/or Owner's Representative before and after piping is laid. Give Owner' Representative 24-hour notice for each inspection. If any trenches are filled without Owner's Representative inspection and as subsequently found to be deficient, the trenches shall be uncovered, inspected, and then re-filled, if requested by Owner's Representative.

C. Provide minimum 18 inches of cover or in compliance with local published frost line data (if greater than 18 inches) to finish grades or paving at water piping.

D. For piping, provide bell holes at trench bottom to assure uniform bearing. Accurately grade trench bottoms by instrument before laying any pipe.

E. Protect and maintain trenches in dry condition until piping has been inspected and approved. Immediately after approval, backfill trenches in tamped layers.

F. Compact fill to satisfaction of Architect and/or Owner's Representative.

1.19 CUTTING AND PATCHING

A. Comply with requirements of Division 00 & 01 regarding cutting and patching. Locate and timely install sleeves as required to minimize cutting and patching.

B. Cutting, fitting, repairing, patching, and finishing of Work shall be done by craftsmen skilled in their respective trades. Where cutting is required, cut in such a manner as not to weaken structure, partitions, or floors. Holes required to be cut must be cut or drilled without breaking out around the holes. Where patching is necessary in finished areas of the building, the Architect will determine the extent of such patching and refinishing.

C. Repairing Roadways and Walks: Coordinate all roadway work with authorities having jurisdiction. Cut and/or bore under roadways for connection of utilities as required. Coordinate work through General Contractor. Where this contractor cuts or breaks roadways, or walks to lay the piping, he shall repair or replace these sections to match existing, unless specifically identified as the responsibility of others.

1.20 PAINTING

A. Painting shall be provided by General Contractor’s painting sub-contractor, unless specified otherwise. Leave exposed piping, materials, and equipment clean and free of rust, grease, dirt, etc. before and after painting.

B. Factory finished equipment, fixtures, and materials which are marred, chipped, scratched, or otherwise unacceptable shall be repaired or replaced under this Division to Architect satisfaction, at no additions cost to Owner.

C. Coordinate all painting requirements with prime bidder prior to bids.

D. Paint all exposed piping inside and outside of building. Label all piping after painting in accordance with Section 230553. Utilize industry standard paint colors for respective system unless directed otherwise by Architect. Review proposed color scheme with Architect/Engineer prior to ordering materials.

1.21 CLEANING AND ADJUSTING:

A. Upon completion of his work, the Contractor shall clean and adjust all equipment, controls, valves, etc.; clean all piping, ductwork, etc.; and leave the entire installation in good working order.

1.22 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Provide the Owner with three (3) copies of printed instructions indicating various pieces of equipment by name and model number, complete with parts lists, maintenance and repair instructions and test and balance report.

B. Copies of shop drawings will not be acceptable as operation and maintenance instructions.

C. This information shall be bound in plastic hardbound notebooks with the job name, Architect and Engineer names permanently embossed on the cover. Rigid board dividers with labeled tabs shall be provided for different pieces of equipment. Submit manuals to the Architect for approval.

D. In addition to the operation and maintenance brochure, the Contractor shall provide a separate brochure which shall include registered warranty certificates on all equipment, especially any pieces of equipment which carry warranties exceeding one (1) year.

E. The operation and maintenance brochure shall be furnished with a detailed list of all equipment furnished to the project, including the serial number and all pertinent nameplate data such as voltage, amperage draw, recommended fuse size, rpm, etc. The Contractor shall include this data on each piece of equipment furnished under this contract.

F. Contractor shall provide electronic (PDF) format copies of all Operation and Maintenance Instruction on disk.

1.23 GUARANTEE

A. The Contractor shall guarantee all materials, equipment and workmanship for a period of one (1) year from the date of final acceptance of the project. This guarantee shall include furnishing of all labor and material necessary to make any repairs, adjustments or replacement of any equipment, parts, etc. necessary to restore the project to first class condition. This guarantee shall exclude only the changing or cleaning of filters. Warranties exceeding one (1) year are hereinafter specified with individual pieces of equipment.

B. If the Contractor's office is in excess of a fifty (50) mile radius of the project, he shall appoint a local qualified contractor to perform any emergency repairs or adjustments required during the guarantee period. The name of the contractor appointed to provide emergency services shall be submitted to the Architect for his approval.

1.24 LOCAL CONDITIONS

A. The location and elevation of all utility services is based on available surveys and utility maps and are believed to be reasonably accurate; however, these shall serve as a general guide only, and the Contractor shall visit the site and verify the location and elevation of all services to his satisfaction in order to determine the amount of work required for the execution of the Contract.

B. The Contractor shall contact the various utility companies, determine the extent of their requirements and he shall include in his bid all lawful fees and payments required by these companies for complete connection and services to the building, including meters, connection charges, street patching, extensions from meters to main, etc.

C. In case major changes are required, this fact, together with the reasons therefore, shall be submitted to the Architect, in writing, not less than seven (7) days before the date of bidding. Failure to comply with this requirement will make the Contractor liable for any changes, additions and expenses necessary for the successful completion of the project.

1.25 MINOR DEVIATIONS

A. Plans and detail sketches are submitted to limit, explain and define conditions, specified requirements, pipe sizes, etc. Structural or other conditions may require certain modifications from the manner of installation shown, and such deviations are permissible and

shall be made as required. However, specified sizes and requirements necessary for satisfactory operation shall remain unchanged. It may be necessary to shift ducts or pipes, or to change the shape of ducts, and these changes shall be made as required. All such changes shall be referred to the Architect for approval before proceeding. Extra charges shall not be allowed for these changes.

B. Only typical details are shown on the Plans. In cases where the Contractor is not certain about the installation of his work, he shall ask for details. Lack of details will not be an excuse for improper installation.

C. In general, the drawings are diagrammatic and the Contractor shall install his work in a manner so that interferences between the various trades are avoided. In cases where interferences do occur, the Architect is to state which item was first installed.

1.26 VALVE TAGS

A. Secure metal tags to all valves. Labeling on all valve tags shall include type of system the valve controls and the area of building, zone, or equipment number affected by valve operation. Tag shall be 2" minimum diameter brass, engraved with code number, service and size. A framed list of the valves, giving manufacturer's name, model number, type and location shall be mounted in the main basement equipment room.

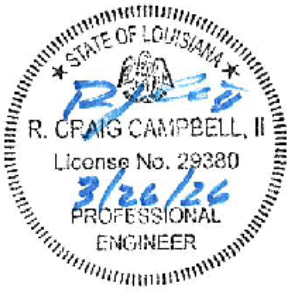
1.27 LABELING PLUMBING EQUIPMENT

A. All equipment furnished under the contract documents shall be labeled with permanent laminated plate secured to equipment. Units shall be labeled as indicated on plans and schedules.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 22 00 00



SECTION 22 05 00 – COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. This Section includes the furnishing and installation of common work results for plumbing which includes the following related components:

1. Strainers;
2. Water hammer arresters;
3. Valves;
4. Hydrants;
5. Hose bibbs and sill faucets;
6. Backflow preventers;
7. Pressure regulating and reducing valves;
8. Pressure-temperature relief valves.

1.3 SUMMARY

A. This Section specifies the water distribution piping system, including potable cold, hot, and recirculated hot water piping, fittings, and specialties within the building.

1.4 DEFINITIONS

A. Water Distribution Piping: A pipe within the building or on the premises which conveys water from the water service pipe or meter to the points of usage.

B. Water Service Piping: The pipe from the water main or other source of potable water supply to the water distributing system of the building served.

1.5 SUBMITTALS

A. Refer to Division 01 and Basic Mechanical Requirements for administrative and procedural requirements for submittals.

B. Product Data: Submit manufacturer's product data for the following products that apply to this project scope:

1. Strainers;
2. Water hammer arresters;
3. Valves;
4. Hydrants;
5. Hose bibbs and sill faucets;
6. Backflow preventers;
7. Pressure regulating and reducing valves;
8. Pressure-temperature relief valves.

C. Coordination Drawings: Prepare and submit coordination drawings for Water Distribution Piping in accordance with Division 23 - Basic Mechanical Requirements.

D. Maintenance Data: Submit maintenance and operating data. Include this data in maintenance manual in accordance with requirements of Division 01 and Division 23 - Basic Mechanical Requirements for the following products that apply to this project scope:

1. Strainers;
2. Valves;
3. Hose Bibbs and Sill Faucets;
4. Backflow Preventers;
5. Pressure Regulating and Reducing Valves;
6. Pressure-temperature relief valves.

E. Quality Control Submittals:

1. Submit welders' certificates specified in Quality Assurance below.
2. Submit certification of compliance with ASME and UL fabrication requirements specified in below.
3. Submit reports specified in Part 3 of this Section.

1.6 QUALITY ASSURANCE

A. Codes and Standards

1. Plumbing Code Compliance: Comply with applicable portions of Edition 2015 of the International Plumbing Code.
2. ASME Compliance: Fabricate and stamp pressure-temperature relief valves to comply with ASME Boiler and Pressure Vessel Code.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store pipe in a manner to prevent sagging and bending.

1.8 SEQUENCING AND SCHEDULING

A. Coordinate the size and location of concrete equipment pads. Cast anchor bolt inserts into pad. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate the installation of pipe sleeves for foundation wall penetrations.

1.9 MAINTENANCE

A. Spare Parts:

1. Furnish to Owner, with receipt, one valve key for each key operated hydrant, bibb, or faucet installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer uniformity: Conform with the requirements specified in Basic Mechanical Requirements, under "Product Options" for the following water distribution piping products.

2.2 VALVES

A. Gate, ball, butterfly, check, and drain valves are specified in Section 230620 “Hydronic Specialties”.

B. Balance Cocks:

1. Threaded Ends 2" and Smaller: Class 125, bronze body, bronze plug, screw driver operated, straight or angle pattern.
2. Soldered Ends 2" and Smaller: Class 125, bronze body, bronze plug, screw driver operated, straight or angle pattern.

2.3 PIPING SPECIALTIES

A. Water Hammer Arresters: Bellows type, with stainless steel casing and bellows, pressure rated for 250 psi, tested and certified in accordance with PDI Standard WH-201.

B. Basket Strainers: Cast-iron body, 125 psi flanges, bolted type or yoke type cover; with removable non-corrosive perforated strainer basket having 1/8" perforations and lift-out handle.

C. Flexible connectors: Stainless steel bellows with a woven flexible bronze wire reinforcing protective jacket; rated for 150 psig water working pressure, 250 deg F operating temperature and suitable for up to maximum 3/4" misalignment. Connectors shall be a minimum of 12" long and have threaded or flanged ends; sweat ends are not acceptable.

D. Hose Bibbs: Bronze body, renewable composition disc, tee handle, 3/4" NPT inlet, 3/4" hose outlet.

E. Backflow Preventers: Reduced pressure principle assembly consisting of shutoff valves on inlet and outlet, and strainer on inlet. Assemblies shall include test cocks, and pressure-differential relief valve located between 2 positive seating check valves, and comply with requirements of ASSE Standard 1013. Backflow preventer shall be with drain funnel.

F. Pressure Regulating Valves: Single seated, direct operated type; having bronze body with integral strainer, and complying with requirements of ASSE Standard 1003.

G. Relief Valves:

1. Provide proper size for relief valve, in accordance with ASME Boiler and Pressure Vessel Codes, for indicated capacity of the appliance for which installed.
2. Combined Pressure- Temperature Relief Valves: Bronze body, test lever, thermostat, complying with ANSI Z21.22 listing requirements for temperature discharge capacity. Provide temperature relief at 210 deg. F, and pressure relief at 150 psi.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify all dimensions by field measurements. Verify that all water distribution piping may be installed in accordance with pertinent codes and regulations, the original design, and the referenced standards.

B. Examine rough-in requirements for plumbing fixtures and other equipment having water connections to verify actual locations of piping connections prior to installation.

C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 JOINING PIPES AND FITTINGS

A. Copper Tubing: Solder joints in accordance with the procedures specified in ANSI B9.1, using lead free piping, solder and flux. Lead free, when used with respect to solder and flux, refer to solder and flux containing not more than 0.2 percent lead. When used with respect to pipe and fittings, lead free refers to pipe and fittings containing not more than 6.0 percent lead.

3.3 PIPING INSTALLATION

A. Refer to the separate Division 230020 section: “Basic Mechanical Requirements”, for general piping installation instructions.

B. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate the general location and arrangement of the piping systems. Location and arrangement of piping layout take into consideration pipe sizing and friction loss, expansion, pump sizing, and other design considerations. So far as practical, install piping as indicated.

C. Install gravity drainage piping with minimum 1/32" per foot (1/4 percent) downward slope towards drain point unless specified otherwise, herein.

3.4 INSTALLATION OF VALVES

A. Installation requirements for general duty valves are specified in a separate Section of Division 23.

B. Sectional Valves: Install sectional valves on each branch and riser, close to main. For sectional valves 2" and smaller, use ball valves; for sectional valves 2-1/2" and larger, use gate or butterfly valves.

C. Shutoff Valves: Install shutoff valves on inlet of each plumbing equipment item, and on inlet of each plumbing fixture, and elsewhere as indicated. For shutoff valves 2" and smaller, use ball valves; for shutoff valves 2-1/2" and larger, use butterfly valves.

D. Drain Valves: Install drain valves on each plumbing equipment item, located to completely drain equipment for service or repair. Install drain valves at the base of each riser, at low points of horizontal runs, and elsewhere as required to completely drain distribution piping system. For drain valves 2" and smaller, use gate or ball valves; for drain valves 2-1/2" and larger, use gate or butterfly valves.

E. Check Valves: Install swing check valves on discharge side of each pump, and elsewhere as indicated.

F. Balance Cocks: Install in each hot water recirculating loop, discharge side of each pump, and elsewhere as indicated.

3.5 INSTALLATION OF PIPING SPECIALTIES

A. Install pressure regulating valves with inlet and outlet shutoff valves, and balance cock bypass. Install pressure gage on valve outlet.

3.6 EQUIPMENT CONNECTIONS

A. Piping Runouts to Fixtures: Provide hot and cold-water piping runouts to fixtures of sizes indicated on plans. Connect cold water to hot and cold-water faucet connections where hot water is not provided.

B. Mechanical Equipment Connections: Connect hot and cold-water piping system to mechanical equipment. Provide shutoff valve and union for each connection, provide drain valve on drain connection. For connections 2-1/2" and larger, use flanges instead of unions.

3.7 FIELD QUALITY CONTROL

A. Inspections:

1. Do not enclose, cover, or put into operation water distribution piping system until it has been inspected and approved by the Architect.
2. During the progress of the installation, notify the Architect, at least 24 hours prior to the time such inspection must be made. Perform tests specified below in the presence of the Architect.
3. Rough-in Inspection: Arrange for inspection of the piping system before concealed or closed-in after system is roughed-in, and prior to setting fixtures.
4. Final Inspection: Arrange for a final inspection by the Architect to observe the tests specified below and to ensure compliance with the requirements of the plumbing code.
5. Reinspections: Whenever the Architect finds that the piping system will not pass the test or inspection, make the required corrections and arrange for reinspection by the Architect.
6. Reports: Prepare inspection reports, signed by the Architect.

B. Piping System Test:

1. Test for leaks and defects all water distribution piping systems. If testing is performed in segments, submit a separate report for each test, complete with a diagram of the portion of the system tested.
2. Leave uncovered and unconcealed all water distribution piping until it has been tested and approved. Expose all such work for testing, that has been covered or concealed before it has been tested and approved.
3. Cap and subject the piping system to a static water pressure of 50 psi above the operating pressure without exceeding the pressure rating of the piping system materials. Isolate the test source and allow to stand for a period of 4 hours. Leaks and loss in test pressure constitute defects which must be repaired.
4. Repair all leaks and defects using new materials and retest system or portion thereof until satisfactory results are obtained.
5. Prepare reports for all tests and required corrective action.

3.8 ADJUSTING AND CLEANING

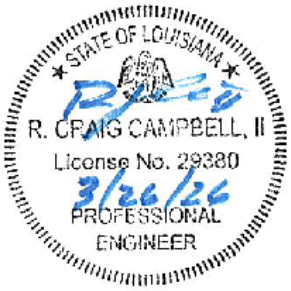
A. Cleaning and Disinfecting:

1. Purge all new water distribution piping systems and parts of existing systems, which have been altered, extended, or repaired prior to use.
2. Reports:
   a. Prepare reports for all purging and disinfecting activities.

3.9 STERILIZATION

A. Sterilize water lines in strict accordance with State Board of Health requirements. After flushing out, obtain approval of water sample analysis from State Board of Health and submit to Architect.

END OF SECTION 22 05 00



SECTION 22 05 19 – PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. This Section includes the following basic mechanical materials and methods to complement other Divisions and Sections.

1. Piping materials and installation instructions common to most piping systems.
2. Pipe Specialties.
3. Sleeves.
4. Valves and Unions.
5. Shock Absorbers.
6. Escutcheons.
7. Flashing.
8. Access Panels.
9. System Accessories.

B. Pipe and pipe fitting materials are specified in individual piping system Sections.

1.3 ELECTRICAL WORK

A. All electrical equipment shall have the U.L. Label and shall meet the standards of the National Electrical Code and NEMA.

PART 2 - PRODUCTS

2.1 PIPE:

A. Sanitary Sewer Waste Lines Above Slab (PVC):

1. Piping above slab, unless otherwise shown or specified, shall be constructed of solid wall Schedule 40 PVC "DWV" plastic pipe and fittings conforming to ASTM D265 and ASTM D1785 with solvent welded joints.

B. Sanitary Sewer Waste Lines Below Slab (PVC):

1. Piping below slab, unless otherwise shown or specified, shall be constructed of solid wall Schedule 40 PVC "DWV" plastic pipe and fittings conforming to ASTM D265 and ASTM D1785 with solvent welded joints.

C. Sanitary Sewer Vent Lines Above Slab (PVC):

1. These shall be constructed of solid wall Schedule 40 PVC “DWV” plastic pipe fittings conforming to ASTM D2665 and ASTM D1785 with solvent welded joints.

2. Sanitary sewer pipe penetrating concrete slabs shall be wrapped with Virginia Chemical K-501, Benjamin Manufacturing Model 6200, or equal foam insulation tape.

D. Domestic Cold and Hot Water Lines:

1. All such lines shall be Government Type "L", hard copper water tubing of standard weight and thickness as made by Mueller, Chase, Anaconda or equivalent, unless indicated otherwise. Use 95-5 lead-free solder on all piping above slab. Use Silfos 1000° lead-free solder on all piping beneath the slab.
2. In certain areas, type "L" soft copper without joints below slab shall be used only where indicated on the Plans. Piping shall be completely insulated per Section 220700.
3. Domestic cold-water lines penetrating concrete slabs shall be wrapped with "Protect-O-Sleeve" vinyl flexible tube as manufactured by Robert H. Harris Co., or equivalent. Sleeve shall have a minimum thickness of .025” (0.635 mm).
4. Domestic hot water lines shall be insulated at all penetrations through slab per insulation (see Section 220700).
5. Domestic cold-water piping within 5'-0" of building may be Schedule 40 PVC plastic pipe with solvent welded joints, or slip joint fittings with EPDM seals. Provide thrust blocks all at changes in direction. Installation shall be in accordance with manufacturer's recommendations.

E. Water Heater Relief Lines:

1. These shall be Government Type "L" hard copper.

F. Trap Primer Lines:

1. All such lines shall be Type "L" soft copper, without joints.

2.2 PIPE SPECIALTIES

A. Dielectric unions shall be used between copper and iron pipe.

2.3 PIPE HANGERS AND SUPPORTS

A. This Contractor shall furnish and install all foundations and supports required for his equipment unless indicated otherwise on the Drawings.

B. This Contractor shall furnish and install all escutcheons, inserts, thimbles, hangers, etc. required for the proper support and installation of his equipment and piping and he shall cooperate with other trades in locating and placing these items.

2.4 PROVIDE SLEEVES FOR ALL PIPES PASSING THROUGH WALLS, FLOORS, BEAMS, ETC.

A. Sleeves passing through structural members or concrete footings shall be of cast iron or Schedule 40 steel pipe. Sleeves passing through nonstructural walls or floors shall be of 26-gauge galvanized iron. Joints between sleeves and pipes passing through floors shall be made weather tight with plastic materials. Where pipes pass through water proofing membrane, flashing sleeves shall be installed.

B. Provide Grinnell, Fee & Mason, or equivalent malleable iron split ring hangers with rod supports throughout. Strap hangers or wire will not be accepted.

C. Maximum spacing of hangers for cast iron pipes shall be 5 ft.; for other than soil, use 10 ft.

D. Provide galvanized iron shields between hangers and pipe covering.

E. Provide Grinnell, Fee & Mason, Crane or equivalent heavy steel riser clamps on vertical risers at floors to support pipes.

F. Provide producer specialty, Jones Manufacturing or equal chrome plated brass escutcheons wherever pipes pass through floors, walls or ceilings in exposed or finished areas.

G. All piping projecting from chases shall be rigidly supported in the wall or chase. Loosely supported fixtures or accessories will not be accepted.

2.5 VALVES AND UNIONS

A. Furnish and install all valves, unions, stops, connections, etc. shown on plans and necessary to make a complete system in working order. Provide valves on inlet and outlet of all equipment and fixtures and on branch lines to fixtures or groups of fixtures.

B. Ball Valves, 3" and smaller, rated for 150 PSI saturated steam pressure, 600 PSI WOG pressure; shall be 2-piece construction, bronze body conforming to ASTM B-62, conventional port, chrome-plated brass ball, replaceable TFE seats and seals, blow-out proof stem, and vinyl-covered steel handle. Provide solder ends for domestic hot and cold-water service of NIBCO Design S-580-70, Milwaukee BA-150-S or equal, threaded ends of heating hot water and low pressure steam of NIBCO Design T-580-70, Milwaukee BA-100-S or equal. At Contractor's option, Victaulic Style 722 or 721 ball valves may be used.

C. All valves, unions, etc. where pipe is chrome plated shall have similar finish. All exposed supplies to plumbing fixtures shall be chrome plated.

D. Domestic water valves (below grade): M & H AWWA Series C-509 resilient gate valve with low torque operation, positive shut-off, O- Ring seals, full epoxy coating and square valve stem end. Provide two (2) adjustable "TEE" handle valve wrenches to be turned over to the owner after construction is complete.

E. Gate Valves, 2-Inch and Smaller: MSS SP-80; Class 125, body and bonnet of ASTM B 62 cast bronze; with threaded or solder ends, solid disc, copper-silicon alloy or bronze stem, brass packing gland, "Teflon" impregnated packing, and malleable iron handwheel. Provide Class 150 valves meeting the above where system pressure requires.

F. Gate Valves, 2-1/2-Inch and Larger: MSS SP-70; Class 125 iron body, bronze mounted, with body and bonnet conforming to ASTM A 126 Class B; with flanged ends "Teflon" impregnated packing, and two-piece backing bland assembly.

G. Globe Valves, 2-Inch and Smaller: NSS SP-80; Class 125; body and screwed bonnet of ASTM B 62 cast bronze; with threaded or solder ends, brass or replaceable composition disc, copper-silicon alloy stem, brass packing gland, "Teflon" impregnated packing, and malleable iron handwheel. Provide Class 150 valves meeting the above where system pressure requires.

H. Butterfly Valves, 2-1/2-Inch and Larger: MSS SP-67; rated at 200 psi; cast-iron body conforming to ASTM A 126, Class B. Provide valves with field replaceable EPDM sleeve, nickel-plated ductile iron disc (except aluminum bronze disc for valves installed in condenser water piping), stainless steel stem, and EPDM O-ring stem seals. Provide lever operators with locks for sizes 2 through 6 inches and gear operators with position indicator for sizes 8 through 24 inches. Provide "Non-Leakage" full threaded lug flange body type capable of being broken down at one side of the valve remaining closed. Drill and tap valves on dead-

end service or requiring additional body strength. At Contractor's option Victaulic 300 BFV for grooved piping systems may be used.

I. Wafer Check Valves: Class 2500, cast-iron body; with replaceable bronze seat, and non-slam design lapped and balanced twin bronze flappers and stainless-steel trim and torsion spring. Provide valves designed to open and close at approximately one-foot differential pressure.

J. Select Valves with the following ends or types of pipe/tube connections:

1. Copper Tube Size 2 Inch and Smaller: Solder ends, except provide threaded ends for heating hot water.
2. Steel Pipe Sizes, 2 Inch and Smaller: Threaded or grooved end.
3. Steel Pipe Sizes, 2-1/2 Inch and Larger: Grooved end or flanged.

2.6 SHOCK ABSORBERS

A. All water service to fixtures or groups of fixtures shall have concealed air chambers. Air chambers shall be of the same diameter as the supply or header pipes and 12 inches long on both hot and cold-water branches. Locate shock absorbers close to fixture or at end of header.

B. Shock arrestors shall be installed for sterilizer water supplies.

C. On lines 1-1/4" and above fixtures with quick closing valves (i.e.: Dishwashers, tempered valves, etc.) install "Shock Trol", "Precision Plumbing Products" or equal water hammer arrester properly sized for each unit.

2.7 ESCUTCHEONS

A. Provide escutcheons for all exposed lines passing through floors, walls, and ceilings. They shall be chrome plated brass and shall be of such flange size as to cover necessary penetrating openings.

2.8 FLASHING

A. Flash all vent penetrations through roof. Extend flashing approximately 10 inches in all directions at base and turn ends down into top of pipe. Off-set vents where necessary to provide 4 feet minimum clearance from other flashing such as outside walls, curbs, etc. Note: All vents shall be 25 feet from fresh air intakes.

2.9 ACCESS PANELS

A. Furnish and install access panels where valves, dampers, control boxes, etc. are concealed in walls, ceilings, floors, or otherwise inaccessible or where specifically called for on plans. Panels shall be Milcor Style DW, or Bar-Co. Model 500, J-L Industries Model WB, or equal sized as required and furnished with prime coat finish.

2.10 SYSTEM ACCESSORIES

A. Automatic Drain Valves for Compressed Air Piping shall be corrosion-resistant metal body and internal parts, rated for 200 psig minimum working pressure, capable of automatic discharge of collected condensate. Plug End shall be flow-sensor bleeder, check-valve type, with serrated outlet for hose.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPING:

A. All pipe shall be true and straight, without sags or traps.

B. The Contractor shall exercise care in cleaning joints after making cuts on pipe to prevent pipe particles from entering the system.

C. All pipe fittings shall be same as piping specified unless indicated otherwise.

D. Arrange, install piping approximately as indicated, straight, plumb and as direct as possible; form right angles, or parallel lines with building walls. The most practical appearance of piping runs is required. Keep pipes close to walls, partitions, ceilings; off-set only where necessary to follow walls as directed.

E. Before installing piping, check plumbing drawings with architectural, mechanical, structural, electrical drawings; make accurate layout of plumbing and HVAC piping. Where interferences may appear and departures from indicated arrangements are required, consult with other trades involved; come to agreement as to changed locations and elevations of piping; obtain approval of proposed changes. Note runs of other contractor's piping and large conduits and cooperate to achieve neat appearance.

F. Unless otherwise indicated, conceal all piping in building construction in finished areas. Install such piping in time so as not to cause delay to work of other trades and to allow ample time for tests and approval; do not cover before approval is obtained.

G. Locate groups of pipes parallel to each other and building lines; space them at distance to permit access for servicing, valves, and to create most practical appearance when racked with conduits, refrigerant, etc., provided by other contractors.

H. Keep fixture branches concealed to points above floor close to fixtures; expose only as much as necessary for final connection. Rigidly support pipes projecting from walls, chases, etc. in wall or chase to make firm, well-braced installation. Loosely supported pipe or accessory is not acceptable.

I. Install horizontal piping to coordinate with other trades and install without sags or humps.

J. Grade inside sewer piping at uniform slope of 1/4 inch per foot, minimum; where this is impossible, maintain slope as directed but in no case less than 1/8 inch per foot. Waste lines 3 inches and smaller must grade at minimum 1/4 inch per foot. See Drawings for fall on exterior sewer lines.

K. Grade other piping as specified under heading or service where used, or as directed.

L. Keep piping free from scale and dirt, protect open pipe ends wherever work is suspended during construction. To prevent foreign bodies entering and lodging in pipe, use temporary plugs or other approved material.

M. Where changes in pipe sizes occur, do not bush down; use only reducing fittings. For drainage piping changes in direction, use longsweep bends where possible; otherwise, short sweep 1/4 bends or combination Y and 1/8 bends; also, Y's in combination with other bends.

N. Provide shut off valves at all supply connections to all equipment. Supplier of equipment shall provide rough-in drawings and this contractor shall fully connect all items, supply necessary piping and fittings as required, unless otherwise noted individually.

O. Buried thermoplastic piping systems shall be installed in accordance with ASTM D2321.

P. Do not locate valves with stems below horizontal.

Q. Locate valves for easy access and operations. Where concealed, notify General Contractor of exact location in order that he may leave openings for access panels. Provide access panels.

R. Provide unions, screwed or flanged, where indicated, and in following locations even if not indicated.

S. In connection to equipment requiring disconnection for repairs or replacement. Locate between shut-off and equipment.

T. Approved expansion joints or flexible couplings shall be provided as necessary.

U. Care shall be taken in making up pipe and fittings such that the pipe does not extend into fitting sufficiently to reduce the waterway.

V. Standard, one-piece reducing fittings of approved design shall be used wherever a change in size is made. Changes in pipe sizes shall not be made by means of reducing flanges.

W. Bushings may be used only where standard, one-piece reducing fittings are not available and shall be subject to the following:

1. Bushings shall be of the face or flush type.
2. Bushings shall not be used in elbow fittings.
3. Bushings shall not be used when the reduction in size of the outlet is less than ½".
4. Bushings shall not be used in more than one outlet of any tee or two outlets of any cross fitting.

3.2 INSTALLATION OF VALVES

A. Use ball and butterfly valves for shut-off duty.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves and unions for each fixture and item of equipment arranged to allow equipment removal without system shutdown. Unions are not required on flanged devices.

D. Install three-valve bypass around each pressure reducing valve using throttling-type valves.

E. Install valves in horizontal piping with stem at or above the center of the pipe.

F. Install valves in a position to allow full stem movement.

G. All valves, unions, etc. where pipe is chrome plated shall have similar finish. All exposed supplies to plumbing fixtures shall be chrome plated.

H. All valves, on insulated piping shall be complete with extended lever handle stem.

3.3 PIPE MARKERS

A. Provide pipe markers and directional arrows on all piping in mechanical equipment rooms, or which is exposed in building, and on both sides of all valves located above ceiling. Markers shall be as manufactured by W.H. Bradley Co., or the equivalent. All letters shall be color-

coded and sized as recommended by OSHA. Samples of the type of letters to be used shall be submitted with shop drawings.

B. The following pipe and valves shall be identified:

		Piping	Valves
1.	Domestic Cold Water	X	X
2.	Domestic Hot Water Supply	X	X
3.	Domestic Hot Water Return	X	X
4.	Sanitary	X	

C. Pipe markers with arrows shall indicate lines content and shall be located 20 feet on center and at each change of direction of line. Identification bands shall be color coded to match pipe markers and shall be provided 10 feet on center. Pipe identification markers shall be taped at each end and shall be taped around the entire circumference of pipe.

3.4 TEST

A. Make such tests of work as specified, or required by Architect or by State and Municipal Bureaus having jurisdiction, and under their supervision. Perform tests in presence of Architect's representative. Notify Architect two days prior to testing.

B. Provide apparatus, temporary piping connections, or other requirements necessary for tests. Take precautions to prevent damage to building or contents by tests. Contractor is required to repair and make good at his expense damage so caused.

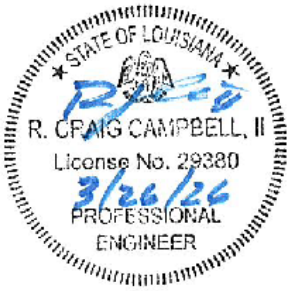
C. For Drain, Waste, and Vent piping, use hydrostatic test to 10 feet of head. Do not use compressed air or gas.

D. Correct leaks, defects, or deficiencies discovered as result of tests. Repeat tests until test requirements are fully complied with. Caulking of pipe joints to remedy leaks is not permitted, except on lead and oakum joints.

3.5 STERILIZATION

A. Sterilization all water lines in strict accordance with State Board of Health requirements. After flushing out, obtain approval of water sample analysis from State Board of Health and submit approval report to Architect.

END OF SECTION 22 05 19



SECTION 22 07 00 – PLUMBING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. Pipe insulation shall not begin until all work has been tested and found to be tight. All insulation adhesives, sealers, tapes and mastic shall meet the latest NFPA requirements and shall meet 25/50/50 flame spread and smoke developed ratings.

B. All insulation shall be installed in strict accordance with the manufacturer's recommendations.

C. All pipe insulation where recommended by the manufacturer shall be banded with aluminum bands, three to a section and with one band on each side of each fitting, valve, etc.

D. Insulation shall be continuous through walls and ceilings.

E. All valves, strainers, etc. shall be insulated to maintain the same thermal resistance rating as its adjacent piping and the covering shall extend all the way up to the equipment.

F. Use high density insulation inserts at hangers on all piping 1-1/2" and above to prevent crushing of insulation.

PART 2 - PRODUCTS

2.1 THERMAL INSULATION

A. After all work has been tested and approved, insulate as follows:

1. Insulation shall be installed in accordance with the manufacturer's recommendations and instructions.

2.2 DOMESTIC WATER PIPING

A. Cover all domestic cold and hot water lines and hot water return lines above slab with 1" thick, high density fiberglass insulation with Universal Fire-Retardant Jacket, Owens/Corning "25 ASJ/SSL", Knauf ASJ-SSL, or equal. All laps are to be sealed and stapled in place. Fittings are to be mitered segments of insulation held in place with white vapor barrier tape for concealed areas and Zeston 25/50 PVC, Knauf 25/50 rated PVC, pre-molded insulated fitting covers in exposed areas.

B. Domestic cold and hot water lines 2 -1/2" and above shall be insulated with 1-1/2" thick fiberglass with jacket.

C. All water lines exposed, including mechanical rooms, shall be covered with 0.030 PVC jacket with solvent welded seams and joints.

D. All water lines on the outside of the building exposed to the weather shall be covered with 0.160 smooth aluminum jacket and elbows.

E. Domestic cold and hot water lines run below slab within building shall be insulated with 3/4" thick closed cell tube insulation. Apply two (2) coats of mastic on insulation.

2.3 WASTE LINE P-TRAPS

A. P-traps receiving HVAC condensate (exposed to weather or above ceilings) shall be insulated with 2.33" thick 3/4 # density fiberglass ductwrap insulation with aluminum foil vapor barrier. Insulation shall be sealed at all seams and joints.

2.4 LAVATORY P-TRAP & SUPPLY LINES

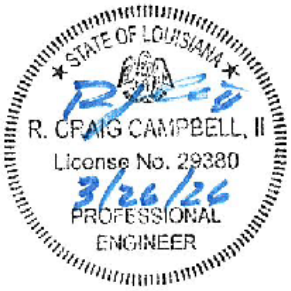
A. Unless specified otherwise on drawings, insulate p-trap, tailpiece and water supplies on lavatories/sinks with white, Truebro Model 102 Handi Lav-Guard, Pro-Wrap A.D.A. lavatory insulation kit, or approved equivalent insulating system to meet A.D.A. Requirements. Provide accessories for offset tailpiece as required.

PART 3 - EXECUTION

3.1 INSULATION THROUGH HANGERS AND SLEEVES

The insulation shall be continuous through pipe hangers and pipe sleeves. At hangers where the pipe is supported by insulation, provide a galvanized iron protection shield. Provide pipes 2-inch i.p.s. and larger in insulation inserts at points of hanger supports. The inserts shall be of calcium silicate, cellular glass, prestressed molded glass fiber of minimum 13-pound density, or other approval material of the same thickness as adjacent insulation and not less than 13-pound density. The inserts shall have sufficient compression strength to adequately support the pipe without compressing the inserts to a thickness less than the adjacent insulation. Inserts shall be 180 degrees and not less than the length of the protection shield. Vapor barrier facing of the insert shall be the same as the facing on the adjacent insulation. Where copper clad hangers are used on domestic copper pipe, insulation may cover pipe and hanger. Provide 18-gauge metal saddles between all hangers and insulation.

END OF SECTION 22 07 00



SECTION 22 11 23 – NATURAL GAS PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipes, tubes, and fittings.
2. Piping specialties.
3. Piping and tubing joining materials.
4. Manual gas shutoff valves.
5. Pressure regulators.
6. Dielectric fittings.

1.3 SCOPE OF WORK

A. Prior to bid, contact the local utility company to determine the extent of their requirements and include all costs associated with the complete installation of the gas service line, gas meter assembly, gas meter and gas service regulator. Contractor shall be responsible for fees and permits required for the gas service.

B. Contract shall include routing gas main from the local utility main to the building and throughout project as indicated on Drawings.

C. Provide gas pressure regulator downstream of the meter assembly to provide adequate gas pressure to equipment furnished in project. Coordinate gas supply pressure and equipment supply pressure requirements with the utility company and equipment manufacturer.

D. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:

1. International Fuel Gas Code.
2. NFPA 54.

1.4 QUALITY ASSURANCE

A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

C. Gas Regulators shall be AGA rated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of authorities having jurisdiction.

B. Deliver pipes and tubes 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.

C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.

D. Protect stored PE pipes and valves from direct sunlight.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Natural-Gas Service: Do not interrupt natural-gas service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide purging and startup of natural-gas supply according to requirements indicated:

1. Notify Architect, Owner and Engineer no fewer than seven days in advance of proposed interruption of natural-gas service.
2. Do not proceed with interruption of natural-gas service without Architect's permission.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Minimum Operating-Pressure Ratings:

1. Piping and Valves: 100 psig minimum unless otherwise indicated.

2. Service Regulators: 100 psig minimum unless otherwise indicated.
3. Minimum Operating Pressure of Service Meter: 5 psig.

B. Natural-Gas System Pressures within Buildings: Two pressure ranges. Primary pressure is more than 0.5 psig but not more than 2 psig, and is reduced to secondary pressure of 0.5 psig or less.

2.2 PIPES, TUBES, AND FITTINGS

A. See Part 3 – Piping Schedule articles to determine where pipes, tubes, fittings and joining materials are applied in various services.

B. Steel Pipe: ASTM A53/A53M, black steel, Schedule 40, Type E or S, Grade B.

1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
2. Wrought-Steel Welding Fittings: ASTM A234/A234M for butt welding and socket welding.
3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
   a. Material Group: 1.1.
   b. End Connections: Threaded or butt welding to match pipe.
   c. Lapped Face: Not permitted underground.

d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum O-rings, and spiral-wound metal gaskets.
e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground and stainless-steel underground.

5. Mechanical Couplings:
a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
i. Baker Hughes Company.
ii. Smith-Blair, Inc.
b. Stainless-steel flanges and tube with epoxy finish.
c. Buna-nitrile seals.
d. Stainless-steel bolts, washers, and nuts.
e. Coupling shall be capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
f. Steel body couplings installed underground on plastic pipe shall be factory equipped with anode.

2.3 PIPING SPECIALTIES

A. Appliance Flexible Connectors:

1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
4. Corrugated stainless-steel tubing with polymer coating.
5. Operating-Pressure Rating: 0.5 psig.
6. End Fittings: Zinc-coated steel.
7. Threaded Ends: Comply with ASME B1.20.1.
8. Maximum Length: 72 inches

B. Quick-Disconnect Devices: Comply with ANSI Z21.41.

1. Copper-alloy convenience outlet and matching plug connector.
2. Nitrile seals.
3. Hand operated with automatic shutoff when disconnected.
4. For indoor or outdoor applications.
5. Adjustable, retractable restraining cable.

C. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.4 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for natural gas.

B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.5 GAS VALVES

A. General Requirements for Metallic Valves, **(NPS 2 and Smaller)**: Comply with ASME B16.33.

1. CWP Rating: 125 psig.
2. Threaded Ends: Comply with ASME B1.20.1.

3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
4. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
5. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.

B. General Requirements for Metallic Valves, **(NPS 2-1/2 and Larger)**: Comply with ASME B16.38.

1. CWP Rating: 125 psig.
2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
3. Service Mark: Initials "WOG" shall be permanently marked on valve body.

C. Service / Main Line Valves: Cast-Iron, Lubricated Plug Valves: MSS SP-78.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. A.Y. McDonald Mfg. Co.
   b. Flowserve Corporation.
   c. Homestead Valve.
   d. Milliken Valve Company.
   e. Mueller Co.
   f. R & M Energy Systems; Robbins & Myers.
   g. Nordstrom.
   h. Resun.
2. Body: Cast iron, complying with ASTM A126, Class B.
3. Plug: Bronze or nickel-plated cast iron.
4. Seat: Coated with thermoplastic.
5. Stem Seal: Compatible with natural gas.
6. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
7. Operator: Square head or lug type with tamperproof feature where indicated.
8. Pressure Class: 125 psig.
9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

D. Equipment / Shut-off Valves: Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Nibco.
   b. Apollo Flow Controls; Conbraco Industries, Inc.
   c. Milwaukee.
   d. BrassCraft Manufacturing Co.; a Masco company.
   e. Lyall, R. W. & Company, Inc.
   f. Perfection Corporation.
   g. A.Y. McDonald Mfg. Co
2. Body: Bronze, complying with ASTM B584.
3. Ball: Chrome-plated bronze.
4. Stem: Bronze; blowout proof.
5. Seats: Reinforced TFE; blowout proof.
6. Packing: Threaded-body packnut design with adjustable-stem packing.

7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
8. CWP Rating: 600 psig.
9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

E. Automatic Emergency Shut-off Valves.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ASCO Red Hat Series 8044
   b. Honeywell.
2. Listing: UL listed and Factory Mutual (FM) Approved for natural gas service.
3. Valve shall be 2-way electrically tripped solenoid type, fail safe closed; manual reset; Type 1 solenoid enclosure; NBR seals and disc; stainless steel core tube and springs; copper coil.

2.6 PRESSURE REGULATORS

A. General Requirements:

1. Single stage and suitable for natural gas.
2. Steel jacket and corrosion-resistant components.
3. Elevation compensator.
4. End Connections: Threaded for regulators NPS 2 and smaller; flanged for regulators NPS 2-1/2 and larger.

B. Line Pressure Regulators: Comply with ANSI Z21.80.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Meter Company.
   b. Dormont; a WATTS brand.
   c. Fisher Control Valves & Instruments; a brand of Emerson Process Management.
   d. Maxitrol Company.
2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
6. Orifice: Aluminum; interchangeable.
7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
10. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
11. Maximum Inlet Pressure: 2 psig.

C. Appliance Pressure Regulators: Comply with ANSI Z21.18.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Dormont; a WATTS brand.
   b. Eaton.
   c. Harper Wyman Co.
   d. Maxitrol Company.
   e. SCP, Inc.
2. Body and Diaphragm Case: Die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: Nitrile rubber.
6. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
7. Factory-Applied Finish: Minimum three-layer polyester and polyurethane paint finish.
8. Regulator may include vent limiting device, instead of vent connection, if approved by authorities having jurisdiction.
9. Maximum Inlet Pressure: 2 psig.

2.7 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions (NPS 1/2 to NPS 2):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. A.Y. McDonald Mfg. Co.
   b. HART Industrial Unions, LLC.
   c. WATTS.
   d. Wilkins.
   e. Zurn Industries, LLC.
2. Description:
   a. Standard: ASSE 1079.
   b. Pressure Rating: 125 psig minimum at 180 deg F.
   c. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges (NPS 2-1/2 to NPS 4):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Capitol Manufacturing Company.
   b. Matco-Norca.
   c. WATTS.
   d. Wilkins.
2. Description:
   a. Standard: ASSE 1079.
   b. Factory-fabricated, bolted, companion-flange assembly.
   c. Pressure Rating: 125 psig minimum at 180 deg F.
   d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Advance Products & Systems, Inc.
   b. Calpico, Inc.
   c. Central Plastics Company.
   d. Pipeline Seal and Insulator, Inc.
2. Description:
   a. Nonconducting materials for field assembly of companion flanges.
   b. Pressure Rating: 150 psig.
   c. Gasket: Neoprene or phenolic.
   d. Bolt Sleeves: Phenolic or polyethylene.
   e. Washers: Phenolic with steel backing washers.

2.8 LABELING AND IDENTIFYING

A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Close equipment shutoff valves before turning off natural gas to premises or piping section.

B. Inspect natural-gas piping according to NFPA 54 to determine that natural-gas utilization devices are turned off in piping section affected.

C. Comply with NFPA 54 requirements for prevention of accidental ignition.

3.3 OUTDOOR PIPING INSTALLATION

A. Comply with NFPA 54 for installation and purging of natural-gas piping.

B. Install underground, natural-gas piping buried at least 36 inches below finished grade.

1. If natural-gas piping is installed less than 36 inches below finished grade, install it in containment conduit.

C. Install underground, PE, natural-gas piping according to ASTM D2774.

D. Steel Piping with Protective Coating:

1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.

2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.

E. Install fittings for changes in direction and branch connections.

F. Install pressure gage upstream and downstream from each service regulator.

3.4 INDOOR PIPING INSTALLATION

A. Comply with NFPA 54 for installation and purging of natural-gas piping.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.

D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

G. Locate valves for easy access.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Verify final equipment locations for roughing-in.

K. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.

L. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.

1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.

M. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.

N. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.

O. Concealed Location Installations: Except as specified below, install concealed natural-gas piping and piping installed under the building in containment conduit constructed of steel pipe with welded joints as described in Part 2. Install a vent pipe from containment conduit to outdoors and terminate with weatherproof vent cap.

1. Above Accessible Ceilings: Natural-gas piping, fittings, valves, and regulators may be installed in accessible spaces without containment conduit.
2. In Floors: Install natural-gas piping with welded or brazed joints and protective coating in cast-in-place concrete floors. Cover piping to be cast in concrete slabs with minimum of 1-1/2 inches of concrete. Piping may not be in physical contact with other metallic structures such as reinforcing rods or electrically neutral conductors. Do not embed piping in concrete slabs containing quick-set additives or cinder aggregate.
3. In Walls or Partitions: Protect tubing installed inside partitions or hollow walls from physical damage using steel striker barriers at rigid supports.
    a. Exception: Tubing passing through partitions or walls does not require striker barriers.
4. Prohibited Locations:
    a. Do not install natural-gas piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
    b. Do not install natural-gas piping in solid walls or partitions.

P. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.

Q. Connect branch piping from top or side of horizontal piping.

R. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.

S. Do not use natural-gas piping as grounding electrode.

T. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.

U. Install pressure gage upstream and downstream from each line regulator.

V. Install sleeves for piping penetrations of walls, ceilings, and floors.

W. Install sleeve seals for piping penetrations of concrete walls and slabs.

X. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.5 VALVE INSTALLATION

A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing connector.

B. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.

C. Install cooking appliance shunt trip valve per valve manufacturer’s instructions and in coordination with the kitchen equipment vendor and installer.

3.6 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints:

1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
2. Cut threads full and clean using sharp dies.
3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Welded Joints:

1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
2. Bevel plain ends of steel pipe.
3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

E. Flanged Joints: Install gasket material, size, type, and thickness appropriate for natural-gas service. Install gasket concentrically positioned.

F. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D2657.

1. Plain-End Pipe and Fittings: Use butt fusion.
2. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.7 HANGER AND SUPPORT INSTALLATION

A. Install hangers for steel piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

B. Install hangers for corrugated stainless-steel tubing, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

C. Support horizontal piping within 12 inches of each fitting.

D. Support vertical runs of steel piping to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

E. Support vertical runs of corrugated stainless-steel tubing to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.8 CONNECTIONS

A. Connect to utility's gas main after the gas meter and the gas regulator.

B. Install natural-gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.

C. Install piping adjacent to appliances to allow service and maintenance of appliances.

D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.

E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.9 LABELING AND IDENTIFYING

A. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 PAINTING

A. Paint exposed, Exterior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.

1. Alkyd System: MPI EXT 5.1D.
   a. Prime Coat: Alkyd anticorrosive metal primer.
   b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
   c. Topcoat: Exterior alkyd enamel (gloss).
      Color (Service Gas Regulator and Upstream): Grey
   d. Color (Downstream of Service Gas Regulator): Yellow.

B. Paint exposed, Interior metal piping, fittings and piping specialties, except components, with factory-applied paint or protective coating.

1. Latex Over Alkyd Primer System: MPI INT 5.1Q.
   a. Prime Coat: Alkyd anticorrosive metal primer.
   b. Intermediate Coat: Interior latex matching topcoat.
   c. Topcoat: Interior latex (gloss).
   d. Color: Yellow.

C. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

3.11 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Test, inspect, and purge natural gas according to NFPA 54 and authorities having jurisdiction.

C. Natural-gas piping will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports and submit to the Architect and Engineer for review.

3.12 OUTDOOR PIPING SCHEDULE

A. Underground natural-gas piping shall be the following:

1. PE pipe and fittings joined by heat fusion, or mechanical couplings; service-line risers with tracer wire terminated in an accessible location.

B. Aboveground natural-gas piping, **(NPS 2 and Smaller)** shall be the following:

1. Steel pipe with malleable-iron fittings and threaded joints.

C. Aboveground natural-gas piping, **(NPS 2-1/2 and Larger)** shall be the following:

1. Steel pipe with wrought-steel fittings and welded joints.

3.13 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES LESS THAN 0.5 PSIG

A. Aboveground, natural-gas piping **(NPS 2 and smaller)** shall be one of the following:

1. Steel pipe with malleable-iron fittings and threaded joints.
2. At Contractor's option, for branch piping **(NPS 1 or smaller)** Corrugated stainless-steel tubing with mechanical fittings having socket or threaded ends to match adjacent piping.
3. Exceptions:
   a. All exposed piping located within areas utilized as a return air plenum shall have welded joints with Schedule 40 socket welded forged steel fittings conforming ASME B16.11.
   b. All exposed piping serving laboratories from main natural gas riser to each emergency shut-off valve shall have welded joints with Schedule 40 socket welded forged steel fittings conforming to ASME B16.11.

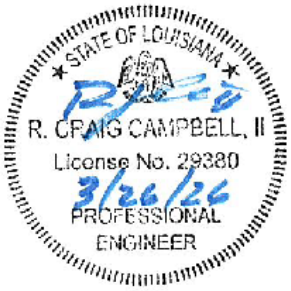
B. Aboveground natural-gas piping, **(NPS 2-1/2 and Larger)** shall be the following:

1. Steel pipe with wrought-steel fittings and welded joints.

3.14 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES MORE THAN 5 PSIG

A. Aboveground, Branch and Distribution Piping: Steel pipe with steel welding fittings and welded joints.

END OF SECTION 22 11 23



SECTION 22 13 19 – PLUMBING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. This Section includes plumbing specialties for water distribution systems; soil, waste, and vent systems; and storm drainage systems.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing piping systems with following minimum working pressure ratings, except where otherwise indicated:

1. Water Distribution Systems, Below Ground: 250 psig.
2. Water Distribution Systems, Above Ground: 250 psig.
3. Soil, Waste, and Vent Systems: 10-foot head of water.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections, and Utility Company requirements.

B. Submit product data including rated capacities of selected models and weights (shipping, installation, and operation). Indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections for the following plumbing specialty products that apply to this project scope:

1. Drain valves.
2. Trap seal primer valves.
3. Cleanouts, cover plates, and access panels.
4. Floor drains, open receptors, trench drains, and roof drains.
5. Sleeve penetration systems.

C. Maintenance data for inclusion in Operating and Maintenance manuals as specified in Division 01.

1.5 QUALITY ASSURANCE

A. Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.

B. Electrical Component Standard: NFPA 70, "National Electrical Code."

C. Listing and Labeling: Provide equipment that is listed and labeled.

D. The Terms "Listed" and "Labeled": As defined in the "National Electrical Code," Article 100.

E. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

1.6 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below. Package them with protective covering for storage and identify with labels clearly describing contents.

B. Operating Keys (Handles): Furnish 1 extra key for each key-operated hose bibb and hydrant installed.

PART 2 - PRODUCTS

2.1 MISCELLANEOUS PIPING SPECIALTIES

A. Piping specialties such as escutcheons, dielectric fittings, sleeves, and sleeve seals are specified in Division 23 Section "Basic Mechanical Materials and Methods."

