



CENTRALBIDDING
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Bid 11-25-07: Tioga Elementary School Addition to Gymnasium
Rapides Parish School Board

Project documents obtained from www.CentralBidding.com

13-Nov-2025 08:33:56 AM

PROJECT MANUAL

**Tioga Elementary School
Addition to Gymnasium**

**46310 Pardue Road
Ball, Louisiana 71405
Rapides Parish School Board
Bid No. 11-25-07**



**Ashe Broussard Weinzettle Architects
301 Jackson St., Suite 205
Alexandria, Louisiana**

Architect's Project Number 2023.11.3.3

October 2025

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RAPIDES PARISH SCHOOL BOARD

INVITATION TO BID

FOR

Tioga Elementary School Addition to Gymnasium

Bid No. 11-25-07

RELEASE DATE: November 7, 2025

BID DUE DATE: Friday, December 12, 2025

BID DUE TIME: 2:00 PM

**RAPIDES PARISH SCHOOL BOARD
PURCHASING DEPARTMENT
619 SIXTH STREET
ALEXANDRIA, LOUISIANA 71301
TELEPHONE (318) 449-3111**

ADVERTISEMENT - INVITATION TO BID

Sealed bids will be received in the Purchasing Department of the Rapides Parish School Board Office Building, 619 Sixth Street, Alexandria, Louisiana 71301 until 2:00 PM, Friday, December 12, 2025 for:

Tioga Elementary School Addition to Gymnasium

(BID 11-25-07)

After stamping to acknowledge timely receipt, the bids will be publicly opened and read by the Executive Committee and/or staff of the Rapides Parish School Board. Sole responsibility for proper delivery of bid is that of the bidder. Any offer received after closing time (2:00 pm, Friday, December 12, 2025) will be returned unopened.

Technical Specification and Drawings: Specifications and Drawings may be obtained from: Ashe, Broussard, Weinzettle Architects, 301 Jackson Street, Suite 205, Alexandria, LA 71301; Telephone: 318-473-0252 upon deposit of Two Hundred Dollars and No/100 (\$200.00) for each set of documents. The full deposit of the first set of hard copy Bid Documents is fully refundable to all bona fide prime contractors submitting a quote upon return of the documents, in good condition, no later than ten (10) days after receipt of quotes. The deposit of additional sets issued to prime contractors and for subcontractors is 50% refundable after return of quote documents in good condition, no later than ten (10) days after receipt of quotes. Documents are also available in PDF at no charge. Specifications and bid forms are also available at www.centralbidding.com; fees may be associated with the use of this site.

All bids must be accompanied by an original bid security equal to five (5%) of the total amount bid and must be in the form of a Bid Bond written by a company licensed to do business in the State of Louisiana.

There will be a Non-Mandatory Pre-Bid Meeting on Friday, December 5, 2025 at 10:00 am at Tioga Elementary School, Front Office.

Award will not be made on the date of the bid opening, but will be awarded by the School Board at a later meeting.

Subject to the provisions of R.S. 38:2211, et seq., the Rapides Parish School Board reserves the right to reject any or all bids for just cause. Each bidder, shall submit with their bid satisfactory evidence that they have complied with the requirements of the LA Contractor's Licensing Law, Louisiana R.S. 37:2150, et seq., and are fully qualified to enter into contract with the Rapides Parish School Board.

Bid envelopes shall be marked " Tioga Elementary School Addition to Gymnasium– Bid # 11-25-07" and delivered to:

Purchasing Department
Rapides Parish School Board
619 Sixth Street
Alexandria, Louisiana 71301

By /s/ Ms. Elizabeth A. Domite, CPA, CGMA, CLSBA, CGFO

/t/ Ms. Elizabeth A. Domite, CFO

RAPIDES PARISH SCHOOL BOARD

Publication Dates: November 7, 2025
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INSTRUCTIONS TO BIDDERS