B. Stop-and-Waste Drain Valves: Ball valve or MSS SP-80 gate valve, rated for 200 psig WOG minimum, ASTM B 62 bronze body, with 1/8-inch side drain outlet and cap.

C. Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, with the following characteristics:

1. 30-75 psig minimum operating pressure.
2. Bronze body with atmospheric-vented drain chamber.
3. Inlet and Outlet Connections: 1/2 inch threaded, union, or solder joint.
4. Gravity Drain Outlet Connection: 1/2 inch threaded or solder joint.
5. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

D. Stack Flashing Fittings: Counterflashing-type, cast-iron fitting, with bottom recess for termination of roofing membrane, and with threaded or hub top for extension of vent pipe.

2.2 CLEANOUTS

A. General: Size cleanouts as indicated on drawings, or where not indicated, same size as connected drainage piping.

B. Cleanouts larger than 4 inches are not required except where indicated.

C. Cleanouts: ASME A112.36.2M, cast-iron body with straight threads and gasket seal or taper threads for plug, flashing flange and clamping ring, and a brass closure plug. Cleanouts for installation in floors not having membrane waterproofing may be furnished without clamping ring.

D. Covers of clean-outs shall be extra-heavy duty, AASHTO H20-44 or greater due to high wheel/point loads.

E. Cleanout top styles shall be coordinate with floor types.

2.3 SLEEVE PENETRATION SYSTEMS

A. Description: UL 1479, through-penetration firestop assembly consisting of sleeve and stack fitting with firestopping plug.

1. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on 1 end for installation in cast-in-place concrete slabs.
2. Stack Fitting: ASTM A 48, cast-iron, hubless-pattern, wye branch stack fitting with neoprene O ring at base and cast-iron plug in thermal-release harness in branch. Include PVC protective cap for plug.
    a. Special Coating: Include corrosion-resistant interior coating on fittings for vent stacks.

2.4 FLASHING MATERIALS

A. Elastic Membrane: Nonreinforced flexible, black elastic, sheet, 50 to 65 mils thick and complying with the following:

1. Shore A Hardness: ASTM D 2240, 50 to 70.
2. Tensile Strength: ASTM D 412, 1200 psi.
3. Tear Resistance: ASTM D 624, Die C, 20 lb per linear inch.
4. Ultimate Elongation: ASTM D 412, 250 percent.
5. Low-Temperature Brittleness: ASTM D 746, minus 30 deg F.
6. Resistance to Ozone Aging: ASTM D 1149, no cracks for 10 percent elongated sample for 100 hours in ozone at 104 deg F.
7. Resistance to Heat Aging: ASTM D 573, maximum hardness increase of 15 points, elongation reduction of 40 percent, and tensile strength reduction of 30 percent, for 70 hours at 212 deg F.
8. Fasteners: Metal compatible with material and substrate being fastened.

PART 3 - EXECUTION

3.1 PIPING SPECIALTY INSTALLATION

A. Install strainers on supply side of each control valve, pressure-regulating valve, and solenoid valve, and where indicated.

B. Install trap seal primer valves with valve outlet piping pitched down toward drain trap a minimum of 1/8 inch per foot (1:100) (1 percent) and connect to floor drain body, trap, or inlet fitting. Adjust valve for proper flow.

C. Install expansion joints on vertical risers, stacks, and conductors.

D. Install cleanouts in above-ground piping and building drain piping where indicated, and where not indicated, according to the following:

1. Size same as drainage piping up to 4 inches size. Use 4 inches size for larger drainage piping except where larger size cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet for piping 3 inches and smaller and 80 feet for larger piping.
4. Locate at base of each vertical soil or waste stack.

E. Install cleanout deck plates (covers), of types indicated, with top flush with finished floor, for floor cleanouts for piping below floors.

F. Install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall, for cleanouts located in concealed piping.

G. Install flashing flange and clamping device with each stack and cleanout passing through floors having waterproof membrane.

H. Install vent flashing sleeves on stacks passing through roof. Secure over stack flashing according to the manufacturer's written instructions.

I. Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1-inch clearance between vent pipe and roof substrate.

3.2 CONNECTIONS

A. Supply Runouts to Fixtures: Install hot- and cold-water supply piping runouts to fixtures of sizes indicated, but not smaller than required by equipment/fixture connection size and/or required by the plumbing code.

B. Drainage Runouts to Fixtures: Provide drainage and vent piping runouts to plumbing fixtures and drains, with approved trap, of sizes indicated, for equipment/fixture connection size and/or required by the but not smaller than required by plumbing code.

C. Locate drainage piping runouts as close as possible to bottom of floor slab supporting fixtures or drains.

3.3 FLASHING INSTALLATION

A. Provide flashing manufactured in a single piece except where large pans, sumps, or other drainage shapes are required.

B. Install 4 psf lead flashing or 16 oz. per sq. ft. copper, except when another weight or material is specified.

C. Install 6 psf lead flashing or heavier where burning (welding) of lead sheets is required.

D. Solder joints of metal sheet flashing utilized sheets where required.

E. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with membrane waterproofing.

1. Pipe Flashing: Sleeve type, matching pipe size, with minimum sleeve length of 10 inches, and skirt or flange extending at least 8 inches around pipe.
2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches around specialty.

F. Set flashing on floors and roofs in solid coating of bituminous cement.

G. Secure flashing into sleeve and specialty clamping ring or device.

H. Install flashing for piping passing through roofs with counter flashing or commercially made flashing fittings, according to Division 07 Section "Sheetmetal Flashing and Trim."

I. Extend flashing up vent pipe passing through roofs and turn down into pipe or secure flashing into cast-iron sleeve having calking recess.

J. Fabricate and install metal sheet flashing and pans, sumps, and other drainage shapes consistent with Architectural details and materials identified. Install drain connection at all equipment requiring drain piping connection.

3.4 COMMISSIONING

A. Preparation: Perform the following checks before start-up:

1. Systems tests are complete.
2. Damaged and defective specialties and accessories have been replaced or repaired.
3. There is clear space for servicing of specialties.

B. Before operating systems, perform these steps:

1. Close drain valves, hydrants, and hose bibbs.
2. Open valves to full open position.
3. Remove and clean strainers.
4. Verify drainage and vent piping are clear of obstructions. Flush with water until clear.

C. Starting Procedures: Follow manufacturer's written procedures.

3.5 ADJUSTING

A. Adjust operation and correct deficiencies discovered during commissioning.

3.6 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

B. Place plugs in ends of uncompleted piping at end of day or when work stops.

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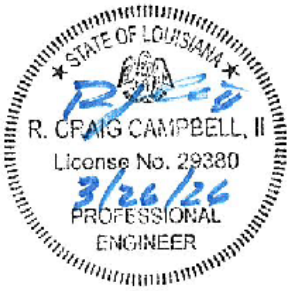


SECTION 22 14 00 – DRAINAGE AND VENT SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. This Section specifies building sanitary drainage and vent piping systems, building condensate drainage system, building grease waste drainage and vent system, and storm drainage and vent piping systems, including drains and drainage specialties.

1.3 DEFINITIONS

A. Building Drain: That part of the lowest piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the building sewer.

B. Building Sewer: That part of the drainage system which extends from the end of the building drain and conveys its discharge to a public sewer, private sewer, individual sewage disposal system, or other point of disposal.

C. Drainage System: Includes all the piping within a public or private premise which conveys sewage, rain water or other liquid wastes to a point of disposal. It does not include the mains of public sewer systems or a private or public sewage treatment or disposal plant.

D. Vent System: A pipe or pipes installed to provide a flow of air to or from a drainage system, or to provide a circulation of air within such system to protect trap seals from siphonage and back pressure.

1.4 SUBMITTALS

A. Refer to Division 01 and Division 23, Basic Mechanical Requirements for administrative and procedural requirements for submittals.

B. Product Data: Submit product data for the following products that apply to this project scope:

1. Drainage piping specialties
2. Floor drains.

C. Quality Control Submittals:

1. Submit reports specified in Part 3 of this Section.

1.5 QUALITY ASSURANCE

A. Codes and Standards:

1. Plumbing Code Compliance: Comply with applicable portions of Edition 2015 of the International Plumbing Code.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate the installation of roof drains, flashing, and roof penetrations.

B. Coordinate flashing materials installation of roofing, waterproofing, and adjoining substrate work.

C. Coordinate the installation of drains in poured-in-place concrete slabs, to include proper drain elevations, installation of flashing, and slope of slab to drains.

D. Coordinate with installation of sanitary and storm sewer systems as necessary to interface building drains with drainage piping systems.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer Uniformity: conform with the requirements specified in Division 23, Basic Mechanical Requirements, under "Product Options" for the following drainage and vent systems.

2.2 DRAINAGE PIPING SPECIALTIES

A. Backwater Valves: Valve assembly shall be bronze fitted cast-iron, with bolted cover. Flapper shall provide a maximum 1/4" clearance between flapper and seat for air circulation. Valve ends shall suit piping material.

B. Trap Primers: Bronze body valve with automatic vacuum breaker, with 1/2" connections matching piping system. Complying with ASSE 1018.

C. Expansion Joints: Cast-iron body with adjustable bronze sleeve, bronze bolts with wing nuts.

D. Cleanout Plugs: Cast-bronze or brass, threads complying with ANSI B2.1, countersunk head.

E. Floor Cleanouts: Cast-iron body and frame, and adjustable round top as follows:

1. Nickel-Bronze Top: Manufacturer's standard cast unit with the following patterns:
2. Exposed flush type, standard non-slip scored or abrasive finish.
3. Cast-iron Top: Manufacturer's extra-heavy duty cast unit with the following patterns:
   a. Exposed flush type, standard non-slip scored or abrasive finish.
4. Wall Cleanouts: Cast-iron body adaptable to pipe with cast-bronze or brass cleanout plug; stainless steel cover including screws.
5. Flashing Flanges: Cast-iron watertight stack or wall sleeve with membrane flashing ring. Provide underdeck clamp and sleeve length as required.
6. Vent Flashing Sleeves: Cast-iron calking type roof coupling for cast-iron stacks, cast-iron threaded type roof coupling for steel stacks, and cast bronze stack flashing sleeve for copper tubing.
7. Frost-Proof Vent Caps: Construct of galvanized iron, copper, or lead-coated copper, sized to provide 1" air space between outside of vent pipe and inside of flashing collar extension.
8. Vandal-Proof Vent Caps: Cast-iron body full size of vent pipe, with calked base connection for cast-iron pipes, threaded base for steel pipes.

2.3 FLOOR DRAINS

A. Floor drain type designations, descriptions, and sizes are indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify all dimensions by field measurements. Verify that all drainage and vent piping and specialties may be installed in accordance with pertinent codes and regulations, the original design, and the referenced standards.

B. Verify all existing grades, inverts, utilities, obstacles, and topographical conditions prior to installations.

C. Examine rough-in requirements for plumbing fixtures and other equipment having drain connections to verify actual locations of piping connections prior to installation.

D. Examine walls, floors, roof, and plumbing chases for suitable conditions where piping and specialties are to be installed.

E. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION FOUNDATION FOR UNDERGROUND BUILDING DRAINS

A. Grade trench bottoms to provide a smooth, firm and stable foundation, free from rock, throughout the length of the pipe.

B. Remove unstable, soft, and unsuitable materials the surface upon which pipes are to be laid and backfill with clean sand and pea gravel to indicate invert elevation.

C. Shape bottom of trench to fit bottom of pipe for 90-degrees (bottom 1/4 of the circumference). Fill unevenness with tamped sand backfill. At each pipe joint dig bell holes to relieve the bell of the pipe of all loads and to ensure continuous bearing of the pipe barrel on the foundation.

3.3 JOINING PIPES AND FITTINGS

A. Copper Tubing: Solder joints in accordance with the procedures specified in ANSI B9.1.

B. Cast-Iron Soil Pipe: Make lead and oakum calked joints, compression joints, and hubless joints in accordance with the recommendations in the CISPI Cast Iron Soil Pipe and Fittings Handbook, Chapter IV.

3.4 INSTALLATION

A. Refer to the separate Division 23 section: Basic Piping Materials and Methods, for general piping installation instructions.

B. Install supports and anchors in accordance with Division-23 Basic Mechanical Materials and Methods section "Supports and Anchors".

C. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate the general location and arrangement of the piping systems. Location and arrangement of piping layout take into account many design considerations. So far as practical, install piping as indicated.

D. Make changes in direction for drainage and vent piping using appropriate 45-degree wyes, half-wyes, or long sweep quarter, sixth, eighth, or sixteenth bends. Sanitary tees or short quarter bends may be used on vertical stacks of drainage lines where the change in direction of flow is from horizontal to vertical, except use long-turn tees where two fixtures are installed back to back and have a common drain. Straight tees, elbows, and crosses may be used on vent lines. No change in direction of flow greater than 90 degrees shall be made. Where different sizes of drainage pipes and fittings are connected, use proper size, standard increasers and reducers. Reduction of the size of drainage piping in the direction of flow is prohibited.

E. Install underground building drains to conform with the plumbing code, and in accordance with the Cast Iron Soil Pipe Institute Engineering Manual. Lay underground building drains beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install required gaskets in accordance with manufacturer's recommendations for use of lubricants, cements, and other special installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.

F. Install building drain pitched down at minimum slope of 1/4" per foot (2 percent) for piping 3" and smaller, and 1/8" per foot (1 percent) for piping 4" and larger.

G. Extend building drain to connect to sewer piping, of size and in location indicated for service entrance to building. Sewer piping is specified in a separate section of Division 02.

H. Install sleeve and mechanical sleeve seal through foundation wall for watertight installation.

I. Install 1" thick extruded polystyrene over underground building drain piping not under building. Width of insulation shall extend minimum of 12" beyond each side of pipe. Install directly over, and center on pipe center line.

3.5 INSTALLATION OF PIPING SPECIALTIES

A. Install backwater valves in sanitary building drain piping as indicated, and as required by the plumbing code.

B. Install expansion joints on vertical risers as indicated, and as required by the plumbing code.

C. Above Ground Cleanouts: Install in above ground piping and building drain piping as indicated, and as required by plumbing code;

1. At each change in direction of piping greater than 45 degrees;
2. At minimum intervals of 50' for piping 3" and smaller and 80' for larger piping;
3. At base of each vertical soil or waste stack.

D. Clean-outs Covers (extra heavy duty): Install floor and wall cleanout covers for concealed piping, types as indicated at all cleanouts.

E. Flashing Flanges: Install flashing flange and clamping device with each stack and clean-out passing through waterproof membranes.

F. Vent Flashing Sleeves: Install on stacks passing through roof, secure over stack flashing in accordance with manufacturer's instructions.

G. Frost-Proof Vent Caps: Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1" clearance between vent and pipe and roof substrate.

3.6 INSTALLATION OF FLOOR DRAINS

A. Install floor drains in accordance with manufacturer's written instructions and in locations indicated.

B. Install floor drains at low points of surface areas to be drained, or as indicated. Set tops of drains flush with finished floor.

C. Set drain elevation depressed below finished slab elevation as listed below to provide proper slope to drain:

DEPRESSION	RADIUS OF AREA DRAINED
1/2"	5'-0"
3/4"	10'-0"
1”	15'-0"
1-1/4"	20'-0"
1-1/2"	25'-0"

D. Trap all drains connected to the sanitary sewer. Provide 6" deep seal p-traps, and trap primers.

E. Install drain flashing collar or flange so that no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes, where penetrated.

F. Position drains so that they are accessible and easy to maintain.

3.7 INSTALLATION OF TRAP PRIMERS

A. Install trap primers with piping pitched towards drain trap, minimum of 1/8" per foot (1 percent). Adjust trap primer for proper flow.

3.8 CONNECTIONS

A. Piping Runouts to Fixtures: Provide drainage and vent piping runouts to plumbing fixtures and drains, with approved trap, of sizes indicated.

B. Locate piping runouts as close as possible to bottom of floor slab supporting fixtures or drains.

3.9 FIELD QUALITY CONTROL

A. Inspections:

1. Do not enclose, cover, or put into operation drainage and vent piping system until it has been inspected and approved by the Architect.
2. During the progress of the installation, notify the Architect, at least 24 hours prior to the time such inspection must be made. Perform tests specified below in the presence of the Architect.
3. Rough-in Inspection: Arrange for inspection of the piping system before concealed or closed-in after system is roughed-in, and prior to setting fixtures.
4. Final Inspection: Arrange for a final inspection by the Architect to observe the tests specified below and to ensure compliance with the requirements of the plumbing code.
5. Re-inspections: Whenever the piping system fails to pass the test or inspection, make the required corrections, and arrange for reinspected by the Architect.
6. Reports: Prepare inspection reports, signed by the Architect.

B. Piping System Test:

1. Test for leaks and defects all new drainage and vent piping systems and parts of existing systems, which have been altered, extended or repaired. If testing is performed in segments, submit a separate report for each test, complete with a diagram of the portion of the system tested.
2. Leave uncovered and unconcealed all new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose all such work for testing, that has been covered or concealed before it has been tested and approved.

C. Drainage and Venting System Testing Procedures:

1. Rough Plumbing: Except for outside leaders and perforated or open jointed drain tile, test the piping of plumbing drainage and venting systems upon completion of the rough piping installation. Tightly close all openings in the piping system, and fill with water to the point of overflow, but not less than 10 feet head of water. Water level shall not drop during the period from 15 minutes before the inspection starts, through completion of the inspection. Inspect all joints for leaks.
2. Finished Plumbing: After the plumbing fixtures have been set and their traps filled with water, their connections shall be tested and proved gas and water-tight. Plug the stack openings on the roof and building drain where it leaves the building, and introduce air into the system equal to a pressure of 1" water column. Use a "U" tube or manometer inserted in the trap of a water closet to measure this pressure. Air pressure shall remain constant without the introduction of additional air throughout the period of inspection. Inspect all plumbing fixture connections for gas and water leaks.
3. Repair all leaks and defects using new materials and retest system or portion thereof until satisfactory results are obtained.
4. Prepare reports for all tests and required corrective action.

3.10 ADJUSTING AND CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

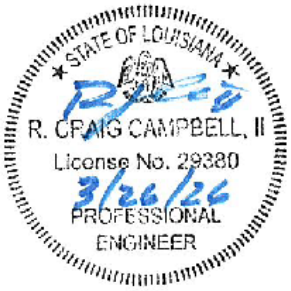
B. Clean drain strainers, domes, and traps. Remove dirt and debris.

3.11 PROTECTION

A. Protect drains during remainder of construction period, to avoid clogging with dirt and debris, and to prevent damage from traffic and construction work.

B. Place plugs in ends of uncompleted piping at end of day or whenever work stops.

END OF SECTION 22 14 00



SECTION 22 40 00 – PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

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

B. Products unloaded, uncreated, set in place, installed and final connections made but not furnished under this Section include:

1. Plumbing Fixtures described in Plumbing Fixture Schedule.
2. Accessories, appliances, appurtenances, and equipment specified in other sections, requiring plumbing services or fixture-related devices such as ice makers for refrigerators, as indicated.

1.3 DEFINITIONS

A. Accessible: Describes a plumbing fixture, building, facility, or portion thereof that can be approached, entered, and used by physically handicapped people.

B. Accessory: Device that adds effectiveness, convenience, or improved appearance to a fixture but is not essential to its operation.

C. Appliance: Device or machine designed and intended to perform a specific function.

D. Appurtenance: Device or assembly designed to perform some useful function when attached to or used with a fixture.

E. Equipment: Device used with plumbing fixtures or plumbing systems to perform a certain function for plumbing fixtures but that is not part of the fixture.

F. Fitting: Fitting installed on or attached to a fixture to control the flow of water into or out of the fixture.

G. Fixture: Installed receptor connected to the water distribution system that receives and makes available potable water and discharges the used liquid or liquid-borne wastes directly or indirectly into the drainage system. The term "Fixture" means the actual receptor, except when used in a general application where terms "Fixture" and "Plumbing Fixture" include associated trim, fittings, accessories, appliances, appurtenances, support, and equipment.

H. Roughing-In: Installation of piping and support for the fixture prior to the actual installation of the fixture.

I. Support: Device normally concealed in building construction, for supporting and securing plumbing fixtures to walls and structural members. Supports for urinals, lavatories, and sinks

are made in types suitable for fixture construction and the mounting required. Categories of supports are:

1. Carrier: Floor-mounted support for wall-mounted water closet, and support fixed to wall construction for wall-hung fixture.
2. Chair Carrier: Support for wall-hung fixture, having steel pipe uprights that transfer weight to the floor.
3. Chair Carrier, Heavy Duty: Support for wall-hung fixture, having rectangular steel uprights that transfer weight to the floor.
4. Reinforcement: Wood blocking or steel plate built into wall construction, for securing fixture to wall.

J. Trim: Hardware and miscellaneous parts, specific to a fixture and normally supplied with it required to complete fixture assembly and installation.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.

B. Product data for each type of plumbing fixture specified, including fixture and trim, fittings, accessories, appliances, appurtenances, equipment, supports, construction details, dimensions of components, and finishes.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with requirements of ANSI Standard A117.1, "Buildings and Facilities -- Providing Accessibility and Usability for Physically Handicapped People," and Public Law 90-480, "Architectural Barriers Act, 1968," with respect to plumbing fixtures for the physically handicapped.

B. Regulatory Requirements: Comply with requirements of ATBCB (Architectural and Transportation Barriers Compliance Board) "Uniform Federal Accessibility Standards (UFAS) - 1985-494-187" with respect to plumbing fixtures for the physically handicapped.

C. Listing and Labeling: Provide electrically (battery) operated fixtures specified in this Section that are listed and labeled.

1. The terms "listed" and "labeled" shall be as defined in the National Electrical Code, Article 100.
2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

D. Design Concept: The drawings indicate types of plumbing fixtures and are based on the specific descriptions, manufacturers, models, and numbers indicated. Plumbing fixtures having equal performance characteristics by other manufacturers may be considered provided that deviations in dimensions, operation, color or finish, or other characteristics are minor and do not change the design concept or intended performance as judged by the Architect. Burden of proof for equality of plumbing fixtures is on the proposer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver plumbing fixtures in manufacturer's protective packing, crating, and covering.

B. Store plumbing fixtures on elevated platforms in a dry location.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work as described in plumbing fixture schedule on drawings.

2.2 PLUMBING FIXTURES, GENERAL

A. Contractor shall install all plumbing fixtures shown on accompanying Drawings. Refer to both Plumbing and Architectural, and install all fixtures shown on either.

B. Provide plumbing fixtures and trim, fittings, other components, and supports as specified in "Plumbing Fixture Schedule" identified on plans.

C. All brass must be of the best quality. Lightweight goods will not be accepted.

D. All brass pipe shall be seamless brass tubing and nipples shall be extra heavy.

E. All fittings and trim shall be chromium plated heavy brass unless otherwise specified.

F. "P" traps on lavatories and sinks shall be cast brass with cleanouts.

G. All exposed piping shall be chromium plated.

H. Provide cut-off valves at each fixture in both hot and cold-water piping.

I. For the purpose of establishing type and class of fixtures required, the following plate numbers have been taken from the Manufacturer's Catalog as indicated Fixture manufacturer's and Model numbers with prior approval will be acceptable, however fixtures and accessories shall meet standards and features consistent with basis of design fixtures and accessories identified.

J. Provide plumbing fixtures and trim, fittings, other components, and supports as specified in "Plumbing Fixture Schedule" identified on plans.

2.3 PLUMBING FIXTURE SUPPORTS

A. Supports: ASME A112.6.1M, categories and types as required for wall-hanging fixtures specified, and wall reinforcement.

1. Support categories are:
   a. Carriers: Supports for wall-hanging fixtures supported from wall construction.
   b. Reinforcement: 2 inches by 4 inches wood blocking between studs or 1/4 inch by 6 inches steel plates attached to studs, in wall construction, to secure floor-mounted and special fixtures to wall.
   c. Support Types: Provide support of type having features required to match fixture.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for potable cold water and hot water supplies and soil, waste, and vent piping systems to verify actual locations of piping connections prior to installing fixtures.

B. Examine walls, floors, and cabinets for suitable conditions where fixtures are to be installed.

C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 APPLICATION

A. Install plumbing fixtures and specified components, in accordance with designations and locations indicated on Drawings.

B. Install supports for plumbing fixtures in accordance with categories indicated, and of type required:

1. Carriers for following fixtures:
   a. Wall-hanging fixtures supported from wall construction.
2. Chair carriers for the following fixtures:
   a. Wall-hanging urinals.
   b. Wall-hanging lavatories and sinks.
   c. Wall-hanging drinking fountains and electric water coolers.
3. Heavy-duty chair carriers for the following fixtures:
   a. Fixtures where specified.
4. Reinforcement for the following fixtures:
   a. Floor-mounted sinks required to be secured to wall.
   b. Recessed, box-mounted electric water coolers.

3.3 INSTALLATION OF PLUMBING FIXTURES

A. Install plumbing fixtures level and plumb, in accordance with fixture manufacturers' written installation instructions, roughing-in drawings, and referenced standards.

B. Install water closets with closet flanges and gasket seals.

C. Install wall-hanging, back-outlet urinals with gasket seals.

D. Fasten wall-hanging plumbing fixtures securely to supports attached to building substrate when supports are specified, and to building wall construction where no support is indicated.

E. Fasten wall-mounted fittings to reinforcement built into walls.

F. Fasten counter-mounting-type plumbing fixtures to casework.

G. Secure supplies behind wall or within wall pipe space, providing rigid installation.

H. Install stop valve in an accessible location in each water supply to each fixture.

I. Install trap on fixture outlet except for fixtures having integral trap.

J. Install escutcheons at each wall, floor, and ceiling penetration in exposed finished locations and within cabinets and millwork. Use deep pattern escutcheons where required to conceal protruding pipe fittings.

K. Seal fixtures to walls, floors, and counters using a sanitary-type, one-part, mildew-resistant, silicone sealant in accordance with sealing requirements specified in Division 07. Match sealant color to fixture color.

3.4 CONNECTIONS

A. Piping installation requirements are specified in other sections of Division 22. The Drawings indicate general arrangement of piping, fittings, and specialties. The following are specific connection requirements:

1. Install piping connections between plumbing fixtures and piping systems and plumbing equipment specified in other sections of Division 22.
2. Install piping connections indicated between appliances and equipment specified in other sections, direct connected to plumbing piping systems.

3.5 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Test fixtures to demonstrate proper operation upon completion of installation and after units are water pressurized. Replace malfunctioning fixtures and components, then retest. Repeat procedure until all units operate properly.

3.6 ADJUSTING AND CLEANING

A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.

B. Operate and adjust disposers, hot water dispensers, and controls. Replace damaged and malfunctioning units and controls.

C. Adjust water pressure at drinking fountains, electric water coolers, and faucets, shower valves, and flushometers having controls, to provide proper flow and stream.

D. Replace washers of leaking and dripping faucets and stops.

E. Clean fixtures, fittings, and spout and drain strainers with manufacturers' recommended cleaning methods and materials.

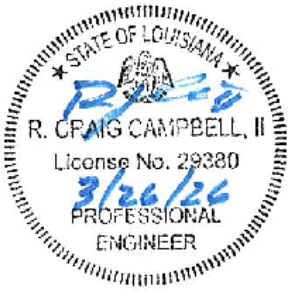
1. Review the data in Operating and Maintenance Manuals. Refer to Division 01.

3.7 PROTECTION

A. Provide protective covering for installed fixtures and fittings.

B. Do not allow use of fixtures for temporary facilities, except when approved in writing by the Owner.

END OF SECTION 22 40 00



SECTION 23 00 10 - MECHANICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. Furnish all labor and material necessary to provide and install the complete mechanical portion of this Contract as called for herein and on accompanying drawings. Parts of the mechanical division may be bid separately or in combination, at the Contractor's option; however, it shall be the responsibility of the Contractor to assure himself that all items covered in the mechanical Division have been included if he chooses to accept separate bids.

B. It is the intent of this specification that all materials with temperatures below ambient conditions or conveying any fluid/gas at temperatures below 70 deg. F be insulated to completely eliminate the potential for condensation. Unless specified elsewhere in these specifications, for materials that do not require and requiring occasional access, use 2" thick closed cell rubberized insulation with re-sealable fabric joints (hook and loop type).

C. Contractor shall refer to the Architectural and Structural drawings and install equipment, piping, etc. to meet building and space requirements. No equipment shall be bid on or submitted for approval if it will not fit in the space provided.

D. It is the intention of these specifications that all mechanical systems shall be furnished complete with all necessary valves, controls, insulation, piping devices, equipment, etc. necessary to provide a satisfactory installation that is complete and in good working order.

E. Contractor shall visit the site and acquaint himself thoroughly with all existing facilities and conditions which would affect his portion of the work. Failure to do so shall not relieve the Contractor from the responsibility of installing his work to meet the conditions.

F. Contractor shall protect the entire system and all parts thereof from injury throughout the project and up to acceptance of the work. Failure to do so shall be sufficient cause for the Architect to reject any piece of equipment.

1.3 BIDDING REQUIREMENTS AND RESPONSIBILITIES

A. Prime bidder is responsible for all work, of all trades and sub-contractors bidding this project. It is the prime bidder’s responsibility, prior to submitting a bid to ensure that sub-contractors coordinate all aspects of the work between trades, sub-contractors, etc. to the fullest extent possible.

B. Prime bidder shall ensure that all sub-contractors, suppliers, equipment vendors, etc., obtain all necessary and pertinent contract document information pertaining to their work prior to the submission of a bid.

C. Bidders of all or any portions of this section or division are required to review all contract documents including but not limited to Architectural drawings, Structural drawings, Mechanical drawings, Plumbing drawings, Electrical drawings, and Fire Alarm drawing section to coordinate requirements and responsibilities with and through prime bidder.

D. Bidders of all or any portions of this section or division, by furnishing a bid on a portion of the prime contract are indicating that they have received all contract documents and coordinated services provided under their portion of the work with the prime bidder; they are indicating that they have expressed any pertinent questions (which would result from a detailed, thorough review of the entire set of contract documents) to the prime bidder in accordance with Division 01 requirements, prior to bidding.

E. All timely, pertinent, questions provided in writing prior to bids, in accordance with Division 01 requirements, will be clarified, defined, or otherwise explained in written addendum and / or addendums prior to bids, in accordance with Division 01 requirements.

F. It is not the intention of these contract documents to leave any issue relating to coordination between trades or sub-contractors vaguely defined. The intention is to define all issues, coordination matters, equipment requirements, sizes, routing, etc. to the satisfaction of the prime bidder, prior to receipt of bids.

G. Bidders of all or any portions of this section or division, by virtue of the submission of a bid to the prime bidder, are indicating that they have reviewed the entire set of contract documents with due diligence and regard for the Owner's desire for a comprehensive and complete bid proposal; that they have expressed all concerns or questions requiring clarification on matters of coordination between trades and/or sub-contractors; that they have expressed any such concerns or questions in writing in accordance with Division 01 requirements.

H. Prime bidders, by submission of a comprehensive bid on the project are indicating that the subcontractors selected in their bid have complied with all Division 01 requirements, that they have indicated in writing, prior to bidding, all questions or concerns requiring clarification and/or explanation and have documented any and all specific exclusions involving work that would generally be considered to be work of their trade. The prime bidder shall coordinate all work so that anything excluded by the bidder of all or any portions of this section or division, have been addressed prior to bids in one of the following manners:

1. The work has been confirmed, by the prime bidder, to be work of another trade or subcontractor (whose proposal is also being accepted).
    a. Clarification of the matter has been made through the prime design professional via written addendum and is clearly and mutually understood by the prime bidder and the party raising the issue/question, or seeking clarification.
    b. The work has been accepted as the responsibility of the Contractor directly.

1.4 POST-BID VALUE ENGINEERING (V/E):

A. Value Engineering (V/E) defined: For purposes of Division 23 Specifications, in accordance with all Division 01 Requirements and all Terms and Conditions of proposed contract between Owner and Contractor, Value Engineering (V/E) shall be defined as a “post bid” process, whereby the apparent low bidder (having submitted a proposal in strict accordance with Project Contract Documents, that exceeds the Owner’s available funds for construction [AFC] for this specified project offers proposed changes (“Value Engineering”) to the work. This proposed value engineering may alter or adjust aforementioned contract document requirements in exchange for financial and/or other consideration (in response to a specific request by the Owner/Owner’s Representative).

B. Value Engineering may not be considered, prior to scheduled receipt and review of Bid Proposals by the Owner and an official written request from the Owner/Owner's Representative expressing the Owner's desire to consider value engineering items.

C. While it may be in the project Owner's interest to consider the first cost money saving that may be generated via alternatives and options generated via participation in Value Engineering, Division 23 contractor shall realize that substantive offers of Value Engineering (V/E), if accepted by the Owner, constitute a design-build agreement (offer and acceptance) with the owner, and drastically change the design concept of the project, as developed by the Professional of Record identified on the Contract Documents.

D. Should Contractor offer, and the owner accept value engineering options that alter aspects of the system design, equipment, performance and/or performance verification or monitoring of respective systems, Contractor shall provide duly licensed professional engineering consultants working on behalf of the Contractor (including sub-contractors and equipment vendors/manufacturers) to review, approve and take professional responsibility for performance and suitability of V/E hybrid systems, materials or operational changes related to respective V/E items. The Contractor's licensed professional engineering consultants and the Contractor assume any and all responsibility for the design and suitability in terms of performance, of hybrid systems installed, as Contractor's Professional of Record, absolving the original project Professional of Record (identified on the original Contract Documents, released for the original project Bid/Negotiation) from responsibility for the V/E hybrid systems portion of the work.

E. Division 23 Contractor, via the offer and acceptance of value engineering items on the project agrees to provide professional engineering design services and take full and complete responsibility for the hybrid design. Further, the Contractor's (V/E Items) professional of record (either employees, or independent consultants to the Contractor) through the offer and acceptance of V/E items, agree to indemnify and hold harmless the project owner, the owner's original A/E team (Professional of Record on behalf of the owner for the original Contract Documents) their heirs and assigns in regard to the V/E changes and their impact on the Division 23 systems altered, affected or modified, in whole or in part. The Professional of Record shown on the original Contract Documents in regard to the systems altered, adjusted, revised, modified or otherwise affected by the value engineering items implemented, shall be absolved of design responsibility as a result of implementation of V/E items, and their original use of Engineering Seals used for original Contract Documents, shall not apply.

1.5 MATERIAL AND EQUIPMENT

A. Specific reference in the Specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the Contractor, in such cases, may at his option use any article, device, product, material, fixture, form or type of construction which in the judgment of the Architect expressed in writing is equal to that specified.

B. Coordinate and properly relate all Work of this Division to building structure and work of all other trades.

C. Visit premises and become thoroughly familiar with existing conditions; verify all dimensions in field. Advise Architect of any discrepancies prior to Bid Date in accordance with Division 00.

D. Do not rough-in for any item or equipment furnished by others or noted "Not in Contract" (NIC), without first receiving rough-in information or determining rough-in requirements from

physically examining the existing equipment, receiving specific cut sheet information from the Owner's representative, other trades and/or Architect. Rough-in services for "NIC" equipment as required, as the work progresses.

E. Provide storage and protection for all equipment and materials in accordance with requirements of Division 00 and Division 01. Replace any equipment and materials damaged by improper handling, storage, or protection, at no additional cost to Owner.

F. Keep premises clean in accordance with requirements of Division 00 and Division 01.

1.6 SUBSTITUTIONS

A. Substitutions are allowed under La. R.S. 38:2291 and La R.S. 38:2292. Any requests for prior approval (as provided for under La. R.S. 38:2295) including any re-submitted data, shall be received by the Architect/Engineer a minimum of ten (10) working days prior to bid date. The Contractor shall recognize that it may be necessary to submit certain requests for prior approval sooner than the final date listed in the Instructions to Bidders, depending upon the complexity and completeness of the submittal. If, in the opinion of the Architect/Engineer, there is neither sufficient time available nor adequate descriptive data attached to the submittal, the submittal will not be considered. Except as otherwise specified, materials and equipment shall be new and bear the approval label of the Underwriters Laboratories, Inc. for the type of installation required.

B. Basis of design of systems is based on specific equipment for performance, size, shape, color, construction material, etc... If the use of other manufacturer's equipment, even though approved by Architect, involves additional cost due to space requirements, foundation requirements, increased mechanical or electrical services, the cost of such extra work shall be borne by the contractor. Even though a manufacturer's name appears in the Contract Documents as having acceptable equipment, his equipment shall be classified as being a substitute to the equipment originally designed for and named in the Contract Documents. Substitute equipment, materials, etc., will not be allowed to deviate from basis of design requirements.

C. All requests for prior approval shall identify where proposed material matches or exceeds the performance of the equipment specified. In addition, such submittal shall also clearly identify all deficiencies compared to specified product. Submittal of general cut sheets will be returned rejected.

1.7 DRAWINGS AND SPECIFICATIONS

A. The specific intent of these Contract Documents is to provide the various systems, equipment, etc. to the Owner complete and in a thoroughly calibrated and functional condition.

B. The Drawings shall not be construed as shop drawings. In the event of a possible interference with piping or equipment of another trade, items requiring set grade and elevations shall have precedence over other items. Should any major interference develop, immediately notify the Architect.

C. In laying out Work, refer to Contract Documents at all times in order to avoid interference and undue delays in the progress of the Work.

D. Furnish all plumbing fixtures (with required accessories) shown on either the plumbing drawings or the architectural drawings. Review Architectural casework elevations and identify fixtures indicated. Provide fixtures indicated. Rough-in for all fixtures as work

progress. Verify plumbing fixtures required from review of Mechanical and Architectural drawings, prior to fixture shop drawing submittal.

1.8 CODES AND REGULATIONS

A. Work shall be in full accord with the most stringent interpretation of the State Sanitary Code, local ordinances, building codes, and other applicable national, local, and state regulations.

B. Equipment shall conform to requirements and recommendations of the National Bureau of Fire Underwriters and National Fire Protection Association (NFPA).

C. Items provided under this Division shall comply with the American National Standards Institute (ANSI) "Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People," ANSI A 117.1

D. In the possible event of conflict between codes or regulations and Contract Documents, notify the Architect immediately. Codes and Standards represent minimum requirements. These specifications may exceed requirements in various codes and standards.

1.9 FEES, PERMITS, AND TAXES

A. Obtain and pay for permits required for the Work of this Division. Pay fees in connection therewith, including necessary inspection fees.

B. Pay any and all taxes levied for Work of this Division, including municipal and/or state sales tax where applicable.

1.10 MANUFACTURER'S DIRECTIONS

A. Install and operate equipment and material in strict accord with manufacturer's installation and operating instructions. The manufacturer's instructions shall become part of the Contract Documents and shall supplement Drawings and Specifications.

1.11 SUBMITTAL DATA

A. Submit shop drawings, project data, and samples in accordance with requirements of Division 01.

B. Shop drawings shall consist of published ratings or capacity data, detailed construction drawings for fabricated items, wiring and control diagrams, performance curves, installation instructions, manufacturer's installation drawings, and other pertinent data. Submit drawings showing revisions to equipment layouts due to use of alternate or substitute equipment.

C. Where approved manufacturers and suppliers of equipment, materials, etc. are unable to fully comply with Contract Document requirements, specifically call such deviations to attention of Architect on submittals. Type deviations on a separate sheet; underlined statements or notations on standard brochures, equipment fly sheets, etc. will not be accepted.

D. Approval of submittals shall not relieve Contractor from furnishing required quantities and verifying dimensions. In addition, approval shall not waive original intent of Contract Documents.

E. Failure to obtain written approval of equipment shall be considered sufficient grounds for rejection of said equipment regardless of the stage of completion of the project.

1.12 PROJECT RECORD DOCUMENTS

A. Keep Project Record Documents in accordance with requirements of Division 00 and/or Division 01.

B. During construction period, keep accurate records of installations made under this Division, paying particular attention to major interior and exterior underground and concealed piping, ductwork, etc.

1.13 EXCAVATING AND BACKFILLING

A. Provide excavating and backfilling necessary for Work of this Division. Comply with provisions of Division 31, Earth Work, if applicable.

B. Trenches shall be inspected by Code Authorities and/or Owner's Representative before and after piping is laid. Give Owner' Representative 24-hour notice for each inspection. If any trenches are filled without Owner's Representative inspection and as subsequently found to be deficient, the trenches shall be uncovered.

C. Inspected, and then re-filled, if requested by Owner's Representative.

D. Provide minimum 18 inches of cover or in compliance with local published frost line data (if greater than 18 inches) to finish grades or paving at water piping.

E. For piping, provide bell holes at trench bottom to assure uniform bearing. Accurately grade trench bottoms by instrument before laying any pipe.

F. Protect and maintain trenches in dry condition until piping has been inspected and approved. Immediately after approval, backfill trenches in tamped layers.

G. Compact fill to satisfaction of Architect and/or Owner's Representative.

1.14 CUTTING AND PATCHING

A. Comply with requirements of Division 00 and Division 01 regarding cutting and patching. Locate and timely install sleeves as required to minimize cutting and patching.

B. Cutting, fitting, repairing, patching, and finishing of Work shall be done by craftsmen skilled in their respective trades. Where cutting is required, cut in such a manner as not to weaken structure, partitions, or floors. Holes required to be cut must be cut or drilled without breaking out around the holes. Where patching is necessary in finished areas of the building, the Architect will determine the extent of such patching and refinishing.

C. Repairing Roadways and Walks: Coordinate all roadway work with authorities having jurisdiction. Cut and/or bore under roadways for connection of utilities as required. Coordinate work through Contractor. Where this Contract cuts or breaks roadways, or walks to lay the piping, he shall repair or replace these sections to match existing, unless specifically identified as the responsibility of others.

1.15 PAINTING

A. Painting shall be provided under Division 09, unless specified otherwise. Leave exposed piping, materials, and equipment clean and free of rust, grease, dirt, etc. before and after painting.

B. Factory finished equipment, fixtures, and materials which are marred, chipped, scratched, or otherwise unacceptable shall be repaired or replaced under this Division to Architect satisfaction, at no additional cost to Owner.

C. Coordinate all painting requirements with prime bidder prior to bids.

D. Paint all exposed piping inside and outside of building. Label all piping after painting in accordance with Section 230553. Utilize industry standard paint colors for respective system unless directed otherwise by Architect. Review proposed color scheme with Division 23 Requirements prior to ordering materials.

1.16 GUARANTEE

A. The Contractor shall guarantee all materials, equipment and workmanship for a period of one (1) year from the date of final acceptance of the project. This guarantee shall include furnishing of all labor and material necessary to make any repairs, adjustments or replacement of any equipment, parts, etc. necessary to restore the project to first class condition. This guarantee shall exclude only the changing or cleaning of filters. Warranties exceeding one (1) year are hereinafter specified with individual pieces of equipment.

B. If the Contractor's office is in excess of a fifty (50) mile radius of the project, he shall appoint a local qualified contractor to perform any emergency repairs or adjustments required during the guarantee period. The name of the contractor appointed to provide emergency services shall be submitted to the Architect for his approval.

PART 2 - PRODUCTS

2.1 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Furnish manufacturers operating and maintenance instructions, parts lists and sources of supply for replacements in accordance with Division 01.

B. Provide the following operations and maintenance data:

1. Complete sets of final and correct shop drawings, maintenance and replacement parts manuals, and operating instructions, for equipment supplied.
2. Bind each set within a common binder. Index and organize with a table of contents, to permit quick and convenient reference.
3. Provide a minimum of five (5) days of instruction in operation and maintenance of equipment to Owner’s Representative maintenance force. Design a 2-week period, convenient to Owner’s Representative, during which qualified personnel, including manufacturers' technicians and authorized factory trainers shall be available for Architect/Owner's Representative instruction.

2.2 RECORD DRAWINGS

A. Provide "Record Drawings" in accordance with the Division 01, General Requirements, indicating in a neat and accurate manner a complete record of all revisions of the original design of the work.

1. Include all changes and provide for an accurate record, on reproductions of the Contract drawings or on appropriate shop drawings, all deviations between the work shown and work installed.

B. Submit for approval bound sets of the required drawings, manuals and operating instructions.

2.3 IDENTIFICATION MARKINGS

A. General: Apply identification tags, markers, etc. after insulation and field painting are completed.

PART 3 - EXECUTION

3.1 COORDINATION AND LAYOUT

A. Study Drawings and Specifications to ensure completeness of work required.

1. Include supplementary items normal to manufacturers' requirements or standard accepted trade practices as necessary to complete work, though not specifically indicated or specified.

B. Verify measurements and conditions in field before starting work.

C. Examine materials to which work is to be applied and notify the Architect/Owner's Representative, in writing, of any conditions existing which are detrimental to proper and expeditious installation of work.

1. Starting of work shall be construed as acceptance of conditions.

D. Confer with other trades, install work to avoid interference with other trades, and possible necessary adjustments to conform to structural conditions and work of other trades.

E. Coordinate and set inserts and locate openings in floors and walls in new construction.

1. Locate pipes and ducts to avoid interference with other work shown on the drawings and as directed by the Architect/Owner's Representative.
2. Keep all concealed pipes and ducts within the enclosing construction provided.
3. Arrange exposed work neatly in parallel runs and parallel with walls or structure, with uniformly spaced hangers and supports, and within the spaces assigned for each kind of work.

F. Make coordinated layouts showing concrete work required for housekeeping pads, equipment bases and inertia masses which are cast in place, including the location of anchors and dowels.

1. Coordinate the scheduling and placing of the concrete to suit the mechanical work schedules.
2. Concrete housekeeping pads are to cover the full area of each piece of equipment. Concrete bases are to be of dimension and heights to suit the equipment.
   The forming and placing of concrete shall be provided under this specification section.

3.2 MAINTENANCE OF EQUIPMENT AND SYSTEM PRIOR TO FINAL ACCEPTANCE

A. Maintain all installed equipment and systems in accordance with the manufacturer's published instructions, until final acceptance by the Architect/Owner's Representative, and take such measures as necessary to ensure adequate protection of all equipment and materials during delivery, storage, installation, operating and shut-down conditions.

1. This responsibility shall include all provisions required to meet the conditions incidental to the delays pending final test of systems and equipment.
2. Maintain and periodically clean all equipment until final acceptance.

B. After installation of systems has been completed, operate the system to determine the capability of the equipment and controls to conform to the requirements of the drawings and specifications prior to performance testing.

3.3 DAMAGED EQUIPMENT

A. Any and all equipment, parts, components, etc., provided under this division which is damaged by the Contract or which is received in damaged condition during shipping, transit, handling, or during installation shall be replaced. Dented, or damaged non-structural equipment jackets or surface casings such as but not limited to water heater jackets, boiler jackets, chiller insulation jackets, etc., shall either be repaired or replaced at the option of the Owner's Representative. If repaired, the finished product shall match original equipment exactly.

B. Any equipment which develops surface rust, either through improper storage, handling or installation, shall be refinished by grinding the affected area down to bare (white) metal, then prepared with a rust preventive primer and finished with the original manufacturer's touch-up paint to match existing color.

3.4 EQUIPMENT INSTALLATION

A. Locate and set equipment anchor bolts, dowels and aligning devices for all equipment requiring them. Coordinate requirements of concrete work with Contractor and other trades.

1. Level the equipment and grout solid between the equipment and the surface below. Grout to be premixed grout mixed in accordance with manufacturer's specifications.

B. The field assembly, installation and alignment of equipment is to be done under field supervision provided by the manufacturer or with inspections, adjustments and approval by the manufacturer.

C. Equipment startup.

1. Contractor shall provide qualified start-up personnel, certified by equipment manufacturer, to inspect and approve equipment and to supervise the operating tests of the equipment. System commissioning shall be performed in accordance with ASHRAE standards.

D. Equipment and system test operation.

1. Note: Equipment and system test operation is separate and apart from additional requirements of training and demonstration. Refer to individual sections for requirements regarding training and demonstration. Notify the Owner's Representative in advance of beginning the equipment and system test operation. All equipment testing/demonstration shall be performed in the presence of the Architect/Owner's Representative. A minimum of seven (7) days notice is required before equipment and system testing.
2. Each piece of equipment shall be operated in its system as long as required to provide proper functioning.
3. Perform an operating test of each complete system for twenty-four hours continuous operation as a minimum, or as long as required to provide coordination and proper functioning of all related systems and controls.
4. The operating criteria for each test shall be determined in advance with the Owner's Representative approval whenever seasonal conditions shall not produce a full design load on any equipment or system.

5. Certify to the Owner's Representative that all equipment is functioning properly.
6. Should the apparatus fail to meet the Contract requirements, adjust, repair or replace all defective or inoperative parts and again conduct the complete performance tests.

3.5 CLEANING AND ADJUSTING OF SYSTEMS

A. Blow out, clean and flush each system of piping, and equipment to thoroughly clean the systems.

1. Clean all materials and equipment, and leave in condition ready to operate and receive succeeding finishes where required.
2. Adjust and align all equipment interconnected with couplings or belts.
   a. Adjust valves of all types and operating equipment of all types to provide proper operation.
   b. Remove and clean elements in all steam trap bodies.
   c. Clean all strainers. Replace temporary construction screens with new permanent screens.

B. Permanent equipment operated during construction shall not be abused or be used in service different from its design application.

1. Temporary disposable filters shall be used during temporary operation.
2. All expendable media, including belts used for temporary operation and similar expendable materials shall be replaced just prior to acceptance.
3. Packing boxes of equipment operated during construction must be replaced just prior to system acceptance, using materials and methods specified by the supplying manufacturer.

C. Equipment furnished with factory finishes where damaged shall be retouched and repainted to present a new appearance.

D. Furnish and maintain protection for all of the work whether completed or in progress.

1. Furnish and install coverings and enclosures as required.

E. New and existing operating equipment and systems shall be clean and dust free inside and out.

1. Concealed and unoccupied areas such as plenums, pipe and duct spaces and Equipment Rooms shall be free of rubbish and swept, vacuumed or wiped clean at time of acceptance.

3.6 CONTRACTOR REQUESTED FIELD OBSERVATIONS

A. During the course of, and at stages appropriate to the progress of construction, the Contractor may request field observations of the design professional. If the field observation is a request of and by the Contractor, the Contractor shall provide all necessary ladders, scaffolding, lifts, safety harnesses or other equipment in order for the Architect to safely and adequately perform the requested observations.

1. Requests for observations shall be made a minimum of seven (7) days in advance of the requested date of observation.
2. All equipment, ladders, lifts, safety nets, scaffolding, etc., shall be provided and in place for the use of the Architect.

3. All equipment panel covers, electrical panels, or other equipment shall be opened by the Contractor for viewing by the Architect.
4. The Contractor shall make available a mechanic or technician of that field in order to answer questions of the designer, make any and all adjustments and/or corrections and to assist the Architect.

3.7 TESTING AND BALANCING

A. Refer to Specifications Section 230593.

3.8 PAINTING

A. General painting is typically performed by the Division 09 Contractor. This Contract shall however, either perform specialized painting as called for below in the following conditions or he shall advise the Contractor of these requirements as follows:

1. Thoroughly clean all surfaces, requiring prime painting, of rust, loose scale, oil and grease.
2. Dry surfaces before painting.
3. Do not paint controls, nameplates, labels or sprinklers.

B. Paint all equipment unless otherwise specified not to be painted at the factory with one prime coat of rust prohibitive paint.

C. Provide field painting as follows:

1. All exposed iron work, including un-insulated ferrous piping and conduit system components, hangers, supports, equipment bases, and apparatus; prime coat with a red lead-free paint.
2. Un-insulated duct work and casing exposed to view and exposed galvanized surfaces of conduit and piping and of equipment prime painted at the shop: Prime coat, zinc chromate for galvanized surfaces.
3. Inside of all duct work where visible through registers and grilles: One coat of flat black paint.

3.9 CONNECTIONS TO EQUIPMENT

A. Provide mechanical connections to equipment and fixtures requiring such connections which are supplied by Architect/Owner's Representative or under other divisions.

B. Provide unions, nipples, adapters, valves, flexible connections, and other trim required for final connections for each such fixture or item of equipment, as required for complete operation, servicing, and maintenance.

3.10 WORKMANSHIP

A. Perform all work in a practical, neat and workmanlike manner with mechanics skilled in work, and using the best practices of the trade involved.

B. No work shall be concealed until it has been inspected and approved by the Architect/Owner's Representative.

C. Workmanship or materials not meeting with requirements of the specifications and drawings and satisfaction of the Architect/Owner's Representative shall be rejected and immediately replaced in an acceptable manner, without additional cost to the Architect/Owner's Representative.

3.11 LUBRICATION

A. All equipment furnished, installed or connected under this division, shall be inspected for proper lubrication when connected and before operation of the equipment is begun, as recommended by the Manufacturer.

B. The Contractor for the work of this division shall be held responsible for any damage to equipment that is operated without having been properly lubricated.

3.12 USE OF PREMISES AND CLEANING

A. Remove and dispose of all waste materials and rubbish due to all construction operations under the Contract, except as otherwise noted, and keep the building free from rubbish and dirt caused by his and/or his Sub-Contractors' employees.

1. During the entire progress of the work, rubbish removal shall be made frequently so as to prevent any potential safety or health hazard.

B. Upon completion of the work, remove all protection, paint, putty, and other stains from all fixtures and glass and leave the premises thoroughly broom cleaned.

3.13 CUTTING, ALTERING AND PATCHING

A. Provide all cutting, chasing, drilling, altering and rough patching required for the work of this division.

B. Do all shoring, bracing, cutting, patching, piecing out, filling in, repairing and refinishing of all present work as made necessary by the alteration and the installation of new work.

C. All holes and openings occurring in the existing floors after equipment, partitions, floors, steel work, conduits and pipes are removed or installed shall be closed up with materials similar to the adjacent work.

D. The size and location of items requiring an opening, chase or other provisions to receive it shall be given by the trade requiring same in ample time to avoid undue cutting of any new work to be installed. These provisions shall not relieve the Contractor from keeping other trades informed as to the required opening, chases, etc., nor from responsibility for the correctness thereof, nor for cutting and repairing after the new work is in place.

E. Include all cutting, repairing and patching in connection with the work that may be required to make the several parts come together properly and fit it to receive or be received by the work of other trades, as shown on the drawings and/or specified, or reasonably implied by the drawings and specifications.

F. All repairing, patching, piecing-out, filling-in, restoring and refinishing shall be neatly done by mechanics skilled in their trade to leave same in condition satisfactory to the Architect/Owner’s Representative.

G. Materials and their methods of application for patching shall comply with applicable requirements of the specifications.

1. Materials and workmanship not covered by the specifications and items of work exposed to view adjoining existing work to remain shall conform to similar materials and workmanship existing in or adjacent to the spaces to be altered.

H. Cutting, repairing and patching shall include all items shown on the drawings, specified in the specifications or required by the installation of new work or the removal of existing work.

I. Remove partitions, walls, suspended ceilings, etc., as necessary to perform the required alterations or new construction work.

1. Avoid damage to construction and finishes that are to remain.

J. Protect and be responsible for the existing building, facilities and improvements if any.

1. Any disturbance or damage to the work, the existing building, and improvements, or any impairments of facilities resulting from the construction operations, shall be promptly rectified, with the disturbed, damaged, or impaired work, restored, repaired or replaced at no extra cost.

K. All alterations which are not indicated on the drawings nor specified herein but necessary to make good existing work disturbed by reason of the work shall be restored to a condition satisfactory to the Architect/Owner's Representative.

L. All holes in masonry floors and walls are to be core drilled.

M. Disturbed concrete and /or cement floor areas shall be patched with approved type latex mortar.

1. When cement mortar is used for patching, the surfaces shall be depressed a minimum depth of one inch (1").

N. Reinstall all weather protection work in waterproof manner.

O. Openings in roofs:

1. Openings in roofs shall be kept properly plugged and caulked at all times, except when being worked on, to preclude the possibility of flooding due to storms or other causes. After completion of work, openings shall be permanently sealed.

P. Temporary openings.

1. All temporary openings cut in walls, floors or ceilings for pipe or duct work shall be closed off with transite or an equally non-combustible material except when mechanics are actually working at the particular opening.

3.14 USE OF PERMANENT SYSTEMS:

A. Heating System:

1. The Contractor may, at his option, utilize the permanent heating systems provided under this Contract to provide space heating prior to Project completion date. The fuel for such space heating and for required tests of heating equipment shall be provided by Contractor.
2. The heating system shall be operated only by qualified personnel, and shall be operated with all auxiliaries, and in accordance with manufacturer's' instructions and good operating practice. If at any time the Owner's Representative determines that the equipment is being improperly operated or maintained, Contractor may be directed to disconnect its use.
3. Heating systems shall be operated and controlled to prevent temperature in any room or space in any building from exceeding 90 deg. F.

4. Systems may be activated without diffusers and registers in place, but filters with same efficiency as those specified shall be provided both in air handling equipment and at return air grille locations. Filter return air entering duct work, to prevent return air duct work from accumulating dust or otherwise becoming dirty.
5. Contractor shall, prior to final acceptance of the Work, place heating systems and related equipment in a condition equal to new.

B. Air Conditioning System:

1. The Contractor may, at his option, utilize the permanent air conditioning systems provided under this Contract to provide space cooling prior to the Project completion date.
2. The fuel, electricity or other energy required for space cooling and for any subsequent operation or testing shall be provided for by the Contractor.
3. The cooling system shall be operated only by fully qualified personnel and shall be operated with all auxiliaries, and in accordance with manufacturer's instructions and good operating practice. Start up of equipment for use by the Contractor shall not commence any warranty period.
4. Cooling systems shall be operated and controlled to prevent temperature in any room or space in any building from falling below 70 deg. F.
5. Systems may be activated without diffusers and registers in place, but filters with same efficiency as those specified shall be provided both in air handling equipment and at return air grille locations. Filter all return air entering duct work, to prevent return air duct work from accumulating dust or otherwise becoming dirty.
6. Contractor shall, prior to final acceptance of the Work, place cooling systems and related equipment in a condition equal to new.

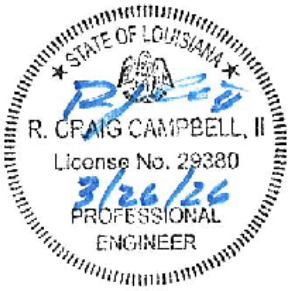
3.15 PENETRATIONS THROUGH FIRE SEPARATIONS

A. Pack annular space between sleeve and pipe (insulation) and / or conduit in fire rated construction with fire retardant putty, sealant and / or caulk in accordance with listed assemblies utilized on the project. Material shall be non-asbestos based and installed in accordance with manufacturers instructions for fire rating required.

B. Penetrations of multiple items and penetrations with annular space greater than 1/2" shall be provided with approved backing material in accordance with manufacturer's instructions.

C. Fire retardant sealer and system shall meet ASTM E-84, ASTM E-814, and UL-1479.

END OF SECTION 23 00 10



SECTION 23 00 20 – BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. This Section specifies the basic requirements for mechanical installations and includes requirements common to more than one section of Division 23. It expands and supplements the requirements specified in sections of Division 01.

1.3 ACCESSIBILITY

A. Install equipment and materials to provide required access for servicing and maintenance. Coordinate the final location of concealed equipment and devices requiring access with final location of required access panels and doors. Allow ample space for removal of all parts that require replacement or servicing. Verify exact location and placement of all access panels with/through Architect prior to any equipment rough-in.

B. Extend all grease fittings to an accessible location.

C. Refer to the Division 08 Section: Access Doors.

1.4 ROUGH-IN

A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

B. Refer to equipment specifications in Divisions 23 for rough-in requirements.

1.5 MECHANICAL INSTALLATIONS

A. Coordinate mechanical equipment and materials installation with other building components.

B. Verify all dimensions by field measurements.

C. Arrange for chases, slots, and openings in other building components to allow for mechanical installations.

D. Coordinate the installation of required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed.

E. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing-in the building.

F. Coordinate the cutting and patching of building components to accommodate the installation of mechanical equipment and materials.

G. Where mounting heights are not detailed or dimensioned, install mechanical services and overhead equipment to provide the maximum headroom possible.

H. Install mechanical equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.

I. Coordinate the installation of mechanical materials and equipment above ceilings with suspension system, light fixtures, and other installations.

J. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

1.6 MECHANICAL COORDINATION DRAWINGS

A. Prepare and submit a set of coordination drawings showing major elements, components, and systems of mechanical equipment and materials in relationship with other building components. Prepare drawings to an accurate scale of 1/4"=1'-0" or larger. Indicate the locations of all equipment and materials, including clearances for installing and maintaining insulation, servicing and maintaining equipment, valve stem movement, and similar requirements. Indicate movement and positioning of large equipment into the building during construction.

B. Prepare floor plans, reflected ceiling plans, elevations, sections, and details to conclusively coordinate and integrate all installations. Indicate locations where space is limited, and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:

1. Mechanical equipment room layouts;
2. Specific equipment installations, including:
    a. Ductwork and diffusers;
    b. Pumps (new and existing) and piping connections
    c. Air Handling equipment, fan coils and terminal units with accessories requirements.
3. Work in pipe spaces, chases, trenches, and tunnels;
4. Exterior wall penetrations;
5. Ceiling plenums which contain piping, ductwork, or equipment in congested arrangement;
6. Installations in mechanical riser shafts, at typical sections and crucial offsets and junctures;
7. Division 23 Contractor shall furnish drawings, to Contractor, once approved by reviewing Architect, to fully coordinate with all trades and subcontractors required. Failure to fully coordinate via this process shall not relieve the contractor of his responsibility to coordinate structural supports, electrical service routing of mechanical systems and provisions for required access.

1.7 CUTTING PATCHING AND SEALING OF PENETRATIONS

A. This Article specifies the cutting and patching of mechanical equipment, components, and materials to include removal and legal disposal of selected materials, components, and equipment.

B. Refer to the Division 01 Section: CUTTING AND PATCHING for general requirements for cutting and patching.

C. Refer to Division 26 Section for BASIC ELECTRICAL REQUIREMENTS for requirements for cutting and patching electrical equipment, components, and materials.

D. Do not endanger or damage installed Work through procedures and processes of cutting and patching.

E. Arrange for repairs required to restore other work, because of damage caused as a result of mechanical installations.

F. No additional compensation will be authorized for cutting and patching Work that is necessitated by ill-timed, defective, or non-conforming installations.

G. Perform cutting, fitting, and patching of mechanical equipment and materials required to:

1. uncover Work to provide for installation of ill-timed Work;
2. remove and replace defective Work;
3. remove and replace Work not conforming to requirements of the Contract Documents;
4. remove samples of installed Work as specified for testing;
5. install equipment and materials in existing structures;
6. upon written instructions from the Architect, uncover and restore Work to provide for Architect observation of concealed Work.

H. Cut, remove and legally dispose of selected mechanical equipment, components, and materials as indicated, including, but not limited to removal of mechanical piping, heating units, plumbing fixtures and trim, and other mechanical items made obsolete by the new Work.

I. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

J. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

K. Locate identify, and protect mechanical and electrical services passing through remodeling or demolition area and serving other areas required to be maintained operational. When transit services must be interrupted, provide temporary services for the affected areas and notify the Owner prior to changeover.

L. Seal all penetrations of building envelope air and water tight. For complete closure of openings, where necessary, provide 1/8" thick elastomeric barrier anchored to materials penetrating building envelope and adjacent envelope surfaces involved - seal connections with caulk and mechanical fasteners. Refer to Architectural Sections on joints and sealants. Seal all conduit systems communicating between conditioned and unconditioned spaces. Coordinate all work with and through prime bidder and other trades. Unless otherwise directed, caulk sealant shall be long lasting polyurethane based products, resistant to UV exposure, installed in accordance with manufactures instructions. Sealant joints shall withstand building pressures variance with respect to ambient of 0.25 inches water gauge, with no leakage in terms of air and or water vapor.

1.8 MECHANICAL SUBMITTALS

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 01 Section: Submittal Procedures for submittal definitions, requirements, and procedures.

B. Submittal of bound shop drawings, product data, and samples will be accepted only when submitted by the Contractor. Data submitted from subcontractors and material suppliers directly to the Architect will not be processed.

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Refer to the Instructions to Bidders for requirements in selecting products and requesting substitutions.

2.2 PRODUCT LISTING

A. Prepare listing of major mechanical equipment and materials for the project. A sample schedule is included at the end of this Section to complete this requirement.

B. Provide all information requested.

C. Submit this listing as a part of the submittal requirement specified in the Division 01.

D. When two or more items of same material or equipment are required (plumbing fixtures, pumps, valves, air conditioning units, etc.) they shall be of the same manufacturer. Product manufacturer uniformity does not apply to raw materials, bulk materials, pipe, tube, fittings (except flanged and grooved types), sheet metal, wire, steel bar stock, welding rods, solder, fasteners, motors for dissimilar equipment units, and similar items used in Work, except as otherwise indicated.

E. Provide products which are compatible within systems and other connected items.

2.3 NAMEPLATE DATA

A. Provide permanent operational data nameplate on each item of power operated mechanical equipment, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliance, and similar essential data. Locate nameplates in an accessible location.

2.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.

B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage.

C. Coordinate deliveries of mechanical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.

2.5 RECORD DOCUMENTS

A. Refer to the Division 01 Section: Closeout Procedures for requirements. The following paragraphs supplement the requirements of Division 01.

B. Mark Drawings to indicate revisions to piping and ductwork, size and location both exterior and interior; including locations of coils, dampers and other control devices, filters, boxes,

and similar units requiring periodic maintenance or repair; actual equipment locations, dimensioned from column lines; actual inverts and locations of underground piping; concealed equipment, dimensioned to column lines; mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.); Change Orders; concealed control system devices.

C. Mark Specifications to indicate approved substitutions, Change Orders, actual equipment and materials used.

2.6 OPERATION AND MAINTENANCE DATA

A. Refer to the Division 01 Section for Project Closeout or Operation and Maintenance Data for procedures and requirements for preparation and submittal of maintenance manuals.

B. In addition to the information required by Division 01 for Maintenance Data, include the following information:

1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
2. Manufacturer's printed operating procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shut-down, and emergency instructions; and summer and winter operating instructions.
3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
4. Servicing instructions and lubrication charts and schedules.

C. Submit in accordance with Section 017800.

D. Use multiple binders if a single binder would exceed 2-1/2 inches in thickness; arrange the data in the same sequence as the specification sections; delete or mark through extraneous data.

E. Provide tab pages with metal or plastic reinforced holes to separate each major item or closely related group of items with typed item names on the tabs. Supply a table of contents at the beginning of each volume listing at items, the manufacturers and the name, address and phone number of the nearest authorized service representative.

F. A copy of the completed manual shall be submitted to the Contracting Officer one week before the user instruction for perusal. This copy will be returned to the Contractor with the user, comments. These comments shall be incorporated in the final copies of the manual. The Contractor shall obtain a signed receipt for the manual.

G. The O & M Manual outline shall be prepared in two parts along the lines suggested in the 2011 HVAC Applications, Chapter 39.

H. All contents shall be project specific, typewritten.

2.7 WARRANTIES

A. Refer to individual equipment specifications for warranty requirements.

B. Compile and assemble the warranties specified in Division 23, into a separated set of vinyl covered, three ring binders, tabulated and indexed for easy reference.

C. Provide complete warranty information for each item to include product or equipment to include date of beginning of warranty or bond; duration of warranty or bond; and names, addresses, and telephone numbers and procedures for filing a claim and obtaining warranty services.

2.8 CLEANING

A. Refer to the Division 01 Section for general requirements for final cleaning.

B. Refer to Division 230593 Section: TESTING, ADJUSTING, AND BALANCING for requirements for cleaning filters, strainers, and mechanical systems prior to final acceptance.

PART 3 - EXECUTION

3.1 WARRANTIES

A. Refer to the Division 01 Section for procedures and submittal requirements for warranties. Refer to individual equipment specifications for warranty requirements.

B. Compile and assemble the warranties specified in Division 23, into a separated set of vinyl covered, three ring binders, tabulated and indexed for easy reference.

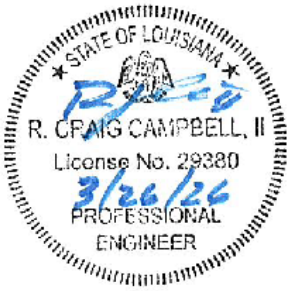
C. Provide complete warranty information for each item to include product or equipment to include date of beginning of warranty or bond; duration of warranty or bond; and names, addresses, and telephone numbers and procedures for filing a claim and obtaining warranty services.

3.3 CLEANING

A. Refer to the Division 01 Section for general requirements for final cleaning.

B. Refer to Division 23 Section: TESTING, ADJUSTING, AND BALANCING for requirements for cleaning filters, strainers, and mechanical systems prior to final acceptance.

END OF SECTION 23 00 20



SECTION 23 05 10 - ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. Compliance with National Electric Code Requirements

1. Minimum Requirements:
   a. The requirements of this Division supercede the “minimum” requirements of National Codes such as NEC in many areas. Where reference to this National Code is made, it is understood that the requirements of these codes are meant to indicate the “minimum” requirements required by these Contract Documents and are not to infer that these “minimum” requirements eliminate or in any way diminish the requirements of individual sections of these Contract Documents.
   b. Wherever compliance with this National Code is required, it shall be taken as a minimum requirement and applicable whenever the Contract Documents are silent with respect to specific requirements or installation procedures. The Contractor shall as a minimum, comply with the more stringent of the requirements.

B. Interlock Wiring for Mechanical Equipment

1. Interlocks & Wiring of Mechanical Equipment: It is the intent of the contract documents to note or include most of the obvious physical wiring, conduit, relays, and necessary interlocks between various pieces of mechanical/electrical equipment. Plans, details, specifications and drawings however, do not typically indicate the exact extent and encompassment of all required mechanical/electrical interlocks, routing, control voltages, conduit, wiring diagrams, etc., between mechanical and electrical devices and equipment that may be required for the proper operation and sequencing of equipment. Also, typically not indicated on the drawings is the differentiation between field installed and factory provided wiring because of the significant differences in requirements between various equipment manufacturer’s requirements and/or job site conditions. It is the responsibility of this contractor to first verify that all mechanical related items affecting other trades are properly coordinated, accounted for and included in pricing prior to bid date. Additional costs for interlocks after bids are received will not be allowed for failure to coordinate. Reference is made to coordination and responsibility of providing the required wiring diagrams and requirements between the various subs, etc. It remains however, the responsibility of this Contractor as further described in the following articles, to properly coordinate, be responsible for, and to allow for any and all costs associated with the requirements of the equipment manufacturer’s recommendations in order to preserve guarantees and warranties. (Note: For informational purposes only) - Typical mechanical/electrical/control/wiring interlocks covered under this section include but are not limited to the following examples:

a. Domestic water pump interlocks with aquastats & thermostats.
b. Exhaust fans and supply fan general ventilation interlocks.
c. Smoke detector interlocks with supply air fans.
d. Hi-Limit Temperature (firestat) interlocks with supply air fans.
e. Lo-Limit Temperature (freezestat) interlocks with supply air fans.
f. Interlocks between automatic safety float switches in emergency drain pans and respective fan motors and/or condensing units.
g. Interlocks between Air Handling Unit “Kill” switches and fan motor starters.
h. Damper interlocks between required fire suppression systems.
i. Fresh air damper interlocks with supply air fans.
j. Two speed fan motors, number of conductors, and interlocks between motor starters and fan speed controllers.
k. High limit temperature interlocks with unit heater thermostats.
l. High and low water level limit interlocks with sump and ejector pumps.
m. All other factory wired mechanical equipment requiring field installed connections and interfaces.

1.3 SUMMARY OF RESPONSIBILITY

A. In order to ensure proper operation of mechanical equipment installed, it is the intent of this section of the specifications to ensure that the Division 23 Contractor is the ultimate party responsible for the proper electrical installation of the equipment provided under the technical specifications of this Division. Unless the Division 23 Contractor is fully licensed and qualified to provide a complete electrical installation, he shall obtain the services of a fully qualified electrical Contractor to perform those services required to provide a complete and operational system. If, however, the services of other Contractors or sub-contractors are required by the Division 23 Contractor in order that the equipment provided is to operate and perform as specified, the Division 23 Contractor shall obtain, pay for, and coordinate the services of such Contractor(s) in order to provide a complete a fully operational mechanical system. The Division 23 Contractor shall be fully responsible for the work of all sub-contractors and shall fully warrant their work in accordance with the requirements of Division 01 of these specifications.

B. This section includes the basic requirements for field installed electrical conduits, power circuits, breakers, wiring, interlocks, and other electrical components which are to become an integral part of mechanical equipment provided under Division 23. All work performed under this section shall fully as a minimum, comply with Division 26 Specifications and National Electric Code - (latest edition) and shall be provided as listed below:

1. All “field-installed” interlock and/or control/power wiring necessary to provide a complete and operating mechanical system shall be ultimately provided by, and be the responsibility of the Division 23 Contractor. These components shall include, but are not limited to the following examples:
   a. Automatic Temperature Control panels
   b. Installation and connection of factory installed motors.
   c. Variable frequency drives
   d. Motors (single & multi-speed)
   e. Motor starters (single and multi-speed) for all Division 23 equipment
   f. Fire protection control panels.
   g. Supply, return, & exhaust fan interlocks
   h. Plumbing fixture automatic flush valves
   i. Interlocks between domestic water circulating pumps & aquastats.
   j. Exhaust fan/supply fan interlocks.
   k. Filters at AHU’s
   l. AHU, hi-limit temperature interlocks, lo-limit temperature interlocks, smoke detectors, and other interlocks related to Life Safety protection.

m. Other various interlocks between items of mechanical equipment, safeties, and field wired interconnections.

C. It is the responsibility of the Division 23 Contractor to fully coordinate the electrical requirements of his mechanical equipment with the Division 26 Contractor prior to bidding and to insure that other contractors and divisions are made aware of the requirements of his equipment that he intends to provide. The Division 23 Contractor shall provide wiring and control diagrams of all mechanical, air conditioning, ventilation, plumbing and /or fire protection equipment clearly delineating between factory wiring and field installed wiring. The mechanical contractor shall insure that all field installed wiring, interlocks, etc., required to provide a complete and operable system are inclusive with his bid.

D. Specific electrical power requirements (i.e., horsepower and electrical characteristics) where known, for mechanical equipment are scheduled on the Drawings or within the body of the individual technical specifications.

E. Low Voltage Wiring: Low voltage wiring is not typically shown on the contract documents or plans. It remains however, the responsibility of the Division 23 Contractor to fully coordinate the low voltage electrical requirements of his mechanical equipment with the Division 26 Contractor prior to bidding and to insure that other Contractors and Divisions are made aware of the requirements of his equipment that he intends to provide. The Division 23 Contractor shall also provide the low voltage wiring and control wiring diagrams of all mechanical, air conditioning, ventilation, plumbing and /or fire protection equipment clearly delineating between factory wiring and field installed wiring.

1. The Division 23 Contractor shall coordinate with the Division 26 Contractor for all necessary power requirements.

1.4 REFERENCES

A. NEMA Standards MG 1: Motors and Generators

B. NEMA Standard ICS 2: Industrial Control Devices, Controllers, and Assemblies.

C. NEMA Standard 250: Enclosures for Electrical Equipment.

D. NEMA Standard KS 1: Enclosed Switches.

E. As a minimum, comply with National Electrical Code (NFPA 70).

1.5 SUBMITTALS

A. Motors, Starters, & VFD Drives: Provide manufacturer's product data. If starters are an integral part of packaged mechanical equipment, then a separate starter submittal is not required.

B. Submit product data for motors, starters, variable frequency drives and other electrical components with submittal data required for the equipment for which it serves, as required by the individual equipment specification sections.

1.6 QUALITY ASSURANCE

A. All electrical components and materials shall be UL labeled.

PART 2 - PRODUCTS

2.1 MOTORS

A. The following are basic requirements for simple or common motors. For special duty motors, more detailed and specific requirements are specified in Section 230513 – “Electric Motors”.

1. Torque characteristics shall be sufficient to satisfactorily accelerate the driven loads.
2. Motor sizes shall be large enough so that the driven load will not require the motor to operate in the service factor range.
3. Temperature Rating: Rated for 50 deg. C environment with maximum 50 deg. C temperature rise for continuous duty at full load (Class A Insulation).
4. Starting capability: Frequency of starts as indicated by automatic control system, and not less than 5 evenly time spaced starts per hour for manually controlled motors.
5. Service Factor: 1.15 for poly-phase motors and 1.35 for single phase motors.
6. Motor construction: NEMA Standard MG 1, general purpose, continuous duty, Design "B", except "C" where required for high starting torque.
   a. Frames: NEMA Standard No. 48 or 54; use driven equipment manufacturer's standards to suit specific application.
   b. Bearings: Ball or roller or pillow block bearings with inner and outer shaft seals; re-greaseable, except permanently sealed where motor is normally inaccessible for regular maintenance; designed to resist thrust loading where belt drives or other drives produce lateral or axial thrust in motor; for fractional horsepower, light duty motors, sleeve type bearings are permitted.
7. Enclosure Type: Open drip-proof motors for indoor use where satisfactorily housed or remotely located during operation; totally enclosed, fan cooled for exterior applications or where specifically indicated on drawings.
8. Overload protection: Built-in thermal overload protection.
9. Noise rating: "Quiet"
10. Efficiency: "Premium Energy Efficient" motors shall have a minimum efficiency as scheduled in accordance with IEEE Standard 112, test method B. If efficiency not specified, motors shall have a higher efficiency than "average standard industry motors", in accordance with IEEE Standard 112, test method B.
11. Nameplate: Indicate the full identification of manufacturer, ratings, characteristics, construction, special features and similar information.

2.2 STARTERS, ELECTRICAL DEVICES, AND WIRING

A. Motor Starter Characteristics:

1. Enclosures: Unless otherwise specifically identified, provide NEMA 1, general purpose enclosures with padlock ears, except in wet or exterior locations, where enclosures shall be NEMA 3R with conduit hubs, or units in hazardous or dust laden atmospheres or other locations which shall have NEC rating for that particular proper class and division.
2. Type and size of starter shall be as recommended by motor manufacturer and the driven equipment manufacturer for applicable protection and start-up condition.

B. Magnetic Starters:

1. Refer to Section 230514 - “Motor Starters” for full requirements of motor starters.
2. As a minimum, provide the following items on each motor starter:
   a. Maintained contact push buttons and pilot lights, properly arranged for single speed or multi-speed operation as indicated.
   b. Trip-free thermal overload relays, each phase.

c. Interlocks, pneumatic switches and similar devices as required for coordination with control requirements of Division 23- “Building Automation System” controls sections.
d. Built-in 120 volts control circuit transformer, fused from line side, where incoming electrical service exceeds 240 volts.
e. Lockable “Off” position handle.
f. H-O-A selector switch.
g. Externally operated manual reset.
h. Under-voltage release or protection.

C. Motor connections:

1. Flexible conduit, except where plug-in electrical cords are specifically indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify equipment physical size and clearances required.

B. Verify electrical interlocks required.

3.2 THERMAL STOPS & BARRIERS

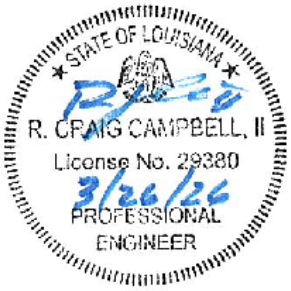
A. Thermal Barriers: Where electrical equipment, conduit, wiring, etc., penetrates or comes into contact with cold or hot mechanical equipment, provide thermal barriers to prevent intrusion of unconditioned air into mechanical equipment or to prevent electrical devices from sweating or accumulating condensation.

1. Examples: Examples of the above include but are not limited to:
a. Air handling conduit penetrations at or into AHU casings.
b. Smoke detectors attachment to hot or cold ductwork.

3.3 TRAINING & DEMONSTRATION

A. Provide training as described in individual technical specifications.

END SECTION 23 05 10



SECTION 23 05 29 – HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. This Section includes hangers and supports for mechanical systems piping and equipment.

1.3 SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 01 Specification Sections.

B. Product data for each type of hanger and support.

C. Submit pipe hanger and support schedule showing manufacturer's Figure No., size, location, and features for each required pipe hanger and support.

D. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.

E. Shop drawings for each type of hanger and support, indicating dimensions, weights, required clearances, and methods of component assembly.

1.4 QUALITY ASSURANCE

A. Qualify welding processes and welding operators according to AWS D1.1 "Structural Welding Code--Steel."

1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

B. Qualify welding processes and welding operators according to ASME "Boiler and Pressure Vessel Code," Section IX, "Welding and Brazing Qualifications."

C. Listing and Labeling: Provide hangers and supports that are listed for their intended use.

1. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Hangers, Supports, and Components: Factory-fabricated according to MSS SP-58.

1. Components include galvanized coatings where installed for piping and equipment that will not have a field-applied finish.

2. Pipe attachments include nonmetallic coating for electrolytic protection where attachments are in direct contact with copper tubing.

B. Thermal-Hanger Shield Inserts: 100-psi average compressive strength, waterproofed calcium silicate, encased with sheet metal shield. Insert and shield cover entire circumference of pipe and are of length indicated by manufacturer for pipe size and thickness of insulation.

C. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used. Fasteners for fire protection systems include UL listing and FM approval.

2.2 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36, steel plates, shapes, and bars, black and galvanized.

B. Bolts and Nuts: ASME B18.10 or ASTM A 183, steel, hex-head, track bolts and nuts.

C. Washers: ASTM F 844, steel, plain, flat washers.

D. Grout: ASTM C 1107, Grade B, nonshrink, nonmetallic.

1. Characteristics include post-hardening, volume-adjusting, dry, hydraulic-cement-type grout that is nonstaining, noncorrosive, nongaseous and is recommended for both interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Water: Potable.
4. Packaging: Premixed and factory-packaged.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

A. Specific hanger requirements are specified in the Section specifying the equipment and systems.

B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping specification Sections.

3.2 HANGER AND SUPPORT INSTALLATION

A. General: Comply with MSS SP-69 and SP-89. Install hangers, supports, clamps, and attachments to properly support piping from building structure.

B. Arrange for grouping of parallel runs of horizontal piping supported together on field-fabricated, heavy-duty trapeze hangers where possible.

C. Install supports with maximum spacings complying with MSS SP-69.

D. Where pipes of various sizes are supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.

E. Install building attachments within concrete or to structural steel. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert to forms. Install reinforcing bars through openings at top of inserts.

F. Install concrete inserts in new construction prior to placing concrete.

G. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install according to fastener manufacturer's written instructions. Do not use in lightweight concrete slabs or in concrete slabs less than 4 inches thick.

H. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

I. Heavy-Duty Steel Trapezes: Field-fabricate from ASTM A 36 steel shapes selected for loads being supported. Weld steel according to AWS D-1.1.

J. Support fire protection systems piping independent of other piping.

K. Install hangers and supports to allow controlled movement of piping systems, permit freedom of movement between pipe anchors, and facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

L. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so that maximum pipe deflections allowed by ASME B31.9 "Building Services Piping" is not exceeded.

N. Insulated Piping: Comply with the following installation requirements.

1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ASME B31.9.
2. Saddles: Install protection saddles MSS Type 39 where insulation without vapor barrier is indicated. Fill interior voids with segments of insulation that match adjoining pipe insulation.
3. Shields: Install MSS Type 40, protective shields on cold piping with vapor barrier. Shields span an arc of 180 degrees and have dimensions in inches not less than the following:

THICKNESS	LENGTH	
NPS (Inches)	(Inches)	
1/4 to 3-1/2	12	0.048
4	12	0.060
5 and 6	18	0.060
8 to 14	24	0.075
16 to 24	24	0.105

4. Pipes 8 Inches and Larger: Include pressure treated wood inserts.
5. Insert Material: Length at least as long as the protective shield.
6. Thermal-Hanger Shields: Install with insulation of same thickness as piping.

3.3 EQUIPMENT SUPPORTS

A. Fabricate structural steel stands to suspend equipment from structure above or support equipment above floor.

B. Grouting: Place grout under supports for equipment, and make a smooth bearing surface.

C. Provide housekeeping pads where indicated on plans.

3.4 METAL FABRICATION

A. Cut, drill, and fit miscellaneous metal fabrications for pipe and equipment supports.

B. Fit exposed connections together to form hairline joints. Field-weld connections that cannot be shop-welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1 procedures for manual shielded metal-arc welding, appearance and quality of welds, methods used in correcting welding work, and 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. Finish welds at exposed connections so that no roughness shows after finishing, and so that contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.6 ESCUTCHEONS, SLEEVES AND RISER CLAMPS

A. Contractor shall furnish and install all escutcheons, inserts, thimbles, hangers, etc. required for the proper support and installation of his equipment and piping and he shall cooperate with other trades in locating and placing these items.

B. Contractor shall furnish and install all piping sleeves required. Sleeves passing through structural members or concrete footings shall be of cast iron or Schedule 40 steel pipe. Sleeves passing through nonstructural walls or floors shall be of 26-gauge galvanized iron. Joints between sleeves and pipes passing through floors shall be made weather tight with plastic materials. Where pipes pass through water proofing membrane, flashing sleeves shall be installed. Sleeves of structural members shall be as detailed on structural plans.

C. Provide malleable iron split ring hangers with rod supports as specified. Strap hangers or wire will not be accepted. Spacing of hangers shall be as required above by MSS Standards. Maximum spacing shall no case exceed the following: For cast iron pipes 5ft.; for other than soil pipes 10 ft.

D. Provide galvanized iron shields between hangers and pipe covering.

E. Provide heavy steel riser clamps on vertical risers at floors to support pipes.

F. Provide chrome plated brass escutcheons wherever pipes pass through floors, walls or ceilings in exposed or finished areas.

G. All piping projecting from chases shall be rigidly supported in the wall or chase. Loosely supported piping, fixtures or accessories will not be accepted.

3.7 PAINTING

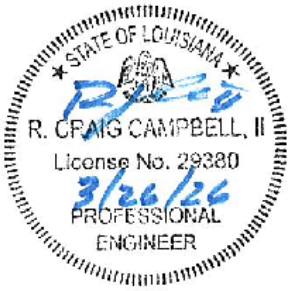
A. Touching Up: Clean field welds and abraded areas of shop paint and paint exposed areas immediately after erection of hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Touching Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal is specified in Division 09 Section "Paints and Coatings."

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 23 05 29



SECTION 23 05 53 – MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Duct labels.
4. Stencils.
5. Warning tags.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For color, letter style, and graphic representation required for each identification material and device.

C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

D. Valve numbering scheme.

E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Material and Thickness: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: White.
3. Background Color: Black.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: White.

C. Background Color: Black.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 DUCT LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: White.

C. Background Color: Black.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

2.4 STENCILS

A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/4 inches for ducts; and minimum letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.

1. Stencil Material: Aluminum.
2. Stencil Paint: Exterior, gloss, acrylic enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.
3. Identification Paint: Exterior, acrylic enamel in colors according to ASME A13.1 unless otherwise indicated.

2.5 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: 3 by 5-1/4 inches.
2. Fasteners: Brass grommet and wire.

3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels with painted, color-coded bands or rectangles on each piping system.

1. Identification Paint: Use for contrasting background.
2. Stencil Paint: Use for pipe marking.

B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

C. Pipe Label Color Schedule (Verify exact color prior to installation):

1. Chilled-Water Piping:
   a. Background Color: Blue.
   b. Letter Color: White.
2. Heating Water Piping:
   a. Background Color: Yellow
   b. Letter Color: White

3.4 DUCT LABEL INSTALLATION

A. Install plastic-laminated self-adhesive duct labels with permanent adhesive on air ducts in the following color codes:

1. Blue: For cold-air supply ducts.
2. Yellow: For hot-air supply ducts.
3. Green: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
4. ASME A13.1 Colors and Designs: For hazardous material exhaust.

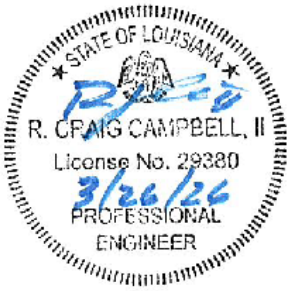
B. Stenciled Duct Label Option: Stenciled labels, showing service and flow direction, may be provided instead of plastic-laminated duct labels, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.

C. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.5 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 23 05 53



SECTION 23 05 93 – TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. This Section specifies the requirements and procedures total mechanical systems testing, adjusting, and balancing. Requirements include measurement and establishment of the fluid quantities of the mechanical systems as required to meet design specifications, and recording and reporting the results.

B. Test, adjust, and balance the following mechanical systems:

1. Supply air systems, all pressure range;
2. Fresh Air
3. Return air systems
4. AHUs
5. Verify temperature control system operation;

C. Provide assistance to Division 23 and Division 26 Contractor and project Architect in system commissioning process. Identify all system variances of greater than 10% and make required measurements, adjustments, etc. to bring systems into compliance to satisfaction of project Architect.

D. THE TEST AND BALANCE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING OUT AND REPORTING EACH SEQUENCE OF HEATING, COOLING AND CONTROL INTERLOCK OPERATION FOR THE EQUIPMENT REFERENCED ABOVE.

1.3 DEFINITIONS

A. Systems testing, adjusting, and balancing is the process of checking and adjusting all the building environmental systems to produce the design objectives. It includes:

1. The balance of air distribution;
2. Adjustment of total system to provide design quantities;
3. Electrical measurement;
4. Verification of performance of all equipment and automatic controls;

B. Test: To determine quantitative performance of equipment.

C. Adjust: To regulate the specified fluid flow rate and air patterns at the terminal equipment (e.g., reduce fan speed, throttling).

D. Balance: To proportion flows within the distribution system (submains, branches, and terminals) according to specified design quantities.

E. Procedure: Standardized approach and execution of sequence of work operations to yield reproducible results.

F. Report forms: Test data sheets arranged for collecting test data in logical order for submission and review. These data should also form the permanent record to be used as the basis for required future testing, adjusting, and balancing.

G. Terminal: The point where the controlled fluid enters or leaves the distribution system. These are supply inlets on water terminals, supply outlets on air terminals, return outlets on water terminals, and exhaust or return inlets on air terminals such as registers, grilles, diffusers, louvers, and hoods.

H. Main: Duct or pipe containing the system's major or entire fluid flow.

I. Submain: Duct or pipe containing part of the systems' capacity and serving two or more branch mains.

J. Branch main: Duct or pipe serving two or more terminals.

K. Branch: Duct or pipe serving a single terminal.

1.4 SUBMITTALS

A. Agency Data:

1. Submit proof that the proposed testing, adjusting, and balancing agency meets the qualifications specified below.

B. Engineer and Technicians Data:

1. Submit proof that the Test and Balance Engineer assigned to supervise the procedures, and the technicians proposed to perform the procedures meet the qualifications specified below.

C. Procedures and Agenda: Submit a synopsis of the testing, adjusting, and balancing procedures and agenda proposed to be used for this project.

D. Maintenance Data: Submit maintenance and operating data that include how to test, adjust, and balance the building systems. Include this information in maintenance data specified in Division 01 and Section 230020.

E. Sample Forms: Submit sample forms, if other than those standard forms prepared by the AABC or NEBB are proposed.

F. Certified Reports: Submit testing, adjusting, and balancing reports bearing the seal and signature of the Test and Balance Engineer. The reports shall be certified proof that the systems have been tested, adjusted, and balanced in accordance with the referenced standards; are an accurate representation of how the systems have been installed; are a true representation of how the systems are operating at the completion of the testing, adjusting, and balancing procedures; and are an accurate record of all final quantities measured, to establish normal operating values of the systems. Follow the procedures and format specified below:

1. Draft reports: Upon completion of testing, adjusting, and balancing procedures, prepare draft reports on the approved forms. Draft reports may be hand written, but must be complete, factual, accurate, and legible. Organize and format draft reports

in the same manner specified for the final reports. Submit 2 complete sets of draft reports. Only 1 complete set of draft reports will be returned.

2. Final Report: Upon verification and approval of draft reports, prepare final reports, type written, and organized and formatted as specified below. Submit 2 complete sets of final reports.
3. Report Format: Report forms shall be those standard forms prepared by the referenced standard for each respective item and system to be tested, adjusted, and balanced. Bind report forms complete with schematic systems diagrams and other data in reinforced, vinyl, three-ring binders. Provide binding edge labels with the project identification and a title descriptive of the contents. Divide the contents of the binder into the below listed divisions, separated by divider tabs:
4. General Information and Summary
    a. Air Systems
    b. Hydronic Systems
    c. Temperature Control Systems
    d. Special Systems
5. Report Contents: Provide the following minimum information, forms and data:
    a. General Information and Summary: Inside cover sheet to identify testing, adjusting, and balancing agency, Contractor, Owner, Architect, Engineer, and Project. Include addresses and contact names and telephone numbers. Also include a certification sheet containing the seal and name address, telephone number, and signature of the Certified Test and Balance Engineer. Include in this division a listing of the instrumentations used for the procedures along with the proof of calibration.
    b. The remainder of the report shall contain the appropriate forms containing as a minimum, the information indicated on the standard report forms prepared by the AABC and NEBB, for each respective item and system. Prepare a schematic diagram for each item of equipment and system to accompany each respective report form.
6. Provide electronic (PDF) copies of all documentation included in the Final Report.

G. Calibration Reports: Submit proof that all required instrumentation has been calibrated to tolerances specified in the referenced standards, within a period of six months prior to starting the project.

H. At the front of the Report, the TAB Contractor shall provide a summary sheet identifying system operational variances problems, etc. recommended corrective measures that in the opinion of the TAB Contractor should be enacted by the Mechanical Contractor prior to retesting. Submit to project Architect as work progresses with resolution documented for inclusion in final report.

1.5 QUALITY ASSURANCE

A. Test and Balance Engineer's Qualifications: A Professional Engineer (either on the installer's staff or an independent consultant), registered in the State in which the services are to be performed, and having testing, adjusting, and balancing experience on projects with testing and balancing requirements similar to those required for this project.

B. Pre-Balancing Conference: Prior to beginning of the testing, adjusting, and balancing procedures, schedule and conduct a conference with the Architect and representatives of installers of the mechanical systems. The objective of the conference is final coordination and verification of system operation and readiness for testing, adjusting, and balancing.

1.6 PROJECT CONDITIONS

A. Systems Operation: Systems shall be fully operational prior to beginning procedures.

1.7 SEQUENCING AND SCHEDULING

A. Test, adjust and balance air conditioning systems during summer season and heating systems during winter season, including at least a period of operation at outside conditions within 5 deg F wet bulb temperature of maximum summer design condition, and within 10 deg F dry bulb temperature of minimum winter design condition. Take final temperature readings during seasonal operation.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 PRELIMINARY PROCEDURES FOR AIR SYSTEM BALANCING

A. Before operating the system, perform these steps:

1. Obtain design drawings and specifications and become thoroughly acquainted with the design intent.
2. Obtain copies of approved shop drawings of all air handling equipment, outlets (supply, return, and exhaust) and temperature control diagrams.
3. Compare design to installed equipment and field installations.
4. Walk the system from the system air handling equipment to terminal units to determine variations of installation from design.
5. Check filters for cleanliness.
6. Check dampers (both volume and fire) for correct and locked position, and temperature control for completeness of installation before starting fans.
7. Prepare report test sheets for both fans and outlets. Obtain manufacturer's outlet factors and recommended procedures for testing. Prepare a summation of required outlet volumes to permit a crosscheck with required fan volumes.
8. Determine best locations in main and branch ductwork for most accurate duct traverses.
9. Place outlet dampers in the full open position.
10. Prepare schematic diagrams of system "as-built" ductwork and piping layouts to facilitate reporting.
11. Lubricate all motors and bearings.
12. Check fan belt tension.
13. Check fan rotation.

3.2 MEASUREMENTS

A. Provide all required instrumentation to obtain proper measurements, calibrated to the tolerances specified in the referenced standards. Instruments shall be properly maintained and protected against damage.

B. Provide instruments meeting the specifications of the referenced standards.

C. Use only those instruments which have the maximum field measuring accuracy and are best suited to the function being measured.

D. Apply instrument as recommended by the manufacturer.

E. Use instruments with minimum scale and maximum subdivisions and with scale ranges proper for the value being measured.

F. When averaging values, take a sufficient quantity of readings which will result in a

repeatability error of less than 5 percent. When measuring a single point, repeat readings until 2 consecutive identical values are obtained.

G. Take all reading with the eye at the level of the indicated value to prevent parallax.

H. Use pulsation dampeners where necessary to eliminate error involved in estimating average of rapidly fluctuation readings.

I. Take measurements in the system where best suited to the task.

3.3 PERFORMING TESTING, ADJUSTING, AND BALANCING

A. Perform testing and balancing procedures on each system identified, in accordance with the detailed procedures outlined in the referenced standards.

B. Cut insulation, ductwork, and piping for installation of test probes to the minimum extent necessary to allow adequate performance of procedures.

C. Patch insulation, ductwork, and housings, using materials identical to those removed.

D. Seal ducts and piping, and test for and repair leaks.

E. Seal insulation to re-establish integrity of the vapor barrier.

F. Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings. Mark with paint or other suitable, permanent identification materials.

G. Retest, adjust, and balance systems subsequent to significant system modifications, and resubmit test results.

3.4 RECORD AND REPORT DATA

A. Record all data obtained during testing, adjusting, and balancing in accordance with, and on the forms recommended by the referenced standards, and as approved on the sample report forms.

B. Prepare report of recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced.

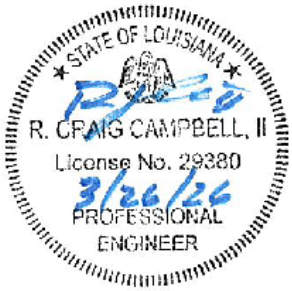
C. Prepare a summary sheet of noted variances in excess of $\pm$ 10% of design value. Include all such variances, recommended resolutions and ultimate result in Appendix “A” to TAB Final Report.

3.5 DEMONSTRATION

A. Training:

1. Train the Owner's maintenance personnel on troubleshooting procedures and testing, adjusting, and balancing procedures. Review with the Owner's personnel, the information contained in the Operating and Maintenance Data specified in Division 01 and 230020.
2. Schedule training with Owner through the Architect with at least 7 days prior notice.

END OF SECTION 23 05 93



SECTION 23 07 13 - INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. Extent of mechanical insulation required by this section is indicated on drawings and schedules, and by requirements of this section.

B. This Section includes:

1. Piping insulation including fittings and valves.
2. Duct insulation (internal lining and external wrapping)
3. Mechanical equipment room walls and ceilings
4. Mechanical equipment insulation.

C. Cover and insulate all valves, fittings, and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run and piping system. Install factory molded, pre-cut or field cut and fabricated units (at installer's option) except where specifically noted otherwise.

D. Maintain the integrity of vapor jackets on all pipe insulation, duct insulation, equipment insulation and protect during construction to prevent puncture or other damage.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections:

1. Product data for each type of mechanical insulation identifying k-value, thickness, and accessories.
2. Manufacturer's installation recommendations.
3. Material certificates, signed by the manufacturer, certifying that materials as a minimum, comply with specified requirements where laboratory test reports cannot be obtained.
4. Material test reports prepared by a qualified independent testing laboratory. Certify insulation meets specified requirements.

1.4 QUALITY ASSURANCE

A. Fire Performance Characteristics: Conform to the following characteristics for insulation including facings, cements, and adhesives, when tested according to ASTM E 84, by UL or other testing or inspecting organization acceptable to the authority having jurisdiction. Label insulation with appropriate markings of testing laboratory.

1. Interior Insulation: Flame spread rating of 25 or less and a smoke developed rating of 50 or less.

2. Exterior Insulation: Flame spread rating of 75 or less and a smoke developed rating of 150 or less.

1.5 SEQUENCING AND SCHEDULING

A. Schedule piping and duct insulation application only after the testing of piping and duct systems is complete and accepted.

B. Schedule insulation application after installation and testing of heat trace tape is complete and accepted.

C. Schedule insulation of walls and ceiling to correspond with installation of pipe hangers, supports and equipment.

PART 2 - PRODUCTS

2.1 GENERAL

A. Pipe insulation shall not begin until all work has been tested and found to be tight. All insulation adhesives, sealers, tapes and mastic shall meet the latest NFPA requirements and shall meet 25/50/50 flame spread and smoke developed ratings.

B. All insulation shall be installed in strict accordance with the manufacturer's recommendations.

C. All pipe insulation where recommended by the manufacturer shall be banded with aluminum bands, three to a section and with one band on each side of each fitting, valve, etc.

D. Insulation shall be continuous through walls and ceilings.

E. All valves, strainers, etc. shall be insulated the same as its adjacent piping and the covering shall extend all the way up to the equipment.

1. USE HIGH DENSITY INSULATION INSERTS AT HANGERS ON ALL PIPING 1-1/2" AND ABOVE TO PREVENT CRUSHING OF INSULATION.

2.2 THERMAL INSULATION

A. After all work has been tested and approved, insulate as follows:

1. INSULATION SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.

2.3 CONDENSATE DRAIN PIPING

A. Insulate with 1/2" Aerotube or Armaflex pipe insulation applied in accordance with manufacturer's recommendations and instructions.

2.4 REFRIGERANT LINES

A. Insulate with 3/4" closed cell, tube insulation, Aerotube, Armaflex or equivalent. Apply two coats of weatherproof mastic on all piping below grade or exposed to weather. Contractor shall install refrigerant lines below grade in watertight PVC sleeve in accordance with manufacturer's recommendations.

B. All copper refrigerant lines shall be separated from dissimilar metals at all support points.

2.5 CHILLED WATER SUPPLY AND RETURN PIPING

A. Insulate lines above slab with foamglass or approved equivalent pipe covering with factory applied Flame Bar Jacket to pipe with all joints firmly butted together. Seal all laps and butt joint strips with vapor barrier adhesive. Fittings to be insulated with pre-fabricated fitting covers and finished with an envelope coverage of vapor barrier mastic reinforced with Glassfab.

B. Thickness to be 1" for pipe sizes up to and included 2" and 1-1/2" thick for pipe sizes 2-1/2" and above.

C. All voids around valves, fittings, housings and other devices installed in the piping system shall be filled with loose fiberglass insulation. Insulation vapor barrier shall be maintained to prevent moisture penetration through outer cover.

D. Finish entire installation with a white 0.030 PVC covering fittings with clear solvent weld joints and seams suitable for installation in return air plenum.

E. Lines on the exterior of the building shall be covered with smooth 0.160 aluminum jacket and elbows.

2.6 AIR HANDLING ROOM WALLS

A. Furnish and install over entire areas of walls of air handling rooms containing a/c units a 1" thick Manville Linacoustic or equal acoustical type duct insulation 3# density, applied over Slick-Klips 12" on center. Stick-Klips shall be applied to wall with Miracle Adhesive. Acoustical material shall be applied over Stick-Klips with duct liner adhesive tape EC-104 spotted between pins. Stick-Klips with factor applied adhesive will not be acceptable.

2.7 HVAC DUCTWORK INSULATION:

A. Supply, return, transfer, fresh air and exhaust ductwork shall be wrapped on outside with 2.33" thick 3/4# density fiberglass insulation with aluminum foil vapor barrier (unless stated otherwise on mechanical drawings). Insulation shall be taped at all joints and installed per the manufacturer's recommendations.

B. Refer to air distribution section of mechanical specifications for duct insulation supplied by the sheet metal sub-contractor.

C. Transfer ductwork across walls shall be internally lined with 1" thick acoustical insulation.

2.8 HVAC FLEX-CONNECTIONS:

A. Shall be wrapped on outside with 2.33" thick 3/4 # density fiberglass insulation with aluminum foil vapor barrier. Insulation shall be taped at all joints and installed per the manufacturer's recommendations.

2.9 INSULATION THROUGH HANGERS AND SLEEVES

A. The insulation shall be continuous through pipe hangers and pipe sleeves. At hangers where the pipe is supported by insulation, provide a galvanized iron protection shield. Provide pipes 2-inch i.p.s. and larger in insulation inserts at points of hanger supports. The inserts shall be of calcium silicate, cellular glass, prestressed molded glass fiber of minimum 13-pound density, or other approval material of the same thickness as adjacent

insulation and not less than 13-pound density. The inserts shall have sufficient compression strength to adequately support the pipe without compressing the inserts to a thickness less than the adjacent insulation. Inserts shall be 180 degrees and not less than the length of the protection shield. Vapor barrier facing of the insert shall be the same as the facing on the adjacent insulation. Where copper clad hangers are used on domestic copper pipe, insulation may cover pipe and hanger. Provide 18 gauge metal saddles between all hangers and insulation.