SECTION I

PREPARATION OF BIDS

- A. **LOUISIANA UNIFORM PUBLIC WORK BID FORM:** Form must be complete and submitted in order to qualify the bidder.
1. **BIDDER CERTIFICATION AND IDENTIFICATION:** Failure to indicate the bidder's exact legal name may rule the bid irregular. An unsigned bid is considered a "no bid."
 2. **ASSIGNMENT:** Required to assure that the State of Louisiana is able to pursue through litigation under both state and federal antitrust laws its rights to recover damages for its indirect purchase of price-fixed goods.
- B. **INSTRUCTIONS TO BIDDERS** define conditions of the bid.
- C. **ISSUING OFFICE**
This Invitation to Bid (ITB) is issued by and for Rapides Parish School Board, henceforth sometimes referred to as RPSB, Rapides Parish School Board and/or Owner. RPSB is the sole contract for this ITB.
- D. **GENERAL WORDING**
Where the words "BIDDER", "CONTRACTOR" or "VENDOR" are mentioned in these specifications, it shall be understood to refer to the individual or corporation submitting a bid and to whom a contract may be awarded. Where the words "OWNER", "RPSB", "BOARD", "DISTRICT" or "SCHOOL BOARD" are mentioned in these specifications, it shall be understood to refer to RAPIDES PARISH SCHOOL BOARD.
- E. **INCURRING COSTS**
RPSB is not liable for any cost incurred by the bidders prior to the issuance of a contract and accompanying purchase order.
- F. **SPECIAL CONDITIONS** found on succeeding pages always supersede the INSTRUCTIONS TO BIDDERS when the two are in conflict.
- G. **BID PROPOSAL FORM** defines requirements of items to be purchased or work to be done must be completed and submitted as a part of this bid. The bidder's name and signature must appear on pages 9 of the bid document in ink. Spaces are provided for this purpose.
- H. **ITEM SPECIFICATION.** Specifying of a certain brand, make or manufacturer, etc. is to denote the quality, type and standard of the article desired. Articles offered must be new merchandise (unless specifically granted exception) and must be of equal or a superior grade.
- a. It is recognized there may be other brands that could likely serve the needs of the school system. However, it should be understood by the bidder that the use of brand names and numbers is to establish standards and styles of products that have been judged to meet the needs of the school district. Such use of brand names is in no way designed or intended to restrict the bidding, but contrarily, to invite bids of comparable products that would equally satisfy the requirements stated herein. Equivalent brands that meet the approval of the Rapides Parish School Board will be accepted.
 - b. The materials, products and equipment described in the Bid Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitutions. No substitutions shall be allowed after bids are received.
 - c. No substitutions will be considered unless written request for approval has been submitted by the Proposer and has been received by the Architect at least seven (7) working days prior to the opening of bids. (La.R.S.38:2295©). Each such request shall 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 any 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. It shall be the responsibility of the proposer to include in his proposal all changes required of the Bid Documents if the proposed product is used. Prior approval, if given, is contingent upon supplier being responsible for any costs which may be necessary to modify the space or facilities needed

to accommodate the materials and equipment approved.

- d. The bidder must insert the manufacturer's brand name and identifying numbers along with any other information (such as illustrations, technical data, catalog or catalog cuts, descriptive literature, and page numbers in the catalog), necessary to sufficiently identify the articles offered. If bidding items other than as specified, bidder must furnish with the bid, catalog or catalog cuts, descriptive literature, and must list the page numbers on which the items appear in the catalog. The bidder must identify the item(s) bid by marking the item in the catalog. The bidder must also include a detailed list of all deviations stating in what respect the item(s) deviate. Any change made to a manufacturer's published specifications submitted for a product shall be verifiable by the manufacturer. Failure to meet any of these requirements (at the time of bid opening) shall prevent consideration of the entire bid. If such literature is too large for the bid envelope, a separate envelope may be used by the bidder, provided the envelope is properly labeled and submitted with the bid. The Bid Number and Name MUST be stated on the outside of any and all mailing envelopes.
- e. If the Architect approves any proposed substitution, such approval shall be set forth in an addendum. Bidders shall not rely upon approvals made in any other manner.

- I. **OBJECTIONS.** Objections to the specifications and/or bid conditions must be filed in writing and must be received by the Purchasing Agent at least five (5) business days prior to the date specified for acceptance of the bid.
- J. Preference is hereby given to materials, supplies and provisions, produced, manufactured or grown in Louisiana, quality being equal to articles offered by competitors outside of the state". Added by Acts 1958, No. 318, §2.

SECTION II

SUBMITTING OF BIDS

- A. **BID FORMS:** All written bids, unless otherwise provided for, must be submitted on, and in accordance with forms provided, properly signed. Bids in the following manner will not be accepted:
 - a. Bid contains no signatures indicating intent to be bound; or
 - b. Bid completed in pencil; or
 - c. Bid not submitted on the RPSB standard forms; or
 - d. Bid not submitted with appropriate bid security; or
 - e. Bid arriving after bid opening date and time.
- B. **PRICES.** The bidder shall quote a net unit price for a turnkey project. See **BID PROPOSAL FORM FOR SPECIFIC PRICE QUOTATION FORM; PRICES MUST BE ON THE UNIT(s) designated**
- C. **FREIGHT.** All prices bid shall include platform delivery F.O.B. Rapides Parish, LA. All cartage, drayage, packing, etc. shall be delivered to and unloaded at the receiving station designated in the **SPECIAL CONDITIONS** or in the **BID PROPOSAL FORM**. All shipments must be received and accepted by a designated agent of the School Board.
 - a. **DISCOUNTS.** Discounts for prompt payment as may be offered on the bid or on the invoice will be accepted, but these discounts will not be considered in evaluating bids for purposes of determining a low bidder unless all other factors are equal.
- D. **BID ENVELOPE** If submitting paper bid, enclose bid in envelope and seal envelope. If the bid is being submitted in multiple envelopes then any and all envelopes shall be sealed and marked on the outside with the Bid Number and Name and the Bidder's Name.
- E. **PLACE, DATE AND HOUR.** All bids shall be submitted to the Rapides Parish School Board, Purchasing Office located at 619 Sixth Street, Alexandria, LA 71301, or mailed to Post Office Box 7117, Alexandria, Louisiana, 71306 or online at centralbidding.com (fees may be associated with the use of this site).
 - a. The **SPECIFICATIONS** indicate the date and hour of the bid opening. Bids will be received until the stated date and time; late bids arriving after the stated date and time will not be considered.