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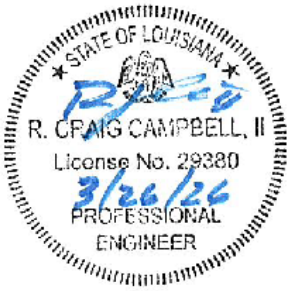


SECTION 23 31 13 – METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Single-wall round ducts and fittings.
3. Double-wall round and flat-oval ducts and fittings.
4. Sheet metal materials.
5. Duct liner.
6. Sealants and gaskets.
7. Hangers and supports.
8. Seismic-restraint devices.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible "SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical System.

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

1.4 SUBMITTALS

A. Product Data: For each type of the following products:

1. Liners and adhesives.
2. Sealants and gaskets.

B. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.
3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
4. Elevation of top of ducts.

5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.
9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment, seismic restraints, and vibration isolation.

C. Delegated-Design Submittal:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.
5. Design Calculations: Calculations, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation for selecting hangers and supports and seismic restraints.

D. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including but are not limited to the following:
    a. Lighting fixtures.
    b. Air outlets and inlets.
    c. Speakers.
    d. Sprinklers.
    e. Access panels.
    f. Perimeter moldings.
    g. F/A devices, wi-fi antennas, etc.

E. Welding certificates.

F. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Lindab Inc.
   b. McGill AirFlow, LLC.
   c. SEMCO Incorporated.
   d. Sheet Metal Connectors, Inc.
   e. Eastern Sheet Metal, Inc.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and

Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.

D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 DOUBLE-WALL ROUND INSULATED DUCT & FITTINGS

A. Unless otherwise specified, all interior and outer shell duct and fittings shall be a minimum G-90 galvanized sheet metal in accordance with ASTM A525 and A527 specifications.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include the following:
   a. Eastern Sheet Metal, Inc.
   b. Hamlin Sheetmetal, Inc.
   c. United McGill, Inc.
   d. Semco, Inc.
2. General: "Basic Round Diameter" as used in this article is the diameter of the size of round duct that has a circumference equal to the perimeter of a given sized of flat oval duct. Except where interrupted by fittings, provide round and flat oval ducts in lengths not greater than 12 feet.
3. Round Ducts: Fabricate round supply ducts with “spiral lock seam” construction, except where interior diameters exceed 72 inches. As a minimum, comply with SMACNA "HVAC Duct Construction Standards," Second Edition - 1995 with addendums, Table 3-2A and 3-2B for galvanized steel gages.
   a. Round & Oval Ducts - Low Pressure: Solid welded (continuous welded), 1-inch insulation, perforated inner liner and with metal thickness listed below for pressure classes from minus 2 inches to plus 1 inch:
      i. 3 to 26 inches: 24 gage.
      ii. 27 to 36 inches: 22 gage.
      iii. 37 to 50 inches: 20 gage.
      iv. 52 to 60 inches: 18 gage.
   b. Round & Oval Ducts - Medium Pressure: Solid welded (continuous welded), 1-inch insulation, perforated inner liner and with metal thickness listed below for pressure classes from 2 inches to plus 6 inches:
      i. 3 to 14 inches: 24 gage.
      ii. 15 to 26 inches: 26 gage.
      iii. 28 to 36 inches: 20 gage.
      iv. 38 to 50 inches: 18 gage.
      v. 52 to 78 inches: 14 gage.
4. Double-Wall (Insulated) Fittings: Fabricate double-wall insulated fittings with an outer shell, insulation, and an inner liner as specified below. Dimensions indicated on internally insulated ducts are nominal inside dimensions.
   a. Thermal Conductivity: 0.27 Btu/sq.ft./deg. F/inch thickness at 75 deg. F mean temperature.

b. Outer Shell: Base outer shell gage on actual outer shell dimensions. Gages for outer shell shall be same as for uninsulated fittings specified above.

c. Insulation: Unless otherwise indicated, provide 1-inch-thick fiber-glass insulation. Provide insulation ends where internally insulated duct connects to single-wall duct or non-insulated components. The insulation end shall terminate the insulation and reduce the outer shell diameter to the nominal single-wall size.

d. Perforated Inner Liner: Construct round and flat oval inner liners with perforated sheet metal of the gages listed below. Provide 3/32-inch-diameter perforations, with an overall open area of 23 percent. For flat oval ducts, the diameter indicated in the table below is the "basic round diameter."

i. 3 to 34 inches: 24 gage.
ii. 35 to 58 inches: 22 gage.
iii. 60 to 88 inches: 20 gage.

e. Connectors: Maintain concentricity of liner to outer shell by mechanical means. A second “inner” factory installed flange shall be provided to keep the inner liner concentric and to eliminate the need to make inner connections at the inner wall. Retain insulation from dislocation by mechanical means. Ductwork shall be provided with flanged connections (paint grip galvanized) at each fitting or coupling on all double wall ducts.

5. Exhibit Hall/General Assembly Exposed Ductwork: Drum louver taps are to be factory fabricated and installed double wall taps with factory installed air foil type extractors up to the first duct reducer. Extractors are to be field adjustable and provided with means of securing the extractor to the duct without the use of additional fasteners or attachments. The drum louver taps are to be of length suitable for the dimensions of the installed louver. Factory manifold taps shall be welded to the spiral duct. Tack or spot welds are not acceptable.

2.4 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60.
2. Finishes for Surfaces Exposed to View: Mill phosphatized. (Paint Grip)

C. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.5 DUCT LINER

A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2. Basis-of-Design Product: Subject to compliance with requirements, provide product name or designation or comparable product by one of the following:
   a. CertainTeed Corporation; Insulation Group.
   b. Johns Manville.
   c. Knauf Insulation.
   d. Owens Corning.
3. Maximum Thermal Conductivity:
   a. Type I, Flexible: 3 lbs. Density / 1 ½" thick.
   b. Type II, Rigid: 3 lbs. Density / 1 ½" thick.
4. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
5. Solvent -Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
   a. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Insulation Pins and Washers:

1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- - diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-19, "Flexible Duct Liner Installation."

1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.
4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
   a. Fan discharges.
   b. Intervals of lined duct preceding unlined duct.
   c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.

9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.
    a. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall open area of 23 percent.
10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.6 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: 4 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Solvent-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Base: Synthetic rubber resin.
3. Solvent: Toluene and heptane.
4. Solids Content: Minimum 60 percent.
5. Shore A Hardness: Minimum 60.
6. Water resistant.
7. Mold and mildew resistant.

8. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
9. VOC: Maximum 395 g/L.
10. Maximum Static-Pressure Class: 10-inch wg, positive or negative.
11. Service: Indoor or outdoor.
12. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

E. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

G. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Duct Accessories" for fire and smoke dampers.

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
2. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
3. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
4. Unconditioned Space, Exhaust Ducts: Seal Class C.
5. Unconditioned Space, Return-Air Ducts: Seal Class B.
6. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
7. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
8. Conditioned Space, Exhaust Ducts: Seal Class B.
9. Conditioned Space, Return-Air Ducts: Seal Class C.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."

B. Building Attachments: Concrete inserts or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
4. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum interval of 16 feet.

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Division 23 Section "Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 PAINTING

A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 09 painting Sections.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
2. Test the following systems:

a. Ducts with a Pressure Class Higher Than 3-Inch wg: Test representative duct sections, selected by Architect from sections installed, totaling no less than 25 percent of total installed duct area for each designated pressure class.
b. Supply Ducts with a Pressure Class of 3-Inch wg or Higher: Test representative duct sections, selected by Architect from sections installed, totaling no less than 50 percent of total installed duct area for each designated pressure class.
c. Return Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections, selected by Architect from sections installed, totaling no less than 50 percent of total installed duct area for each designated pressure class.
d. Exhaust Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections, selected by Architect from sections installed, totaling no less than 50 percent of total installed duct area for each designated pressure class.
e. Outdoor Air Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections, selected by Architect from sections installed, totaling no less than 50 percent of total installed duct area for each designated pressure class.

3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
4. Test for leaks before applying external insulation.
5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
6. Give seven days' advance notice for testing.

C. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.
2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."
   a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.

D. Duct system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.8 DUCT CLEANING

A. Clean new duct system(s) before testing, adjusting, and balancing.

B. Use service openings for entry and inspection.

1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Division 23 Section "Duct Accessories" for access panels and doors.
2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Particulate Collection and Odor Control:

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

D. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within new duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.9 START UP

A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing."

3.10 DUCT SCHEDULE

A. Supply Ducts:

1. Ducts Connected Downstream of Fan Coil Units, and Terminal Units:
   a. Pressure Class: Positive 2-inch wg.

b. Minimum SMACNA Seal Class: A.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12

2. Ducts Connected to Variable-Air-Volume Air-Handling Units and Inlets of Terminal Units:
   a. Pressure Class: Positive 4-inch wg
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 3.
   d. SMACNA Leakage Class for Round and Flat Oval: 3
3. Ducts Connected to Equipment Not Listed Above:
   a. Pressure Class: Positive 2-inch wg.
   b. Minimum SMACNA Seal Class: A
   c. SMACNA Leakage Class for Rectangular: 3.
   d. SMACNA Leakage Class for Round and Flat Oval: 3.

B. Return Ducts:

1. Ducts Connected to Air-Handling Units
   a. Pressure Class: Positive or negative 4-inch wg.
   b. Minimum SMACNA Seal Class: A
   c. SMACNA Leakage Class for Rectangular: 6
   d. SMACNA Leakage Class for Round and Flat Oval: 6
2. Ducts Connected to Equipment Not Listed Above:
   a. Pressure Class: Positive or negative 2-inch wg>.
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 3.
   d. SMACNA Leakage Class for Round and Flat Oval: 3.

C. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
   a. Pressure Class: Negative 1-inch wg.
   b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
   c. SMACNA Leakage Class for Rectangular: 12.
   d. SMACNA Leakage Class for Round and Flat Oval: 6.
2. Ducts Connected to Equipment Not Listed Above:
   a. Pressure Class: Positive or negative 2-inch wg.
   b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
   c. SMACNA Leakage Class for Rectangular: 6.
   d. SMACNA Leakage Class for Round and Flat Oval: 6.

D. Outdoor-Air (Not Filtered, Heated, or Cooled) Ducts:

1. Ducts Connected to Air-Handling Units:
   a. Pressure Class: Positive or negative 2-inch wg.
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 6
   d. SMACNA Leakage Class for Round and Flat Oval: 6.
2. Ducts Connected to Equipment Not Listed Above:
   a. Pressure Class: Positive or negative 2-inch wg.
   b. Minimum SMACNA Seal Class: A
   c. SMACNA Leakage Class for Rectangular: 6.
   d. SMACNA Leakage Class for Round and Flat Oval: 6

E. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel

F. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
   a. Velocity 700 fpm or Lower:
      i. Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
      ii. Mitered Type RE 4 without vanes.
   b. Velocity 700 to 1500 fpm:
      i. Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
      ii. Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
      iii. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
   c. Velocity 1500 fpm or Higher:
      i. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
      ii. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
      iii. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
   a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
   b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
   c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."
   a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
      i. Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
      ii. Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
      iii. Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
      iv. Radius-to Diameter Ratio: 1.5.
   b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
   c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.

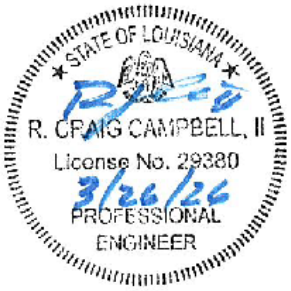
G. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."
   a. Rectangular Main to Rectangular Branch: 45-degree entry.

b. Rectangular Main to Round Branch: Spin in.

2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are permitted in existing duct.
   a. Velocity 1000 fpm or Lower: 90-degree tap.
   b. Velocity 1000 to 1500 fpm: Conical tap.
   c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 23 31 13



SECTION 23 33 00 – DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. This Section includes the following:

1. Backdraft dampers.
2. Manual volume control dampers.
3. Motorized Dampers.
4. Spin Collars.
5. Turning vanes.
6. Duct-mounted access doors and panels.
7. Flexible connectors.
8. Flexible ducts.
9. Accessories hardware.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.

B. Product data including details for materials, dimensions of individual components, profiles, and finishes for the following items:

1. Backdraft dampers.
2. Manual volume control dampers.
3. Duct-mounted access panels and doors.
4. Flexible ducts.

C. Shop drawings from manufacturer detailing assemblies. Include dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection. Detail the following:

1. Special fittings, volume control damper installation (both manual and automatic), and transformers details.
2. Fire and smoke damper installations, including sleeves and duct-mounted access door and panel installations.

D. Product Certification: Submit certified test data on dynamic insertion loss; self-noise power levels; and airflow performance data, static pressure loss, and dimensions and weights.

1.4 QUALITY ASSURANCE

A. NFPA Compliance: Comply with the following NFPA Standards:

1. NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems."
2. NFPA 90B, "Standard for the Installation of Warm Air Heating and Air Conditioning Systems."

1.5 EXTRA MATERIALS

A. Furnish extra materials matching products installed as described below, packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to Owner.

1. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.1 BACKDRAFT DAMPERS

A. Description: Suitable for horizontal or vertical installation.

B. Frame: 0.063-inch-thick 6063T extruded aluminum.

C. Blades: 0.025-inch-thick roll-formed aluminum.

D. Blades: 0.050-inch-thick 6063T extruded aluminum.

E. Blade Seals: Vinyl.

F. Blade Axles: Nonferrous.

G. Tie Bars and Brackets: Aluminum.

H. Return Spring: Adjustable tension.

I. Wing-Nut Operator: Galvanized steel, with 1/4-inch galvanized-steel rod.

J. Adjustable Pressure Controls.

K. Dampers to be Greenheck EM-30, Ruskin BD6, Pottorff BD-150, or approved equal.

2.2 MANUAL VOLUME CONTROL DAMPERS

A. General: Provide factory-fabricated volume-control dampers, complete with required hardware and accessories. Stiffen damper blades to provide stability under operating conditions. Provide locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class. Provide end bearings or other seals for ducts with pressure classifications of 3 inches or higher. Extend axles full length of damper blades. Provide bearings at both ends of operating shaft.

B. Standard Volume Control Dampers: Multiple or single-blade, parallel or opposed-blade design as indicated, standard-leakage rating, with linkage outside of air stream, and suitable for horizontal or vertical applications. Greenheck MDB-15, Ruskin MD-15, Pottorff CD-10 & MD-41, or approved equal.

2.3 MOTORIZED DAMPERS

A. Mechanical Contractor shall furnish and install motorized dampers as indicated on mechanical and architectural drawings. Damper shall be opposed blade motorized type equivalent to Greenheck Model VCD-23, Ruskin CD36/OB, Pottorff CD-41, or equal. Motorized dampers shall be operated by 120/1/60 electric actuator as indicated on plans. Damper shall be complete with outboard support bearing, blade and jamb seals. Dampers shall be low - leakage type. Dampers shall go to closed position when units are off unless otherwise noted.

2.4 SPIN COLLARS

A. All round take-offs to round branch duct shall be made with 26-gauge spin-type collars with 26-gauge balancing dampers. These spin-collars shall be as manufactured by Flexmaster Model FLD, Dace MSD, or approved equivalent.

B. The mounting groove shall be die-formed to assure constant fit control. Balancing dampers shall be factory-installed with spring loaded, retractable bearings and a positive locking wing-nut for easy adjustment.

2.5 TURNING VANES

A. Fabricate turning vanes according to SMACNA HVAC Duct Construction Standards, Figures 2-2 through 2-7.

B. Manufactured Turning Vanes: Fabricate of 1-1/2-inch-wide, curved blades set at 3/4 inch) on center, support with bars perpendicular to blades set at 2 inches on center, and set into side strips suitable for mounting in ducts.

C. Acoustic Turning Vanes: Fabricate of airfoil-shaped aluminum extrusions with perforated faces and fiber glass fill.

2.6 DUCT-MOUNTED ACCESS DOORS AND PANELS

A. General: Provide construction and airtightness suitable for duct pressure class.

B. Frame: Galvanized sheet steel. Provide with bend-over tabs and foam gaskets.

C. Door: Double-wall, galvanized sheet metal construction with insulation fill and thickness, number of hinges and locks as indicated for duct pressure class. Provide vision panel where indicated. Provide 1-inch by 1-inch butt hinge or piano hinge and cam latches.

D. Seal around frame attachment to duct and door to frame with neoprene or foam rubber seals.

E. Insulation: 1-inch- thick fiber glass or polystyrene foam board.

F. Access doors shall be Ruskin Model ADH-22, Kees ADH, Pottorff HAD, or approved equal.

2.7 FLEXIBLE CONNECTORS

A. General: Flame-retarded or noncombustible fabrics, coatings, and adhesives complying with UL Standard 181, Class 1.

B. Standard Metal-Edged Connectors: Factory-fabricated with a strip of fabric 3-1/2 inches wide attached to 2 strips of 2-3/4-inch-wide, 24-gage, galvanized sheet steel or 0.032-inch

(0.8-mm) aluminum sheets. Select metal compatible with connected duct system. Fold and crimp metal edge strips onto fabric as illustrated in SMACNA HVAC Duct Standard, 1st Edition, Figure 2-19.

2.8 FLEXIBLE DUCTS

A. General: Comply with UL 181, Class 1.

B. Flexible Ducts – Insulated (2.33”, R-6): Factory-fabricated, insulated, round duct, with an outer aluminum jacket, glass fiber insulation around a continuous inner liner.

1. Reinforcement: Steel-wire helix encapsulated in the inner liner.
2. Outer Jacket: Glass-reinforced, silver mylar with a continuous hanging tab, integral fiber glass tape, and nylon hanging cord.
3. Outer Jacket: Polyethylene film.
4. Inner Liner: Polyethylene film for low pressure, woven glass fiber for high pressure.
5. Low pressure duct rated at 6" static pressure.
6. Manufacturer: Thermaflex or approved equivalent.

2.9 ACCESSORIES HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket and a flat mounting gasket. Size to allow insertion of pilot tube and other testing instruments and provide in length to suit duct insulation thickness.

B. Splitter Damper Accessories: Zinc-plated damper blade bracket, 1/4-inch, zinc-plated operating rod, and a duct-mounted, ball-joint bracket with flat rubber gasket and square-head set screw.

C. Flexible Duct Clamps: Stainless steel band with cadmium-plated hex screw to tighten band with a worm-gear action. Provide in sizes from 3 to 18 inches to suit duct size.

D. Adhesives: High strength, quick setting, neoprene based, waterproof and resistant to gasoline and grease.

E. Provide all necessary transformers, electrical components suitable for each system installation including duct damper controllers, fire dampers and smoke dampers.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of duct accessories. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Install duct accessories according to manufacturer's installation instructions and applicable portions of details of construction as shown in SMACNA standards.

B. Install volume control dampers in lined duct with methods to avoid damage to liner and to avoid erosion of duct liner.

C. Provide test holes at fan inlet and outlet and elsewhere as indicated.

D. Install fire and smoke dampers according to the manufacturer's UL-approved printed instructions.

E. Install fusible links in fire dampers.

F. Label access doors according to Division 23 for "Mechanical Identification."

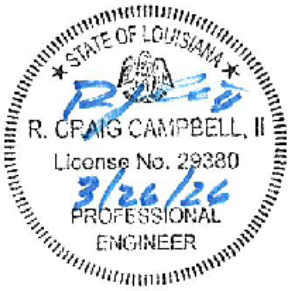
3.3 ADJUSTING

A. Adjust duct accessories for proper settings.

B. Adjust fire and smoke dampers for proper action.

C. Final positioning of manual dampers is specified in Division 23 Section "Testing, Adjusting, and Balancing."

END OF SECTION 23 33 00



SECTION 23 37 13 – DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.

B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

A. Section Includes:

1. Adjustable bar, registers and grilles

1.3 SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

B. Samples for Initial Selection: For diffusers, registers, and grilles with factory-applied color finishes.

C. Samples for Verification: For diffusers, registers, and grilles, in manufacturer's standard sizes to verify color selected.

D. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

1. Ceiling suspension assembly members.
2. Method of attaching hangers to building structure.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
5. Duct access panels.
   a. Source quality-control reports.

PART 2 - PRODUCTS

2.1 REGISTERS AND GRILLES

A. Adjustable Bar Register:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

i. Anemostat Products; a Mestek company.
ii. Krueger.
iii. METALAIRE, Inc.
iv. Nailor Industries Inc.
v. Price Industries.
vi. Titus.

2. Material: Aluminum.
3. Finish: Baked enamel, white.
4. Face Blade Arrangement: Horizontal spaced 3/4 inches apart.
5. Core Construction: Removable.
6. Rear-Blade Arrangement: Vertical spaced 3/4 inch apart.
7. Frame: 1 inch wide.
8. Mounting Frame: Filter
9. Mounting: Countersunk screw or Lay in.
10. Damper Type: Adjustable opposed blade.
11. Accessories:
    a. Front-blade gang operator.

B. Adjustable Bar Grille:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
        i. Anemostat Products; a Mestek company.
        ii. Krueger.
        iii. METALAIRE, Inc.
        iv. Nailor Industries Inc.
        v. Price Industries.
        vi. Titus.
2. Material: Aluminum
3. Finish: White baked enamel, unless noted otherwise.
4. Face Blade Arrangement: Horizontal spaced 3/4 inches apart.
5. Core Construction: Integral
6. Rear-Blade Arrangement: Vertical spaced 3/4 inch apart.
7. Frame: 1 inch wide.
8. Mounting: Countersunk screw or Lay in.

2.2 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

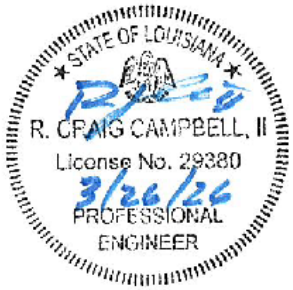
B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 23 37 13



SECTION 23 80 00 - AIR CONDITIONING, HEATING, AND VENTILATING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The air conditioning system, in general, shall be for the entire building, providing cooling and de-humidification in summer and heating in winter. A constant amount of fresh air shall be taken into the system and all air shall be filtered.

1.2 EMERGENCY DRAIN PAN:

A. Provide an emergency drain pan below all interior air handling units. The pan shall be constructed of 18 gauge galvanized steel, extending 6" beyond unit all around and turning up a minimum of 4" around the perimeter. A 1-1/4" x 1-1/4" x 1/8" galvanized angle iron frame shall be welded around the top of the pan. Entire pan should be painted with black asphalt rust preventative paint. Extend a Type "L" hard copper drain line (minimum 1") to the floor drain in the mechanical room or as indicated on the drawings. Provide a float switch in drain pan and interlock with A/H unit motor to de-energize the unit motor on rise of water in drain pan.

1.3 HIGH EFFICIENCY CONDENSING UNIT - OUTDOOR SECTION (20 TON OR LESS):

A. Furnish and install high-efficiency, air-cooled top discharge condensing unit where shown and with capacities scheduled. UNIT SHALL BE COMPLETELY FACTORY ASSEMBLED, PRE-CHARGED AND TESTED, AND SHALL BE SUPPLIED FROM THE FACTORY WITH ALL FEATURES LISTED BELOW. Min. SEER 13.0 FOR UNITS OVER 5 TONS AND 14.0 SEER FOR UNITS 5 TONS AND BELOW. Unit electrical, parts, compressors, controls and labor shall have a 5 year warranty (entire unit).

B. Condenser coil shall be constructed of aluminum fins mechanically bonded to an aluminum coil and shall be protected with stamped louvered panels on outside of unit.

C. Condenser fan shall be propeller type, direct driven. Motor shall have inherent protection and be of the permanently lubricated type, resiliently mounted. Fans shall be complete with safety guards.

D. Compressor shall be a single speed serviceable hermetic or sealed hermetic design complete with crankcase heater and external spring isolators and compressors, and shall have a 5-year warranty. Unit shall be equipped with time delay to prevent compressor from starting within five minutes of "off" time. Refrigerant shall be R-410A.

E. All controls shall be factory wired and shall consist of condenser fan overload devices, hard start kit (single phase only), internal pressure relief valve, filter dryers, pressure taps for refrigerant check, quick connect refrigerant couplings and liquid and suction line service valves. Unit shall also be furnished with outdoor expansion valve or metering valve and check valve, switch-over valve and an evaporator defrost control kit to permit the cooling system to operate down to 30oF outdoor temperature. Provide hot gas re-heat as required for proper operation of humidity control system.

F. Casing shall be fully weatherproof for outdoor installation and shall be bonderized steel with baked enamel finish. Panels shall be removable to provide access for servicing. Unit shall be set in place on rubber mounting pads.

G. Contractor shall advise the Electrical Contractor of the manufacturer's recommended breaker size, fuse size, wire size, electrical service, etc. if different from that specified on

the Electrical Drawings. Mechanical Contractor shall pay any additional costs required to change breaker size, fuse sizes, wire sizes, electrical service of equipment, etc. for proper operation and installation.

H. Unit shall be as manufactured by Trane, Lennox, Carrier, York, Daikin, or approved equivalent.

1.4 HIGH EFFICIENCY AIR CONDITIONING UNIT - INDOOR SECTION:

A. Furnish and install vertical discharge/bottom or horizontal return air conditioning unit of size, type and capacities as scheduled. Units shall be Trane, Lennox, Carrier, York, Daikin, or approved equivalent. Unit shall have a full 5 year parts and labor warranty.

B. Units shall be complete with fan, multi-speed direct drive blower, motor, direct expansion cooling coil, low voltage control transformer, grease fittings, insulated metal drain pan, etc. All units shall be factory insulated on the interior with not less than 3/4# density neoprene coated fiberglass cemented in place with waterproof adhesive.

C. Each unit shall be mounted on a suitable base as indicated on plans or 18" high painted angle iron base approved by the Engineer to allow for proper return air duct connection. Unit shall also be designed for continuous operation at the maximum rated static pressure. Fan capacities shall be rated with the fans in the units, and the horse powers specified shall include all losses.

D. Casings shall be suitable for operation at the pressures specified and constructed of bonderized steel.

E. Cooling coils shall be of aluminum or copper and shall be tested at 400 psi air pressure. Cooling coil face velocity shall not exceed that guaranteed by manufacturer for no moisture carry-over.

F. Electric strip heaters shall be as hereinafter specified and shall be mounted inside unit housing. Coordinate electric service to heaters and blower with Electrical Contractor. Heater and air unit shall be internally wired and fused to receive one electrical source of power. Coordinate fuse size, breaker size, HP size, KW size, etc. with Electrical Contractor. Mechanical Contractor shall pay for all changes required for proper installation and operation.

G. Filter shall be 1" thick, pleated, throw-way mounted in an accessible factory filter rack at unit, or in R.A. ductwork as indicated on plans.

H. Contractor shall provide two new sets of filters upon completion of project, to turn building over to Owner.

I. If the manufacturer's equipment is not available internally wired to receive one source of power, necessary modifications to electric service shall be the responsibility of the equipment supplier. Any modifications required shall be submitted in writing ten (10) days prior to the bid date.

1.5 ELECTRIC STRIP HEATERS:

A. Electric strip heaters shall consist of open coils made from Grade "A" resistant wire insulated by floating ceramic bushings and supported in an aluminum steel frame.

B. All terminal studs, nuts and washers shall be stainless steel, insulated with phenolic terminal bushings. Terminals shall be machine crimped to coils and heater shall be tested at 2000 volts before shipment. All voltages and phases shall be as scheduled.

C. Heater shall be provided with built-in contactors, with one terminal block furnished for each circuit and separate contactors for each stage of heating. Heaters with air units shall be internally wired with air unit to receive one electric source of power.

D. An automatic reset thermal cut-off shall be provided to break the heater load directly on over-temperature. In addition, provide manual reset thermal cut-off to break the heater load manually.

E. Control circuit transformer shall be built into heater terminal box and sized to carry full contactor holding coil load.

F. Heaters shall be listed by UL and shall be as manufactured by Chromalox, Electric Heaters, Inc., Industrial Engineering and Equipment Co., or an approved equivalent.

G. Heater shall be equipped with built-in pressure type air flow switch. Heater shall be mounted inside unit housing.

H. Where indicated on drawings, heaters in ductwork shall be provided with duct flanges. Outside of heater shall be wrapped with 2" thick fiberglass ductwrap with aluminum foil vapor barrier.

1.6 TESTING REFRIGERANT PIPING SYSTEMS:

A. Refrigerant lines shall be tested under 200 psi dry nitrogen pressure for 5 hours using soap suds at joints to test for leaks. Evacuate system and charge with refrigerant.

1.7 AHU FILTERS:

A. All new air handling units (split systems units) shall be furnished and installed with permanent metal filter frames.

B. Frame shall be constructed of 22 gauge perimeter frame enclosing a preformed 16 gauge wire air leaving grid. The front support shall be a 10 gauge wire grid.

C. During construction, start-up and running units, units shall have 2" thick pleated disposable filters as manufactured by FARR or prior approved equivalent.

D. Final size of metal frames for filters shall be coordinated with each A/C unit and owner.

1.8 LABELING A/C UNITS AND FANS

A. All indoor and outdoor a/c units and fans shall be labeled with permanent laminated plate riveted to unit. Units shall be labeled as indicated in schedules. Plate shall be black with white unit numbers. Height of unit number shall be minimum of one (1) inch. Label shall also indicate area serviced by unit as noted in schedules. Height of letters shall be minimum of one-half (1/2) inch.

1.9 VENTILATING SYSTEM

A. This Contractor shall furnish and install all exhaust fans shown and scheduled on Plans. Fans shall be of the type indicated and shall be Cook, Greenheck, Acme, Twin City, Penn Barry, or approved equivalent.

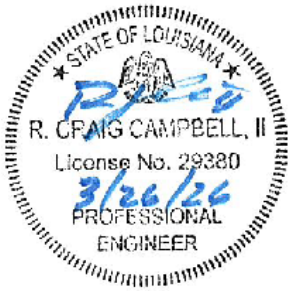
B. All exhaust fans shall be equipped with bird screen, automatic back-draft dampers and integral disconnect switch unless noted otherwise. Fan motors shall be of the 40 deg C ambient temperature rise type and shall be suitable for continuous duty operation. Direct drive fans shall be complete with solid state speed control switch mounted on unit for balancing. Interlock with remote on/off switch.

C. Roof mounted fans and equipment shall be complete with insulated factory roof curb. Coordinate installation requirements and height with roofing manufacturer's recommendation.

D. In-line exhaust fans shall be mounted with spring isolation hangers and threaded rod supports anchored to structure.

E. Ceiling mounted fans shall be complete with white ceiling mounted grille. Grille shall be removable to provide service access to fan, motor, etc.

END OF SECTION 23 80 00



SECTION 23 80 25 – VRF EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes complete VRF HVAC system(s) which may include, but not limited to, the following components:

1. Indoor, recessed, ceiling-mounted units with 33x33” grilles.
2. Outdoor, air-source heat recovery units.
3. VRF system controls.
4. VRF system refrigerant and oil.
5. VRF system condensate drain piping.
6. VRF system refrigerant piping.
7. VRF system control cable.

1.2 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Nationally recognized manufacturer of VRF HVAC systems and products.
2. Shipped VRF HVAC systems with similar requirements to local market for a continuous period of 10 years within time of bid.
3. VRF HVAC systems and products that have been successfully tested and in use on at least five completed projects.
4. Having complete published online catalog literature, installation, and operation and maintenance manuals for all products intended for use. Resources must be publicly available without login or sign-in as registered account.
5. Having full-time in-house employees for the following:
   a. Product research and development.
   b. Product and application engineering.
   c. Product manufacturing, testing, and quality control.
   d. Technical support for system installation training, startup, commissioning, and troubleshooting of installations.
   e. Owner training.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by VRF HVAC system manufacturer.

1. Each employee shall be certified to have successfully completed manufacturer training for proper installation of systems, including, but not limited to, equipment, piping, controls, and accessories indicated and furnished for installation.
2. Installer certificate shall be valid and current for duration of Project.
3. Retain copies of Installer certificates on-site and make available on request.
4. Each person assigned to Project shall have demonstrated past experience.
   a. Demonstrated experience with VRF products being installed for period within five consecutive years before time of bid.
   b. Demonstrated experience on five projects of similar VRF system complexity, scope, and value.

C. ISO Compliance: System equipment and components furnished by VRF HVAC system manufacturer shall be manufactured in an ISO 9001 and ISO 14001 facility.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in a clean and dry place. Protect products from weather, dirt, dust, water, construction debris, and physical damage.

1. Retain factory-applied coverings on equipment to protect finishes during construction and remove just prior to operating unit.

B. Cover unit openings before installation to prevent dirt and dust from entering inside of units. If required to remove coverings during unit installation, reapply coverings over openings after unit installation and remove just prior to operating unit.

C. Comply with manufacturer's written rigging and installation instructions for unloading and moving to final installed location.

1.4 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace equipment and components that fail(s) in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures.
   b. Faulty operation.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period:
   a. For Compressor, 10 year(s) from date of Substantial Completion.
   b. For Parts, One year(s) from date of Substantial Completion.

B. Installer’s Labor Warranty: Installer agrees to repair or replace equipment and components that fail(s) in materials or workmanship within specified warranty period.

1. Warranty Period [**1**][**2**] year(s) from date of substantial completion.

PART 2 - PRODUCTS

2.1 VRF HVAC SYSTEMS

A. Manufacturers: Basis of design is CITY MULTI. Subject to compliance with requirements, provide products by one of the following brands only:

1. Mitsubishi Electric & Electronics USA, Inc.
2. Trane, Inc.
3. Daikin Applied

2.2 SYSTEM DESCRIPTION

A. VRF HVAC system(s) with variable capacity in response to varying cooling and heating loads. System shall consist of multiple indoor units, outdoor unit module(s), and HRCUs or SVKs when shown on Drawings. Piping, controls, and electrical power to components make operating system(s) complying with requirements indicated.

1. System(s) operation being heat pump or heat recovery as indicated on Drawings.
2. Each system with one refrigerant circuit serving all indoor units connected to system.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. AHRI Compliance: System and equipment performance certified according to AHRI 1230-2023.

D. UL Compliance: Comply with UL 60335-2-40.

2.3 INDOOR, EXPOSED, WALL-MOUNTED UNITS

A. Description: Factory-assembled and tested complete unit with components, piping, wiring, and controls required for mating to piping, power, and controls field connections.

B. Cabinet:

1. Material: Painted steel, or coated steel frame covered by a plastic cabinet, with an architectural acceptable finish suitable for tenant occupancy on exposed surfaces.
2. Insulation: Manufacturer's standard internal insulation to provide thermal resistance and prevent condensation.
3. Internal Access: Removable panels of adequate size for field access to internal components for inspection, cleaning, service, and replacement.

C. Coil Assembly:

1. Coil Casing: Aluminum, galvanized, or stainless steel.
2. Coil Fins: Aluminum, mechanically bonded to tubes, with arrangement required by performance.
3. Coil Tubes: Copper, of diameter and thickness required by performance.
4. Capacity Control: DX coil by electronic modulating type valve with linear or proportional characteristics. Hydronic coil by modulating control valve.
5. Unit Internal Tubing: Copper tubing with brazed joints.
6. Unit Internal Tubing Insulation: Manufacturer's standard insulation, of thickness to prevent condensation.
7. Factory Charge: Dehydrated air or nitrogen.
8. Testing: Factory pressure tested and verified to be without leaks.

D. Drain Assembly:

1. Pan: Non-ferrous material, with bottom sloped to low point drain connection.
2. Condensate Removal: Gravity.
   a. If a floor drain is not available at unit, provide unit with field-installed condensate pump accessory.
3. Field Piping Connection: Non-ferrous material.

E. Fan and Motor Assembly:

1. Fan(s):
   a. Direct-drive arrangement.
   b. Single or multiple fans connected to a common motor shaft and driven by a single motor.
   c. Fabricated from non-ferrous components or ferrous components with corrosion protection finish.
   d. Wheels statically and dynamically balanced.
2. Motor: Brushless DC or electronically commutated with permanently lubricated bearings.

3. Motor Protection: Integral protection against thermal, overload, and voltage fluctuations.
4. Speed Settings and Control: Multiple or variable speed with speed setting adjustable via central or wall controllers when present.
5. Vibration Control: Integral isolation to dampen vibration transmission.

F. Filter Assembly:

1. Access: Front, to accommodate filter replacement without the need for tools.
2. Media: Manufacturer's standard washable filter with antimicrobial treatment.

G. Grille Assembly: Manufacturer's standard discharge grille within front face of unit cabinet.

1. Motorized Vane: Adjustable or oscillating flow pattern.

H. Unit Controls:

1. Factory-Installed Sensors:
   a. Unit inlet air temperature.
   b. Coil entering refrigerant or water temperature.
   c. Coil leaving refrigerant or water temperature.
   d. Refrigerant detection if coil is DX.
2. Features and Functions:
   a. Self-diagnostics.
   b. Time delay.
   c. Auto-restart.
   d. Auto operation mode.
   e. Manual operation mode.
   f. Filter service notification.
   g. Run test switch.

I. Unit Electrical:

1. Field Connection: Single point connection to power entire unit and integral controls.
2. Disconnecting Means: Field-installed circuit breaker or switch, complying with NFPA 70.

2.4 INDOOR, RECESSED, CEILING-MOUNTED UNITS WITH 33x33” GRILLES

A. Description: Factory-assembled and tested complete unit with components, piping, wiring, and controls required for mating to ductwork, piping, power, and controls field connections.

B. Cabinet:

1. Material: Painted steel, or coated steel frame covered by a plastic cabinet, with an architectural acceptable finish suitable for tenant occupancy on exposed surfaces.
2. Insulation: Manufacturer's standard internal insulation to provide thermal resistance and prevent condensation.
3. Internal Access: Removable panels of adequate size for field access to internal components for inspection, cleaning, service, and replacement.

C. Coil Assembly:

1. Coil Casing: Aluminum, galvanized, or stainless steel.
2. Coil Fins: Aluminum, mechanically bonded to tubes, with arrangement required by performance.

3. Coil Tubes: Copper, of diameter and thickness required by performance.
4. Capacity Control: DX coil by electronic modulating type valve with linear or proportional characteristics. Hydronic coil by modulating control valve.
5. Internal Tubing: Copper tubing with brazed joints.
6. Internal Tubing Insulation: Manufacturer's standard insulation, of thickness to prevent condensation.
7. Factory Charge: Dehydrated air or nitrogen.
8. Testing: Factory pressure tested and verified to be without leaks.

D. Drain Assembly:

1. Pan: Non-ferrous material, with bottom sloped to low point drain connection.
2. Condensate Removal: Unit-mounted integral lifting mechanism, capable of lifting drain water to an elevation above top of cabinet.
3. Field Piping Connection: Non-ferrous material.

E. Fan and Motor Assembly:

1. Fan(s):
   a. Direct-drive arrangement.
   b. Single or multiple fans connected to a common motor shaft and driven by a single motor.
   c. Fabricated from non-ferrous components or ferrous components with corrosion protection finish.
   d. Wheels statically and dynamically balanced.
2. Motor: Brushless DC or electronically commutated with permanently lubricated bearings.
3. Motor Protection: Integral protection against thermal, overload, and voltage fluctuations.
4. Speed Settings and Control: Multiple or variable speed with speed setting adjustable via central or wall controllers when present.
   a. Airflow volume shall vary based on three unit height settings.
5. Vibration Control: Integral isolation to dampen vibration transmission.

F. Filter Assembly:

1. Access: Bottom, to accommodate filter replacement without the need for tools.
2. Media: Washable screen.

G. Return/Discharge-Air Grille Assembly: Attached to bottom of unit cabinet.

1. Discharge Pattern: Include accessory air outlet shutter plates as required for two, three, or four-way throw as indicated on Drawings.
   a. Discharge Pattern Adjustment: Field-adjustable settings for up and down range of motion.
   b. Discharge Pattern Closure: Ability to close individual discharges of units with multiple patterns using wall-mounted controller.
2. Motorized Vanes: Modulating up and down flow pattern for uniform room air distribution.
3. Alternate Branch Supply Duct Connection: Sheet metal knockout for optional connection to one supply branch duct as shown on Drawings. Utilize accessory air outlet shutter plate with branch ducting.

H. Integral Occupant and Location Detection: Unit includes occupant and location detection for automatic air distribution and energy saving setback control in the following manner.

1. Air Distribution
    a. [Default distribution operation: Integral occupant and location detection will not be utilized to control air distribution. During COOL mode, vanes move to horizontal airflow direction. During HEAT mode, vanes move to down airflow direction.]
    b. [Direct/Indirect distribution: Vanes automatically move relative to the quadrant(s) where persons are detected.]
    c. [Area temperature distribution: Vanes move to down airflow direction toward areas with a high floor temperature during COOL mode and toward areas with a low floor temperature during HEAT mode. Otherwise, vanes move to the horizontal airflow direction.]
2. Energy Saving
    a. [Default energy operation: Integral occupant and location detection will not be utilized to automatically enable setback or mode changes. Set point and setback and mode determined by wall controller or central control when provided.]
    b. [No occupancy-based energy save: If there are no persons in the room for 60 minutes or more, energy saving operation (setback) equal to 4°F is performed.]
    c. [Room occupancy-based energy save: If occupancy rate decreases to approximately 30% of the maximum occupancy rate, energy saving operation (setback) equal to 2°F is performed.]
    d. [No occupancy Auto-OFF: If no persons are in the room for set amount of time (60–180 minutes), MODE is automatically changed (OFF, COOL, or HEAT).]

I. Outdoor Air Ventilation Connection: Sheet metal knockout for connection to outdoor air ventilation duct per Drawings.

J. Field-Installed Unit Accessories:

1. [None.]
2. [Multi-function casement with MERV 10 filter element.]
3. [Left/right horizontal airflow vane kit to further optimize air distribution and energy saving configurations (adds 3 inches to casement height).]
4. [Condensate pump capable of at least 10 feet of lift.]

K. Unit Controls:

1. Factory-Installed Sensors:
    a. Unit inlet air temperature.
    b. Coil entering refrigerant or water temperature.
    c. Coil leaving refrigerant or water temperature.
    d. Room occupancy/location.
    e. Refrigerant detection if coil is DX
2. Features and Functions:
    a. Integral occupancy and location sensor.
    b. Time delay.
    c. Auto-restart.
    d. Auto operation mode.
    e. Manual operation mode.
    f. Filter service notification.
    g. Drain assembly high water level safety shutdown and notification.
    h. Run test switch.

L. Unit Electrical:

1. Field Connection: Single point connection to power entire unit and integral controls.
2. Disconnecting Means: Field-installed circuit breaker or switch, complying with NFPA 70.

2.5 INDOOR, HEAT RECOVERY CONTROL UNITS (HRCUs)

A. Description: Factory-assembled and tested complete unit with components, piping, wiring, and controls required for mating to piping, power, and controls field connections.

1. Specially designed for use in systems with simultaneous heating and cooling.
2. Systems shall include one or multiple units designed by variable refrigerant system manufacturer for field interconnection to make a single refrigeration circuit and multiple indoor units.
3. Units shall respond to calls for HEAT or COOL operation from indoor units by enabling refrigerant or water flow as equipment shown on Drawings require.
    a. If flow direction from HRCU alternates, flow in COOL direction to indoor units in HEAT mode during outdoor unit defrost sequence is not allowed.

B. Cabinet:

1. Galvanized-steel construction.
2. Insulation: Manufacturer's standard internal insulation to provide thermal resistance and prevent condensation.
3. Internal Access:
    a. Removable panels or hinged doors of adequate size.
    b. Access to all internal components for inspection, cleaning, service, or replacement.

C. Drain Pan: If required by manufacturer's design, provide unit with non-ferrous drain pan with bottom sloped to a low point drain connection.

D. Assemblies and Specialties:

1. Specially designed by manufacturer for type of VRF HVAC system being installed, either two or three pipe.
2. Each branch circuit shall have refrigerant and/or water control valve(s) to control flow.
3. Units serving DX indoor units shall include mitigation shut-off valves at each branch circuit.
4. [**Each branch port connection shall be fitted with an isolation valve to simplify service to any individual branch**.]

E. Unit Controls:

1. Factory-Installed Sensors:
    a. Liquid inlet temperature.
    b. Bypass exit area temperature.
    c. Bypass outlet temperature.
    d. Bypass inlet temperature.
    e. High pressure sensor.
    f. Medium pressure sensor.
2. Interlock control sequence: digital output for use in interlock sequences; relay adapter kit may be required. Required interlock sequence(s) include-
    a. [**None**.]
    b. [**Refrigerant detection by any connected indoor unit**.]

F. Refrigerant Leak Detection:

1. Sequence upon receiving leak detection signal from any DX indoor unit:
   a. Shut-off valves for each port(s) connected DX indoor unit(s) having detected refrigerant close.
   b. If indoor unit fan(s) where refrigerant is detected is set to AUTO, fan switches to ON.
   c. Refrigerant detection signal output activated.
   d. Normal operation continues uninterrupted for ports and DX indoor units where refrigerant is not detected.

G. Unit Electrical:

1. Field Connection: Single point connection to power entire unit and integral controls.
2. Disconnecting Means: Field-installed circuit breaker or switch, complying with NFPA 70.

2.6 OUTDOOR, AIR-SOURCE HEAT RECOVERY UNITS

A. Description: Factory-assembled and tested complete unit designed for use in systems with simultaneous heating and cooling.

1. Systems shall consist of one unit, or multiple unit modules that are designed by variable refrigerant system manufacturer for field interconnection to make a single refrigeration circuit, heat recovery control unit(s), and multiple indoor units.

B. Cabinet:

1. Galvanized steel and coated with a corrosion-resistant finish.
   a. Coating with documented salt spray test performance of 2000 hours according to ASTM B117 surface scratch test (SST) procedure.
2. Internal Access: Removable panels or hinged doors of adequate size for field access to internal components for inspection, cleaning, service, and replacement.

C. Compressor and Motor Assembly:

1. One or more positive-displacement, direct-drive and hermetically sealed scroll compressor(s) with inverter drive. Non-inverter compressors—where LRA applies—are not allowed.
2. [**Cold-Climate Compressor: Hot gas injection to allow increased compression ratio for extended periods without damage or excessive wear**.]
3. Protection: Integral protection against the following-
   a. Refrigerant overcharge and undercharge
   b. High and low refrigerant pressure.
   c. High refrigerant and oil temperature.
   d. Liquid flood back.
   e. Thermal and overload.
   f. Voltage fluctuations.
   g. Phase failure and phase reversal.
   h. Short cycling.
4. Speed Control: Configurable to maintain refrigerant evaporating and condensing temperatures while varying refrigerant flow to satisfy cooling and heating loads.
   a. Cooling mode fixed 32°F evaporator temperature.
   b. Cooling mode fixed 43°F evaporator temperature.
   c. Cooling mode variable 32-48°F evaporator temperature.
   d. [**Cooling mode high ambient operation**.]

e. Heating mode high COP operation.
f. Heating mode high heating output operation.

5. Vibration Control: Integral isolation to dampen vibration transmission.
6. Oil Management: Timed sequence enabled during extended periods of reduced refrigerant flow to ensure proper lubrication over entire operating range. Sequences which rely on sensing oil level risk sensor failure or sensor placement not accounting for line length and are not allowed.
7. Crankcase heaters with integral control to maintain safe operating temperature.
8. Fusible plug.

D. Heat-Exchanger Assembly: Individual coil segments for each unit face to simplify future service replacement costs. Documented salt spray test performance of 2000 hours according to ASTM B117 surface test (SST) procedure.

1. Plate Fin Coils:
   a. Casing: Aluminum, galvanized, or stainless steel.
   b. Fins: Aluminum or copper, mechanically bonded to tubes, with arrangement required by performance.
   c. Tubes: Copper, of diameter and thickness required by performance.
2. Zinc-Coated Aluminum Vertical Flat Tube Coils:
   a. Series of tubes containing a series of multiple, parallel flow channels layered between refrigerant header manifolds.
   b. Construct fins, tubes, and header manifolds of aluminum alloy.

E. Heat-Exchanger Defrost Strategy:

1. Alternate methods based on ambient temperatures.
   a. Hot-gas method to maximize efficiency during mild ambient temperatures. Method prolongs defrost sequence.
      i. Segmented coil (single-module systems) or alternating modules (twinned systems) to deliver simultaneous defrost and HEAT delivery indoors.
   b. Reverse-cycle method to maximize comfort during extreme ambient temperatures. Method shortens defrost sequence.
      i. Leverage below 33.8°F for single-module systems and below 23°F for twinned systems to deliver shorter defrost cycles.
2. Preheat Defrost Operation: Signal to indoor units operating in HEAT to increase space temperature before the start of defrost sequence.

F. Heat-Exchanger Fan and Motor Assembly:

1. Fan(s): Propeller type.
   a. Direct-drive arrangement.
   b. Fabricated from non-ferrous components.
   c. Statically and dynamically balanced.
2. Fan Guards: Removable safety guards complying with OSHA regulations. If using metal materials, coat with corrosion-resistant coating to match performance indicated for heat exchanger coil.
3. Motor(s): Brushless DC or electronically commutated with permanently lubricated bearings and rated for outdoor duty.
4. Motor Protection: Integral protection against thermal, overload, and voltage fluctuations.

G. Field-Installed Unit Accessories:

1. [**None**.]

2. [**Low Ambient Cooling Kit: Provide heat-exchanger coil wind deflectors and fan hood assembly for low ambient cooling operation to -15°F as indicated in Drawings**.]
3. [**Snow/Hail Protection Kit: Provide heat exchanger coil guards and fan hoods to protect against hail damage**.]
4. [**Refrigerant Filter/Cleaning System: Replaceable filter core in bypass arrangement from main suction flow to enhance installation quality assurance**.]
5. [**Open-Design Equipment Support Stand: Adjustable 13-17" height**.]
6. [**Adjustable 13-17" height, Open-Design Equipment Support Stand**.]
7. [**Adjustable 13-26" height, Open-Design Equipment Support Stand**.]

H. Unit Controls:

1. Enclosure: Manufacturer's standard, and suitable for unprotected outdoor locations.
2. Factory-Installed Controller: Configurable digital control.
3. Factory-Installed Sensors:
   a. Refrigerant suction temperature.
   b. Refrigerant discharge temperature.
   c. Outdoor air temperature.
   d. Refrigerant high pressure.
   e. Refrigerant low pressure.
4. Features and Functions: Self-diagnostics, time delay, auto-restart, USB connector to allow running system data up to five days based on storage capacity of memory stick when provided.
5. Interlock control sequence: Customizable operation based on external input or contact closure. Required interlock sequence(s) include-
   a. [Multi-stage demand limit.]
   b. [Low noise (nighttime) limit.]
   c. [Lock COOL or HEAT mode.]
   d. [Compressor on/off and fault status.]
   e. [System Refrigerant detection status.]

I. Unit Electrical:

1. Field Connection: Single point connection to power each unit module or factory-twinned unit and integral controls.
2. Disconnecting Means: Field-installed circuit breaker or switch, complying with NFPA 70.

2.7 VRF SYSTEM CONTROLS

A. General Requirements:

1. Communicating network may include: Indoor units, outdoor units, HRCUs, SVKs and integral controls connect through a manufacturer-selected network.
2. Network Communication Protocol: Manufacturer proprietary control communication between interconnected units.
3. Integration with Building Automation System: ASHRAE 135, BACnet IP and certified by BACnet Testing Lab (BTL), including the following-
   a. Ethernet connection via RJ-45 connectors and port with transmission at 100 Mbps or higher.
   b. Integration shall include [control][monitoring][scheduling][change of value notifications]<Insert requirements>.
4. Operator Interface:

a. Operators shall interface with system and unit controls through the following:
   i. Operator interfaces integral to controllers
   ii. [Manufacturer-provided central controller.]
b. Users shall be capable of interface with controllers for indoor units' control to extent privileges are enabled. Control features available to users shall include the following:
   i. On/off control.
   ii. Temperature set-point adjustment.
   iii. Fan speed control.
c. [Interface via secure-cloud access shall allow downloading of system diagnostic information, viewable system diagnostic charts, and email notification of error codes.]

B. VRF HVAC System Operator Interface via PC:

1. Central controller(s) connected local-area-network shall be accessible through standard web browser software requiring no manufacturer-specific software be installed on owner-furnished PC.
2. Browser interface shall provide operator with a graphic user interface to allow monitoring and control of multiple central controllers from a single device location through point-and-click mouse exchange.
3. Plan views shall show building plans with location of indoor units and identification superimposed on plans.
4. Controls operation mode of indoor units as individual units, by selected groups of indoor units, or as collection of all indoor units. Operation modes available through central controller shall match those operation modes of controllers for indoor units.
5. Schedules operation of indoor units as individual units, by selected groups of indoor units, or as collection of all indoor units. Schedules daily, weekly, and annual events.
6. Changes operating set points of indoor units as individual units, by selected groups of indoor units, or as collection of all indoor units.
7. Night setback feature to operate indoor units at energy-conserving heating and cooling temperature set-points during unoccupied periods.
8. Supports Multiple Languages: English, French, or Spanish.
9. Supports Imperial and Metric Temperature Units
10. Displays service notifications and error codes.
11. Monitors and displays cumulative operating time of indoor units.
12. Able to disable and enable operation of individual controllers for indoor units.
13. Information displayed on individual controllers shall also be available for display.

C. Central Controllers:

1. Centralized control for all indoor and outdoor units from a single central controller location.
   a. Include multiple interconnected controllers as required.
   b. [Include backlit, high-resolution color display touch panel.]
2. Controls operation mode of indoor units as individual units, by selected groups of indoor units, or as collection of all indoor units. Operation modes available through central controller shall match those operation modes of controllers for indoor units.
3. Schedule operation of indoor units as individual units, by selected groups of indoor units, or as collection of all indoor units.
   a. Sets schedule for daily, weekly, and annual events.
   b. Schedule options available through central controller shall at least include the schedule options of controllers for indoor units.

4. Changes operating set points of indoor units as individual units, by selected groups of indoor units, or as collection of all indoor units.
5. Optimized start feature to start indoor units before scheduled time to reach temperature set-point at scheduled time based on operating history.
6. Night setback feature to operate indoor units at energy-conserving heating and cooling temperature set-points during unoccupied periods.
7. Able to disable and enable operation of individual controllers for indoor units.
8. Information displayed on individual controllers shall also be available for display through central controller.
9. Multiple RJ-45 ports for direct connection to a local PC and an Ethernet network switch.
10. Start/stop control capability for third-party equipment as required.
11. [Accessory surface-mount case.]
12. [Accessory recess-mount case (for use in 3-1/2” wall cavity).]
13. [DIN rail mounting kit for installation of central controller in an enclosure.]
14. [License for Integration with Building Automation System: BACnet over IP communication of indoor unit monitor and control points.]
15. [Demand response controller kit meeting California Title 24 2022 Building Energy Efficiency Standards– Demand Responsive Controls compliance (Appendix D of California 2022 Nonresidential and Multifamily Compliance)]
16. [Niagara Driver for direct BMS connection to central controller(s) for enhanced data set including indoor unit and control points plus outdoor unit monitor points in lieu of BACnet license.]

D. Wired Controllers and Sensors for Indoor Units

1. Simple Controllers for Indoor Units:
    a. Single controller capable of controlling multiple indoor units as group.
    b. Integral room temperature sensor
    c. Temperature Units: Fahrenheit and Celsius.
    d. On/Off: Turns indoor unit on or off.
    e. Operation Mode: Cool, Heat, Auto, Dehumidification, Fan Only.
    f. Temperature Display and Set-Point: Separate set points for Cooling, Heating. Adjustable in 1-degree Fahrenheit increments between.
    g. Fan Speed Setting: Select between available options furnished with unit.
    h. Airflow Direction Setting: If applicable to indoor unit style, select between available options furnished with the unit.
    i. Service Notification Display: "Filter".
    j. Error Code Notification Display: Used by service personnel to troubleshoot abnormal operation and equipment failure.
    k. Low-voltage power required for controller shall be powered through non-polar connections to indoor unit.
2. Residential / Multi-Family Style Controllers for Indoor Units:
    a. Wall-mounted controller with integral room temperature and humidity sensors and adapter providing connection to indoor unit.
    b. Color LCD with click-wheel operation and Proximity Sensor to wake controller screen when approached.
    c. Automatic switching between Cool and Dry modes to meet target humidity level (user-selectable between 35-75%).
    d. Temperature Units: Fahrenheit and Celsius.
    e. On/Off: Turns indoor unit on or off.
    f. Hold: Hold operation settings until hold is released.
    g. Operation Mode: Cool, Heat, Auto, Dehumidification, Fan Only, and Setback.
    h. Temperature Display and Set-Point: Separate set points for Cooling, Heating. Adjustable in 1-degree Fahrenheit increments between.

i. Fan Speed Setting: Select between available options furnished with unit.
j. Airflow Direction Setting: If applicable to indoor unit style, select between available options furnished with the unit.
k. Seven-day programmable operating schedule with up to five events per day. Operations shall include On/Off, Operation Mode, and Temperature Set-Point.
l. Error Code Notification Display: Used by service personnel to troubleshoot abnormal operation and equipment failure.
m. User and Service Passwords: Capable of preventing adjustments by unauthorized users.
n. Setting stored in nonvolatile memory to ensure that settings are not lost if power is lost.
o. Low-voltage power required for controller shall be powered through polarity-specific connections to indoor unit.
p. Limits central control (when present) to monitor-only functionality.

3. Deluxe Controllers for Indoor Units:
a. Single controller capable of controlling multiple indoor units as group.
b. Integral room temperature sensor
c. Configurable LCD Touch Screen with Auto Timeout: Timeout duration shall be adjustable.
d. Temperature Units: Fahrenheit and Celsius.
e. On/Off: Turns indoor unit on or off.
f. Hold: Hold operation settings until hold is released.
g. Operation Mode: Cool, Heat, Auto, Dehumidification, Fan Only, and Setback.
h. Temperature Display and Set-Point: Separate set points for Cooling, Heating. Adjustable in 1-degree Fahrenheit increments between.
i. Fan Speed Setting: Select between available options furnished with unit.
j. Airflow Direction Setting: If applicable to indoor unit style, select between available options furnished with the unit.
k. Seven-day programmable operating schedule with up to five events per day. Operations shall include On/Off, Operation Mode, and Temperature Set-Point.
l. Auto Off Timer: Operates unit for an adjustable time duration and then turns unit off.
m. Service Notification Display: "Filter".
n. Service Run Tests: Limit use by service personnel to troubleshoot operation.
o. Error Code Notification Display: Used by service personnel to troubleshoot abnormal operation and equipment failure.
p. User and Service Passwords: Capable of preventing adjustments by unauthorized users.
q. Setting stored in nonvolatile memory to ensure that settings are not lost if power is lost.
r. Low-voltage power required for controller shall be powered through non-polar connections to indoor unit.

4. Color Touch Screen Controllers with Bluetooth Connectivity for Indoor Units:
a. Single controller capable of controlling multiple indoor units as group.
b. Integral room temperature sensor
c. Configurable color LCD Touch Screen with Auto Timeout: import custom image, timeout duration shall be adjustable.
d. Configurable and controller via mobile app via Bluetooth™; Bluetooth shall have rotating security PIN.
e. Temperature Units: Fahrenheit and Celsius.
f. On/Off: Turns indoor unit on or off.
g. Hold: Hold operation settings until hold is released.

h. Operation Mode: Cool, Heat, Auto, Dehumidification, Fan Only, and Setback.
i. Temperature Display and Set-Point: Separate set points for Cooling, Heating. Adjustable in 1-degree Fahrenheit increments between.
j. Fan Speed Setting: Select between available options furnished with unit.
k. Airflow Direction Setting: If applicable to indoor unit style, select between available options furnished with the unit.
l. Seven-day programmable operating schedule with up to five events per day. Operations shall include On/Off, Operation Mode, and Temperature Set-Point.
m. Auto Off Timer: Operates unit for an adjustable time duration and then turns unit off.
n. Service Notification Display: "Filter".
o. Service Run Tests: Limit use by service personnel to troubleshoot operation.
p. Error Code Notification Display: Used by service personnel to troubleshoot abnormal operation and equipment failure.
q. User and Service Passwords: Capable of preventing adjustments by unauthorized users.
r. Setting stored in nonvolatile memory to ensure that settings are not lost if power is lost.
s. Low-voltage power required for controller shall be powered through non-polar connections to indoor unit.

5. Touch Controllers with Integral Occupancy and Light Sensing for Indoor Units:
a. Single controller capable of controlling multiple indoor units as group.
b. Integral room temperature, humidity, light and occupancy sensors.
c. Multiple configurable automatic energy-save strategies by integral occupancy sensor (e.g., unit off, unit setback, fan mode, set point ± 4°F).
d. Light sensor may be used to disable energy-save by occupancy sensing.
e. Configurable color LED operation indication.
f. LCD Touch Screen with Auto Timeout: Timeout duration shall be adjustable.
g. Temperature Units: Fahrenheit and Celsius.
h. On/Off: Turns indoor unit on or off.
i. Hold: Hold operation settings until hold is released.
j. Operation Mode: Cool, Heat, Auto, Dehumidification, Fan Only, and Setback.
k. Temperature Display and Set-Point: Separate set points for Cooling, Heating. Adjustable in 1-degree Fahrenheit increments between.
l. Fan Speed Setting: Select between available options furnished with unit.
m. Airflow Direction Setting: If applicable to indoor unit style, select between available options furnished with the unit.
n. Seven-day programmable operating schedule with up to five events per day. Operations shall include On/Off, Operation Mode, and Temperature Set-Point.
o. Auto Off Timer: Operates unit for an adjustable time duration and then turns unit off.
p. Service Notification Display: "Filter".
q. Service Run Tests: Limit use by service personnel to troubleshoot operation.
r. Error Code Notification Display: Used by service personnel to troubleshoot abnormal operation and equipment failure.
s. User and Service Passwords: Capable of preventing adjustments by unauthorized users.
t. Setting stored in nonvolatile memory to ensure that settings are not lost if power is lost.

u. Low-voltage power required for controller shall be powered through non-polar connections to indoor unit.

6. Conventional Thermostat Interface and Thermostat
   a. Provide with and 24V transformer to power thermostat.
   b. Indoor unit modes: COOL, HEAT, FAN, and OFF (AUTO function only at thermostat level).
   c. Three input terminals to control fan speed control:
      i. High.
      ii. Medium.
      iii. Low.
   d. Auto recovery after power failure.
   e. Limits central control (when present) to monitoring mode status and error alarm only.
7. Wired Sensor-Only for Indoor Units:
   a. Surface-mount sensors in lieu of local controllers.

E. Wireless Controllers for Indoor Units:

Wireless Wall-Mounted Controllers for Indoor Units:

a. Wall-mounted controller with integral room temperature sensor and receiver providing connection to indoor unit.
b. Temperature sensing shall be integral sensor within controller
c. Temperature Units: Fahrenheit and Celsius.
d. On/Off: Turns indoor unit on or off.
e. Hold: Hold operation settings until hold is released.
f. Operation Mode: Cool, Heat, Auto, Dehumidification, Fan Only, and Setback.
g. Temperature Display and Set-Point: Separate set points for Cooling, Heating. Adjustable in 1-degree Fahrenheit increments between.
h. Fan Speed Setting: Select between available options furnished with unit.
i. Airflow Direction Setting: If applicable to indoor unit style, select between available options furnished with the unit.
j. Seven-day programmable operating schedule with up to five events per day. Operations shall include On/Off, Operation Mode, and Temperature Set-Point.
k. Service Notification Display: "Filter".
l. User and Service Passwords: Capable of preventing adjustments by unauthorized users.
m. Setting stored in nonvolatile memory to ensure that settings are not lost if power is lost.
n. Two AA alkaline batteries (supplied with controller) required for controller power.
o. Receiver connects to indoor unit control board with 1 m cable.
p. Limits central control (when present) to monitor-only functionality.

2. Handheld Wireless Controllers for Indoor Units:
   a. Controller communicates to remote-mounted receiver that is wired to indoor unit(s).
      i. Include receivers with handheld wireless controllers as required to complete installation.
      ii. Low-voltage power required for receivers shall be powered by indoor unit.
   b. One handheld wireless controller shall be capable of communicating with one or multiple receivers to control one or multiple indoor units as a group.
   c. Temperature Units: Fahrenheit and Celsius.
   d. On/Off: Turns indoor unit on or off.
   e. Operation Mode: Cool, Heat, Auto, Dehumidification, and Fan Only.

f. Fan Speed Setting: Select between available options furnished with indoor unit.
g. Airflow Direction Setting: If applicable to unit, select between available options furnished with indoor unit.
h. Auto Off Timer: Operates unit for an adjustable time duration and then turns unit off.
i. Service Run Tests: Limit use by service personnel to troubleshoot operation.
j. Receiver Error Notification LED: Used by service personnel to troubleshoot abnormal operation and equipment failure.

2.8 VRF SYSTEM REFRIGERANT AND OIL

A. Refrigerant:

1. As required by VRF HVAC system manufacturer for system to comply with performance requirements indicated.
2. ASHRAE 34, Class A2Lrefrigerant classification.
3. R-32

B. Oil:

1. As required by VRF HVAC system manufacturer and to comply with performance requirements indicated.

2.9 VRF SYSTEM CONDENSATE DRAIN PIPING

A. If more than one material is listed, material selection is Contractor's option.

B. Copper Tubing:

1. Drawn-Temper Tubing: According to [ASTM B88, Type L (ASTM B88M, Type B)][ASTM B88, Type M (ASTM B88M, Type C)] or Type DWV according to ASTM B306.
2. Wrought-Copper Fittings: ASME B16.22.
3. Wrought-Copper Unions: ASME B16.22.
4. Solder Filler Metals: ASTM B32, lead-free alloys, and water-flushable flux according to ASTM B813.

C. CPVC plastic pipe according to ASTM F441/F441M, Schedule 40, with socket-type pipe fittings according to ASTM F438 and solvent cement according to ASTM F493.

D. PVC plastic pipe according to ASTM D1785, Schedule 40, with socket-type pipe fittings according to ASTM D2466 and solvent cement according to ASTM D2564, primer according to ASTM F656.

E. Reducers: Where applied to piping connected to unit-mounted integral lifting mechanism, only eccentric reducers oriented horizontally are allowed.

2.10 VRF SYSTEM REFRIGERANT PIPING

A. Refrigerant Piping:

1. Copper Tube: ASTM B280, Type ACR.
2. Wrought-Copper Fittings: ASME B16.22.
3. Brazing Filler Metals: AWS A5.8/A5.8M.

B. Refrigerant Tubing Kits:

1. Factory-rolled and -bundled, soft-copper tubing with tubing termination fittings at each end.
2. Standard one-piece length for connecting to indoor units.
3. Pre-insulated with flexible elastomeric insulation of thickness to comply with governing energy code and sufficient to eliminate condensation.
4. Factory Charge: dehydrated air or nitrogen.

C. Assemblies and Specialties:

1. Divided-Flow Specialty Fittings: Where required by VRF HVAC system manufacturer for proper system operation, VRF HVAC system manufacturer shall furnish specialty fittings with identification and instructions for proper installation by Installer.
2. [Refrigerant Isolation Ball Valves: Uni-body full port design with Schrader valve for refrigerant service, rated for maximum system temperature and not less than 800 psig pressure, and factory tested under pressure to ensure tight shutoff.]

2.11 VRF SYSTEM CONTROL CABLE

A. General Requirements: Refer to and verify all wire and cabling requirements with the manufacturer's current installation and operation manuals to ensure compliance with the latest standards and specifications. Cables may not be spliced and shall be continuous from terminal to terminal. Do not splice cable.

B. Low-Voltage Control Network Cabling:

1. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
   a. Shielded wire (2-core) 16 AWG—CVVS, CPEVS or MVVS.
   b. PVC insulation and jacket.
   c. Foil shielded.
   d. Flame Resistance: Comply with NFPA 262.
   e. Maximum cable distance (distance to farthest components) is 1,640 feet.
   f. Maximum cable distance from OU to connected IU is 656 feet.
   g. Maximum total cable length (sum of all network cabling) is 6,560 feet.

C. Low-Voltage Wall-Mounted Controller Cabling to Indoor Units:

1. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
   a. 22 AWG, 2-conductor unshielded 7-stranded bare copper wire.
      i. Residential / multi-family style controllers require 4-conductor.
      ii. Touch controllers with integral occupancy and light sensing controllers require low-voltage control network cabling to the network.
   b. PVC insulation and jacket.
   c. Flame Resistance: Comply with NFPA 262.
   d. Maximum cable distance (distance from controller to indoor unit) varies by controller style. Refer to manufacturer Submittal or Installation Guides.

D. Transmission power booster provided if additional signal power is required based on connected devices. Coordinate with VRF manufacturer and install near middle of communication bus when required.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine products before installation. Reject products that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for ductwork to verify actual locations of connections before equipment installation.

D. Examine roughing-in for wiring and conduit to verify actual locations of connections before equipment installation.

E. Examine walls, floors, roofs, and outdoor pads for suitable conditions where equipment will be installed.

F. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EQUIPMENT INSTALLATION, GENERAL

A. Clearance:

1. Maintain manufacturer's recommended clearances for service and maintenance.
2. Maintain clearances required by governing code.

B. Equipment Restraint Installation: Install equipment with seismic-restraint device. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."

3.3 INSTALLATION OF INDOOR UNITS

A. Install units to be level and plumb while providing a neat and finished appearance.

B. Unless otherwise required by VRF HVAC system manufacturer, support ceiling-mounted units from structure above using threaded rods; minimum rod size of 3/8 inch (10 mm).

C. Adjust supports of exposed and recessed units to draw units tight to adjoining surfaces.

D. Protect finished surfaces of ceilings, floors, and walls that come in direct contact with units. Refinish or replaced damaged areas after units are installed.

E. In rooms with ceilings, conceal piping and tubing, controls, and electrical power serving units above ceilings.

F. In rooms without ceiling, arrange piping and tubing, controls, and electrical power serving units to provide a neat and finished appearance.

G. Provide lateral bracing if needed to limit movement of suspended units to not more than 0.25 inch

3.4 INSTALLATION OF OUTDOOR UNITS

A. Install units to be level and plumb while providing a neat and finished appearance.

B. Install outdoor units on support structures indicated on Drawings.

C. Pad-Mounted Installations: Install outdoor units on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."

1. Attachment: Install anchor bolts to elevations required for proper attachment to supported equipment.
2. Grouting: Place grout under equipment supports and make bearing surface smooth.

D. Roof-Mounted Installations: Install outdoor units on equipment supports specified in Section 077200 "Roof Accessories." Anchor units to supports with removable, stainless-steel fasteners.

3.5 GENERAL REQUIREMENTS FOR PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping and tubing systems. Install piping and tubing as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping and tubing in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping and tubing at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping and tubing above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping and tubing to permit valve servicing.

F. Install piping and tubing at indicated slopes.

G. Install piping and tubing free of sags.

H. Install fittings for changes in direction and branch connections.

I. Install piping and tubing to allow application of insulation.

J. Install groups of pipes and tubing parallel to each other, spaced to permit applying insulation with service access between insulated piping and tubing.

K. Install sleeves for piping and tubing penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230500 "Common Work Results for HVAC."

L. Install escutcheons for piping and tubing penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230500 "Common Work Results for HVAC."

3.6 INSTALLATION OF SYSTEM CONDENSATE DRAIN PIPING

A. General Requirements for Drain Piping and Tubing:

1. Install a union in piping at each threaded unit connection.
2. Install an adjustable stainless steel hose clamp with adjustable gear operator on unit hose connections. Tighten clamp to provide a leak-free installation.
3. If required for unit installation, provide a trap assembly in drain piping to prevent air circulated through unit from passing through drain piping. Comply with more stringent of the following:
   a. Details indicated on Drawings.
   b. Manufacturer's requirements.
   c. Governing codes.
   d. In the absence of requirements, comply with requirements of ASHRAE handbooks.
4. Extend drain piping from units with drain connections to drain receptors as indicated on Drawings. If not indicated on Drawings, terminate drain connection at nearest accessible location that is not exposed to view by occupants.
5. Provide each 90-degree change in direction with a Y- or T-fitting. Install a threaded plug connection in the dormant side of fitting or future use as a service cleanout.

B. Gravity Drains:

1. Slope piping from unit connection toward drain termination at a constant slope of not less than one percent.

C. Pumped Drains:

1. If unit condensate pump or lift mechanism is not included with an integral check valve, install a full-size check valve in each branch pipe near unit connection to prevent backflow into unit.

3.7 INSTALLATION OF REFRIGERANT PIPING

A. Refrigerant Tubing Kits:

1. Unroll and straighten tubing to suit installation. Deviations in straightness of exposed tubing shall be unnoticeable to observer.
2. Support tubing as specified in Section 230516 “Hangers and Supports for HVAC Piping and Equipment.”
3. Prepare tubing ends and make mating connections to provide a pressure tight and leak-free installation.

B. Select system components with minimum 650 psig pressure rating.

C. Install piping as short and direct as possible, with a minimum number of joints and fittings.

D. Arrange piping to allow inspection and service of equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Section 083113 "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.

E. Install refrigerant piping and tubing in protective conduit where installed below ground.

F. Install refrigerant piping and tubing in rigid or flexible conduit in locations where exposed to mechanical damage.

G. Unless otherwise required by VRF HVAC system manufacturer, slope refrigerant piping and tubing as follows:

1. Install horizontal hot-gas discharge piping and tubing with a uniform slope downward away from compressor.
2. Install horizontal suction lines with a uniform slope downward to compressor.
3. Traps to entrain oil in vertical runs are not allowed.
4. Inverted traps for twinned systems may be required by manufacturer.
5. Liquid lines may be installed level.

H. When brazing, remove or protect components that could be damaged by heat. Braze pipes with a dry nitrogen purge to avoid oxidation.

I. Before installation, clean piping, tubing, and fittings to cleanliness level required by VRF HVAC system manufacturer.

J. Joint Construction:

1. Brazed Joints
   a. Ream ends of tubes and remove burrs.
   b. Remove scale, slag, dirt, and debris from inside and outside of tube and fittings before assembly.
   c. Construct joints in accordance with AWS's "Brazing Handbook," "Pipe and Tube" Chapter.
   d. Use Type BAg (cadmium-free silver) alloy for joining copper with bronze.
   e. The piping being brazed shall be purged of air to remove the oxygen and filled with one of the following inert gases: oxygen-free nitrogen, helium or argon. The piping system shall be purged with an inert gas for a minimum time corresponding to five volume changes through the piping system prior to brazing. The pre-purge rate shall be at a minimum velocity of 100 feet per minute (0.508 m/s). The inert gas shall be directly connected to the tube system being brazed to prevent the entrainment of ambient air. After the pre-purge, the inert gas supply shall be maintained through the piping during the brazing operation at a minimum pressure of 1.0 psi (6.89 kPa) and a maximum pressure of 3.0 psi (20.67 kPa). The joint shall be brazed with a filler metal conforming to AWS A5.8
2. Mechanically Pressed Joints
   a. The installing contractor shall be fully trained and qualified by the manufacturer of the mechanically pressed joints to install the selected piping connections.
   b. Mechanical joints shall be installed in accordance with the manufacturer’s instructions.
3. Flared Joints
   a. Flared fittings shall be installed in accordance with the manufacturer’s instructions. The flared fitting shall be used with the tube material specified by the fitting manufacturer. The flared tube end shall be made by a tool designed for that operation.
4. Soldered Joints
   a. Use of soldered joints is prohibited within VRF systems.

3.8 INSTALLATION OF PIPING AND TUBING INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated. Installation to maintain a continuous vapor barrier.

B. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are unavailable, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Where PVC jackets are indicated, install with 1-inch (25-mm) overlap at longitudinal seams and end joints, for horizontal applications. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

E. Where metal jackets are indicated, install with 2-inch (50-mm) overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless steel bands 12 inches (300 mm) o.c. and at end joints.

3.9 INSTALLATION OF DUCT, ACCESSORIES, AND AIR OUTLETS

A. Where installing ductwork adjacent to equipment, allow space for service and maintenance.

B. Comply with requirements for metal ducts specified in Section 233113 "Metal Ducts."

C. Comply with requirements for nonmetal ducts specified in Section 233116 "Nonmetal Ducts."

D. Comply with requirements for air duct accessories specified in Section 233300 "Air Duct Accessories."

E. Comply with requirements for flexible ducts specified in Section 233346 "Flexible Ducts."

F. Comply with requirements for air diffusers specified in Section 233713.13 "Air Diffusers."

G. Comply with requirements for registers and grilles specified in Section 233713.23 "Registers and Grilles."

3.10 IDENTIFICATION

A. Identify system equipment, piping, tubing, and valves. Comply with requirements for identification specified in Section 230553 "Identification for HVAC Piping and Equipment."

3.11 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage VRF HVAC system manufacturer's service representative to advise and assist installers; witness testing; and observe and inspect components, assemblies, and equipment installations, including controls and connections.

1. Field service shall be performed by a manufacturer-trained and authorized service representative of VRF HVAC system manufacturer whose primary job responsibilities are to provide direct technical support of its products.
2. Manufacturer-trained and authorized service representative shall provide on-site visits during construction at installation milestones indicated. System Installer shall coordinate each visit in advance to give manufacturer sufficient notice to plan the visit.
    a. First Visit: Kick-off meeting.
    b. Second Visit: At approximately 25 percent completion of system(s).
    c. Third Visit: At approximately 50 percent completion of system(s).
    d. Fourth Visit: At approximately 75 percent completion of system(s).
    e. Fifth Visit: Final inspection before system startup.
3. Kick-off Meeting:
    a. Meeting shall include system Installer and other related trades with sole purpose of reviewing VRF HVAC system installation requirements and close coordination required to make a successful installation.
    b. Meeting shall be held at Project site and scheduled at a mutually agreed to time that occurs before the start of any part of system installation.
    c. Meeting shall cover the following as a minimum requirement:
        i. Review of latest issue of Contract Documents, Drawings, and Specifications, relevant to VRF HVAC systems.
        ii. Manufacturer's installation requirements specific to systems being installed.
        iii. Review of all relevant VRF HVAC system submittals, including delegated-design submittals.
        iv. Required field activities related installation of VRF HVAC system.
        v. Project team communication protocol, contact information, and exchange of responsibilities for each party involved, including manufacturer, supplier, system Installer, and other related trades.
4. Site Visits: Activities for each site visit shall include the following:
    a. Meet with VRF HVAC system Installer to discuss field activities, issues, and suggested methods to result in a successful installation.
    b. Offer technical support to Installer and related trades as related to VRF system(s) being installed.
    c. Review progress of VRF HVAC system(s) installation for strict compliance with manufacturer's requirements.
    d. Advise and if necessary, assist Installer with updating related refrigerant calculations and system documentation.
5. Final Inspection before Startup:
    a. Before inspection, Installer to provide written request to manufacturer stating the system is fully installed according to manufacturer's requirements and ready for final inspection.
    b. All system equipment and operating components shall be inspected. If components are inaccessible for inspection, they shall be made accessible before the final inspection can be completed.
    c. A factory-trained and authorized service representative shall provide a comprehensive inspection of all equipment and each operating component that comprise the complete system(s). Inspection shall follow a detailed checklist specific to each equipment and operating component.

d. Inspection reports for indoor units shall include, but not be limited to, the following:
    i. Unit designation on Drawings.
    ii. Manufacturer model number.
    iii. Serial number.
    iv. Network address, if applicable.
    v. Each equipment setting.
    vi. Mounting, supports, and restraints properly installed.
    vii. Proper service clearance provided.
    viii. Wiring and power connections correct.
    ix. Line-voltage reading(s) within acceptable range.
    x. Wiring and controls connections correct.
    xi. Low voltage reading(s) within an acceptable range.
    xii. Controller type and model controlling unit.
    xiii. Controller location.
    xiv. Temperature settings and readings within an acceptable range.
    xv. Condensate removal acceptable.
    xvi. Fan settings and readings within an acceptable range.
    xvii. Unit airflow direction within an acceptable range.
    xviii. If applicable, fan external static pressure setting.
    xix. Filter type and condition acceptable.
    xx. Noise level within an acceptable range.
    xxi. Refrigerant or hydronic piping properly connected and insulated.
    xxii. Condensate drain piping properly connected and insulated.
    xxiii. If applicable, ductwork properly connected.
    xxiv. If applicable, external interlocks properly connected.
    xxv. Remarks.
e. Inspection reports for outdoor units shall include, but not be limited to, the following:
    i. Unit designation on Drawings.
    ii. Manufacturer model number.
    iii. Serial number.
    iv. Network address, if applicable.
    v. Each equipment setting, including compressor speed control.
    vi. Mounting, supports, and restraints properly installed.
    vii. Proper service clearance provided.
    viii. Wiring and power connections correct.
    ix. Line-voltage reading(s) within acceptable range.
    x. Wiring and controls connections correct.
    xi. Low voltage reading(s) within an acceptable range.
    xii. Condensate removal acceptable.
    xiii. Noise level within an acceptable range.
    xiv. Refrigerant piping properly connected and insulated.
    xv. Condensate drain piping properly connected and insulated.
    xvi. For water-source outdoor units, water piping properly connected and insulated.
    xvii. For water-source outdoor units, proof of water flow checked for proper operation.
    xviii. Remarks.
f. Installer shall provide manufacturer with the requested documentation including as-built piping lengths and technical support during inspection.
g. Installer shall correct observed deficiencies found by the inspection.
h. Upon completing the on-site inspection, manufacturer shall provide a written report with complete documentation describing each inspection step, the result, and any corrective action required.

i. If corrective action is required by Installer that cannot be completed during the same visit, provide additional visits, as required, until deficiencies are resolved, and systems are deemed ready for startup.
j. Final report shall indicate the system(s) inspected are installed according to manufacturer's requirements and are ready for startup.

B. Perform the following tests and inspections with the assistance of manufacturer's service representative:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: Not less than 24 hours after electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Refrigerant and Hydronic Tubing Positive Pressure Testing:

1. Comply with more stringent of VRF HVAC system manufacturer's requirements and requirements indicated.
2. After completion of tubing installation, pressurize tubing systems to a test pressure:
   a. Refrigerant piping to a test pressure of not less than 600 psig using dry nitrogen.
   b. Hydronic piping to a test pressure of not less than 43 psig.
3. Successful testing shall maintain a test pressure for a continuous and uninterrupted period of 24 hours. Allowance for pressure changes attributed to changes in ambient temperature are acceptable.
4. Prepare test report to record the following information for each test:
   a. Name of person starting test, company name, phone number, and e-mail address.
   b. Name of manufacturer's service representative witnessing test, company name, phone number, and e-mail address.
   c. Detailed description of extent of tubing tested.
   d. Date and time at start of test.
   e. Test pressure at start of test.
   f. Outdoor temperature at start of test.
   g. Name of person ending test, company name, phone number, and e-mail address.
   h. Date and time at end of test.
   i. Test pressure at end of test.
   j. Outdoor temperature at end of test.
   k. Remarks:
5. Submit test reports for Project record and to system manufacturer.

D. Refrigerant Tubing Evacuation Testing:

1. Comply with more stringent of VRF HVAC system manufacturer's requirements and requirements indicated.
2. After completion of tubing positive-pressure testing, evacuate tubing systems to a pressure of 500 microns.
3. Successful testing shall maintain a test pressure for a continuous and uninterrupted period of one hour with no change.
4. Prepare test report to record the following information for each test:

a. Name of person starting test, company name, phone number, and e-mail address.
b. Name of manufacturer's service representative witnessing test, company name, phone number, and e-mail address.
c. Detailed description of extent of tubing tested.
d. Date and time at start of test.
e. Test pressure at start of test.
f. Outdoor temperature at start of test.
g. Name of person ending test, company name, phone number, and e-mail address.
h. Date and time at end of test.
i. Test pressure at end of test.
j. Outdoor temperature at end of test.
k. Remarks:

5. Submit test reports for Project record and to system manufacturer.
6. Upon successful completion of evacuation testing, system shall be charged with refrigerant.

E. System Refrigerant Charge:

1. System Installer shall consult system manufacturer to determine the correct system refrigerant charge based on as-built piping lengths.
2. Installer shall charge system following VRF HVAC system manufacturer's written instructions.
3. Total refrigerant charge shall be recorded and permanently displayed at the system's outdoor unit.

3.12 STARTUP SERVICE

A. Installer shall engage a factory-trained and authorized service representative of VRF HVAC system manufacturer to perform system(s) startup supervision.

1. Complete startup service of each separate system.
2. Complete system startup service according to manufacturer's written instructions.

B. Startup checks shall include, but not be limited to, the following:

1. Check control communications of equipment and each operating component in system(s).
2. Check each outdoor unit’s power supply is connected 12 to 24 hours before startup of system.
3. Check each indoor unit's response to demand for cooling and heating.
4. Check each indoor unit's response to changes in airflow settings.
5. Check each indoor unit, outdoor unit, and HRCU when present for proper condensate removal.

C. Installer shall accompany factory-trained and authorized service representative during startup service and provide manufacturer's service representative with requested documentation and technical support during startup service.

1. Installer shall correct deficiencies found during startup service for reverification.

D. System Operation Report:

1. After completion of startup service, manufacturer shall issue a report for each separate system.

2. Report shall include complete documentation describing each startup check, the result, and any corrective action required.
3. Manufacturer shall electronically record not less than one hour of continuous operation of each system and submit with report for historical reference.
    a. All available system operating parameters shall be included in the information submitted.

E. Witness:

1. Invite Owner to witness startup service procedures.
2. Provide written notice not less than 10 business days before start of startup service.

3.13 ADJUSTING

A. Adjust equipment and components to function smoothly and lubricate as recommended by manufacturer.

B. Adjust initial temperature set points. Adjust initial airflow settings and discharge airflow patterns.

C. Set field-adjustable switches according to VRF HVAC system manufacturer's written instructions, and as indicated.

3.14 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by [skilled employees of system Installer who are manufacturer's authorized service representative]. Include two service visits for preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper equipment and system operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

3.15 DEMONSTRATION

A. Engage a VRF HVAC system manufacturer's factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain entire system.

B. Instructor:

1. Instructor shall be factory trained and certified by VRF HVAC system manufacturer with current training on the system(s), equipment, and controls that are installed.

C. Schedule:

1. Schedule training with Owner at least 10 business days before first training session.
2. Training shall occur before Owner occupancy.
3. Training shall be held at mutually agreed date and time during normal business hours.

D. Location: Owner shall provide a suitable on-site location to host classroom training.

E. Training Attendance: For record purposes, document training attendees at the start of each new training session. Record attendee's name, signature, phone number, and e-mail address.

F. Training Format: Individual training modules shall include classroom training followed by hands-on field demonstration and training.

G. Training Materials: Provide training materials in electronic format to each attendee.

1. Offer online instructional videos showing general operation and maintenance that are coordinated with operation and maintenance manuals.

H. Acceptance: Obtain [Architect][Commissioning Agent][or][Owner] written acceptance that training is complete, and requirements indicated have been satisfied.

END OF SECTION 23 81 29

SECTION 26 00 01 – ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions as appropriate, apply to the Work specified in this Section.

B. Refer to all Electrical Divisions of the Specifications as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 BIDDING REQUIREMENTS AND RESPONSIBILITIES

A. Prime bidder is responsible for all work, of all trades and sub-contractors bidding this project. It is the prime bidder's responsibility, prior to submitting a bid to ensure that sub-contractors coordinate all aspects of the work between trades, sub-contractors, etc. to the fullest extent possible.

B. Prime bidder shall ensure that all sub-contractors, suppliers, equipment vendors, etc., obtain all necessary and pertinent contract document information pertaining to their work prior to the submission of a bid. Contractor shall realize that different sub-contractors may furnish equipment, accessories, devices, etc. necessary for a complete and working installation, that require provision of services by another sub-contractor or trade.

C. Bidders of all or any portions of this section or division are required to review all contract documents including but not limited to Architectural drawings, Structural drawings, Mechanical drawings, Plumbing drawings, Electrical drawings, etc. to coordinate requirements and responsibilities with and through prime bidder.

D. Bidders of all or any portions of this section or division, by furnishing a bid on a portion of the prime contract are indicating that they have received all contract documents and coordinated services provided under their portion of the work with the prime bidder; they are indicating that they have expressed any pertinent questions (which would result from a detailed, thorough review of the entire set of contract documents) to the prime bidder in accordance with the general provisions of the Specifications requirements, prior to bidding.

E. All timely, pertinent, questions provided in writing prior to bids, in accordance with the general provisions of the Specifications requirements, will be clarified, defined, or otherwise explained in a written addendum and/or addendums prior to bids, in accordance with the general provisions of the Specifications requirements.

F. It is not the intention of these contract documents to leave any issue relating to coordination between trades or sub-contractors vaguely defined. The intention is to define all issues, coordination matters, equipment requirements, sizes, routing, etc. to the satisfaction of the prime bidder, prior to receipt of bids.

G. Bidders of all or any portions of this section or division, by virtue of the submission of a bid to the prime bidder, are indicating that they have reviewed the entire set of contract documents with due diligence and regard for the Owner's desire for a comprehensive and complete bid proposal; that they have expressed all concerns or questions requiring clarification on matters of coordination between trades and/or sub-contractors; that they have expressed any such concerns or questions in writing in accordance with contract document's General Provisions requirements.

H. Prime bidders, by submission of a comprehensive bid on the project are indicating that the subcontractors selected in their bid have complied with all contract document's General Provisions requirements, that they have indicated in writing, prior to bidding, all questions or concerns requiring clarification and/or explanation and have documented any and all specific exclusions involving work that would generally be considered to be work of their trade. The prime bidder shall coordinate all work so that anything excluded by the bidder of all or any portions of this section or division, have been addressed prior to bids in one of the following manners:

1. The work has been confirmed, by the prime bidder, to be work of another trade or subcontractor whose proposal is also being accepted.
2. Clarification of the matter has been made through the prime design professional via written addendum and is clearly and mutually understood by the prime bidder and the party raising the issue/question, or seeking clarification.
3. The work has been accepted as the responsibility of the prime contractor directly.

1.3 MATERIAL AND EQUIPMENT

A. The term "provide" when used in the Contract Documents includes all items necessary for the proper execution and completion of the work.

B. Specific reference in the Specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the Contractor, in such cases, may at his option use any article, device, product, material, fixture, form or type of construction which in the judgement of the Architect expressed in writing is equivalent to that specified.

C. Coordinate and properly relate all work of this Division to building structure and work of all other trades.

D. Visit premises and become thoroughly familiar with existing conditions; verify all dimensions in field. Advise Architect of any discrepancies prior to Bid Date in accordance with contract document's General Provisions.

E. Do not rough-in for any item or equipment furnished by others or noted "Not in Contract" (NIC), without first receiving rough-in information or determining rough-in requirements from other trades and/or Architect.

F. Provide storage and protection for all equipment and materials in accordance with requirements of contract document's General Provisions. Replace any equipment and materials damaged by improper handling, storage, or protection, at no additional cost to the Owner.

G. Keep premises clean in accordance with requirements of contract document's General Provisions.

1.4 SUBSTITUTIONS

A. Substitutions are allowed under La. R.S. 38:2291 and La R.S. 38:2292. Any requests for prior approval (as provided for under La. R.S. 38:2295) including any re-submitted data, shall be received by the Architect/Engineer a minimum of ten (10) working days prior to bid date. Submittals sent via facsimile and/or electronic mail will not be accepted. The Contractor shall recognize that it may be necessary to submit certain requests for prior approval sooner than the final date listed in the Instructions to Bidders, depending upon the complexity and completeness of the submittal. If, in the opinion of the

Architect/Engineer, there is neither sufficient time available nor adequate descriptive data attached to the submittal, the submittal will not be considered. Except as otherwise specified, materials and equipment shall be new and bear the approval label of the Underwriters Laboratories, Inc. for the type of installation required.

B. Basis of design of systems is based on specific equipment for performance, size, shape, color, construction material, etc... If the use of other manufacturer's equipment, even though approved by Architect, involves additional cost due to space requirements, foundation requirements, increased mechanical or electrical services, the cost of such extra work shall be borne by the contractor. Even though a manufacturer's name appears in the Contract Documents as having acceptable equipment, his equipment shall be classified as being a substitute to the equipment originally designed for and named in the Contract Documents. Substitute equipment, materials, etc., will not be allowed to deviate from basis of design requirements.

C. All requests for prior approval shall identify where proposed material matches or exceeds the performance of the equipment specified. In addition, such submittal shall also clearly identify all deficiencies compared to specified product. Submittal of general cut sheets will be returned rejected.

D. The following items shall be submitted for prior approval:

1. Lighting Fixtures and Poles
2. Clock System
3. Dimmer Switches
4. Receptacles
5. Toggle Switches
6. Wiring Device Box Support Brackets
7. Lamps
8. Photocells
9. Tele/Data Systems
10. Cover Plates
11. Medium Voltage Terminations
12. Wire
13. Occupancy/Motion Sensors
14. Dimming Systems/Lighting Control Systems
15. Security System
16. Floor Boxes
17. Audio/Visual System
18. Access Control System
19. Video Surveillance System

1.5 DRAWINGS AND SPECIFICATIONS

A. The specific intent of these Contract Documents is to provide the various systems, equipment, etc. to the Owner complete and in a thoroughly calibrated and functional condition.

B. The Drawings shall not be construed as shop drawings. In the event of a possible interference with piping or equipment of another trade, items requiring set grade and elevations shall have precedence over other items. Should any major interference develop, immediately notify the Architect.

C. In laying out Work, refer to mechanical, electrical, structural, and architectural drawings at all times in order to avoid interference and undue delays in the progress of the Work.

1.6 CODES AND REGULATIONS

A. Work shall be in full accord with the LA Sanitary Code, 2023 N.E.C. (NFPA 70), local ordinances, building codes, and other applicable national, state, and local regulations.

B. Equipment shall conform to requirements and recommendations of the National Bureau of Fire Underwriters and National Fire Protection Association (NFPA).

C. Items provided under this Division shall comply with the American National Standards Institute (ANSI) "Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People," ANSI A 117.1, and the Americans with Disabilities Act (A.D.A.).

D. Work called for in these Plans and Specifications shall be executed by competent workmen.

E. In the possible event of conflict between codes or regulations and Contract Documents, notify the Architect/Engineer immediately.

F. The drawings show approximate locations only of feeders, branch circuits, outlets, etc., except where specific routing or dimensions are indicated. The Architect reserves the right to make reasonable changes in locations indicated, before roughing-in, without additional cost to the Owner.

G. Because of the small scale of the drawings, it is not possible to indicate all of the offsets, fittings, and accessories required. The Contractor shall investigate the structural and finish conditions affecting his work and shall arrange such work accordingly, fittings, bends, junction boxes, pull boxes, access panels, and accessories required to meet such conditions at no additional costs to the Owner.

1.7 FEES, PERMITS, AND TAXES

A. Obtain and pay for permits required for the Work of this Division. Pay fees in connection therewith, including necessary inspection fees.

B. Pay any and all taxes levied for Work of this Division, including municipal and/or state sales tax where applicable.

1.8 MANUFACTURER'S DIRECTIONS

A. Install and operate equipment and material in strict accord with manufacturer's installation and operating instructions. The manufacturer's instructions shall become part of the Contract Documents and shall supplement Drawings and Specifications.

1.9 SUBMITTAL DATA

A. Submit shop drawings, project data, and samples in accordance with requirements of the General Provisions of the contract documents. Submittals shall be received no later than thirty (30) consecutive calendar days from effective date of “Notice to Proceed”.

B. Shop drawings shall consist of published ratings or capacity data, detailed construction drawings for fabricated items, wiring and control diagrams, performance curves, installation instructions, manufacturer's installation drawings, and other pertinent data. Submit drawings showing revisions to equipment layouts due to use of alternate or substitute equipment.

C. Where manufacturers and suppliers of equipment, materials, etc. are unable to fully comply with Contract Document basis of design requirements, specifically call such deviations to attention of Architect/Engineer on submittals. Typed deviations on a separate sheet; underlined statements or notations on standard brochures, equipment fly sheets, etc. will not be accepted. Submittals shall clearly indicate where material submitted meets and/or exceeds the performance criteria of the equipment used as the basis of design of the project. Failure to note compliance with the basis of design material/equipment shall result in rejection of submittals.

D. Approval of submittals shall not relieve Contractor from furnishing required quantities and verifying dimensions. In addition, approval shall not waive original intent of Contract Documents.

E. Failure to obtain written approval of equipment shall be considered sufficient grounds for rejection of said equipment regardless of the stage of completion of the project.

F. Contractor shall submit Submittals/Shop Drawings on all equipment listed below. In addition, contractor shall refer to subsequent sections of the Electrical portion of the specifications for additional shop drawing submittal requirements.

1. Lighting Fixtures and Poles
2. Clock System
3. Dimmer Switches
4. Receptacles
5. Toggle Switches
6. Wiring Device Box Support Brackets
7. Lamps
8. Photocells
9. Tele/Data Systems
10. Cover Plates
11. Medium Voltage Terminations
12. Wire
13. Occupancy/Motion Sensors
14. Dimming Systems/Lighting Control Systems
15. Security System
16. Floor Boxes
17. Audio/Visual System
18. Access Control System
19. Video Surveillance System

G. Shop drawings may be submitted electronically as described below.

1. Must be in a portable document format (PDF).
2. Must be submitted to the prime designer and the prime designer will forward to ADG Engineering for distribution/processing.
3. Do not submit directly to ADG Engineering’s project manager.

H. Shop Drawings/submittals shall be submitted as grouped together and stated below and shall be submitted simultaneously. Electrical gear shop drawings shall not be submitted until approval is obtained for all HVAC and plumbing equipment. Prior to submission of electrical gear shop drawings, contractor shall obtain a copy of the approved mechanical and plumbing submittals. Any modifications required to be made to the electrical gear due to changes in electrical requirements (increases and/or decreases) of the mechanical and plumbing equipment shall be clearly notated in the electrical gear submittals.

1. Light Fixtures, Lamps, Occupancy/Motion Sensors, Poles, Photocells, Dimming Systems/Lighting Control systems,
2. Tele/Data Systems
3. Clock System
4. Dimmer Switches, Receptacles, Toggle Switches, Cover Plates, Device Box Support Brackets, Pull Boxes, Floor Boxes, and Wire
5. Audio/Visual System
6. Access Control System
7. Video Surveillance System

1.10 PROJECT COORDINATION

A. Refer to applicable Electrical Specification Sections for products work of this Division.

B. Refer to all plumbing, mechanical and fire protections specifications sections for related products affecting work of these electrical sections.

C. Coordinate handling of all products, materials, etc., through the Contractor. Coordinate space, access, clearances, etc., through the Contractor prior to preparation of shop drawing submittal.

D. The Contractor is herein cautioned to note that the work involved is a complicated renovation and a new addition project requiring continuous owner occupancy. The Contractor should review the phasing plans/descriptions and visit the project site to determine existing conditions. The Contractor will be held responsible for allowing for these conditions in his bid.

1.11 SERVICE CONTINUITY

A. At all times during the construction of the project, electric service shall be maintained to all portions of the site and existing facility, except with prior written approval from the Architect/Engineer of interruptions. It shall be the responsibility of the contractor to provide, install and maintain (fuel included) any required rental generators to accomplish said task. Any required interruptions of electric service due to work being performed under this Contract shall be scheduled in writing a minimum of forty-eight (48) hours in advance after consultation with the Architect/Engineer and the Owner, and shall occur when permitted by the Architect/Engineer. The Contractor shall be responsible for any overtime pay required to meet these requirements, at no additional cost to the Owner.

1.12 VALUE ENGINEERING (V/E):

A. While it may be in the Owner’s interest to consider the first cost money saving that may be generated via alternatives and options generated via participation in Value Engineering, contractor shall realize that substantive offers of Value Engineering (V/E), if accepted by the Owner, constitute a design-build agreement (offer and acceptance) with the owner, and drastically change the design concept of the project, as developed by the Professional of Record identified on the Contract Documents.

B. Should contractor offer, and the owner accept value engineering options that alter aspects of the system design, equipment, performance and/or performance verification or monitoring of respective systems, the contractor shall provide duly licensed professional engineering consultants working on behalf of the contractor (including sub-contractors and equipment vendors/manufacturers) to review, approve and take professional responsibility for performance and suitability of V/E hybrid systems, materials or operational changes related to respective V/E items. The contractor’s licensed professional engineering consultants and the contractor assume any and all responsibility for the design and

suitability in terms of performance, of hybrid systems installed, as contractor's Professional of Record, absolving the original project Professional of Record (identified on the original Contract Documents, released for the original project Bid/Negotiation) from responsibility for the V/E hybrid systems portion of the work.

C. The contractor, via the offer and acceptance of value engineering items on the project agrees to provide professional engineering design services and take full and complete responsibility for the hybrid design. Further, the contractor's (V/E Items) professional of record (either employees, or independent consultants to the contractor) through the offer and acceptance of V/E items, agree to indemnify and hold harmless the project owner, the owner's original A/E team (Professional of Record on behalf of the owner for the original Contract Documents) their heirs and assigns in regard to the V/E changes and their impact on the systems altered, affected or modified, in whole or in part. The Professional of Record shown on the original Contract Documents in regard to the systems altered, adjusted, revised, modified or otherwise affected by the value engineering items implemented, shall be absolved of design responsibility as a result of implementation of V/E items, and their original use of Engineering Seals used for original Contract Documents, shall not apply.

D. Contractor shall refer to subsequent specification sections for additional requirements for submission and approval of VE items.

1.13 PROJECT RECORD DOCUMENTS

A. Keep Project Record Documents in accordance with general provision requirements of the specifications.

B. During construction period, keep accurate records of installations paying particular attention to major interior and exterior underground and concealed piping, ductwork, etc.

C. The Contractor shall obtain a minimum of one (1) set of the contract documents including all addenda and change orders (including CAD/Revit files) as prepared by the Architect/Engineer.

D. If the Contractor elects to vary from the Contract Documents and secures prior approval from the Architect/Engineer for any phase of the work, he shall record in a neat and readable manner all such variances on the contract documents in red ink. Prior to requesting substantial completion the marked-up set of contract documents shall be returned to the Architect/Engineer for approval.

E. All deviations from sizes, locations and from all other features of the installation shown in the Contract Documents shall be recorded.

F. In addition, it shall be possible using these drawings to correctly and easily locate, identify and establish sizes of all piping, directions, and the like, as well as other features of work which will be concealed underground and/or in the finished building.

G. Locations of underground work shall be established by dimensions to columns, lines or walls, locating all turns, etc. and by properly referenced centerline or invert elevations and rates of fall.

H. For work concealed in the building, sufficient information shall be given so it can be located with reasonable accuracy and ease. In some cases this may be by dimension. In others, it may be sufficient to illustrate the work on the drawings in relation to the spaces in the building near which it was actually installed. The decision of the Architect/Engineer in this matter will be final.

I. The following requirements apply to all Record Drawings:

1. They shall be maintained at the Contractor's expense.
2. All such drawings shall be done carefully and neatly.
3. Additional drawings shall be obtained at the Contractor's expense.
4. They shall be kept up-to-date during the entire course of the work and shall be available upon request for examination by the Architect/ Engineer and when necessary, by other trades, to establish clearances for other parts of the work.
5. Record Drawings shall be returned to the Architect/Engineer upon completion of the work and are subject to approval of the Architect/ Engineer.

1.14 OPERATION AND MAINTENANCE DATA

A. Refer to the specification Sections related to PROJECT CLOSEOUT or OPERATION AND MAINTENANCE DATA for procedures and requirements for preparation and submittal of maintenance manuals.

B. Provide the Owner with three (3) copies of printed instructions indicating various pieces of equipment by name and model number, complete with parts lists, maintenance and repair instructions and test and balance report.

C. COPIES OF SHOP DRAWINGS WILL NOT BE ACCEPTABLE AS OPERATION AND MAINTENANCE INSTRUCTIONS.

D. This information shall be bound in plastic hardbound notebooks with the job name, Architect and Engineer names permanently embossed on the cover. Rigid board dividers with labeled tabs shall be provided for different pieces of equipment. Submit manuals to the Architect for approval.

E. In addition to the operation and maintenance brochure, the Contractor shall provide a separate brochure which shall include registered warranty certificates on all equipment, especially any pieces of equipment which carry warranties exceeding one (1) year.

F. The operation and maintenance brochure shall be furnished with a detailed list of all equipment furnished to the project, including the serial number and all pertinent nameplate data such as voltage, amperage draw, recommended fuse size, rpm, etc. The Contractor shall include this data on each piece of equipment furnished under this contract including but not limited to those items listed below.

1. Lighting Fixtures and Poles
2. Clock System
3. Dimmer Switches
4. Receptacles
5. Toggle Switches
6. Wiring Device Box Support Brackets
7. Lamps
8. Photocells
9. Tele/Data Systems
10. Cover Plates
11. Medium Voltage Terminations
12. Wire
13. Occupancy/Motion Sensors
14. Dimming Systems/Lighting Control Systems
15. Security System
16. Floor Boxes
17. Audio/Visual System

18. Access Control System
19. Video Surveillance System

G. Provide excavating and backfilling necessary for Work of this Division. Comply with provisions of specification section pertaining to Site Work, if applicable.

H. Trenches shall be inspected by Code Authorities and/or Owner's Representative before and after piping is laid. Give Owner' Representative 24-hour notice for each inspection. If any trenches are filled without Owner's Representative and/or authority having jurisdiction inspection and as subsequently found to be deficient, the trenches shall be uncovered, inspected, and then re-filled, if requested by Owner's Representative. Prior to covering any and all underground facilities, including but not limited to conduit, ground rods, terminations, etc., Contractor shall take clear and concise digital photos and shall forward said photos to Engineer prior to covering said utilities.

I. Provide minimum 24 inches of cover to finish grades or paving at raceways.

J. Protect and maintain trenches in dry condition until piping has been inspected and approved. Immediately after approval, backfill trenches in tamped layers. Repeat backfill and tamping 6 months after initial coverage has been accomplished to avoid swale development from sinking soils.

K. Compact fill to satisfaction of Architect and/or Owner's Representative.

L. Prior to any excavating, Contractor shall be responsible for having all utilities in the area of excavation located and marked by an approved company with a minimum of five (5) years' experience locating underground facilities. This includes all owner owned utilities on their site.

M. Approximate locations shown on the drawings shall not be used. Any facility damaged by the Contractor's underground work shall be repaired and/or replaced at no additional cost to the Owner.

1.15 CUTTING AND PATCHING

A. Comply with requirements of the Specifications regarding cutting and patching. Locate and timely install sleeves as required to minimize cutting and patching.

B. Cutting, fitting, repairing, patching, and finishing of Work shall be done by craftsmen skilled in their respective trades. Where cutting is required, cut in such a manner as not to weaken structure, partitions, or floors. Holes required to be cut must be cut or drilled without breaking out around the holes. Where patching is necessary in finished areas of the building, the Architect will determine the extent of such patching and refinishing.

C. Repairing Roadways and Walks: Where this contractor cuts or breaks roadways or walks to lay the piping, he shall repair or replace these sections to match existing, unless specifically identified as the responsibility of others.

1.16 PAINTING

A. Painting shall be provided under the Specification section regarding painting, unless specified otherwise. Leave exposed piping, materials, and equipment clean and free of rust, grease, dirt, etc. before and after painting.

B. Factory finished equipment, fixtures, and materials which are marred, chipped, scratched, or otherwise unacceptable shall be repaired or replaced under this Division to Architect satisfaction, at no additional cost to Owner.

C. Coordinate all painting requirements with prime bidder prior to bids.

D. All exposed conduit, materials, hangers, anchors, etc., are to be primed and painted. Color shall match adjacent surfaces where not specifically designated otherwise. All galvanized materials shall be suitably treated prior to painting to ensure adhesion.

E. All exterior electrical gear (panels, meter cans, CT can, switchboards, safety switches, etc.) shall be painted to match adjacent wall surface(s). All interior panels (flush mount) shall have their covers painted to match adjacent wall surface(s).

F. All exterior receptacles, junction boxes, speakers, trumpets, shall be painted to match adjacent wall surface(s).

1.17 EXISTING CONDITIONS

A. The Electrical Contractor shall visit the building site to determine existing conditions and will be held responsible for allowing for these conditions in his bid.

B. Note that this area of work will have storm drainage, mechanical and electrical utilities located underground and within and under the buildings. It is part of this work for the Contractor to determine the scope and location of all utilities to be installed with this project and arrange his work around others. There will be no extra consideration for work discovered as being hidden after the bid, and no change orders for extra cost that may be caused by unknown after bid conditions. The drawings show approximate locations only of feeders, branch circuits, outlets, etc., except where specific routing or dimensions are indicated. The Architect reserves the right to make reasonable changes in locations indicated, before roughing-in, without additional cost to the Owner.

1.18 PROTECTION OF APPARATUS

A. The Contractor shall take precautions necessary at all times to properly protect his apparatus from damage. Failure on the part of the Contractor to comply with the above to the Architect's satisfaction shall be sufficient cause for the rejection of the particular piece of apparatus in question.

1.19 MINOR DEVIATIONS

A. The Contractor shall realize that the drawings cannot delve into every step, sequence, or operation necessary for the completion of the project without drawing on the Contractor's experience. Only typical details are shown on the plans. In cases where the Contractor is not certain about the method of installation of his work, he shall ask for details. Lack of details will not be an excuse for improper installation.

1.20 SALVAGED MATERIALS

A. The Owner shall have priority for the selection of salvaged material and equipment. Any equipment, light fixtures, devices, ballasts, materials, etc. selected to remain property of the Owner shall be removed and delivered to a location on the site as designated by the Owner. Material and equipment not retained by the Owner shall become the property of this Contractor and shall be removed from the site by him.

B. The Contractor shall obtain written approval of all material and equipment determined not to be salvaged by the Owner.

1.21 SAFETY PRECAUTIONS

A. Work methods and project safety are the Contractor's sole responsibility.

B. Contractor shall furnish and place proper guards for prevention of accidents. He should provide and maintain any other necessary construction required to secure safety of life or property, including maintenance of sufficient lights during all day and night hours as required to secure such protection.

C. Temporary electrical services during construction should be maintained in perfect condition. Frayed, lose or opened connections should not be used for temporary services. The Contractor should use only equipment in first class working condition for construction services.

1.22 TEMPORARY CONSTRUCTION LIGHTING

A. The Contractor should provide and install construction lighting as required by General Contractor and other trades. The installation shall conform to requirements of the National Electrical Code.

1.23 SUPERVISION

A. Contractor shall personally, or through an authorized and competent representative, constantly supervise the work done from beginning to completion and final acceptance. To the best of his ability he shall keep the same foreman and workmen throughout the project duration. Foreman shall be present at project site at all times while work under this section of the contract documents is being performed. Foreman shall be accessible by cellular phone at all times. Respective telephone numbers shall be forwarded to Architect/Engineer prior to commencement of work on this project.

1.24 CAD/REVIT FILES

A. ADG will provide, upon request, AutoCAD/Revit files to the contractors for use in preparing submittals and record drawings. Plans will be provided at a cost of $10.00 per drawings sheet requested. By submitting request for CAD/Revit files, contractors automatically consent to the verbiage contained in the CAD/Revit release form contained in the plans. This includes any all limitations, restrictions, indemnifications, etc… contained therein.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Panelboards, safety switches, equipment cabinets, motor starters and other equipment shown on the drawings and furnished and/or installed under this section of the Specifications shall be labeled with laminated plastic nameplates inscribed to identify equipment with description shown on the drawings for panels, the name of the equipment controlled for motor starters or the system or function involved for other equipment. Provide typewritten panelboard directories indicating the equipment served and its location using final approved room numbers, etc., as directed by the Architect. Refer to specification section – Electrical Distribution System and details(s) for additional requirements.

PART 3 - EXECUTION

3.1 COORDINATION OF TRADES

A. Where work is in close proximity to the work of other contractors, the Contractor shall review plans of other contractors and coordinate his work with theirs. The Electrical Contractor shall verify the location of lighting fixtures, beams, structural members, conduit, ductwork, pipes or other obstructions before beginning his work in the area. Notify the Architect where proper clearances do not occur or where the work of others would interfere with the safe and/or proper operation of this work.

3.2 HARMONIC DISTORTION

A. IEEE 519-1992 - Harmonic Control in Electrical Power Systems shall be a requirement of this project. Harmonic filters (passive or active), phase multiplication devices, or any other components required to mitigate harmonic voltage THD to 5% and current THD to 8% maximum levels shall be an integral part of the VFD system. Compliance measurement shall be based on THD added (during VFD full load operation compared to across-the-line operation) at the VFD circuit breaker terminals or actual THD measurement at the VFD circuit breaker terminals during full load VFD operation. Designs which employ shunt tuned filters must be designed to prevent the importation of outside harmonics which could cause system resonance or filter failure. Calculations supporting the design, including a system harmonic flow analysis, must be provided as part of the submittal process for shunt tuned filters. Any filter designs which cause voltage rise at the VFD terminals must include documentation in compliance with the total system voltage variation of plus or minus 10%. Documentation of Power Quality compliance shall be part of the commissioning required by the VFD supplier. Actual job site measurement testing shall be conducted at full load and documented in the operation and maintenance manuals. Harmonic measuring equipment utilized for certification shall carry a current NiTS calibration certificate. The final test report shall be reviewed and compliance certification stamped by a licensed professional engineer (PE).

3.3 SUPPORTS AND FOUNDATIONS

A. Support all items covered by this Specification directly from building structural members independent of any ceilings or any other installed item. Panelboards and switches may be attached to suitably reinforced walls. Ground or slab mounted equipment shall be mounted on a separate four inch high concrete slab. Extending 6" beyond equipment footprint on all sides

B. Do not attach items of this Specification to HVAC ductwork, ceiling grids and ceiling support members, piping or other equipment unless specifically shown otherwise. Where applicable, all equipment including conduit shall be supported from overhead wall, floor or roof structures using galvanized channel or angle members for a rigid support. Position supports and equipment such that access through lay-in ceilings or panels is not impaired and all Code required clearances are maintained.

C. Where applicable, under no circumstances is the Contractor to attach to or support from any bar joist bridging. Any supports to the bar joists or any structural systems shall be approved by the Architect. All supplemental angle or channel iron required to support equipment of this Specification shall be furnished by the Electrical Contractor.

3.4 EQUIPMENT LAYOUT

A. The physical location and arrangements of electrical equipment is shown on the Plans and is to be used by the Contractor as a guideline in construction. It is the responsibility of the

Contractor to review the Plans with the proposed equipment and equipment of other contractors that are affected, and to ensure that all Code required clearances, wiring distances and maintenance accesses, including equipment heights, of all items are maintained. Alternate arrangements to accomplish the above due to field conditions or changes in physical size of the equipment proposed for the project are to be submitted to the Architect for review before any work is begun or equipment ordered.

B. All electrical gear arrangements shall be presented in a 1/4 inch scaled drawing showing all equipment, including those of other contractors. This includes all electrical rooms, mechanical rooms, mechanical yards, electrical yards, service platforms, boiler rooms, etc… Include shop drawing cut sheets and applicable information. Indicate on the drawing by dimension all required Code clearances, wiring distances and maintenance access requirements. Where equipment heights are required to be coordinated with architectural or other items, indicate revised heights. Refer to "MOUNTING HEIGHTS."

3.5 GUARANTEE

A. The Contractor shall guarantee all materials, equipment and workmanship for a period of one (1) year from the date of final acceptance of the project. This guarantee shall include furnishing of all labor and material necessary to make any repairs, adjustments or replacement of any equipment, parts, etc. necessary to restore the project to first class condition. This guarantee shall include the replacement of lamps. Warranties exceeding one (1) year are hereinafter specified with individual pieces of equipment.

B. If the Contractor’s office is in excess of a fifty (50) mile radius of the project, he shall appoint a local qualified contractor to perform any emergency repairs or adjustments required during the guarantee period. The name of the contractor appointed to provide emergency services shall be submitted to the Architect/Engineer for approval.

3.6 CLEANING

A. Refer to the Specification Section relating to PROJECT CLOSEOUT or FINAL CLEANING for general requirements for final cleaning.

B. Clean all light fixtures, and lenses prior to final acceptance and replace inoperable drivers or LED modules.

END OF SECTION 26 00 01

SECTION 26 05 00 - BASIC MATERIALS AND METHODS

PART 1- GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions; as appropriate, apply to the work specified in this section.

B. Refer to all portions of the Contract Documents as well as the plans and specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

PART 2 - PRODUCTS

2.1 WIRE (600 VOLT AND BELOW)

A. All conductors used in the work shall be soft drawn annealed copper having a composition of not less than 98% of pure copper. Conductors shall be standard code gauge in size, insulated, and shall have insulation rated for use at 600 volts. The contractor's bid shall reflect the use of all copper conductors unless specifically indicated otherwise. When aluminum conductors are used as part of the V.E. process, their use shall be limited to circuits, feeders and services rated 150 Amperes and larger and shall be of the high alloy, compact stranded type, Southwire SIM pull THHN, SIM pull THWN or equivalent. It shall be the contractor's responsibility for properly upsizing the conductors and associated conduit to achieve the equivalent ampere rating of the circuit/feeder/service as specified for copper conductors. As part of this VE item, Contractor shall provide an updated riser diagram (one-line diagram) indicating proposed conductor changes.

B. Unless otherwise noted or specified, insulation shall be Type THWN. Wires shall be of the single conductor type and shall be stranded. Wire insulation shall not contain any asbestos materials.

C. Wire #8 AWG and smaller may be type MC-cable where allowed by applicable codes and ordinances.

D. Throughout the system, conductors shall be identified as to phase and voltage of system by color-coding. Color-coding shall be continuous the full length of wire for all wire sizes. Identification by permanent paint bands or tags at outlets will not be acceptable. Surface printing at regular intervals on all conductors shall indicate manufacturer, size, voltage, and insulation type. White and/or gray colored insulation shall be used for grounded conductors and only for grounded conductors.

E. The color code assigned to each phase wire shall be consistently followed throughout the project. The following systems of color-coding shall be strictly adhered to:

1. 208/120 V Systems
   a. Grounding leads green
   b. Grounded neutral leads white
   c. Ungrounded phase wires black, red and blue

2. 277/480 V Systems
   a. Grounding leads green
   b. Grounded neutral leads gray
   c. Grounded phase wires brown, orange, yellow

F. Where multiple neutral conductors are installed in a common raceway, the neutral conductor for each circuit shall be separately identified in accordance with the National Electric Code (NEC).

2.2 CONDUIT

A. Unless otherwise specified or shown on the drawings, all conduit shall be rigid galvanized steel (RGS), electrical metallic tubing (EMT), or rigid nonmetallic conduit (PVC) as allowed in the paragraphs below.

B. RGS may be used for conduit shown run underground (red concrete encasement required), may be used in concrete slabs, and shall be used for conduit run exposed to the weather (locations defined as damp locations and wet locations in Article 100 of the NEC) and shall be run in hazardous areas.

C. EMT shall be used for conduit not encased in concrete, not exposed to the weather, not run underground, and not run in hazardous areas.

D. PVC may be used for conduit run in concrete slabs or may be run underground (underground only where permitted by NEC and local ordinances). Concrete encasement will not be required on underground runs unless specifically noted or specified elsewhere. PVC shall not be run exposed nor concealed in walls nor above ceilings nor in hazardous areas. When rigid nonmetallic conduit (PVC) is installed underground, it shall be Schedule 80 at all underground road crossings, at all underground driveway crossings, and when required by the NEC or local ordinance or specified otherwise. PVC Schedule 40 may be used at all other underground locations. The only use of exposed above ground PVC conduit shall be for telephone service entrance use up utility poles (schedule 80 required), for CATV service entrance use up utility pole (schedule 80 required) or for power utility service entrance use up utility pole (scheduled 80 required).

E. Where PVC is utilized for underground installations, RGS 90° elbows and conduit shall be utilized to turn conduit vertical and to rise up to above grade/slab. Red concrete encasement shall be required for all elbows and vertical conduits. Refer to detail on plans.

F. All conduit shall be new and shall bear the inspection label of the Underwriters Laboratories, Inc. (U.L.).

G. Where multiple conduits are installed underground in the same trench, carlon snap-n-stac spacers, or approved equivalent, shall be utilized and spaced a maximum of 5'-0" apart. Provide pre-cast, 4" thick, concrete bases at each spacer and where conduits are turned to be installed in a vertical orientation. Provide spacers immediately before and after all elbows and where conduit transitions from underground to above ground.

H. Fittings for rigid steel conduit and EMT shall be hot-dipped galvanized and shall be of an approved type specially designed and manufactured for their purpose.

I. All flexible conduit, where installed indoors and outdoors, shall be of the flexible liquid tight metallic type. Flexible weatherproof electrical conduit is prohibited from use on this project.

J. Metallic conduit shall be metallized, sheradized, or hot-dipped galvanized.

K. Where conduit is installed exposed in finished spaces and on the exterior of the building (excluding mechanical, equipment and electrical rooms), conduit shall be painted to match adjacent surfaces (color as selected by the Architect/Engineer). All other conduit installations shall be complete with factory applied paint finish as manufactured by Allied Tube and Conduit (True Color EMT) or Wheatland Tube Company (Color Check Conduit).

All fittings, couplings, boxes, covers, etc. shall match color of conduit. Color of conduit shall comply with color code noted below.

Power and Lighting - Non-Emergency	Standard Conduit Finish
Tele/Data/CATV	Green
Security/CCTV	Purple

2.3 METAL-CLAD CABLE (600 VOLTS AND BELOW)

A. Where permitted by NEC and local codes and ordinances, metal-clad (MC) cables may be used in lieu of conduit and wiring specified elsewhere herein.

B. Installation of MC cables shall be in compliance with the National Electric Code (NEC).

C. Conductors shall be softdrawn annealed copper having a composition of not less than 98% of pure copper.

D. Conductors shall be solid -type, standard Code gauge in size, insulated, and shall be rated for use at 600 volts or below. Minimum size shall be No. 12.

E. Conductor insulation shall be of a type listed in the NEC and be rated for 75 deg. C (167 deg. F) as a minimum and shall be of a type approved for use in MC cable.

2.4 EXPANSION FITTINGS

A. Each conduit that is buried in or rigidly secured to the building construction on opposite sides of a building expansion joint and each long run of exposed conduit that may be subject to excessive stresses shall be provided with an expansion fitting. Expansion fittings shall be made of hot-dipped galvanized malleable iron and shall have a factory-installed packing, which will prevent the entrance of water, a pressure ring, and a grounding ring.

B. In addition to the grounding ring, a separate grounding conductor shall be provided. This grounding conductor shall be an external flexible copper ground securely bonded by approved grounding straps on each end of the fitting. Grounding conductor may be omitted when expansion fitting includes an approved integral grounding conductor or device.

C. Where conduits are buried in concrete, they shall cross the building expansion joints at right angles. Ends of conduit shall be provided with insulated bushings.

2.5 OUTLET BOXES

A. Outlet boxes in concealed conduit systems shall be flush mounted. Boxes shall be galvanized steel of sufficient size to accommodate devices shown and shall have raised covers. Requirements of the NEC shall be minimum.

B. Boxes for lighting fixtures shall be four-inch (4") octagon, not less than 1-1/2" deep. Where boxes are installed in concrete, boxes designed for this application shall be used.

C. Outlet boxes for switches and receptacles in concealed work shall be 4" square, and not less than 1-1/2" deep. Flush mounted outlet boxes shall be installed with plaster rings.

D. Outlet boxes for switches and receptacles installed in exposed conduit system shall be cast iron or cast aluminum Type FD or approved equivalent.

E. Where multiple outlet boxes are shown to be installed at the same location, they shall be installed using B-Line Series BB8 mounting bracket or approved equivalent. Where single

boxes are shown to be installed, the B-Line Series BB2 mounting bracket or approved equivalent shall be used.

F. Outlet boxes for adjacent rooms shall not be installed in the same stud space to minimize sound transmission.

G. Outlet boxes used for lighting toggle switches shall have outlet box stabilizer(s) installed.

2.6 PULL BOXES

A. Furnish and install pull boxes. Boxes shall be code gauge galvanized steel with screw attached access panels unless noted otherwise in top, side or bottom as required.

2.7 OUTLET COVER PLATES

A. Unless otherwise noted, all outlets including telephone outlets, television outlets, computer outlets, etc. shall be fitted with cover plates of the type indicated below.

B. Cover plates shall be uniform in design and finish for switches, receptacles, and other outlets requiring cover plates. Plates shall be one (1) piece of the required number of gangs. Sectional plates shall not be used.

C. Cover plates shall be smooth nylon with gray, white, black, brown or ivory finish. Color shall be selected by the Architect/Engineer to suit the wall finish.

D. Provide blank coverplates for all un-used/empty device boxes including, but not limited to tele/data, CATV, access controls, etc....boxes.

2.8 WIRING DEVICES

A. Wiring devices shall be as listed in the following table, except that color of device shall match color of outlet cover plate. The "*" in the model numbers indicate color selection to be made.

1. Leviton / Hubbell (or equivalent by Pass and Seymour)
   Single Pole-20A (5621-2* / DS120*)
   Rocker or Paddle Switch

2. Three Way-20A (5623-2* / DS320*)
   Rocker or Paddle Switch

3. Four Way-20A (5624-2* / DS420*)
   Rocker or Paddle Switch

4. 20A 125V 2P 3W Duplex (16342-* / DR20*)
   Decora Style
   Grounded Receptacle

5. 20A 125V 2P 3W Duplex (16362-*IG / SNAP2162IGL)
   Smooth Face
   Isolated Ground Receptacle
   (Color of device shall match other devices and shall be denoted as isolated ground type by the orange triangle on the receptacle face)

6. 20A 125V 2P 3W Duplex (G5362-00*/ GFRST20SNAP*)
   GFCI Receptacles (Indoor)

7. 20A 125V 2P 3W Duplex (G5362-WT*/ GFTWRST20*)
GFCI Receptacles (Outdoor)

8. 20A 125V 2P 3W Duplex (T5833/USB20AC5*)
Grounded Receptacle with USB-A & USB-C Charging Ports

9. 20A 250V 2P 3W (5461*/ HBL5461*)
Grounded Receptacle

10. 30A 250V 2P 3W (5372 / HBL9630FR)
Grounded Receptacle

11. 50A 250V 2P 3W (5374 / HBL9650FR)
Grounded Receptacle

12. Switch with Pilot Light (120V)5628-2* / DS120PL*
(277V)5629-2* / DS277PL*

13. 4-Port Type A&C USB Charging Outlets (Hubbell USB4AC)

2.9 WEATHERPROOF RECEPTACLES

A. Weatherproof receptacles shall be duplex receptacles of the ground fault current interrupting type as specified under WIRING DEVICES, mounted in a cast iron or cast aluminum Type FD (or approved equivalent) conduit fitting with Leviton No. 5977-DCL, (or approved equivalent) clear, extra deep GFCI Style weather resistant cover. Weatherproof receptacles shall be flush mounted in exterior walls whenever possible.

2.10 PHOTOELECTRIC CONTROLS

A. Unless otherwise noted on the drawings, photoelectric controls shall be electronic-stem/swivel with sensor on side: Intermatic EK4236S or equivalent by Voltage and power requirements of circuits controlled per drawings.

2.11 DIMMER SWITCHES

A. Dimmer switches shall be Legrand Radiant series or approved equivalent. Ratings shall be of appropriate wattage for the circuits to be controlled. Provide and install all required 0-10V. control interface units for all LED lighting circuits. Dimmer loading shall not exceed 80% of the dimmer rating. Dimmers shall be UL listed.

2.12 MULTI-OUTLET ASSEMBLIES

A. Fixed multi-outlet assemblies shall consist of surface metal raceway with minimum dimensions of 1-1/4" wide by 3/4" deep and single receptacles spaced twenty-four inches (24") on centers or as noted on the drawings. Receptacles shall be 20 ampere, 125 volt NEMA 5-20R Specification Grade. Phase and neutral conductors shall not be smaller than No. 12 AWG. A green insulated equipment ground conductor shall be installed which shall connect all receptacle ground terminals to the building equipment grounding system. Where more than one (1) circuit is indicated as serving a group of receptacles in a common raceway, adjacent receptacles shall be connected to alternate circuits.

B. The multi-outlet assemblies shall be provided with snap-on blank covers and/or snap-on receptacle covers to suit the receptacles furnished, all as manufactured by the raceway manufacturer, and shall be installed in such a manner that there will be no open cracks

C. Suitable fittings, elbows, clips, mounting straps, connection blocks, insulators, etc., as required, shall be provided.

D. Raceway and cover custom color shall be as selected by the Architect/Engineer during shop drawing submittal.

E. Multi-outlet assemblies shall be installed in accordance with the National Electrical Code.

2.13 SURFACE METAL RACEWAY

A. Provide and install surface metal raceways where shown on the drawings and/or where required by new installation where concealed devices cannot be installed in the existing structures as approved by the Architect/Engineer.

B. Raceways shall be approved for the number and size of wires indicated. Raceways shall be installed complete with boxes, angle fittings, straps, bushings, etc. especially designed for use with the particular raceway being used.

C. Installation of surface metal raceway shall be in accordance with the National Electrical Code. The raceway shall be supported at intervals of four feet (4') or less, and shall be installed parallel and perpendicular to walls, ceilings, and floors.

D. Custom color of the raceways shall be as selected by the Architect/Engineer during shop drawing submittal.

2.14 FLOOR OUTLETS/FLOOR BOXES

A. Floor outlets shall consist of the assembly of wiring devices, floor boxes and fittings. Floor boxes shall be16 gauge galvanized sheet metal complete with fusion-banded epoxy paint. Boxes shall be fully adjustable before concrete pour.

B. Contractor shall adjust box such that coverplate is flush against floor surface. When multiple floor outlets are shown directly adjacent to each other, multiple gang type boxes with separating partitions between each gang shall be utilized. Provide separate conduit for each function.

C. Floor boxes shall be round with threads for conduits or hubs as required and be of suitable height for concrete slab use. Box shall be capable of accepting duplex receptacles and/or other wiring devices or usage as indicated.

D. Each floor box shall be Legrand Evolution Series for Poke-Thru-devices or Legrand Resource RFB-E Series for floor boxes, (or equivalent) with round covers. Quantity of gangs/size of box shall be individually determined by each location’s requirements. Provide fire-rated poke-thrus as required by floor assemblies.

E. Where box is to be installed in an existing concrete slab above the ground level, caution must be taken to ensure that the structural integrity of the slab is not impaired by the box installation. Coordinate with the Architect. Use a core drill, poke through device, fire rated to at least the rating of the floor system, as per National Electrical Code (NEC). Depth of unit shall be as required. Hole by the Electrical Contractor. Color by Architect during shop drawing submittal. Color choices shall include satin brass, nickel, grey powder coated, brass, bronze, brushed aluminum, black power-coated, brass-plated, bronze-plated and/or satin nickel-plated.

PART 3 - EXECUTION

3.1 MOUNTING HEIGHTS

A. Unless otherwise noted on the drawings or required by the Architect/Engineer, the mounting heights set forth below shall apply. Dimensions given are from finished floor to the top of the device unless noted otherwise noted.

1.	Toggle Switches	4'-0" to top of device
2.	Receptacles	1'-6" to bottom of receptacle
3.	Tele/Data Outlets	1'-6" to bottom of outlet

* Mounting height shall be 6" from ceiling or maximum 80" above finished floor, whichever is lowest.
** Contractor shall be responsible for coordinating exact location in field with the plumbing contractor.

B. Where overcurrent or safety switch devices are shown to serve exterior equipment, the Contractor shall review in detail with the Architect/Engineer proposed exterior mounting locations, mounting heights, conduit routing, etc., and receive approval prior to rough-in.

C. Where overcurrent or safety switch devices are shown to serve condensing units, the top of the overcurrent device shall be 3’- 0” AFG or level with the top of the condensing unit(s) whichever is lower. Refer to detail on plans for additional requirements.

3.2 WIRE (600 VOLT AND BELOW)

A. Service entrance, feeders, and motor circuit conductors shall be run their entire length without joints or splices. Splices and joints in branch circuit wiring shall be only at outlets or in accessible junction boxes.

B. Joints and splices in branch circuit wiring shall be made with compression type solderless connectors. Connectors of the nonmetallic screw on type are not acceptable.

C. Terminations or splices for conductors # 6 AWG and larger shall utilize Burndy Unitap, Polaris Black or equivalent connectors.

D. Unless otherwise specified, all wiring shall be installed in conduit.

E. No wire shall be smaller than No. 12 for power or lighting service, fixture whips or for switch legs. Wire for each branch circuit shall be of a single size and type from the branch circuit protective device to the last outlet on the circuit unless noted otherwise.

F. Not more than three (3) branch circuits shall be installed in a raceway for three-phase electrical systems. For single phase electrical systems, the number of circuits in any one raceway shall be limited to two (2).

G. Branch circuits shall have a 200% rated neutral where more than one (1) branch circuit is in a raceway and the neutral conductor is shared. The neutral should match the branch phase wire size when only one (1) circuit is in a raceway and when the neutral conductor is not shared. Refer to the "Multiple Circuit Neutral Wiring Diagram." Provide multi-pole breakers to simultaneously trip all phase conductors for shared neutral circuits.

H. Type THWN conductors may be connected directly to recessed fixtures only when the fixtures are equipped with outlet boxes approved by Underwriters Laboratories, Inc. for use with wires having insulation rated for maximum operating temperature of 75o C., (167o F.); otherwise, conductors with Type SF2 insulation shall be run from fixture terminal

connections to an outlet box placed at least one foot (1') from the fixture, such a tap shall extend for at least four feet (4'), but not more than six feet (6'), in flexible metal conduit.

I. Branch circuit home run numbers shown on the drawings shall be used for connection of circuit wiring to similarly numbered protective devices in branch circuit panelboards.

J. Where the length of a home run, from panel to the first outlet exceeds 75 feet (75') for 120-volt circuits or 175 feet (175') for 277-volt circuits, the conductor size shall be No. 10 AWG or that shown on the drawings, whichever is larger.

K. For all 3-phase circuits, contractor shall provide and install a full-size neutral conductor and a grounding conductor for a complete 5-wire circuit. If the neutral conductor is not required by the equipment, contractor shall install wire nuts on each end of the neutral conductor for future use.

3.3 CONDUIT

A. When conduits are shown to be installed in the floor slab, under the floor slab, or underground, whenever possible and approved by the Architect/Engineer, conduits one-inch (1") trade size and smaller shall be installed in the concrete floor slab. Conduits embedded in concrete slabs shall have lateral spacing not less than three diameters except where the slab has been specially designed to accommodate closer spacing.

B. Conduits larger than one-inch (1") trade size shall not be installed in the floor slab and shall be installed a minimum of twelve inches (12") below the floor slab.

C. Conduits shown underground but not in or under a floor slab shall be installed not less than thirty inches (30") below grade. Conduit locations shall be identified by means of 4" wide, detectable, Red warning/ marker tape installed in trench in accordance with NEC requirements

D. Prior to backfilling of trenches and /or providing concrete encasement, contractor shall take photographs of conduit installation including spacers/supports and concrete support blocks. In addition, prior to backfilling trenches and after concrete encasement, take additional photographs of installation. Submit photographs to engineer upon request.

E. Rigid conduit joints shall be made with threaded fittings made up tight with at least five threads fully engaged. Compression type threadless fittings and setscrew type fittings shall not be used for RGS unless specifically approved in writing by the Architect/Engineer.

F. Couplings and connectors for EMT shall be compression type or cast iron set screw type.

G. Where conduits enter boxes or cabinets that do not have threaded hubs the conduit shall be secured in place with galvanized locknuts inside and outside and shall have bushings inside for interior locations. All exterior terminations shall be made with Meyers hubs or approved equivalent. Conduits larger than one inch (1") shall have galvanized insulating bushings.

H. All conduits shall be installed as indicated or scheduled on the drawings and shall be of sufficient size to accommodate the required number of insulated conductors including equipment-grounding conductor. A grounding conductor shall be pulled in every raceway and properly terminated. The Contractor shall increase the conduit size from that shown on the drawings where necessary to accommodate the equipment-grounding conductor and/or where to comply with the NEC.

I. Unless otherwise noted, conduit shall be run concealed. Conduit runs from wall mounted receptacles, toggle switches, etc. shall be run concealed in walls whenever possible.

J. Conduit runs shall be straight; elbows and bends shall be uniform, symmetrical, and free from dents or flattening. All conduit shall be installed with runs parallel or perpendicular to walls, ceilings and structural members.

K. Conduit shall not be run nearer than three inches (3") to hot water or steam pipes except where crossings are unavoidable. Conduit shall be kept at least one inch (1") from covering of pipe crossed and the conductor size shall be increased one (1) size

L. Conduit shall be held securely in place by approved hangers and fasteners of appropriate design and dimensions for the particular application. Support shall be such that no strain will be transmitted to the outlet box and/or pull box supports. Conduit shall be secured only to the building structure.

M. All conduit runs shall be installed in accordance with all applicable sections of the National Electrical Code and local codes or ordinances.

N. Where empty conduits are shown, a #14 pull wire shall be installed and conduits shall be capped.

O. Terminations to all mechanical equipment and to all dry-type transformers shall be made using a minimum of 12" to a maximum of 24" liquid-tight flexible metallic conduit.

P. At each concealed junction box in the power and lighting system, identify the panel and circuit number(s) contained in the junction box by writing in permanent marker on the outside of the junction box cover.

Q. Where conduits are run from condition spaces to/thru un-conditioned spaces, the ends of the conduits shall be sealed (after conductor installation) to prevent the transmission of air from non-conditioned spaces into the conditioned spaces. Expanding spray foam and EYS seals are approved methods of sealing conduits.

R. For all surface mounted devices, including fire alarm, and intercom systems, device boxes shall be Wiremold No. R5752 and R5753 or approved equivalent style boxes sized such that device does not overhang edge(s) of back box. Color of box shall match device.

3.4 WIRING DEVICES

A. All wiring devices installed shall be identified as to which panel serves it and which overcorrect protection device protects the wiring device. This shall be accomplished via panel name and circuit number being written using a permanent marker on the back side of the coverplate.

3.5 MANUFACTURER'S DIRECTION

A. Contractor shall be responsible for coordinating all aspects of equipment electrical service installation for all electrical gear, devices, mechanical, plumbing, fire protection, architectural, and owner furnished equipment including any and all medical equipment. Contractor shall obtain and review actual manufacturer's installation instructions and shall install electrical facilities to said equipment in accordance with the instructions, NEC, NFPA and contract documents. Should a discrepancy exist between the manufacturer's installation directions and the contract documents, the engineer shall be notified in writing immediately.

3.6 COORDINATION WITH OTHER TRADES

A. Prior to purchasing and installing any wire and/or conduit for all circuitry to mechanical equipment, medical equipment, owner furnished equipment, and other equipment requiring electrical power furnished by other trades as part of this project, contractor shall review equipment cut sheets and shall verify exact equipment electrical requirements. Any discrepancies between contract documents and equipment submittals shall be immediately brought to the architect/engineer's attention for clarification.

END OF SECTION 26 05 00

SECTION 26 05 26 - GROUNDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) as appropriate, apply to the Work specified in this Section.

B. Refer to all Electrical portions of the specifications, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 GENERAL

A. Contractor shall provide grounding of service equipment, transformers, non-current carrying conductive surfaces of equipment, cable tray, metallic raceways, fencing, metal buildings, structures and other equipment as specified herein and as shown on the drawings.

1.3 SCOPE

A. The equipment shall be grounded as shown on the plans and as specified herein. All metal structures and equipment, including fences, shall be connected to the systems ground grid. Ground conductors must be as short and straight as possible, protected from mechanical injury and, if practicable, without splice or joint.

B. Provide and install 1" C with insulated 3/0 C.U. service grounding conductor from grounding electrode(s) to telephone service backboard and to each and every tele/data/CATV closet.

C. Provide and install ERICO No. TMGBA24L33PT Tamper Resistant Copper Bus Bar Kit or approved equivalent, at each telephone service backboard, data backboard, CATV backboard in the MDF Room and IDF Rooms. Terminate 3/0 C.U. conductor to each bus bar. Refer to details.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Main grounding conductors shall be bare, soft drawn, stranded, single conductor copper wire, and generally sized as follows:

1. Ground grid cable: #3/0 AWG
2. Equipment and structures to grid conductor: #3/0 AWG
3. Fence grid conductor: #3/0 AWG
4. Fence-to-fence post conductor: #2 AWG (Stranded)
5. Fence post to grid conductor: #2 AWG (Stranded)

2.2 CONNECTORS

A. All connectors shall be of the exothermically welded type.

2.3 GROUND RODS

A. Ground electrodes shall be copper-clad steel rods nominal 3/4 inch in diameter and ten feet (10') long.

2.4 EXOTHERMIC WELD PROCESS

A. All wire-to-wire exothermic welds shall be the parallel type. Wire-to-wire rod connections shall be "T" type. To establish a basis of design for quality and type, the following is a partial list of approved Cadweld type connections. Approved equivalent connectors by other manufacturers may be utilized.

Connections	Cadweld Type
Parallel cable-to-cable	PG
Cable to ground rod	GR, FT, NT or NX
Cable to steel	VN
Cable to lug	LA
Cable to rebar	Consult factory (similar to RR)

PART 3 - EXECUTION

3.1 EXPOSED NON-CURRENT-CARRYING METAL PARTS

A. Ground connections to equipment or devices shall be made as close to the current-carrying parts as possible; that is, to the main frame rather than supporting structures, bases or shields. Grounding connections shall be made only to surfaces that are clean and dry. Steel surfaces shall be ground or filed to remove all scale, rust, grease and dirt. Copper and galvanized steel shall be cleaned to remove oxide before making welds or connections. Code size ground conductors shall be run in all conduits containing circuits protected by overcurrent devices; then properly terminated.

B. All raceways, cable racks, cable trays, conduits, armored or shielded cable or cables with ground and all exposed non-current carrying metal parts shall be grounded. Such items shall be bonded together and permanently grounded to the equipment ground bus. Conduits shall be connected by the grounding bushings or clamps to ground bus. Flexible "jumpers" shall be provided around all raceway expansion joints. Bonding straps for steel conduit shall be copper. Jumper connections shall be provided to effectively ground all sections of rigid conduit connected into plastic pipe. No metallic conduit shall be left ungrounded. In conduit systems interrupted by junction or switch boxes where locknuts and bushings are used to secure the conduit in the box, the sections of conduit and box must be bonded together using grounding bushings.

C. Any conduits entering low voltage (600 volts or below) equipment through sheet metal enclosure and effectively grounded to enclosure by hub need not be otherwise bonded. Both ends of ground buses in switchboards, etc., shall be separately connected to the main ground bus to form two (2) separate paths to ground.

D. All metal buildings shall be grounded by separate grounding conductor and ground rods. Fencing (existing and new) shall be grounded as specified herein and as shown on the drawings. Where exposed to physical damage, the ground wires shall be suitably protected with PVC conduit enclosures. Cables below grade shall be laid with a reasonable amount of slack to reduce the possibility of breakage.

3.2 EXOTHERMIC WELD PROCESS

A. The grounding grid shall be installed and connected as specified herein and as shown on the drawings using an exothermic weld process (Cadweld or other approved

manufacturer). Where bolted connections are required, brass/bronze 2 hole pads exothermically welded to the grounding conductor shall be used.

B. All exothermic weld grounding connections shall be made using exothermic welded Cadweld (or other approved manufacturer) connections, tools and materials.

C. Unless noted otherwise, all copper-to-copper or copper-to-steel splices and terminating specified shall be made with exothermic welds.

D. Steel surfaces shall be ground or filed to remove the galvanizing coating and the surface cleaned and dried thoroughly prior to making the welds. All welds shall be repainted with an approved galvanized paint after the welds are made.

E. Copper surfaces shall be sanded to remove oxides and the surface cleaned and dried thoroughly prior to making the welds. All welds shall be painted with an approved anti-oxide manufactured by T&B or Burndy (or other approved manufacturer) to prevent corrosion.

F. Brass/bronze split bolts shall be used to connect the fence grounding conductors where shown on the drawings.

G. Where bolted connections are specified, brass/bronze 2 hole pads shall be utilized except for equipment manufactured neutral and ground busses. The equipment to be grounded shall be cleaned of all paint, dirt, and rust prior to making the bolted connection. All bolts, nuts, washers, and lock washers shall be stainless steel. All such connections shall be coated with an approved anti-oxide compound. Only one (1) 2-hole pad shall be terminated on one (1) set of bolts, nuts and washers.

H. Where approved in writing by the Engineer, brass/bronze pipe ground clamps or 2 set screw 2 hole pads may be used for special conditions.

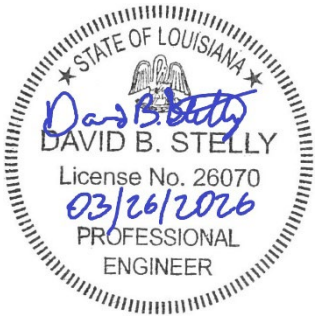
I. Where grounding conductors or PVC conduits penetrate walls, floors, etc., these openings and conduits shall be sealed with Dow Corning No. 2001 Silicone RTV (or other prior approved manufacturer) after installation is complete.

J. Provide gradual bends for all grounding grid cables wherever possible. Sharp bends will not be permitted. The minimum being radius should be 8 inches.

K. The Contractor shall notify the Architect/Engineer when the buried grounding grid is completed for inspection by the Engineer prior to backfilling. Notification should be no less than 24 hours prior to scheduling the backfill of trenches.

L. The Contractor shall test the grounding grid resistance and continuity. The testing shall be performed after all underground and above ground connections have been made. Refer to “Acceptance Testing” specification section for additional requirements.

END OF SECTION 26 05 26



SECTION 26 05 72 - OVERCURRENT PROTECTIVE DEVICE SHORT-CIRCUIT STUDY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes a computer-based, fault-current study to determine the minimum interrupting capacity of circuit protective devices.

1.3 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.

D. SCCR: Short-circuit current rating.

E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Other Action Submittals: Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.

1. Short-circuit study input data, including completed computer program input data sheets.
2. Short-circuit study and equipment evaluation report; signed, dated, and sealed by a qualified professional engineer.

    a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.
    b. Revised single-line diagram, reflecting field investigation results and results of short-circuit study.

C. At the conclusion of the project, contractor shall have the specified studies updated to reflect “As-Installed” conditions and submit the revised studies as part of the O&M manuals. This includes the electronic software data files, PDF of the study and PDF’s of the appropriate labels.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Short-Circuit Study Specialist and Field Adjusting Agency.

B. Product Certificates: For short-circuit study software, certifying compliance with IEEE 399.

1.6 QUALITY ASSURANCE

A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.

B. Short-Circuit Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

C. Short-Circuit Study Specialist Qualifications: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. SKM Systems Analysis, Inc.
2. ETAP

B. Comply with IEEE 399 and IEEE 551.

C. Analytical features of fault-current-study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output.

2.2 SHORT-CIRCUIT STUDY REPORT CONTENTS

A. Executive summary.

B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of the computer printout.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.
2. Cable size and lengths.
3. Transformer kilovolt ampere (kVA) and voltage ratings.
4. Motor and generator designations and kVA ratings.
5. Switchgear, switchboard, motor-control center, and panelboard designations.

D. Comments and recommendations for system improvements, where needed.

E. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short-circuit ratings.
2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short-circuit duties.
3. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
4. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.
5. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

F. Short-Circuit Study Input Data: As described in "Power System Data" Article in the Evaluations.

G. Short-Circuit Study Output:

1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

    a. Voltage.
    b. Calculated fault-current magnitude and angle.
    c. Fault-point X/R ratio.
    d. Equivalent impedance.

2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

    a. Voltage.
    b. Calculated symmetrical fault-current magnitude and angle.
    c. Fault-point X/R ratio.
    d. Calculated asymmetrical fault currents:

        i. Based on fault-point X/R ratio.
        ii. Based on calculated symmetrical value multiplied by 1.6.
        iii. Based on calculated symmetrical value multiplied by 2.7.

3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

    a. Voltage.
    b. Calculated symmetrical fault-current magnitude and angle.

c. Fault-point X/R ratio.
d. No AC Decrement (NACD) ratio.
e. Equivalent impedance.
f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Obtain all data necessary for the conduct of the study.

1. Verify completeness of data supplied on the one-line diagram. Call any discrepancies to the attention of Engineer.
2. For equipment provided that is Work of this Project, use characteristics submitted under the provisions of action submittals and information submittals for this Project.
3. For relocated equipment and that which is existing to remain, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. The qualifications of technicians and engineers shall be qualified as defined by NFPA 70E

B. Gather and tabulate the following input data to support the short-circuit study. Comply with recommendations in IEEE 551 as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study and shall be by the engineer or its representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.

1. Product Data for Project's overcurrent protective devices involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
2. Obtain electrical power utility impedance at the service.
3. Power sources and ties.
4. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
5. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
6. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip, SCCR, current rating, and breaker settings.
7. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
8. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
9. Motor horsepower and NEMA MG 1 code letter designation.
10. Cable sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).

3.2 SHORT-CIRCUIT STUDY

A. Perform study following the general study procedures contained in IEEE 399.

B. Calculate short-circuit currents according to IEEE 551.

C. Base study on the device characteristics supplied by device manufacturer.

D. The extent of the electrical power system to be studied is indicated on Drawings.

E. Begin short-circuit current analysis at the service, extending down to the system overcurrent protective devices as follows:

1. To normal system low-voltage load buses where fault current is 10 kA or less.
2. Exclude equipment rated 240-V ac or less when supplied by a single transformer rated less than 125 kVA.

F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

G. The calculations shall include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and shall apply to low- and medium-voltage, three-phase ac systems. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

H. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault at each of the following:

1. Electric utility's supply termination point.
2. Incoming switchgear.
3. Unit substation primary and secondary terminals.
4. Low-voltage switchgear.
5. Motor-control centers.
6. Control panels.
7. Standby generators and automatic transfer switches.
8. Branch circuit panelboards.
9. Disconnect switches.

3.3 ADJUSTING

A. Make minor modifications to equipment as required to accomplish compliance with short-circuit study.

3.4 DEMONSTRATION

A. Train Owner's operating and maintenance personnel in the use of study results.

END OF SECTION 26 05 72

SECTION 26 09 23 - OCCUPANCY SENSORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) as appropriate, apply to the Work specified in this Section.

B. Refer to all other Electrical specification sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 GENERAL

A. Contractor shall provide and install motion sensors in accordance with the plans and specifications herein. System shall be installed to provide detection system coverage of the entire space the sensors are located in. It is understood that due to some manufacturer's devices providing different coverage patterns, the plans represent a generic system. Contractors shall evaluate each space individually and shall at no additional costs to the owner, provide additional detection sensors where required to provide a complete coverage pattern and shall also adjust installation locations to retain the coverage while reducing false triggers of the sensors.

PART 2 - PRODUCTS

2.1 WALL MOUNTED SENSORS

A. For single-pole/single switch applications wall mounted motion sensors shall be IR-TecLDS700S, Watt Stopper No.: DSW-100, Lutron MS-A102, Greengate ONW-D-1001-MV, Leviton ODS10.

B. For two-pole/dual switch applications, wall mounted motion sensors shall be IR-TecLDT700S or Watt Stopper No.: DSW-200, Greengate ONW-D-1001-DMV, Leviton ODSOD.

C. Color of sensor shall be selected by Architect/Engineer during shop drawing submittal.

2.2 CEILING MOUNTED SENSORS

A. Ceiling mounted motion sensors shall be IR-Tec-BDS-600S, Watt Stopper No. DT-305, Lutron LOS-CDT-2000-WH, Greengate OAC-DT-2000.

B. All relays, contactors, and power packs required to provide a fully operational system shall be provided and installed at no additional cost to the owner.

C. Install device using properly sized device box recessed in ceiling. Utilize MC-cable to run all conductors. Install power pack in properly rated junction box.

D. Color of sensor shall be selected by Architect/Engineer during shop drawing submittal.

2.3 POWER/SWITCH PACKS

A. Power packs shall employ zero crossing circuit to limit inrush current. Contacts shall be dry-type (Isolated) twenty-ampere (20A). Leads shall be Class 2 Teflon insulated for use in plenums. Power pack shall be rated for both 120 volt and 277 volt operation.

B. Install device using properly sized device box recessed in ceiling. Utilize flexible conduit to run all control voltage conductors. Install power pack in properly rated junction box.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Should a particular manufacturer's product require that additional sensors and associated wiring and accessories be provided to allow full and complete coverage of the space, the additional sensors and associated wiring and accessories shall be provided at no additional cost to the owner.

B. Installation of motion sensor shall be such that motion is detected as soon as a person enters the particular room and with the sensor being a minimum of four feet (4') from any HVAC diffuser/register.

C. All sensors shall be installed on the line side of all toggle switches so that power is maintained to the sensor at all times.

D. Prior to requesting substantial completion, contractor shall coordinate with the owner to determine the length of time the sensors shall keep the lighting illuminated after the room if vacated and shall program sensors accordingly. Time shall be adjustable from a minimum of 5 minutes to a maximum of 30 minutes. Contractor shall provide a minimum of one additional setting adjustment per sensor installed for the duration of the one-year warranty period.

3.2 SUBMITTALS

A. Prior to installation, contractor shall submit a proposed layout in shop drawings indicating all sensor and power pack locations. The sensor Contractor shall be responsible for such layout.

B. At time of substantial completion, contractor shall submit how each and every sensor is programmed including but not limited to trigger on technology, maintain on technology, time delay to off.

3.3 MISCELLANEOUS ITEMS

A. Contractor shall be responsible for providing all relays, contactors, power packs, etc. to provide a complete motion detecting lighting switching circuit.

END OF SECTION 26 09 23

SECTION 26 27 13 - ELECTRICAL DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions); as appropriate, apply to the work specified in this section.

B. Refer to all Electrical specification sections, as well as the plans and specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 ELECTRIC SERVICE

A. Contractor shall modify existing normal (and emergency) 120/240 volt 3 phase 4 wire electrical system(s) at the facility as specified herein and noted on the drawings. This Contractor shall be responsible for the coordination of all electrical work with the local utility company. Contractor shall be responsible for determining the proper breakers and connectors to tie into the existing electrical systems. Short circuit current interrupting rating of new breakers shall match rating of existing breakers. Contractor shall be responsible for examining the panelboards to be tied into, building structure, and site, and shall include in his bid all materials and time (regular pay and overtime pay) to install the new feeders avoiding conflicts with existing equipment to remain.

1.3 GENERAL

A. All electrical gear furnished as part of this project, panelboards, switchboards, motor control centers, dry-type transformers, safety switches, etc. shall be of the same manufacturer unless specified otherwise. Electrical equipment manufactured by a subsidiary or parent company of manufacturer that is prior approved is not itself prior approved unless its own manufacturer's name specifically is listed as being prior approved.

1.4 SERIES RATING OF EQUIPMENT

A. Where it is indicated that electrical gear is series rated to accomplish a particular fault current interrupting rating, this series rated electrical gear shall be properly identified as such. Equipment shall be labeled with a plastic tag, orange background with white 1/4" embossed characters, thereon identifying the panelboard as being series rated. Tag shall indicate the individual equipment’s name/use, individual interrupting rating and the combined series rating of the equipment such as:

1. Panel Name
2. Interrupting Rating: _____ Amps
3. Series Rating: _____ Amps

B. The tags shall be fixed to the interior of the panelboard door with a suitable adhesive.

PART 2 - PRODUCTS

2.1 PANELBOARDS

A. Panelboards shall be circuit breaker type using quick-make, quick-break, trip free, thermal magnetic trip indicating, bolt-on circuit breakers. Two and three pole branches and mains shall be common trip. Panelboards shall be dead front safety type with main breaker or main lugs, and number and size of branches as shown on the drawings. Panelboards shall

have single, feed through, or double lugs, to accommodate feeder conductors as shown on the drawings, and shall have neutral and ground bus for termination of conductors. Bussing shall be copper.

B. Doors shall be fitted with flush cylinder locks, keys to which shall all on project be alike. Two (2) keys shall be furnished for each lock. Cabinet fronts shall be finished as directed by the Architect/Engineer. Cabinet fronts shall not be removable with door in the locked position. Provide for each panel a directory frame with waterproof transparent plastic window on inside of door and place therein a typewritten identification of all circuits.

C. Directories shall be made only after permanent room numbers have been assigned. Room numbers shown on the construction drawings shall not be used for making directories. Each circuit shall be clearly identified as to use and location (ex: Receptacles Rooms 201, 202 or Lighting Rooms 207, 209, 211, and 213).

D. Cabinets shall be galvanized steel not less than twenty inches (20") in width. Gutters shall not be smaller than minimum dimensions required by the National Electrical Code.

E. Double section panelboards shall be comprised of cabinets of equal dimensions.

F. All panels rated NEMA 1, shall be of the door-in-door type construction providing tool-less access to interior of the panelboard(s).

G. Panelboards shall be as shown in the schedules and shall be completely factory assembled. Do not purchase panelboards or cabinets until shop drawings have been approved. Approved manufacturers include:

1. General Electric
2. Square D
3. Eaton-Cutler Hammer
4. Approved Equivalent

H. Minimum short circuit current interrupting ratings for circuit breakers shall be 10,000 amps. Where a specific interrupting rating is shown on the drawings, in the panel schedules, or as required by the coordination and fault current study, panelboards and associated circuit breakers shall be rated for that value as a minimum at no additional cost to the owner.

I. In branch circuit panelboards having two (2) vertical columns of devices, circuit numbers shall be such that, starting at the top, odd numbers shall be used in sequence down the left hand side. See Schedule of Panelboards on drawings for circuit device sizes and number of poles.

J. Construction of panelboards shall be such that, where applicable, any three (3) adjacent single-pole devices are individually connected to each of the three different phases in such a manner that 2 or 3 pole devices, when available, can be installed at any location.

K. UL Listing: Panelboards shall be listed by UL and bear the UL label.

L. Interior panelboards shall be NEMA I unless noted otherwise. All exterior panelboards shall be rated NEMA 3R.

M. All panelboards, starters, VFD’s, contactors, transformers, safety switches and fused safety switches installed by this contractor shall have laminated phenolic tags with 1/4" characters embossed thereon identifying the equipment by name, voltage, ampacity, phase and number of current carrying conductors such as:

Panel Name
120/240 V - 400A
3 Phase - 4 Wire
Fed From Panel:_____, Circuit _____
Fused @ _____**

The tags shall be fixed to the center of the equipment cover/door with a suitable heavy duty industrial grade adhesive.

**Note – For fused safety switches, label shall include fuse sizes contained therein.

N. Color Coding of labels shall be as follows:

Normal Power	White Background with Black Letters
Emergency Power (Life Safety Branch)	Red Background with White Letters
Emergency Power (Critical Branch)	Blue Background with White Letters
Emergency Power (Equipment Branch)	Yellow Background with Black Letters

2.2 DRY-TYPE TRANSFORMERS

A. Dry-type transformers shall be three phase, 60 cycle with 480 volt delta primary windings and 120/208 volt, 4-wire wye secondary windings with capacities and mounting arrangements as indicated on the drawings. Each transformer shall have four (4) 2-1/2% FCBN taps, except that two (2) full current taps above normal and two (2) below normal will be acceptable where this is manufacturer's standard for the particular size.

B. Transformers shall have internally isolated core and coil and shall be built with 220 Class insulation and shall have a temperature rise not to exceed 115^{o} C where installed indoors or not to exceed 150 C where installed outdoors. Where shown on plans where transformers are stacked, both transformers shall have a temperature rise not to exceed 80 C, under full load in an ambient temperature of 40^{o} C. Windings shall be copper.

C. Units shall be designed for quiet operation with core and coil completely isolated from the enclosure by vibration absorbing mounts. Sound levels shall not exceed 45 db for 75 KVA or below, or 50 db for units above 75 KVA in an ambient of 24 db.

D. Enclosures shall be NEMA 1 for secured interior locations, NEMA 3R for secured exterior locations, and totally enclosed for all unsecured locations.

E. Enclosures shall be constructed of heavy code gauge steel with terminal compartments located at the bottom of each unit. Circuit connections shall be made through flexible metallic conduit.

F. Transformers shall be as manufactured by Square D, General Electric, Eaton Electrical, Siemens, or approved equivalent.

2.3 MAGNETIC CONTACTORS

A. The Contractor shall furnish and install contactors where shown on the drawings except that contactors shown mounted in branch circuit panelboards shall be factory mounted by panelboard manufacturer.

B. Contactors shall be of the same manufacturer as the panelboards, disconnect switches, etc.

C. Contactors shall be suitable for use at the voltage rating of the circuits controlled and shall have the number of poles and ampere rating shown on the drawings as a minimum. Where ampere ratings are not shown, ratings shall be 20 amperes minimum, or as required to match the supply feeder protective device.

D. Main contacts shall be double break silver alloy to silver alloy type protected by arching contacts. Contacts shall be self-aligning and renewable from the front of the panel.

E. Contactors shall be Underwriters' Laboratories, Inc. listed under UL 508, 11th Edition. Contactors shall be fully rated and marked for use with motor loads, tungsten lamp loads, and ballast lamp loads.

F. Remote control stations shall be three-wire momentary contact type with indicator light. Stations shall be arranged as indicated on the drawings and shall be furnished by the contactor manufacturer.

G. Contactors shall be mounted in suitable enclosures for locations shown with hinged cover and latch.

2.4 LIGHTING CONTACTORS

A. The Contractor shall furnish and install lighting contactors where shown on the drawings except those contactors shown mounted in branch circuit panelboards shall be factory mounted by panelboard manufacturer. Contactors shall be suitable for use at voltage rating of circuits controlled and shall have the number of poles and ampere rating shown on the drawings as a minimum.

B. The contactor amp rating shall be continuous per pole for all types of ballast and tungsten lighting, resistance and motor loads. The contactor shall have totally enclosed, double-break silver-cadmium-oxide power contacts. Auxiliary arcing contacts are not acceptable. Contact inspection and replacement shall be possible without disturbing line or load wiring. The contactor shall have straight-through wiring with all terminals clearly marked. The contactor shall be approved per UL508 and/or CSA, and be designed in accordance with NEMA ICS2-211B. They shall be industrial-duty rated for applications to 600 volts maximum. The contactor shall have the following:

1. Control-circuit fuse holder, with one (1) fuse.
2. 0.2-60 second TDE (Time Delay Energize) and TDD (Time Delay De-energize) timer attachments.

C. The contactor shall have a NEMA Type 1 enclosure and shall be the mechanically held type.

D. Coil-clearing contacts shall be supplied so that the contactor coils shall be energized only during the instance of operation. Both latch and unlatch coils shall be encapsulated.

2.5 SAFETY SWITCHES

A. Furnish and install safety switches at locations and in capacities shown on the drawings, as hereinafter specified and/or as required by the latest edition of the National Electrical Code.

B. Safety switches shall be rated heavy duty and fusible.

C. Safety switches exposed to the weather shall be rated NEMA 3R.

D. Safety switches shall be of the solid neutral type where required by circuit or feeder specified.

E. Safety switch covers shall be internally mechanically held closed when in the ON position and shall be allowed to open in the OFF position. The switch shall come equipped with provisions to allow the switch to be padlocked in the off position.

F. Galvanized angle or other suitable supports shall be provided for switches that cannot be mounted on walls or other rigid surfaces. Switches shall not be supported by conduit alone and shall not be mounted on HVAC or other equipment unless specifically approved by the Architect/Engineer. Verify mounting heights for all exterior locations with Architect/Engineer prior to rough-in.

G. Fuses shall be installed so that fuse rating and type are clearly and easily readable from the front of the disconnect.

H. Safety switches shall be General Electric, Square "D", Eaton Electrical, Siemens or approved equivalent.

2.6 FUSES

A. Unless otherwise noted or specified, all fuse holders shall be equipped with dual-element, time-lag, and current limiting fuses. Provide one (1) spare set of fuses for each size initially installed, with a minimum of three (3) fuses of each size. Spare fuses shall be turned over to the Owner's maintenance supervisor prior to requesting substantial completion inspection.

B. Fuses shall be Gould, Bussman, or approved equivalent.

PART 3 - EXECUTION

3.1 MANUFACTURER’S DIRECTION

A. All electrical gear shall be installed in accordance with the manufacturer’s directions. Contractor shall review these directions prior to rough-in. Should any discrepancies exist between the contract documents and the manufacturer’s direction, contractor shall advise the engineer in writing.

B. All electrical terminations shall be properly tightened to manufacturer’s specifications. Where manufacturer’s specifications are not available, contractor shall refer to the NEC and adjust tightness valves (torque) to the NEC published values.

C. Install all safety switches, breakers, disconnects, etc., in accordance with manufacturer’s directions and maintain all required NEC clearances. Coordinate exact locations in field with applicable contractors.

END OF SECTION 26 27 13

SECTION 26 51 00 - LIGHTING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) as appropriate, apply to the Work specified in this Section.

B. Refer to other Electrical specifications, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 GENERAL

A. The Contractor shall furnish and install lighting fixtures and accessories as shown on the drawings and/or described herein. The Contractor shall also furnish and install new lamps for all new fixtures and existing fixtures to be re-used in project area.

B. Unless otherwise specified, lighting fixtures shall be permanently installed and connected to the wiring system.

C. The Contractor shall support each new fixture independently, from the building structure. Ceiling framing members shall not be used to support fixtures except in specific areas where ceiling supports for this purpose have been specified elsewhere in these specifications.

D. Catalog numbers scheduled on the drawings or descriptions of lighting fixtures contained herein may indicate fixture compatibility with certain types of ceiling construction. The Contractor shall determine exact type of ceilings actually to be furnished in each area and shall obtain fixtures to suit, deviating from specified catalog numbers or descriptions only where necessary, and only to the extent necessary to insure fixture-ceiling compatibility. The Contractor shall notify the Architect/Engineer in writing where such changes are to be made. Contractor shall clean all lighting fixtures of dirt and debris upon completion of project prior to requesting substantial completion inspection.

E. Incandescent fixtures for recessed locations shall have a thermal cutout and be installed in accordance with manufacturer's requirements and in accordance with NEC.

F. Unless noted otherwise on the drawings, lamps installed in each fixture shall be of the type specifically recommended by the manufacturer of the fixture for use in the fixture. Fixtures shall not be wired with or have any parts constructed using asbestos materials.

G. All requests for prior approval shall contain the following:

1. Photometric data for each fixture being submitted.
2. For all exterior lighting, point by point foot candle levels shall be submitted. (Exception: Wall packs, ground mounted flood lights, landscape lighting).
3. Listing of all deviations of fixtures proposed as compared to fixtures specified.
4. For interior lighting point by point foot-candle levels shall be submitted for typical interior spaces (offices, classrooms, corridors) and for spaces with indirect and/or specialty lighting.

PART 2 - PRODUCTS

2.1 EMERGENCY BATTERY PACKS

A. Emergency battery packs shall be provided and installed in all fixtures denoted by the letter “E” appearing at the end of the fixture type designation and where required in the light fixture schedule. Emergency battery packs shall be installed in the ballast/driver housing (not on top of the fixture) of the fixture(s) unless specifically noted otherwise on the drawings.

B. At the contractor’s option, a central inverter (or multiples thereof) may be provided in the electrical room(s) to provide emergency lighting as indicated. If contractor elects to implement this option, they shall be responsible for providing the appropriate sub-feed breaker in the lighting distribution panel as well as all required sub-feed circuitry. Any and all required generator transfer devices (GTD’s) shall be provided at no additional costs. All required branch emergency circuitry shall be provided as well as all branch circuit overcurrent protective devices required in the central inverter(s). As part of the lighting submittal package, fixture supplier shall provide connection diagrams indicating installation requirements for the emergency lighting system showing all switching, inverters (battery packs), GTDs, etc… required for a complete and fully operational emergency lighting system.

C. Operation of the fixture shall be as follows:

Normal A/C Power	Switch Position	Operation of Lamps/LED’s
On	On	All lamps/LED’s operating
On	Off	All lamps/LED’s off
Off	On	Emergency Lamps/LED’S all operating
Off	Off	Emergency Lamps/LED’s all operating

D. Emergency operation of the light fixture shall provide a minimum total lamp output of 1200 lumens for a minimum time period of ninety (90) minutes.

E. Emergency battery packs shall be as manufactured by Bodine, Iota Engineering Co., or approved equivalent.

F. The Contractor shall be responsible for any additional wiring, conduit, labor, etc., to provide the emergency lighting system specified at no additional cost to the Owner. This includes running of a continuously energized conductor to each and every battery pack.

2.2 LED FIXTURES

A. Manufacturers of LED luminaires shall demonstrate a suitable testing program incorporating high heat, high humidity and thermal shock test regimens to ensure system reliability and to substantiate lifetime claims.

B. The use of IESNA LM-80 data to predict luminaire lifetime is not acceptable.

C. At time of manufacture, electrical and light technical properties shall be recorded for each luminaire. At a minimum, this should include lumen output, CCT, and CRJ. Each luminaire shall utilize a unique serial numbering scheme. Technical properties must be made available for a minimum of 5 years after the date of manufacture.

D. Luminaires shall be provided with a full, non-pro-rated, non-limited, 5-year warranty covering LEDs, drivers, paint and mechanical components.

1. Each luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array and electronic driver (power supply).
2. The rated operating temperature range shall be 30°C to +40°C.
3. Each luminaire is capable of operating above 100°F° (37°C), but not expected to comply with photometric requirements at elevated temperatures.
4. Photometry must be compliant with IESNA LF-79 and shall be conducted at 25°C ambient temperature.
5. The individual LEDs shall be constructed such that a catastrophic loss or the failure of one LED will not result in the loss of the entire luminaire.
6. Luminaire shall be constructed such that LED modules may be replaced or repaired without replacement of whole luminaire.
7. Each luminaire shall be listed with Underwriters Laboratory, Inc. under UL 1598 for luminaires, or an equivalent standard from a nationally recognized testing laboratory.
8. Power Consumption: Maximum power consumption allowed for the luminaire shall be determined by application. The luminaire shall not consume power in the off state.
9. Operation Voltage: The luminaire shall operate from a 60 HZ ± 3HZ AC line over a voltage ranging from 108 VAC to 305 VAC. The fluctuation of line voltage shall have no visible effect on the luminous output.
10. Power Factor: The luminaire shall have a power factor of 0.90 or greater.
11. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent.
12. Surge Suppression: The luminaire onboard circuitry shall include fused surge protection devices (SPD) to withstand high repetition noise transients as a result of utility line switching, nearby lightning strikes, and other interference. The SPD shall protect the luminaire from damage and failure for common mode transient peak voltages up to 10 kV (minimum) and transient peak currents up to 5 kA (minimum) SPD shall conform to UL 1449 depending on the components used in the design. SPD performance shall be tested per the procedures in ANSI/IEEE C62.41-1992 (or current edition for category C (standard). The SPD shall fail in such a way as the luminaire will no longer operate. The SPD shall be field replaceable.
13. Each luminaire shall have integral UL Listed Class II power supplies. Class I power supplies will not be acceptable.
14. Operational Performance: The LED circuitry shall prevent visible flicker to the unaided eye over the voltage range specified above.
15. RF Interference: LED drivers must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise.
16. Drivers shall have a Class A sound rating.
17. Illuminance: The illuminance shall not decrease by more than 30% over the expected operating life. The measurements shall be calibrated to standard photopic calibrations.
18. Light Color Quality: The luminaire shall have a correlated color temperature (CCT) range of 3300K to 3700K. The color rendition index (CRI) shall be 80 or greater. Binning of LEDS shall conform to ANSI/G.NEMA SSL 3-2010.
19. Backlight –Uplight-Glare: the luminaire shall not allow more than 10 percent of the rated lumens to project above 80 degrees from vertical. The luminaire shall not allow more than 2.5 percent of the rated lumens to project above 90 degrees from vertical. Backlight and Glare ratings as per fixture schedule and calculated per IESNA TM-15.
20. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life.

21. The LED manufacturer's maximum thermal pad temperature for the expected life shall not be exceeded.
22. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.
23. The luminaire shall have a minimum heat sink surface such that LED manufacturer's maximum junction temperature is not exceeded at maximum rated ambient temperature.
24. The heat sink shall be aluminum.
25. The luminaires shall be dimmable from 100 percent output to 0 percent output.
26. Driver shall be integral to the fixture and field replaceable.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All surface mounted fixtures shall be properly anchored so that all sides of the fixture are butted up against the mounting surface. A minimum of two (2) anchors shall be used; however, where additional anchors are required to properly install fixture (all sides evenly spaced from ceiling), the Contractor shall provide and install them at no additional cost to the Owner.

1. Anchor types shall be as follows:

Mounting Surface Material	Anchor type
* Gypsum board (wall)	Toggle bolts or blocking with screws
Gypsum board (ceiling)	Expansion type anchor
Concrete/concrete block	Expansion type anchor
** Wood	Screws

*Anchor type shall be determined in field by Architect/Engineer as dictated by fixture weight.
** Any fixture installed on combustible material shall be installed on ½ minimum spacers unless prior approved, otherwise in writing by Architect/Engineer.

B. All recessed fixtures in suspended ceiling shall be supported by a minimum of two (2) support wires, at opposite corners of the fixture. Each support wire shall be continuous without splices to the building structure and separately anchored. Fixture support wires shall support only the light fixture and not the ceiling. Surface mounted fixtures installed on lay-in ceiling shall be supported as lay-in fixtures. Refer to details for additional requirements.

END OF SECTION 26 51 00

SECTION 28 05 13 - TELEPHONE/DATA COMMUNICATION SYSTEM(s)

PART 1 - GENERAL

1.1 The Contractor shall provide, install and connect the complete telephone/data system equipment, backboards, conduit, cable tray, j-hooks, wiring and testing as specified herein and shown on the drawings.

1.2 SCOPE OF WORK

A. This installation includes the furnishing of labor, materials, and equipment required for the installation of all service, inside station, and riser cables for telephone and data use between distribution frames, and to each station outlet location required by the plans and specifications.

B. The work shall include but is not necessarily limited to the following:

1. Furnish and install telephone outlets, data outlets, cables, connecting blocks, backboards, conduits, mounting brackets and associated hardware for bundling, racking and cross-connecting as required.
2. Furnish and install one (1) 1" C from each tele/data outlet concealed up wall to above ceiling. Turn conduits 90˚ and extend conduit to accessible ceiling space. Provide nylon bushings at ends of conduits.
3. Contractor shall submit an installation color coding, labeling and testing plan for each floor prior to commencing work.

1.3 APPLICABLE DOCUMENTS

A. The following current issues of rules and regulations shall apply to this scope of work:

1. EIA/TIA 568, 569, 570, 606, TSB36, TSB40
2. Building Industry Consulting Service (BICS)
3. Telephone Standards Handbook GHB-155
4. Planning Handbook CHB-156
5. Design Handbook CHB-157
6. REA Construction and Installation Manuals
7. REA Specification PC4 for Acceptance Tests
8. List of Materials Acceptable for use on telephone systems of REA borrowers
9. National Electric Code (NEC)
10. State and Local Codes
11. Telco System Practices
12. UL

1.4 GENERAL REQUIREMENTS

A. Installation costs including all necessary materials, cables, closures, bridging clips, splice materials, and terminations are to be the responsibility of the Contractor.

B. Cables routed above the drop ceiling and where not installed in conduit shall be supported to the structure utilizing "J" hooks. Cables are not allowed to rest on the ceiling tiles nor building steel. Maximum clearance to other electrical systems shall be maintained.

C. All cables, wires, and equipment shall be securely and neatly installed. Inside routings shall be installed parallel and perpendicular to existing structural lines and members.

D. All cables, wires, and equipment shall be firmly held in place. Fastening and support shall be adequate to support their load with ample safety factors.

E. The Contractor shall be responsible for replacing, restoring, or bringing to original condition any damage to floor, ceilings, walls, furniture, grounds, pavement, etc., caused by his personnel and operations. Contractor shall restore any damage or disfigurements at his expense.

F. Cables shall be continuous; no splices will be allowed.

G. The Contractor shall refer to the Construction Phasing Description section of these specifications for additional information and requirements. It is intended that the Telephone and Data Communications System be placed in service and be of beneficial use to the Owner at the completion of each construction phase of the work prior to occupancy by the Owner.

H. The Contractor shall coordinate all of his work with the Owner's Information Network Department to maintain tele/data service to the old and new systems as may be required. The Contractor will provide all new services as specified and shown on the drawings in a timely manner.

I. The Contractor shall not interrupt existing tele/data services and systems in any way until new facilities are in place and approval is received from the Information Network Department and the Architect/Engineer.

1.5 SUBMITTALS

A. Submit to the engineer shop drawings, product data (including cut sheets and catalog information). Submit shop drawings, product data with such promptness and in such sequence as to cause no delay in the work or in the activities of separate contractors. The engineer will indicate approval of shop drawings and product data submitted to the engineer by stamping such submittals "APPROVED" with a stamp. Submitted shop drawings shall be initialed or signed by the contractor, showing the date and the contractor's legitimate firm name.

B. By submitting shop drawings and product data, the contractor represents that he or she has carefully reviewed and verified materials, quantities, field measurements, and field construction criteria related thereto. It also represents that the contractor has checked, coordinated, and verified that information contained within shop drawings and product data conform to the requirements of the work and of the contract documents.

C. The engineer remains responsible for the design concept expressed in the contract documents as defined herein.

D. The engineer’s approval of shop drawings and product data submitted by the contractor shall not relieve the contractor of responsibility for deviations from requirements of the contract documents, unless the contractor has specifically informed the engineer in writing of such deviation at time of submittal, and the engineer has given written approval of the specific deviation. The contractor shall continue to be responsible for deviations from requirements of the contract documents not specifically noted by the contractor in writing, and specifically approved by the engineer in writing.

E. The engineer's approval of shop drawings and product data shall not relieve the contractor of responsibility for errors or omissions in such shop drawings and product data.

F. The engineer's review and approval, or other appropriate action upon shop drawings and product data, is for the limited purpose of checking for conformance with information given and design concept expressed in the contract documents. The engineer's review of such submittals is not conducted for the purpose of determining accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the contractor as required by the contract documents. The review shall not constitute approval of safety precautions or of construction means, methods, techniques, sequences, or procedures. The engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

G. Perform no portion of the work until the engineer has approved the respective submittal. Such work shall be in accordance with approved submittals.

H. Submit shop drawings and product data as a complete set within thirty (30) days of award of contract.

I. For initial submission and for re-submission required for approval, submit one (1) electronic copy of each item. Make reproductions as required for your use and distribution to subcontractors. Reproduction of documents will be at contractor's expense. Illegible submittals will not be checked by the engineer.

J. General: Submit the following:

1. Bill of materials, noting long lead time items
2. Project schedule including all major work components that materially affect any other work on the project

K. Shop drawings: Submit the following:

1. Backbone (riser) diagrams.
2. System block diagram, indicating interconnection between system components and subsystems.

L. Product Data -- Provide catalog cut sheets and information for the following:

1. Wire/Cable.
2. Outlets, jacks, faceplates, and connectors.
3. Terminal blocks and patch panels.
4. Enclosures, racks, and equipment housings.
5. Over-voltage protectors.
6. Splice housings.
7. Fiber optic cable

1.6 QUALITY ASSURANCE

A. Commscope cabling systems, Hubbell Premise Wiring Cat 6 Cabling, and Com Tran Cable - Signamax connectivity are approved for the work of this section.

B. The contractor shall be an authorized Manufacturer's cabling system contractor.

C. The contractor shall have worked satisfactorily for a minimum of five (5) years on systems of this type and size and be currently operating service organization within 50 miles of project site.

D. Material and equipment shall be new, and conform to grade, quality, and standards specified. Equipment and materials of the same type shall be a product of the same manufacturer throughout.

E. Subcontractors shall assume all rights and obligations toward the contractor that the contractor assumes toward the owner and engineer/designer.

1.7 WARRANTY

A. Unless otherwise specified, unconditionally guarantee in writing the materials, equipment, and workmanship, of all cabling system components, for a period of not less than twenty-five (25) years from date of acceptance by the owner.

B. Transfer manufacturer's warranties to the owner in addition to the General System Guarantee. Submit these warranties on each item in list form with shop drawings. Final payment shall not relieve contractor of these obligations.

C. Installation costs including all necessary materials, cables, closures, bridging clips, splice materials, and terminations are to be the responsibility of the Contractor.

D. Installer Qualifications:

1. The Data Cable System Installer shall be licensed and shall meet all applicable regulations of the local and state authorities insofar as they apply to this type of system. The proposer shall be a firm normally employed in the low voltage and data cabling industry and shall provide a reference list of ten (10) large-scale projects and contact names confirming successful Category 6 premises wiring system installations.
2. The Installer shall be a local area, integrator of the manufacturer's product and must provide the manufacturer's maximum available warranty on the entire system. The contractor's certification must have been obtained and held within 75 miles of the project's location.
3. The installing contractor must have a full-time employed RCDD (Registered Communications Distribution Designer) on staff. Current RCDD certification shall be provided in the product submittals.
4. All individuals must be employees of the certified installer and at least 25% of the installing staff shall have undergone a training class given by the manufacturer. Current certification indicating the successful completion of the training course shall be available upon request at the project and submitted in the contractor's product submittals.

PART 2 - PRODUCTS

2.1 MATERIAL SPECIFICATIONS

A. Inside Unshielded Twisted Pair (UTP)

1. All unshielded twisted pair requirements for use shall meet EIA Category 6 specifications (plenum rated when installed in plenum spaces).
   a. NEC
   b. UL
   c. ANSI/ICEA Publication S-80-576

d. EIA/TLA 568, 569, 570, 606, TSB 36, TSB 40

2. Multi-pair Riser Cables
   a. Cables from the MDF shall be further distributed to each of the other closets and terminated on 110 block in the IDFs there. The intra-building inter-IDF cables shall be of the multi-pair type, conforming to or exceeding the following EMMA 568 physical specifications of CAT 6a physical specification.
3. UTP Patch Cords
   a. EIA Category 6 UTP patch cords (8' in length) shall be supplied at each wall outlet for each jack installed. At the MDF's and IDF's, patch cords shall be terminated at both ends in 4-pair Type 110 or equivalent connectors for plugging onto the type 110 or equivalent cross-connect panels, IDFs and MDFs. The other patch cords shall be terminated in 8 position modular male connectors at both ends conforming to FCC Part 68 Rules, Subpart F. The ends shall be wired in accordance with EIA/TIA 568B.
4. UTP Termination Wall Plates
   a. The four-pair horizontal cables shall be terminated on 6-position modular duplex (two) outlets meeting EIA specifications for EIA Category 6 UTP and configured in compliance with T56B. The outlets shall be in compliance with FCC Part 68 Rules, Subpart F. The outlets with integrated or separate cover plates shall be installed in single standard electrical wall boxes. The data termination shall allow keyed connectors. The termination of wires shall be by the insulation displacement method equivalent to type 110 and shall require the use of the same punch down tool as the UTP termination blocks specified below.
   b. Jacks shall allow the insertion of 4 and 6 pin plugs as well as 8 pin plugs or RG6 - Coax connectors. Metal faceplates specified for all wiring devices. Each faceplate shall have provisions for inserting colored tabs to provide use identification for each jack
5. UTP TERMINATION BLOCKS
   a. At the MDF and IDF closets, all UTP cables shall be terminated on rack mounted two (2) "U" 48 -port patch panels and terminating blocks meeting EIA/TIA 568 specifications for EIA Category 6 UTP. These terminating blocks shall be used for MDFS, IDFs and all UTP cross-connect requirements. They shall allow termination of cables as well as the capability of connecting pre-assembled single pair and composite 4-pair patch cords. Termination blocks to be used for terminating outside plant cables shall be equipped with gas discharge protection units.
   b. The blocks shall be equipped with designation strips and color coded for terminating sets of four pairs of wires in accordance with ICEA specifications.
   c. Cable tie wraps shall be included to neatly route, store and organize the termination cables.
6. INSIDE FIBER
   a. All fiber optic cables shall comply with the FDDI specifications published in ANSI Standard. The cables shall also comply with EIA and the FOTP specifications. The fibers in the cable shall conform to the industry standard color coding as specified by EIA. The outer jacket shall have markings indicating that it is a fiber optic cable. Other markings shall be core size and mode.
   b. Unless specified otherwise, all fiber optic cables shall be a minimum of twelve (12) strands.
   c. Fiber optic cable shall be armored riser cable, multi-mode, complete with flame retardant jacket.

d. Cables shall be NEC OFNR listed and compliant to UL-1666, CSA FT-4, and ICEA S-83-596 standards.

7. FIBER CONNECTORS
   a. All fiber optic cables shall be terminated on connectors installed on rack mounted patch panels. The connectors shall be of the Type LC as defined in the EIA 568 or ANSI FDDI standards, constructed of ceramic or metal/ceramic materials. Plastic connectors shall not be used.
   b. The connector design shall incorporate strain relief such that it can withstand pulling, bending or twisting of the cable during installation and removal without affecting its operating characteristics.
   c. The connectors shall conform to all applicable EIA specifications for attenuation, durability, tensile strength, thermal shock, temperature cycling, humidity, impact, etc.
   d. Provide and install all fiber patch cords complete with LC connectors at both ends. Patch cords shall be 3-meters in length.
8. TYPE LC TERMINATING OUTLETS
   a. The connectors and adapters shall conform to specifications as outlined for connectors.
9. FIBER OPTIC SPLICES
   a. All fiber optic cables shall be installed in continuous lengths without splices. If splicing is required for extra long distances, the splices shall be constructed by fusion and offer an attenuation of no more than 0.2 dB per splice. Mechanical splices are not permitted. All splices shall be stored neatly in splice boxes that allow easy access for maintenance and testing.
10. FIBER TERMINATION PANELS AND ADAPTERS
   a. The fiber optic cables shall be terminated in Type LC connectors. The terminated fibers shall be inserted in Type LC or equivalent fiber optic couplings /adapters/barrels mounted on rack mounted termination panels/enclosures. The panels shall be of metal construction with the capability of neatly storing excess fiber lengths and providing protection from dust and dirt. The panels shall allow ease of access to and maintenance of fibers.
   b. The panels shall allow cables to be installed and stored such that they do not alter the attenuation of the cables (as may happen when the fibers are tightly coiled or the fiber is excessively bent at the connector strain relief). The adapters shall be metal, of the same manufacture as the connectors and shall introduce a loss of no more than 0.1 dB when two connectors are installed in it.
11. EQUIPMENT RACKS
   a. Each closet shall be equipped with an EIA standard heavy-duty steel 4-post 19-inch equipment racks. Each rack shall be free standing with holes for anchoring it to the floor. They shall be 72 inches high and tapped with mounting holes of 19 inches in width. Provide vertical wire management system on each side of the rack.
12. UTP CABLES AND PATCH CORDS COLOR CODING
   a. Wireless access points - white.
   b. All other ethernet - blue.

PART 3 - EXECUTION

3.1 PAIR IDENTIFICATION

A. The following room recording procedure shall be completed after each wire or cable has been pulled:

1. Terminations: Telephone station cables, CATV station cables and data station cables shall be tagged at backboards with cable tags indicating telephone or data and marked with room number to which it is connected. In rooms where more than one jack exists, the jacks are to be numbered sequentially, and indicated on the cable tag. The outlet number shall also be indicated on the faceplate of the jack.
   a. Each pair terminated shall be legibly labeled on the terminal blocks according to the room number and jack with which it is associated.
   b. Each station wire shall be plainly marked at its backboard end with the room number to which it is connected and terminated on the Type 110 termination blocks.
   c. All cables will be legibly and permanently numbered at each end. String tags are not acceptable.

3.2 UTP NETWORK

A. The UTP network consist of the following elements:

1. Outside Plant
2. Inside Plant - Riser and Horizontal
3. Wall Plates
4. Patch Cables

3.3 CABLE INSTALLATION

A. The contractor shall optimize cable utilization by designing splice points. All cable splices and cable routed through manholes shall be supported on cable racks.

3.4 INSIDE

A. The cables in the risers and closets shall be neatly bundled and tie wrapped. Cable trays shall be provided and installed where necessary, especially between the backboards and equipment racks, and the backboard and the horizontal pathways. Cables traversing the vertical paths shall be anchored to the wall. The method and means of running horizontal cable distribution will vary. Each duplex wall outlet shall have a conduit that runs in the wall from that outlet to the wire closet. Thus, the 4-pair horizontal cable runs shall emanate at the wall outlets, run along the wall conduit, and terminate at the voice or data patch panel in the wire closet.

B. All cables shall be labeled and color coded in accordance with the EIA 606 standard.

3.5 HORIZONTAL RUNS

A. The wall outlets are of three types: voice, data. The voice outlets shall be connected to the voice cross-connect panels in the wire closets. The data outlets are identified by the keyed slot and they shall be connected to the data cross-connect panels in the wire closets. The voice and data cross- connect panels are so identified on the closet drawings. The wall outlets shall be wired in accordance with EIA T568B configuration. At each wall outlet, 18 inches of wire shall be allowed spare for future changes.

B. Since the cables to be terminated shall be of EIA Category 6 quality, all terminations shall ensure minimum of untwisting at the connections. The length of wire shall be untwisted only to the extent necessary for making the connection. Both the cross-connect panels and the wall outlets are of type 110. These allow the twists to be maintained to the point of termination. Also, the cable slots between the index strips provide space to maintain cable shield to the point of termination.

C. All terminations on the cross-connect panels shall be labeled and color coded in accordance with industry standards as specified by EIA. All terminations, cables and panels shall be identified and labeled in accordance with EIA 606.

3.6 TESTING

A. All conductors in every cable shall be tested end-to-end to prove that they meet the cable specifications described in EIA standards and this document. The tests shall be conducted in the presence of a Telecommunications Specialist. All tests shall be completed first before any corrective action is taken. Corrected conductors shall be tested again. The Telecommunications Specialist reserves the right to request that the conductors passing the previous tests be tested again after corrective action has been taken on the faulty conductors. Conductors not passing the tests shall also be documented together with the corrective action taken. Test results shall be documented and supplied before the installation is considered for acceptance.

B. The following tests shall be conducted as a minimum:

1. Compliance with color coding
2. Tip and ring polarity
3. Neatness of cable routing and tie downs
4. Continuity
5. Shorts, grounds and opens
6. Crosses (shorts to other pairs)
7. Rolls (reversed polarity)
8. Splits

3.7 ACCEPTANCE TESTING

A. When the Contractor has completed all cable installation and termination, and he is ready for testing, he shall inform the Architect/Engineer of the intent. The Architect/Engineer shall assign the Telecommunications Specialist who shall monitor the Contractor testing. The Architect/Engineer has the authority to accept or reject any test and request, and, at his discretion, complete retesting of any portion of the plant if there are an unreasonable number of pairs not passing tests indicated above. The Architect/Engineer may request the Contractor to replace any portion of the plant if the tests indicate faulty or improper installation, or numerous repairs are necessary to pass the tests. The plant shall be accepted by the Architect/Engineer after the Contractor has demonstrated that all the pairs have passed all the tests, all the tests have been documented, the plant is labeled and recorded, and all plant records have been provided in accordance with the requirements of the Documentation Sub-Section later in this document. The Contractor shall comply with any and all warranties required by the general contract agreement with the Architect/Engineer.

3.8 RECEIVING FIBER OPTIC CABLES

A. Before commencing installation, the Contractor shall inspect and test the cables on the reel. The reels shall be accompanied by manufacturer’s test report for that particular glass strand and cable indicating such parameters as the attenuation and bandwidth. The Contractor shall at a minimum perform attenuation, break/kink and length verification tests on each strand on the reel with the aid of an OTDR. A printout of the test for each fiber shall be generated and submitted for records. A five-foot section of the cable shall be stripped back and inspected for consistency of manufacture of the jacket, buffer, plastic coating, etc. An inspection and test report shall be provided. Installation shall only proceed after the test documentation has been submitted and the cables have been accepted for installation by a telecommunication specialist.

3.9 INSTALLATION OF FIBER OPTIC CABLES

A. The installation plan shall describe the approach that the Contractor plans to take in installing the fiber optic cables. Some of the typical factors are:

1. Supervisory and technical staff contingent and qualifications
2. Testing the ducts before installation
3. Use of mechanical devices
4. Pulling Force
5. Manhole organization - laying on cable racks and loops of extra cable, etc.

B. All outside fiber optic cables shall be installed in inner ducts and prominently labeled with “caution, glass fiber cables” or equivalent, at six foot intervals wherever the cables are exposed to view. Inside cables shall be installed in inner ducts only where installation is in conduits. Open trays do not require inner ducts. Unwound cables shall be placed in figure 8 configurations when they are not on the reels. When a cable is installed, the pulling tension shall be minimal, less than the manufacturer’s recommended tension. The cable on the reel shall be unwound such that there is no tension on the cable. The cable shall either be unwound manually, or by any mechanical means that turns the wheel as opposed to pulling the cable. The cable shall be hand-fed over or around any curves, bends or edges without scrapes or bends in the cable. Strain reliefs or supports shall be provided where necessary, such as in manholes or vertical risers.

C. At each end of the cable a minimum of ten feet of service loop cable shall be allowed for termination and future use. All excess cable shall be neatly stored out of harm’s way.

3.10 TERMINATIONS OF FIBER OPTIC CABLE

A. Both single mode and multi-mode-cables are to be installed. Both these types of cables shall be terminated in LC type connectors. However, the two cable types shall be connected on separate fiber patch panels. Proper procedures shall be followed and the right tools used for terminating the fibers in the connectors. Below are examples of precautions and procedures which shall be conformed to:

1. The tool used for stripping the fiber shall conform to the size of the fiber being stripped and shall leave no nicks on the fiber; the stripping shall be effortless and, for example, not require looping of the fiber around the finger for gripping.
2. If crimping is required, the appropriate size apertures on the tool shall be selected.
3. The jacket material remaining after stripping shall be removed by dissolving in chemicals and not by scraping.
4. If the connector required adhesives or epoxy for fastening the fiber to the connector, the material shall be injected in the connector such that it oozes out, displacing all the air from the space to be occupied by the fiber.
5. While seating the fiber in the adhesive filled connector, no air bubbles shall be introduced, such as by inserting and re-inserting the fiber. The fiber protruding from the connector ferrule shall have a small bead formed at its base.
6. The scribe tool used for preparing the excess fiber for removal shall be of high quality and sharp so as not to shatter the glass fiber. The scribed fiber shall be pulled rather than snapped.
7. Heat guns or hot-air blowers shall not be used for curing.
8. Heat shrink tubing shall not be used.
9. A minimum of three types of polishing paper shall be used (changing them often).
10. Polishing shall be performed using the figure 8 routine, creating a spherical polished end profile; a recessed profile shall be rejected.

11. The quality of the polish end shall be inspected using a microscope with a minimum magnification of 200x.
12. All finished terminations shall be covered with boots at all times; similarly, all adapters shall also be covered with boots.
13. Strands of fiber from loose tube cables shall be sheathed in protective fan-out tubing or spiral from the point the fiber leaves the cable to the point where it is terminated on a connector. All gel or waterproofing compounds shall have been cleaned off.
14. The terminations shall be sequentially numbered in synchronization with the color code. The terminations and cables shall be labeled to clearly describe the location at the other end.

3.11 TESTING OF FIBER OPTIC CABLE

A. All tests shall be conducted at 1300 mn.

B. The cable shall be tested on the reels with the OTDR before beginning installation.

C. The fibers shall be tested with the OTDR after the cables have been pulled and the ends dressed for termination. A paper trace of the test shall be provided for each fiber. Evidence of kinked or otherwise damaged fibers shall be cause for replacement of the entire cable.

D. Termination of the fiber on connectors shall only commence after OTDR traces have been approved by the Architect/Engineer and the cable accepted for termination. The terminated fibers shall be tested using the power meter. The OTDR - and power meter tests shall be performed from both ends using calibrated adapters and connectors.

E. Reference measurements of the power receivers shall be checked frequently. Any deviation of 0.1 dB or more shall be cause for retesting the fibers that were tested with that reference.

F. All test equipment, especially the OTDR and the power meter shall have been calibrated by the manufacturer or an accredited test facility within six months prior to beginning the tests on site.

G. Acceptance Testing. When the Contractor has completed all cable installation and termination, and he is ready for testing, he shall inform the Contracting Officer of the intent. The Contracting Officer has the authority to accept or reject any test and request, and at his discretion, complete retesting of any portion of the plant if there are an unreasonable number of fibers not passing tests indicated above. The Contracting Officer may request the Contractor to replace any portion of the plant if the tests indicate faulty or improper installation, or excessive re-work is necessary to pass the tests. The plant shall be accepted by the Contracting Officer after the Contractor has demonstrated that all the fibers have passed all the tests, all the tests have been documented, the plant is labeled and recorded, and all plant records have been provided in accordance with the requirements of Documentation, Section 3.4 later in this document. The Contractor shall comply with any and all warranties required by the general contract agreement with the Contracting Officer.

3.12 GROUNDING

A. The buildings shall be equipped with central point grounding schemes. A master ground bar shall be installed at the MDF. Ground window bars shall be installed at the IDF in every other closet. All cables with metallic elements and all metallic hardware shall be grounded in accordance with REA Section 810 and EIAMA PN-2327 grounding specifications for telecommunications.

3.13 DOCUMENTATION

A. The Contractor shall provide two sets of documents. One set shall provide a record of all the tests conducted on cables, terminations, etc. Another set shall depict all the telecommunications wiring and cabling installation, within and to the building.

3.14 TEST DOCUMENTATION

A. Test records shall be provided for the following tests:

1. UTP, Terminations
   a. Manufacturing test results
   b. Outside plant cables
   c. Horizontal cables
2. Fiber
   a. Manufacturing test results
   b. Outside plant fibers - OTDR before and after installation
   c. Fiber terminations - power meter tests

3.15 RECORD DOCUMENTATION

A. After all installations have been completed and tested, the Contractor shall provide records of the installation in accordance with EIA/TIA Standard 606. The records shall be required in hard copy format printed from a software such as Cable Management Systems by Microtest (CMS). CMS is a commercially available off-the-shelf software designed specifically for cable installation records. The Contractor shall supply the software and the records using the software to one FWS technician.

B. As described in the EIA standard, the following types of records shall be supplied:

1. Fiber, voice and data terminations located in work areas, telecommunications closets, equipment rooms and entrance facilities.
2. Telecommunications media between terminals (horizontal distribution).
3. Pathways between terminations that contain the media.
4. Spaces where terminations are located.
5. Bonding/grounding as it applies to telecommunications.

C. All the elements of the telecommunications infrastructure shall be identified and labeled by a code. The coding method to be used shall be as specified in the EIA 66 standard. On the following page is a representative list reproduced from the standard (xxx denotes a numerical designation).

CODE	DESCRIPTION
BCxxx	Bonding Conductor
BCDxxx	Backbone Conduit
Cxxx	Cable
CBxxx	Backbone Cable
CDxxx	Conduit
CTxxx	Cable Tray
ECxxx	Equipment (bonding) conductor

EFxxx	Entrance Facility
ERxxx	Equipment Room
Fxxx	Fiber
HHxxx	Hand Hole
ICxxx	Intermediate Cross-Connect (IDF)
Jxxx	Jack (Outlet)
MCxxx	Main-Cross-connect (MDF)
MHxx	Man hole or maintenance hole
PHxxx	Pull Box
Sxxx	Splice
SExxx	Service Entrance
SLxxx	Sleeve
TCxxx	Telecommunications Closet
TGBxxx	Telecommunications grounding busbar
TMGB	Telecommunications main grounding busbar
WAxxx	Work Area

3.16 MAINTENANCE CONSIDERATIONS

A. The cable installation shall be installed to maximize the safety, maintainability, and performance effectiveness of maintenance personnel, and shall minimize demands upon skills, training and manpower. Splices/terminations shall be placed and supported so as to maximize the efficiency and ease with which it can be maintained and shall ensure accessibility.

3.17 CABLE TESTS

A. Contractor shall perform testing of all pairs for each cable installed as directed by these specifications. Post construction cable acceptance tests consist of conductor continuity tests, and conductor insulation resistance tests. These tests assure that the cable has been terminated properly and has not been damaged during construction. An Owner's representative will be required to witness these tests.

B. Each cable pair shall be tested for shorts (T to R and T&R to ground), continuity, and loop resistance. Maximum loop resistance from the main telephone/data panel to each jack shall be within 5% of the calculated value based on the actual length of cable installed, and the loop ohms/1000 ft. for copper conductors.

3.18 DEFECTIVE CABLE PAIRS

A. The vendor shall test all cable pairs and shall record, on the pair assignment record, the nature of the defect for each pair found to be defective and remedies used to clear the

defect. In order for the cable distribution system to be considered acceptable, there shall be no defective pairs in any cable. Any cable having defective pairs shall not be used and shall be replaced at Contractor's expense.

3.19 INSPECTIONS

A. Routine on-site construction inspections by the Architect/Engineer and/or an Owner’s representative will involve trips to the complex to inspect construction, so as to assure adherence to standard construction practices. The number of such inspections will be at the Architect/Engineer's discretion.

3.20 ACCEPTANCE

A. The project shall be considered acceptable based upon the following:
   1. Contractor has furnished and installed all equipment and materials and performed all work in accordance with these specifications.
   2. Contractor has successfully completed all the required testing assuring compliance with the required specifications.
   3. Contractor has removed all trash and debris by contractor from the area and restored site to original condition.
   4. Contractor has submitted the required documentation to state officials.

END OF SECTION 28 05 13

SECTION 28 31 11 - INTELLIGENT REPORTING FIRE DETECTION SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION:

A. This section of the specification includes the furnishing, installation, and connection of new devices connecting to existing Siemens fire alarm control panel located in the main office lobby.

B. The installing company shall employ NICET (minimum Level III Fire Alarm Technology) technicians on site to guide the installation and final check-out and to ensure the systems integrity.

1.2 SUBMITTALS

A. General:

1. One printed copy of all submittals shall be submitted to the Architect/Engineer for review.
2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent compatible UL-listed equipment from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.
3. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

B. Shop Drawings:

1. Contractor shall be responsible for submitting a minimum of one (1) printed copy of all submittals to the Architect/Engineer for review. The Architect/Engineer will review the submittal and scan the reviewed submittal after the shop drawing review stamp has been applied. A pdf file of the reviewed submittal will be returned to the contractor. If the submittal is Noted as “APPEARS TO COMPLY” the contractor shall forward the pdf file to the State Fire Marshal’s office for their review.
2. No payment will be made to the contractor for any fire alarm system work until submittal is forwarded to the AHJ for approval.
3. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality.
4. All submittals to the Architect/Engineer shall include all items as called for in the 2019 edition of NFPA 72: 7.2.1, 7.3.1, 7.3.2, 7.3.4.2, 7.4 and the following as a minimum:

    a. System Riser Diagram - include all devices and components of the system by zone, group or individual device. Each device shall be labeled indicating location in the facility.
    b. Submittal shall include a master list of all components and equipment to be installed as part of the system. List shall include manufacturer, model number, size, voltage and quantity of each component.
    c. System Wiring Diagram - Include diagrams for equipment and for system with all terminals and interconnections identified. Make all diagrams specific to this project and distinguish between field and factory wiring.

d. System Component Data Sheets - Indicating current draw-in alarm mode and in standby mode. Also submit component data sheets to indicate UL compatibility with system and compatibility with rest of system. Indicate all applicable data by highlighting on ALL submittal booklets.
e. Zone Designations, group(s) or individual device(s).
f. Battery Load Calculations for sizing battery for sixty (60) hours of continuous system operation in standby mode followed by five (5) minutes of continuous full evacuation alarm condition (fifteen (15) minutes of continuous full evacuation alarm if a voice evacuation alarm system is present in the system.) Calculations shall be on equipment manufacturer's standard form and shall clearly indicate capacity of batteries proposed to be installed.
g. Master list of system components by model number, description and quantity of each.
h. Shop Drawings showing details of graphic annunciator
i. Device Address List
j. Annunciator Lay-out, configurations.
k. Review Application - Contractor's portion completed
l. Review Application Fee - If Required
m. Blueline or Xerox copies of plans complying with the following criteria:
    1) Drawn to scale
    2) Identify each room or area
    3) Show all system components, identifying each
    4) Show all exits, door swings, ceiling height, light fixtures, exit lights (with direction arrows), HVAC openings in ceilings, whether ceilings are sloped or flat, and show all projections 0’-4” below ceilings
    5) Shall not have Architect’s/Engineer’s titlebox and/or professional stamp
    6) No markings showing additions, deletions or revisions after copies are made
    7) Highlight in yellow or blue all system components
    8) Proposed conductor routings
n. Statement on type of system - must be one of the following:
    1) Local
    2) Auxiliary
    3) Remote Station
    4) Proprietary
o. Description of this project’s specific Sequence of Operation.
p. Description of wiring.

q. Designation of type
r. Color of insulation
s. Notifications appliance circuits shall be designed so that the maximum load on the circuit does not exceed eighty (80) percent of that available for alarm notification.

5. Manufacturer's certificate certifying supplier is an authorized factory representative along with mileage distance of office to job site.
6. Certificate showing that supplier/installer is licensed by the State Fire Marshal's Office to install, modify and maintain fire detection and alarm system.
7. Be aware that State Fire Marshal requirements do not allow work to occur on any portion of the fire alarm system prior to receipt of their approval on shop drawings.

C. Manuals:

1. Submit simultaneously with the shop drawings, complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets.
2. Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.
3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.

D. Software Modifications:

1. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4 hours.
2. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power-down of the system or loss of system fire protection while modifications are being made.

E. Certifications:

1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of the installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.3 GUARANTEE

A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

1.4 MAINTENANCE:

A. Maintenance and testing shall be as specified herein or as required by the local AHJ where more stringent. A preventive maintenance schedule shall be provided by the contractor describing the protocol for preventive maintenance. The schedule shall include:
1. Systematic examination, adjustment and cleaning of all detectors, manual fire alarm stations, control panels, power supplies, relays, waterflow switches and all accessories of the fire alarm system.
2. Each circuit in the fire alarm system shall be tested semiannually.
3. Each smoke detector shall be tested in accordance with the requirements of NFPA 72 Chapter 14.

B. As part of the bid/proposal, include a quote for a maintenance contract to provide all maintenance, tests, and repairs described below. Include also a quote for unscheduled maintenance/repairs, including hourly rates for technicians trained on this equipment and

response travel costs for each year of the maintenance period. Submittals that do not identify all post contract maintenance costs will not be accepted. Rates and costs shall be valid for the period of five (5) years after expiration of the guaranty.

1.5 APPLICABLE STANDARDS AND SPECIFICATIONS:

A. The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards, if applicable.

1. National Fire Protection Association (NFPA) - USA:
   a. No. 70 National Electric Code (NEC)
   b. No. 72 National Fire Alarm Code
   c. No. 101 Life Safety Code
2. Underwriters Laboratories (UL) – USA
   a. No. 38 Manually Actuated Signaling Boxes
   b. No. 217 Smoke Detectors, Single and Multiple Station
   c. No. 228 Door Closers–Holders for Fire Protective Signaling Systems
   d. No. 268 Smoke Detectors for Fire Protective Signaling Systems
   e. No. 268A Smoke Detectors for Duct Applications
   f. No. 346 Waterflow Indicators for Fire Protective Signaling Systems
   g. No. 464 Audible Signaling Appliances
   h. No. 521 Heat Detectors for Fire Protective Signaling Systems
   i. No. 864 Control Units for Fire Protective Signaling Systems
   j. No. 1481 Power Supplies for Fire Protective Signaling Systems
   k. No. 1610 Central Station Burglar Alarm Units
   l. No. 1638 Visual Signaling Appliances
   m. No. 1971 Visual Signaling Appliances
   n. No. 2017 General-Purpose Signaling Devices and Systems
   o. CAN/ULC S524-01 Standard for Installation of Fire Alarm Systems
      1) The FACP shall be ANSI 864, 9th Edition Listed. Systems listed to ANSI 864, 8th edition (or previous revisions) shall not be accepted.

B. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.

C. Local and State Building Codes including the International Building Code.

D. All requirements of the Authority Having Jurisdiction (AHJ).

1.6 APPROVALS:

A. The system shall have proper listing and/or approval from the following nationally recognized agencies:

1. UL Underwriters Laboratories, Inc.
2. FM Factory Mutual
3. MEA Material Equipment Acceptance (NYC)

B. The fire alarm control panel shall meet UL Standard 864, (Control Units) and UL Standard 1076 (Proprietary Burglar Alarm Systems).

C. The system shall be listed by the national agencies as suitable for extinguishing release applications

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIAL, GENERAL:

A. All equipment and components shall be new, and the manufacturer's current model. Models which are scheduled for obsolescence with the next twelve (12) months shall not be accepted. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protective signaling system, meeting the National Fire Alarm Code.

B. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.

C. All Equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

2.2 CONDUIT AND WIRE:

A. Conduit:

1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.
2. All wiring shall be installed using conduit in un-accessible spaces, and/or where exposed and j-hooks in accessible spaces.
3. Cable must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760-29.
4. Wiring for 24 volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
5. Conduits shall not enter the Fire Alarm Control Panel, or any other remotely mounted Control Panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.
6. Conduit shall be 3/4 inch (19.1 mm) minimum.
7. All fire alarm system junction boxes shall be painted red in color with the word “FIRE” painted in white 1" high letters painted on each junction box cover.
8. All fire alarm system junction boxes shall be painted with the word “FIRE”, painted in white 1" high letters painted on each junction box cover.

B. Wire:

1. All fire alarm system wiring shall be new.
2. The Signaling Line Circuit (SLC) and Data Communication Bus (S-BUS) shall be wired with standard NEC 760 compliant wiring, no twisted, shielded or mid capacitance wiring is required for standard installations. All FACP screw terminals shall be able to accept 12-18 AWG wire. All system wiring shall be in accordance with the requirements of NFPA 70, the National Electrical Code (NEC) and comply with article 760 of the NEC.
3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
4. All field wiring shall be completely supervised.

C. Terminal Boxes, Junction Boxes and Cabinets:

1. All boxes and cabinets shall be UL listed for their use and purpose.

D. Initiating circuits shall be arranged to serve like categories (manual, smoke, water flow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.

E. The Fire Alarm Control Panel and all remote power supply units shall be connected to a separate dedicated branch circuit, maximum 20 amperes. The circuit breaker protecting this circuit shall be of the locking type. This circuit shall be labeled at the Main Power Distribution Panel as FIRE ALARM and locked in the “ON” position. Fire Alarm Control Panel Primary Power wiring shall be 12 AWG. The Control Panel Cabinet shall be grounded securely to either a cold water pipe or grounding rod.

2.3 SYSTEM COMPONENTS

A. Programmable Electronic Sounders:

1. Electronic sounders shall operate on 24 VDC nominal.
2. Electronic sounders shall be field programmable without the use of special tools, at a sound level of at least 90 dBA measured at 10 feet from the device.
3. Shall be flush or surface mounted as shown on plans.
4. Where shown to be installed outside, device shall be of the weatherproof design.
5. Where installed surface mounted, provide factory backbox and/or backbox skirt so that edge of device does not overhang installation box.

B. Speakers:

1. All speakers shall operate on 25 VRMS or with field selectable output taps from 0.5 to 2.0 Watts.
2. Speakers in corridors and public spaces shall produce a nominal sound output of 84 dBA at 10 feet (3m).
3. Frequency response shall be a minimum of 400 HZ to 4000 HZ.
4. The back of each speaker shall be sealed to protect the speaker cone from damage and dust.
5. Where shown to be installed outside, device shall be of the weatherproof design.
6. Where installed surface mounted, provide factory backbox and/or backbox skirt so that edge of device does not overhang installation box.

C. Strobe lights shall meet the requirements of the ADA, UL Standard 1971, be fully synchronized, and shall meet the following criteria:

1. The maximum pulse duration shall be 2/10 of one second.
2. Strobe intensity shall meet the requirements of UL 1971.
3. The flash rate shall meet the requirements of UL 1971.
4. Where shown to be installed outside, device shall be of the weatherproof design.
5. Where installed surface mounted, provide factory backbox and/or backbox skirt so that edge of device does not overhang installation box.

D. All interfaces and associated equipment are to be protected so that they will not be affected by voltage surges or line transients consistent with UL standard 864.

2.4 SYSTEM COMPONENTS - ADDRESSABLE DEVICES

A. Addressable Devices - General

1. Addressable devices shall use simple to install and maintain decade, decimal address switches. Devices shall be capable of being set to an address in a range of 001 to 251.
2. Addressable devices, which use a binary-coded address setting method, such as a DIP-switch, are not an allowable substitute.
3. Detectors shall be intelligent (analog) and addressable, and shall connect with two wires to the fire alarm control panel Signaling Line Circuits.
4. Addressable smoke and thermal detectors shall provide dual alarm and power/polling LEDs. Both LEDs shall flash green under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady red illumination by the control panel, indicating that an alarm condition has been detected. If required, the LED flash shall have the ability to be removed from the system program. An output connection shall also be provided in the base to connect an external remote alarm LED.
5. The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system. The panel on a time-of-day basis shall automatically adjust sensitivity.
6. Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 17.
7. The detectors shall be ceiling-mount and shall include a separate twist-lock base with tamper proof feature. Bases shall include a sounder base with a built-in (local) sounder rated at 85 DBA minimum, a relay base and an isolator base designed for Style 7 applications.
8. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
9. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (ION, PHOTO, THERMAL).
10. Detectors will operate in an analog fashion, where the detector simply measures its designed environment variable and transmits an analog value to the FACP based on real-time measured values. The FACP software, not the detector, shall make the alarm/normal decision, thereby allowing the sensitivity of each detector to be set in the FACP program and allowing the system operator to view the current analog value of each detector.
11. Addressable devices shall store an internal identifying code that the control panel shall use to identify the type of device.
12. A magnetic test switch shall be provided to test detectors and modules. Detectors shall report an indication of an analog value reaching 100% of the alarm threshold.
13. Addressable modules shall mount in a 4-inch square (101.6 mm square), 2-1/8 inch (54 mm) deep electrical box. An optional surface mount Lexan enclosure shall be available.
14. Addressable devices installed outdoors, in non-conditioned spaces, and/or wet environments shall be listed weather/water-proof or have a listed weather proof covering.

B. Addressable Manual Fire Alarm Box (manual station)

1. Addressable manual fire alarm boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they

cannot be restored to normal use except by the use of a key. Manual stations shall be of the double action type.

2. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.
3. Manual fire alarm boxes shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches (44 mm) or larger.
4. All manual stations installed outdoors, in non-conditioned spaces and/or wet environments shall be installed with STI No. STI-3150-R weather stopper cover.
5. Surface mounted manual stations shall be complete with factory backbox such as the Notifier BG-2. Typical wiring device backboxes will not be accepted.

C. Intelligent Photoelectric Smoke Detector

1. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.

D. Intelligent Multi Criteria Acclimating Detector

1. The intelligent multi criteria Acclimate detector shall be an addressable device that is designed to monitor a minimum of photoelectric and thermal technologies in a single sensing device. The design shall include the ability to adapt to its environment by utilizing a built-in microprocessor to determine its environment and choose the appropriate sensing settings. The detector design shall allow a wide sensitivity window, no less than 1 to 4% per foot obscuration. This detector shall utilize advanced electronics that react to slow smoldering fires and thermal properties all within a single sensing device.
2. The microprocessor design shall be capable of selecting the appropriate sensitivity levels based on the environment type it is in (office, manufacturing, kitchen etc.) and then have the ability to automatically change the setting as the environment changes (as walls are moved or as the occupancy changes).
3. The intelligent multi criteria detection device shall include the ability to combine the signal of the thermal sensor with the signal of the photoelectric signal in an effort to react hastily in the event of a fire situation. It shall also include the inherent ability to distinguish between a fire condition and a false alarm condition by examining the characteristics of the thermal and smoke sensing chambers and comparing them to a database of actual fire and deceptive phenomena.

E. Intelligent Thermal Detectors

1. Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit.

F. Addressable Dry Contact Monitor Module

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the fire alarm control panel SLCs.
2. The IDC zone shall be suitable for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

3. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4 inch (70 mm) x 1-1/4 inch (31.7 mm) x 1/2 inch (12.7 mm). This version need not include Style D or an LED.

G. Two Wire Detector Monitor Module

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device).
2. The IDC zone may be wired for Class A or B (Style D or Style B) operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

H. Addressable Control Module

1. Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances.
2. The control module NAC may be wired for Style Z or Style Y (Class A/B) with up to 1 amp of inductive A/V signal, or 2 amps of resistive A/V signal operation.
3. Audio/visual power shall be provided by a separate supervised power circuit from the main fire alarm control panel or from a supervised UL listed remote power supply.
4. The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC.

I. Addressable Relay Module

1. Addressable Relay Modules shall be available for HVAC control and other building functions. The relay shall be form C and rated for a minimum of 2.0 Amps resistive or 1.0 Amps inductive. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.

J. Isolator Module

1. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC Class A or Class B branch. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC loop segment or branch. At least one isolator module shall be provided for each floor or protected zone of the building.
2. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.
3. The isolator module shall not require address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.
4. The isolator module shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

K. Surge Suppression

1. Provide and install Ditek No. 2MHLPB-WS on all initiating circuits entering/leaving the building. Provide and install devices in junction box concealed above accessible ceiling immediately at building exterior wall. Properly ground device per manufacturer's instructions.
2. Provide and install Ditek No. DTK-120SRD-A on all 120V circuits providing power to any and all fire alarm system components. Provide and install empty cabinet adjacent to respective fire alarm system (match fire alarm system device cabinet). Cabinet to house surge protection device.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.

B. All conduit, junction boxes, conduit supports, and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.

C. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

3.2 TEST

A. Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with NFPA 72, Chapter 14. Testing shall be personally supervised by NICET Level III Certified Personnel.

B. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

C. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.

D. Verify activation of all flow switches.

E. Open initiating device circuits and verify that the trouble signal actuates.

F. Open and short signaling line circuits and verify that the trouble signal actuates.

G. Open and short Notification Appliance Circuits and verify that trouble signal actuates.

H. Ground all circuits and verify response of trouble signals.

I. Check presence and audibility of tone at all alarm notification devices.

J. Check installation, supervision, and operation of all intelligent smoke detectors using the Walk Test.

K. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.

L. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

3.3 PROGRAM CODE

A. At the end of the project and prior to requesting substantial completion, the Contractor shall provide on CD-ROM a copy of the current program code for the system.

1. During program upload or download the system shall retain the capability for alarm reporting.
2. The system shall download to a PC for program editing. System program shall be stored on a CD-ROM and all programming shall be multi-level password protected. A duplicate-copy of the CD-ROM shall be turned over to the Owner's personnel prior to requesting substantial completion. All system passwords shall also be turned over to the Owner at this time.

3.4 SYSTEM TESTING

A. After installation of the Fire Detection and Alarm System is complete, the contractor shall align, adjust and balance the system and perform complete 100% operational testing as herein before described to determine conformance of the system to the requirements of the contract documents. Correct deficiencies observed in testing and replace malfunctioning or damaged items with new ones and retest until satisfactory performance and conditions are achieved. Record results using the fire alarm system printer of the testing and submit to the Engineer as part of the close-out documentation. Should the installation of a permanent printer not be part of the project, contractor shall provide and install a temporary printer and all required interface hardware, paper, toner (ink), software and programming to provide the required test reports. This temporary printer shall be available for printing test reports as required until final acceptance of the fire detection system has been issued by the engineer.

B. In addition to the testing requirements herein before specified, testing shall also include the following as a minimum:

1. Verify the absence of unwanted voltages between circuit conductors and the ground conductor(s).
2. Test all conductors for short circuits.
3. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on the record drawings.
4. Test each and every initiation and signaling device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.
5. Test both primary and secondary power sources for proper operation.
6. Test the system to ensure that all specified functions operate as specified. This includes all function switches and indications at all Fire Detection and Alarm System control and monitoring points.

C. In addition to the documentation required above the contractor shall provide completed copies of Forms 7.8.2(a) through 7.8.2(l) as included in the 2019 Edition of NFPA 72.

D. All documents shall be stored in a locked “Documentation Cabinet “. Cabinet size as required to hold all documentation for the system. Cabinet shall comply with the requirements of NFPA 72:7.7.2

3.5 FIRE MARSHAL'S CHECKOUT

A. Upon completing the entire installation of the Fire Detection and Alarm System, the Contractor shall perform a demonstration of the operation of the complete system in the presence of the Architect/Engineer. The above demonstrations shall encompass the work performed under this Contract. Any deficiencies found with the Fire Detection and Alarm System installed as part of this project shall be corrected with no additional expense to the Owner prior to demonstration to “Authority Having Jurisdiction (AHJ)”. After successful and accepted demonstration of the entire system to the Architect/Engineer, the Contractor shall schedule demonstration of the system with the Authority having Jurisdiction (AHJ).

B. The Contractor shall be responsible for coordinating this demonstration with the Architect/Engineer and “Authority Having Jurisdiction (AHJ)” a minimum of forty-eight (48) hours prior to the meeting.

3.6 CLOSE-OUT DOCUMENTATION

A. Upon successful completion of installation of the Fire Detection and Alarm System, the Contractor shall submit to the AHJ’s office through the Architect/Engineer, a copy of the Fire Alarm System Certifications and Description form as described and required in NFPA 72.

B. Contractor shall also label the Fire Detection and Alarm System as being certified by a Louisiana State Fire Marshal licensed contractor.

C. Equipment Manuals: As part of the equipment manual submittals, the Contractor shall include the following information as a minimum:

1. All information required to be submitted as part of the shop drawing submittal
2. Operation and Maintenance Manual
3. Device Address List
4. Record of field tests of the system including the 100% operational test.
5. Names, addresses, and telephone numbers of service department including nighttime and holiday access.

3.7 WARRANTY PERIOD REQUIRED WORK

A. Three (3) months after date of substantial completion of the entire system, the Contractor shall provide a complete checkout and calibration of entire Fire Detection and Alarm System. A detailed report of this checkout shall be immediately submitted to the Architect/Engineer for review and acceptance.

B. When requested by the owner within one (1) year of date of Substantial Completion, the contractor shall provide on-site assistance in adjusting sound levels, controls, and sensitivities to suit actual occupied conditions. Provide up to three (3) requested adjustment visits to the site for this purpose.

C. At a period between eleven (11) and twelve (12) months from the date of substantial completion, contractor shall provide complete checkout and calibration of entire Fire Detection and Alarm System and shall certify the system as being fully operational.

3.8 TRAINING

A. Contractor shall provide one (1) on-site training session with a minimum of four (4) hours of instructions on system operation to Owner's representative(s) upon completion of construction phase of the work. Contractor shall conduct instruction session prior to use by the Owner or requesting substantial completion.

B. Contractor shall submit to the Engineer through the Architect, a sign-in sheet with the instructor's signature and signatures of all persons present during the instructional session. The sign-in sheet shall indicate time of instruction session. This sheet shall be submitted prior to use by the Owner or requesting substantial completion. Training session shall be requested in writing to the Engineer a minimum of seven (7) consecutive calendar days prior to time requested.

C. Items to instruct the Owner's personnel on include startup, shutdown, troubleshooting, servicing, adjusting, and preventive maintenance.

D. At the same time as the three (3) month check-out and calibration listed above, the contractor shall also provide one (1) additional training session consisting of a maximum of four (4) hours for owner's personnel. Sign-in sheets shall be submitted as hereinbefore specified. This session shall also be scheduled a minimum of seven (7) consecutive calendar days prior to requested time.

END OF SECTION 28 31 11

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks, and pavements.
3. Excavating and backfilling for buildings and structures.
4. Subbase course for concrete walks and pavements.
5. Subsurface drainage backfill for walls and trenches.
6. Excavating and backfilling trenches for utilities and pits for buried utility structures.
7. Work identified in S series drawings (only)

B. Related Requirements:

1. Section 033000 “Cast-in-Place Concrete”

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe. Commercially available as “610 Roadbase”.

C. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

D. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as

remedial work directed by Engineer, shall be without additional compensation or contract time.

E. Fill: Soil materials used to raise existing grades.

F. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

G. Subbase Course: Aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete walk. Commercially available as "610 Roadbase".

H. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase or topsoil materials.

I. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct pre-excavation conference at **Project site**.

1. Review methods and procedures related to earthmoving, including, but not limited to, the following:

a. Personnel and equipment needed to make progress and avoid delays.
b. Coordination of Work with utility locator service.
c. Coordination of Work and equipment movement with the locations of tree- and plant-protection zones.
d. Extent of trenching by hand or with air spade.
e. Lime treatment of fill material
f. Field quality control.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Controlled low-strength material, including design mixture.

B. Material Test Reports: For each soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.
2. Laboratory compaction curve according to ASTM D 698.
3. For material proposed for treatment, provide material test reports prior to treatment.

C. Lime Treatment Material

1. Product information
2. Proposed application rate (i.e. – depth and quantity)

D. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

E. Photographic documentation positively identifying depth of excavation.

1.6 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving 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 Owner or authorities having jurisdiction.

B. Utility Locator Service: Notify utility locator service Louisiana One Call for area where Project is located before beginning earth-moving operations. If a SUE (subsurface utility engineering) survey has been performed for the project site, Contractor shall use this to assist with locating and avoiding subsurface improvements that are to remain or otherwise to be protected.

C. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials.

B. Satisfactory Soils: Lime-treated silty or sandy clay free of debris, waste, vegetation, and other deleterious matter.

1. Liquid Limit: 55 max prior to treatment, 30-42 after treatment
2. Plasticity Index: 35 or less prior to treatment; 12-22 after treatment

3. Lime Treatment:

a. Lime treatment material shall be either hydrated lime or granular quicklime conforming to ASTM C 977.
b. Application rate shall be 19 lbs of material (hydrated lime or granular quicklime) per square yard per 12” depth.
c. Properties, including soil properties prior to lime treatment, properties after lime treatment, and confirmation of lime application (i.e. – depth and quantity), shall be submitted for approval by Engineer prior to installation and shall be field verified by testing agency during mixing operations.
d. Lime treatment shall occur at the borrow pit – no on-site mixing will be permitted.

C. Unsatisfactory Soils: Any soils that do not satisfy the requirements for “Satisfactory Soils”.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content to at least 95% of the Standard Proctor maximum dry density at time of compaction.

D. Subbase Material and Bedding Course: Crushed stone conforming to the requirements of Section 1003.03.1 (stone) and 1003.03.2 (recycled Portland cement), of the Specifications in Part X of the Louisiana Standard Specifications for Roads and Bridges published by the Louisiana Department of Transportation and Development (LADOTD). Commercially available as “610 Roadbase”.

E. Sand: ASTM C 33; fine aggregate.

2.2 GEOTEXTILES

A. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications.

1. Manufacturers: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

a. Mirafi 600X by Tencate
b. Geotex 315ST by Propex Geosolutions
c. Alternate products meeting or exceeding the specifications of the above products will be considered; submit prior to bid submission.

2.3 CONTROLLED LOW-STRENGTH MATERIAL

A. Controlled Low-Strength Material: Self-compacting**,** low-density, flowable concrete material produced from the following:

1. Portland Cement: ASTM C 150, Type I or Type II.
2. Fly Ash: ASTM C 618, Class C or F.
3. Normal-Weight Aggregate: ASTM C 33, 1-inch nominal maximum aggregate size.
4. Water: ASTM C 94.
5. Air-Entraining Admixture: ASTM C 260.

B. Produce low-density, controlled low-strength material with the following physical properties:

1. As-Cast Unit Weight: 36 to 42 lb/cu. ft. at point of placement, when tested according to ASTM C 138/.
2. Compressive Strength: 80 psi, when tested according to ASTM C 495.

C. Produce conventional-weight, controlled low-strength material with 80-psi compressive strength when tested according to ASTM C 495.

2.4 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Provide dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades. No modification of contract amount or time will be awarded for unanticipated dewatering efforts, or otherwise for damage (and any required repairs and testing) caused by a lack of proper dewatering.

B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

D. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

E. Damage to the site, including subgrade and fill, sand and aggregate material and installed products, that are a result of degradation by precipitation, insufficient dewatering efforts, construction traffic, etc. as determined by the Engineer, will be repaired by the contractor, with no modification of contract amount or time. Repair efforts may include, but are not limited to, tilling, windrowing, scarifying, and drying the site until a satisfactory moisture content is achieved.

3.3 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include soil materials and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials, replace with satisfactory soil materials.

3.4 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.6 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.
4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trench Bottoms: Excavate trenches 6 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

3.7 SUBGRADE INSPECTION

A. Notify Engineer when excavations have reached required subgrade.

B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.
3. Proof-roll shall not be performed with any vehicle other than a tandem-axle dump truck.
4. Engineer reserves the right waive witnessing of the proof-roll and can direct testing agency to perform witnessing on his behalf.
5. Testing agency is not authorized to fail a proof-roll or otherwise provide any direction to the Contractor. Testing agency shall immediately contact the Engineer directly to discuss potentially unsatisfactory conditions observed during the proof-roll.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for **changes in the Work**.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.9 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.10 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 033000 "Cast-in-Place Concrete."

D. Backfill voids with satisfactory soil while removing shoring and bracing.

E. Initial Backfill:

1. Soil Backfill: Place and compact initial backfill of satisfactory soil to a height of 12 inches over the pipe or conduit.

a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

2. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the pipe or conduit. Coordinate backfilling with utilities testing.

F. Final Backfill:

1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
2. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

G. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.11 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material. "Bench" site as required to achieve slope this condition.

B. Place and compact fill material in layers to required elevations.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.12 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.13 COMPACTION OF SUBGRADE, SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than 95 percent of maximum dry unit weight according to ASTM D 698. Compact bedding and backfill materials at utility trenches to not less than 85 percent.

3.14 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.15 SUBBASE UNDER PAVEMENTS AND WALKS

A. Place subbase course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends. Prior to beginning installation, grade area to be covered smooth, remove any foreign materials and lumps of soil that would contaminate subbase course or interfere with installation of the geotextile.
2. Shape subbase course to required crown elevations and cross-slope grades.
3. Place subbase course 6 inches or less in compacted thickness in a single layer.
4. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
5. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 90 percent of maximum dry unit weight according to ASTM D 698.

3.16 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. Testing agency will test compaction of subbase and soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2937, and ASTM D 6938, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab but in no case fewer than three tests.
2. Trench Backfill: At each compacted bedding, initial backfill layer, and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.

D. Testing agency will positively identify and photographically document depths of excavations following satisfactory proof-roll and prior to installation of backfill.

E. Testing agency will positively identify and document thicknesses of layers of backfill and fill prior to compaction.

F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 33 10 00 – WATER DISTRIBUTION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes water-distribution piping and specialties outside the building for the following:

1. Water services
2. Fire-service mains

1.02 SUBMITTALS

A. Product Data: For the following:

1. Valves and accessories
2. Backflow preventers and assemblies
3. Fire department connections

B. Wiring Diagrams: Power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For the following:

1. Valves
2. Backflow preventers

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

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, and marked for intended use.

D. Comply with FM's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

E. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

F. NFPA Compliance:

1. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.04 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than two days in advance of proposed utility interruptions.

1.05 COORDINATION

A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product section:

1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.02 PIPING MATERIALS

A. Refer to Part 3 “Piping Applications” Article for applications of pipe, tube, fitting, and joining materials.

2.03 PIPE AND FITTINGS

A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint, bell- and plain-spigot end unless grooved or flanged ends are indicated.

1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
   a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

B. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.

1. Copper Fittings: ASME B16318, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.

C. PVC, AWWA Pipe: AWWA C900, Class 150, with bell end with gasket and spigot end.

1. Comply with UL 1285 for fire-service mains if indicated.

2. PVC Fabricated Fittings: AWWA C900, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.

3. PVC Molded Fittings: AWWA C907, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.

2.04 JOINING MATERIALS

A. Refer to Division 2 Section “Utility Materials” for commonly used joining materials.

B. Brazing Filler Metals: AWS A5.8, B Cup Series.

C. Soldering Flux: ASTM B 813, water-flushable type.

D. Solder Filler Metal: ASTM B 32, lead-free type with 0.20 percent maximum lead content.

2.05 VALVES

A. UL/FM, Cast-Iron Gate Valves:

1. Manufacturers:
   a. Central Sprinkler Company
   b. Crane Co.; Crane Valve Group; Stockham Div.
   c. Grinnell Corporation; Mueller Co.; Water Products Div.
   d. McWane, Inc.; Kennedy Valve Div.
   e. McWane, Inc.; M & H Valve Company Div.

B. UL/FM, Nonrising-Stem Gate Valves: UL 262, FM-approved iron body and bonnet with flange for indicator post, bronze seating material, and inside screw.

1. Minimum Working Pressure: 175psig.
2 End Connections: Flanged

2.06 VALVE ACCESSORIES AND SPECIALTIES

A. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering “WATER”, bottom section with base of size to fit over valve, and approximately 5-inch diameter barrel.

1. Operating Wrenches: Steel tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

B. Vertical-Type Indicator Posts: UL 789, FM-approved, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve.

2.07 BACKFLOW-PREVENTION DEVICES

A. Manufacturers:

1. Ames Co., Inc.
2. Cla-Val Co.
3. Grinnell Corporation; Mueller Co.; Hersey Meters
4. Watts Industries, Inc.; Water Products Div.
5. Zurn Industries, Inc.; Wilkins Div.

B. General: ASSE standard, backflow preventers.

1. Working Pressure: 150 psig minimum, unless otherwise indicated.
2. NPS 2 and Smaller: Bronze body with threaded ends.
3. NPS 2½ and Larger: Bronze, cast-iron, steel, or stainless-steel body with flanged ends.
   a. Interior Lining: AWWA C550 or FDA-approved, epoxy coating for backflow preventers having cast-iron or steel body.

4. Interior Components: Corrosion-resistant materials.
5. Exterior Finish: Polished chrome plate if used in chrome-plated piping system.

C. Reduced-Pressure-Principle Backflow Preventers: ASSE 1013 or AWWA C511, suitable for continuous pressure application. Include outside screw and yoke gate valves on inlet and outlet, and strainer on inlet; test cocks; and pressure-differential relief valve with ASME A112.1.2, air-gap fitting located between two positive-seating check valves.

1. Maximum Pressure Loss: 5 psig through middle 1/3 of flow range.

PART 3 - EXECUTION

3.01 PIPING APPLICATIONS

B. Refer to Division 2 Section “Earthwork” for excavating, trenching, and backfilling.

C. Underground Water-Service Piping: Use any of the following piping materials for each size range:

1. NPS 3/4 to NPS 2: Soft copper tube, Type L; wrought-copper fittings; and soldered joints.
2. NPS 2½ to NPS 4: Soft copper tube, Type L; wrought-copper fittings; and soldered joints.

D. Underground Fire-Service-Main Piping: Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.

3.02 VALVE APPLICATIONS

A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FM, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 and smaller installation.

B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Underground Valves, NPS 4 and Larger, for Indicator Posts: UL/FM, Cast-iron, nonrising-stem gate valves with indicator post.

3.03 JOINT CONSTRUCTION

A. See Division 2 Section “Utility Materials” for basic piping joint construction.

B. Make pipe joints according to the following:

1. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194
2. Copper Tubing Soldered Joints: ASTM B 828. Use flushable flux and lead-free solder.
3. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure. Refer to Division 2 Section “Utility Materials” for joining piping of dissimilar metals.

3.04 PIPING INSTALLATION

A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.

B. Comply with NFPA 24 for fire-service-main piping materials and installation.

C. Install copper tube and fittings according to CDA’s “Copper Tube Handbook”.

D. Install PVC, AWWA pipe according to AWWA M23 and ASTM F 645.

E. Bury piping with depth of cover over top at least 30 inches, with top at least 12 inches below level of maximum frost penetration.

F. Extend water-service piping and connect to water-supply source and building water piping systems at outside face of building wall in locations and pipe sizes indicated.

1. Terminate water-service piping at building wall until building water piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building water piping systems when those systems are installed.

G. Sleeves are specified in Division 2 Section “Utility Materials”, and Division 15 Section “Basic Mechanical Materials and Methods”.

H. Mechanical sleeve seals are specified in Division 15 Section “Basic Mechanical Materials and Methods”.

I. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

J. Anchor service-entry piping to building wall.

3.05 ANCHORAGE INSTALLATION

A. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:

1. Fire-Service-Main Piping: According to NFPA 24
2. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.06 VALVE INSTALLATION

A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

B. UL/FM Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.

3.07 BACKFLOW-PREVENTER INSTALLATION

A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.

B. Do not install backflow preventers with relief drain in vault or other space subject to flooding.

C. Do not install bypass piping around backflow preventers.

D. Support NPS 2½ and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

3.08 CONNECTIONS

A. Piping installation requirements are specified in other Division 2 Sections. Drawings indicate general arrangement of piping and specialties.

B. See Division 2 Section “Utility Materials” for piping connections to valves and equipment.

C. Connect water-distribution piping to interior domestic-water and fire-suppression piping.

D. Ground equipment according to Division 16 Section “Grounding and Bonding”.

3.09 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than 1½ times working pressure for 2 hours.

1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints.
Remake leaking joints with new materials and repeat test until leakage is within allowed limits. Test fire main at 200 psig for 2 hours.

C. Prepare reports of testing activities.

3.10 IDENTIFICATION

A. Install continuous underground detectable warning tape during backfilling of trench for underground water-service piping. Locate below finished grade, directly over piping. See Division 2 Section “Earthwork” for underground warning

tapes.

B. Permanently attach equipment nameplate or marker, indicating plastic water-service piping, on main electrical meter panel. See Division 2 Section “Utility Materials” for identifying devices.

3.11 CLEANING

A. Clean and disinfect water-distribution piping as follows:

1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or as described below:
   a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
   b. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
   c. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

B. Prepare reports of purging and disinfecting activities.

END OF SECTION 33 10 00

SECTION 33 30 00 – SANITARY SEWERAGE

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes gravity-flow, non-pressure sanitary sewerage outside the building, with the following components:

1. Clean-outs
2. Pre-cast concrete manholes.

1.02 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Non-pressure, Drainage-Piping Pressure Rating: 10-foot head of water.

1.03SUBMITTALS

A. Shop Drawings: For manholes. Include plans, elevations, sections, details, and frames and covers.

B. Coordination Drawings: Show pipe sizes, locations, and elevations.

C. Field quality-control test reports.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.02 PIPING MATERIALS

A. Refer to Part 3 “Piping Applications” Article for applications of pipe, fitting, and joining materials.

2.03 PVC PIPE AND FITTINGS

A. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D 3034, SDR 21, with bell-and-spigot ends for gasket joints with ASTM F 477, elastomeric seals.

2.04 NON-PRESSURE-TYPE PIPE COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground non-pressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:

1.. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
2. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC
3. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Unshielded, Flexible Couplings: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-

metal tension band and tightening mechanism on each end.

1. Manufacturers:
   a. Dallas Specialty & Mfg. Co.
   b. Fernco Inc.
   c. Plastic Oddities, Inc.

D. Shielded, Flexible Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

1. Manufacturers:
   a. Cascade Waterworks Mfg.
   b. Dallas Specialty & Mfg. Co.
   c. Mission Rubber Company; a division of MCP Industries, Inc.

E. Ring-Type, Flexible Couplings: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

1. Manufacturers:
   a. Fernco Inc.
   b. Logan Clay Products Company (The)
   c. Mission Rubber Company; a division of MCP Industries, Inc.

2.05 CLEAN-OUTS

A. Gray-Iron Clean-outs: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.

1. Manufacturers:
   a. Josam Company
   b. Smith, Jay R. Mfg. Co.
   c. Wade Div.; Tyler Pipe
   d. Watts Industries, Inc.
   e. Watts Industries, Inc.; Enpoco, Inc. Div.
   f. Zurn Specification Drainage Operation; Zurn Plumbing Products Group
2. Top-Loading Classification: Medium duty
3. Sewer Pipe Fitting and Riser to Clean-out: ASTM A 74, Service class, cast-iron soil pipe and fittings.

2.06 MANHOLES

A. Standard Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.

1. Diameter: 48 inches minimum, unless otherwise indicated.
2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
3. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slip or base section with integral floor.
4. Riser Sections: 4-inch minimum thickness, and of length to provide depth indicated.
5. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone size that matches grade rings.
6. Joint Sealant: ASTM C 990, bitumen or butyl rubber
7. Resilient Pipe Connectors: ASTM C 923, Cast or fitted into manhole walls, for each pipe connection

8. Steps: ASTM A 615/A 615M, deformed, ½-inch steel reinforcing rods encased in ASTM D 4101, PP steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
9. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover.
10. Manhole Frames and Covers: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange and 26-inch diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "SANITARY SEWER".
    a. Material: ASTM A 536, Grade 60-40-18 ductile iron, unless otherwise indicated.

2.07 CONCRETE

A. General: Cast-in-place concrete according to ACI 318/318R, ACI 350R, and the following:

1. Cement: ASTM C 150, Type II
2. Fine Aggregate: ASTM C 33, sand
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
    a. Invert Slope: 1 percent through manhole.
2. Benches: Concrete, sloped to drain into channel.
    a. Slope: 4 percent
3. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.
4. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain
5. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel

PART 3 - EXECUTION

3.01 PIPING APPLICATIONS

A. Pipe couplings and fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.

1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping, unless otherwise indicated.
    a. Shielded flexible couplings for same or minor difference OD pipes.
    b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
    c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

3.02 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and

arrangement of underground sanitary sewerage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. Install gravity-flow, non-pressure, drainage piping according to the following:

1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.
2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
3. Install piping below frost line.
4. Install hub-and-spigot, cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook".
5. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.

F. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.03 PIPE JOINT CONSTRUCTION

A. Basic piping joint construction is specified in Division 2 Section "Pipe Utilities - Basic Materials and Methods". Where specific joint construction is not indicated, follow piping manufacturer's written instructions.

B. Join gravity-flow, non-pressure, drainage piping according to the following:

1. Join hub-and-spigot, cast-iron piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
2. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.
3. Join ductile-iron, gravity sewer piping according to AWWA C600 for push-on joints.
4. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-gasket joints.
5. Join dissimilar pipe materials with non-pressure type, flexible couplings.

3.04 MANHOLE INSTALLATION

A. General: Install manholes complete with appurtenances and accessories indicated.

B. Install precast concrete manhole sections with sealants according to ASTM C 891.

C. Form continuous concrete channels and benches between inlets and outlets.

D. Set taps of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3

inches above finished surface elsewhere, unless otherwise indicated.

3.05 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

1. Use light-duty, top-loading classification cleanouts in earth or unpaved foot traffic areas.
2. Use medium-duty, top-loading classification cleanouts in paved foot traffic areas.
3. Use heavy-duty, top-loading classification cleanouts in vehicle traffic service areas.
4. Use extra-heavy-duty, top-loading classification cleanouts in roads.

B. Set cleanout frames and covers in earth in cast-in-place-concrete block, 18 by 19 by 12 inches deep. Set with tops above surrounding grade.

C. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.

3.06 CONNECTIONS

A. Connect non-pressure, gravity-flow drainage piping to building's sanitary building drains specified in Division 15 Section "Sanitary Waste and Vent Piping".

B. Make connections to existing piping and underground manholes.

1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

3.07 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate report for each system inspection.
2. Defects requiring correction include the following:
   a. Alignment: Less than full diameter of inside of pipe is visible between structures.
   b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.05 percent of piping diameter.
   c. Crushed, broken, cracked, or otherwise damaged piping.
   d. Infiltration: Water leakage into piping.
   e. Exfiltration: Water leakage from or around piping.
3. Replace defective piping using new materials, and repeat instructions until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate report for each test.
5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having

jurisdiction and the following:

a. Allowable leakage is maximum of 50 gal./inch of nominal pipe size per mile of pipe, during 24-hour period.
b. Close openings in system and fill with water.
c. Purge air and refill with water.
d. Disconnect water supply
e. Test and inspect joints for leaks.
f. Options: Test ductile-iron piping according to AWWA C600, “Hydrostatic Testing” Section. Use test pressure of at least 10 psig.

6. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
   a. Option: Test plastic gravity sewer piping according to ASTM F 1417
   b. Option: Test concrete gravity sewer piping according to ASTM C 924

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

END OF SECTION 33 31 00

SECTION 33 40 00 – STORM DRAINAGE UTILITIES

PART 1 GENERAL

1.1 SECTION SUMMARY

A. This work consists of furnishing, installing, and cleaning pipe, pipe arch, storm drains and sewers, also referred to as culvers or conduit, in accordance with these specifications and in conformity with lines and grades shown on the plans or established.

PART 2 PRODUCTS

2.1 MATERIAL PROPERTIES

Materials comply with the following sections and subsections of the latest ed. of the DOTD standards and specifications manual:

Usable Soil----------203.06(a)
Selected Soil----------203.06(b)
Plastic Soil Blanket----------203.10
Flowable Fill----------710
Mortar----------702.02
Portland Cement Concrete---------- 901
Stone----------1003.03(b)
Recycled Portland Cement Concrete---------- 1003.03(c)
Granular Material---------- 1003.07
Bedding Material----------1003.08
Concrete Sewer Pipe----------1006.02
Reinforced Concrete Pipe----------1006.03
Reinforced Concrete Pipe Arch----------1006.04
Gasket Materials----------1006.06
Plastic Pipe----------1006.07
Split Coupling Bands----------1006.07(d)(4)
Plastic Yard Drain Pipe----------1006.09
Bituminous Coated Corrugated Steel Pipe
and Pipe Arch---------- 1007.02
Structural Plate for Pipe, Pipe Arch and Arch---------- 1007.04
Corrugated Aluminum Pipe and Pipe Arch---------- 1007.05
Coupling Bands----------1007.09
Reinforcing Steel----------1009
Geo-textile Fabric----------1019

MATERIAL TYPE ABBREVIATIONS:

1) REINFORCED CONCRETE PIPE:
RCP Reinforced Concrete Pipe
RCPA Reinforced Concrete Pipe Arch

2) CORRUGATED METAL PIPE:
CAP Corrugated Aluminum Pipe
CAPA Corrugated Aluminum Pipe Arch
CMP Corrugated Metal Pipe
CMPA Corrugated Metal Pipe Arch
CSP Corrugated Steel Pipe
CSPA Corrugated Steel Pipe Arch
BCCSP Bituminous Coated Corrugated Steel Pipe
BCCSPA Bituminous Coated Corrugated Steel Pipe Arch

3) PLASTIC PIPE:

PP Plastic Pipe
PVCP Polyvinyl Chloride Pipe
RPVCP Ribbed Polyvinyl Chloride Pipe
CPEPDW Corrugated Polyethylene Pipe Double Wall

PART 3 EXECUTION

3.1 EXCAVATION

A. The bottom of the trench shall be excavated to a minimum width of 18 inches on each side for all pipes. Surplus material or excavated material that does not conform to the requirements of Subsection 203.06(a) of the DOTD MANUAL shall be satisfactorily disposed of in accordance with subsection 202.02 of the DOTD MANUAL.

3.2 FORMING PIPE BED

A. When the rock is encountered, it shall be removed below grade and replaced with material complying with Subsection 203.06. This replacement material shall be compacted to at least the density of the surrounding soil. The compacted earth cushion shall have a thickness under the pipe of at least ½ inch per foot of fill height over the top of the pipe with a minimum thickness of 8 inches.

B. When pipe is not laid in a trench, a uniformly firm bed shall be made as specified for the bottom of a trench.

C. When bedding material is specified, additional excavation shall be performed below established grade and bedding material placed.

D. When a suitable foundation cannot be obtained, unstable soil below established grade shall be removed and replaced with granular material or bedding material constructed in accordance with Section 726 of the DOTD MANUAL. When stone or recycled Portland cement concrete is used as backfill, unstable soil below established grade shall be removed and replaced

3.3 LAYING PIPE

A. Pipe laying shall begin at the downstream end of the line. The pipe shall be in contact with the foundation throughout its length. Bell or groove ends of pipe and outside circumferential laps of riveted metal pipe shall be placed facing upstream. Riveted seam metal pipe shall be placed with longitudinal laps at sides. Pipes in each continuous line shall have the same wall thickness. Metal pipes provided with lifting lugs shall be handled only by these lugs.

B. After pipe has been laid and before backfill is placed, the Engineer will inspect the pipe for alignment, grade, integrity of joints, and coating damage.

3.4 JOINING PIPE

A. Type 1 (T1) joints shall be used for side drains under grass or walking areas and similar installations.

B. Type 2 (T2) joints shall be used for cross drains under paving, including turnouts.

C. Type 3 (T3) joints shall be used for closed storm drain systems, flumes and siphons.

3.5 BACKFILLING

A. Prior to backfilling, pipes found to be damaged or out of alignment or grade shall be removed and reinstalled, or replaced.

B. Type A backfill material shall be stone, recycled Portland cement concrete, or flowable fill.

C. Type B backfill material shall be stone, recycled Portland cement concrete, flowable fill, selected soils, or granular material.

D. When Type A backfill material is used; geo-textile fabric shall be placed in accordance with plan details prior to placing backfill material. Care shall be taken to prevent damage to geo-textile fabric during placement of backfill material.

E. Adjacent rolls of fabric shall be overlapped or sewn. When rolls are overlapped, the overlap shall be a minimum of 18 inches, including the ends of rolls. The top layer of the fabric shall be parallel with adjacent rolls and in the direction of backfill materials placement. When rolls are sewn, the contractor shall join adjacent rolls by sewing with polyester, or with the two pieces of geo-textile fabric mated together, turned in order to sew through 4 layers of fabric and sewn with 2 rows of Type 401, two-threaded locking chain stitch. Factory seams other than specified shall be submitted to the Materials and Testing Section of the DOTD MANUAL for approval.

3.6 BACKFILL APPLICATIONS

A. PAVED AREAS: Paved area subject to traffic loads such as roadway travel lanes, shoulders, and turnouts shall be backfilled with Type A material. Type B backfill material shall be used in all other paved areas including driveways, detour roads and similar installations. Selected soils will not be allowed as backfill material.

B. NONPAVED AREAS: Pipe backfill material, except for plastic pipe, shall be Type B backfill material placed by approved methods and compacted to the density of surrounding soil. Plastic pipe shall be backfilled with granular material or Type A backfill Material.

C. PLACEMENT AND COMPACTION: When corrugated metal pipe is used, the backfill material shall be tested and shall have a resistivity greater than 1500 ohm-cm and pH greater than 5 when tested in accordance with DOTD TR 429 and DOTD 430 respectively.

D. If the top of pipe is even with or below the top of the trench, backfill material shall be brought up evenly on both sides of pipe for its full length to material shall be brought up evenly on both sides of pipe for its full length to an elevation of 12 inches above the top of pipe [or to sub grade if less than 12 inches] or to natural ground elevation, whichever is greater.

E. When the top of the pipe is above the top of the trench, backfill material shall be brought up evenly on both sides of pipe for its full length to 12 inches above the tip of pipe or to sub grade if less than 12 inches. Material in the trench and above the top of the trench for a distance on metal or plastic pipe and 18 inches for concrete pipe, and to 12 inches above the tip of pipe or to sub grade if less than 12 inches shall be backfill material.

F. The embankment shall be constructed to a minimum of 24 inches over the pipe before heavy construction equipment is allowed to cross the installation. Where practical, installations with less than 24 inches of cover over the top of the pipe shall be constructed after heavy hauling is completed over the pipe location. After completion of hauling and backfilling operations shall be removed and reinstalled, or replaced, at no direct pay.

3.7 BACKFILL METHODS

A. GENERAL: Compaction by flooding will not be allowed.

B. SELECTED FILL: Backfill shall be placed at or near optimum moisture content determined in accordance with DOTD TR 415 or TR 418 in layers not exceeding 8 inches compacted thickness. Backfill material shall be thoroughly compacted under the haunches of the pipe. Each layer shall be compacted by approved methods to at least 95 percent of maximum dry density prior to placement of a subsequent layer.

C. GRANULAR MATERIAL: Backfill shall be placed at or near optimum moisture content determined in accordance with DOTD TR 415 or TR 418. Backfill material shall be thoroughly compacted under the haunches of the pipe and then compacted in layers not exceeding 12 inches compacted thickness. Each layer shall be compacted by approved methods to at least 95 percent of maximum dry density to prior placement of subsequent layer. Exposed slopes at the pipe ends shall be covered by at least 12 inches compacted thickness of plastic soil blanket.

D. FLOWABLE FILL: Flowable fill shall be in accordance with Section 710 of the DOTD MANUAL.

E. STONE OR RECYCLED PORTLAND CEMENT CONCRETE: Backfill shall be placed at or near optimum moisture content determined in accordance with DOTD TR 415 or TR 418. Back fill material shall be thoroughly compacted under the pipe haunches and then compacted in layers not exceeding 8 inches compacted thickness. With approval of the Engineer, layer thickness may be increased to 12 inches with verification of satisfactory installation and performance. Each layer shall be compacted by approved methods to at least 95 percent of maximum dry density prior to placement of a subsequent layer. The contractor shall control placement operations so as not to damage protective coatings on metal pipes. The contractor shall repair damaged coatings at no additional pay.

A. DENSITY REQUIREMENTS: Maximum dry density will be determined in accordance with DOTD TR 415 and DOTD 418 and in-place density determined in accordance with DOTD TR 401.

3.8 INSPECTION OF PIPES

A. After completion of embankment and prior to roadway surfacing, the engineer shall inspect pipes for proper alignment and integrity of joints. Any misaligned pipe or defective joints shall be corrected by the contractor at no direct pay.

B. PLASTIC PIPE: Installed plastic pipe shall be tested to ensure that vertical deflections do not exceed 5.0 percent. Maximum allowable deflections shall be 3 governed by the mandrel requirements stated herein.

C. Deflection tests shall be performed no sooner than 30 calendar days after installation and compaction of backfill. The pipe shall be cleaned and inspected for offsets and obstructions prior to testing

D. For pipe 36 inches and less in diameter, a mandrel shall be pulled through the pipe by hand to ensure that maximum allowable deflections to use. Use of an unapproved mandrel or a mandrel altered or modified after approval will invalidate the test. If the mandrel fails to pass, the pipe is over deflected.

E. Unless otherwise permitted, over deflected pipe shall be uncovered and, if not damaged, reinstalled. Damaged pipe shall not be reinstalled, but shall be removed and replaced with new pipe. Any pipe subjected to any method or process other than removal, which attempts, even successfully, to reduce or cure any over deflection, shall be removed and replaced with new pipe.

F. The mandrel shall be a rigid, nonadjustable, odd-numbered legged (minimum 9 legs) mandrel having a length not less than its nominal diameter or 24 inches, whichever is less. The minimum diameter at any point shall be 5.0 percent less than the base inside diameter of the pipe being tested. The mandrel shall be fabricated of steel, aluminum or other approved material fitted with pulling rings at each end. The nominal pipe size and outside diameter of the mandrel shall be stamped or engraved on some segment other than a runner. A suitable carrying case shall be furnished.

G. For pipe larger than 36 inches in diameter, deflection shall be determined by a method approved by the Engineer. If a mandrel is selected, the minimum diameter, length, and other requirements shall conform to the above requirements.

H. Mandrel testing shall be conducted by the contractor in the presence of the Engineer.

I. Prior to final acceptance, pipes shall be cleaned of all debris and soil to the invert of the pipe at no direct pay. Removed soil, debris, and other materials shall be disposed of in accordance with Subsection 202.02 or as otherwise approved in writing.

END OF SECTION 33 40 00

SECTION 33 42 31 – CATCH BASINS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Catch basins.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 – Cast-in-Place Concrete: Concrete collars.

B. Section 31 23 00 – Excavation and Fill.

C. Section 33 41 00 – Storm Utility Drainage Piping.

1.03 PREINSTALLATION MEETINGS

A. Convene preinstallation meeting 1 week before start of Work of this Section.

B. Require attendance of parties directly affecting Work of this Section, including Contractor, Architect, installer, and manufacturer's representative.

C. Review the Following:
1. Materials.
2. Installation.
3. Adjusting.
4. Cleaning.
5. Protection.
6. Coordination with other Work.

1.04 SUBMITTALS

A. Comply with Section 01 33 00 – Submittal Procedures.

B. Product Data: Submit manufacturer's product data, including installation instructions.

C. Shop Drawings: Submit manufacturer's shop drawings, indicating layout, dimensions, materials, components, and accessories.

D. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.

E. Sustainable Design Submittals: Submit manufacturer's sustainable design submittals for catch basins.
1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
2. Regional Materials: Certify distance between manufacturer and Project, in miles.

F. Manufacturer's Project References: Submit manufacturer's list of successfully completed catch basin projects, including project name and location, name of architect, and type and quantity of catch basins furnished.

G. Installer's Project References: Submit installer's list of successfully completed catch basin projects, including project name and location, name of architect, and type and quantity of catch basins installed.

H. Warranty Documentation: Submit manufacturer's standard warranty.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Manufacturer regularly engaged, for a minimum of 10 years, in the manufacturing of catch basins of similar type to that specified.

B. Installer's Qualifications:
1. Installer regularly engaged, for a minimum of 5 years, in installation of catch basins of similar type to that specified.
2. Employ persons trained for installation of catch basins.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage and Handling Requirements:
1. Store and handle materials in accordance with manufacturer's instructions.
2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
3. Store materials in clean areas, protected from exposure to harmful weather conditions.
4. Store materials out of direct sunlight.
5. Protect materials during storage, handling, and installation to prevent damage.

1.07 AMBIENT CONDITIONS

A. During Cold Weather:
1. Do not use frozen materials.
2. Do not use materials mixed or coated with ice or frost.
3. Do not build on frozen Work.

B. During Wet Weather: Do not build on wet, saturated, or muddy subgrade.

PART 2 PRODUCTS

2.01 PRECAST CATCH BASIN

A. Normal traffic precast concrete manholes: ASTM C478, precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.

B. Gaskets: ASTM C 443, rubber.

C. Steps: Provide one of the following:
1. Fiberglass, individual steps, or ladder of a width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step.
2. Steel Reinforced Plastic or Cast-Iron individual steps. Wide enough to allow worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from invert to finished grade is less than 60 inches.

D. Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service.

E. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

F. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and diameter matching manhole frame and cover. Include sealant recommended by ring manufacturer.

G. Protective Coating: Plant-applied, Bitumastic Coal Tar SSPC-Paint 1610-mil minimum thickness applied to exterior surface.

H. Substitutions: Comply with Section 01 25 00 – Substitution Procedures.

2.02 CATCH BASIN GRATES

A. 24-Inch-Square Grates:
1. Manufacturer: NDS, Inc., 851 North Harvard Avenue, Lindsay, California 93247. Toll Free 800-726-1994. Phone 559-562-9888. Website www.ndspro.com. Email nds@ndspro.com.
a. Part Number: 2415.
b. Color: Galvanized steel.
c. Material: Heavy-duty galvanized steel.
d. Load Rating: Class C, 176 to 325 psi.
e. Height: 2 inches.
f. Grate Openings: 1-1/4 inches.
g. Open Surface Area: 422.45 square inches.
h. Inlet Capacity: 1,292.33 gpm.

B. Substitutions: Comply with Section 01 25 00 – Substitution Procedures.

PART 3 – EXECUTION

3.01 EXAMINATION

I. Examine areas to receive catch basins.

J. Notify Architect of conditions that would adversely affect installation or subsequent use.

K. Do not begin installation until unacceptable conditions are corrected.

3.02 INSTALLATION

A. Install catch basins in accordance with manufacturer's instructions at locations indicated on the Drawings.

B. Install catch basins and grates level, plumb, square, and to elevations indicated on the Drawings.

C. Install catch basins on top of compacted gravel base as indicated on the Drawings.

D. Connect drainage piping to catch basins in accordance with manufacturer's instructions.

E. Backfill evenly around catch basins with specified material.

F. Ensure no large stones or debris are in contact with catch basins.

G. Concrete Collars:
1. Encase catch basins with concrete collars as indicated on the Drawings.
2. Concrete: Specified in Section 03 30 00.

H. Keep concrete, sediment, and debris out of catch basins during installation.

3.03 ADJUSTING

A. Remove and replace with new material, damaged components that cannot be successfully repaired.

3.04 CLEANING

B. Clean catch basins of accumulated sediment and debris before final project completion.

3.05 PROTECTION

A. Protect Work of this Section to ensure that Work will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 33 42 31