- b. All bids shall be hand delivered by the bidder or his agent, sent registered or certified mail with a return receipt requested or by regular mail or may be submitted online at centralbidding.com (fees may be associated with this site).
- c. **IMPORTANT** The responsibility for timely presentation (delivery) of bids rest solely with the bidder. Bids delayed through the mail and arriving after the stated date and hour cannot be accepted.

F. BID SECURITY DEPOSITS. An original bid security deposit is required for this bid.

- a. All bids must be accompanied by an original bid security equal to five (5%) of the total amount bid and must be in the form of a Bid Bond written by a company licensed to do business in the State of Louisiana.
- b. Bid security **must accompany** the bid proposal; it cannot be submitted after the bid has been opened.
- c. Bid security deposits shall be returned after a satisfactory contract/purchase order has been made with the successful bidder or all items have been delivered and/or installed, or if any or all bids are rejected.
- d. Any bid received and opened without an original bid security in appropriate form when such security has been required as a part of the bid shall be ruled a "no bid" and cannot be considered.

SECTION III

CONTRACTS, WORK ORDERS, AND PERFORMANCE SECURITY

- A. **CONTRACT / WORK ORDERS** – If any bid is accepted, Contract / Work Order(s) will be issued by the Board for all products awarded.
- B. **PERFORMANCE /PAYMENT BONDS.** Per LA RS 38:2241, A performance bond of at least 100% and a payment bond of at least 50% is required on projects over \$25,000; awarded contractor will secure and submit bonds prior to issuance of Notice to Proceed.
- C. **FAILURE TO PERFORM (DELIVER AND/OR SERVICE)** - In the event a successful bidder fails to perform on the awarded bid, the Board shall declare the successful bidder in default. Bid security shall be forfeited to RPSB as liquidated damages in the event the successful bidder fails to perform on the awarded bid. The successful bidder in default will not be permitted to bid for a period of 2 years on any business with the Rapides Parish School Board.
- D. **WAIVER** - Pursuant to the provisions of LRS 38:2216, bidders shall provide written documentation with the bid if claiming any part of these provisions.

SECTION IV

CHANGE OR WITHDRAWAL OF BIDS

- A. **CHANGE OR WITHDRAWAL PRIOR TO BID OPENING** - Should any bidder desire to change or withdraw his bid, he shall do so in writing to the Purchasing Agent. This communication shall be received prior to the date and hour of the opening. Should you choose to withdraw your bid, this action will result in forfeiture of your bid security not as earnest money but as liquidated damages for the default or nonperformance of the bidder.
- B. **CHANGE AFTER BID OPENING BUT PRIOR TO BID AWARD** - After bids are opened, they may not be changed except to correct obvious errors or clerical mistakes. The bidder shall submit to the Board prior to the final award by the Board verification of the correct bid actually intended.
- C. **WITHDRAWAL AFTER BID OPENING BUT PRIOR TO BID AWARD** - After bids are opened, a bidder may request that his bid be withdrawn for good cause. Such request must be submitted in writing to the Board prior to the final award by the Board. Should you choose to withdraw your bid, this action will result in forfeiture of your bid security not as earnest money but as liquidated damages for the default or nonperformance of the bidder.

**SECTION V
REJECTION OF BIDS**

Subject to the provisions of R.S. 38:2211, et seq., the Rapides Parish School Board reserves the right to reject any or all bids for just cause.

**SECTION VI
AWARDS**

- A. **BASIS FOR AWARDS.** The recommendations are based on an evaluation of bids submitted and a contract/purchase order will be awarded by the Board on an all or none basis to the responsible and responsive bidder with the lowest total taking into consideration the quality of the products to be supplied, their conformity with specifications, the purpose for which they are required, and the time of delivery.
- B. **BID EVALUATION:** Bids will be evaluated for completeness. Bidders are encouraged to submit their bids as clearly and concisely as possible in order that a thorough evaluation can be made. Rapides Parish School Board reserves the right to accept or reject any bid for cause.
- C. In the event of a tie, awards will be made to the vendor meeting specifications in the following manner:
- a. Bidder located in parish will have 1st preference.
 - b. Bidder located in state, second;
 - c. Bidder located outside state, next;
 - d. Service history of the company and length of time in business. The company that has been in business longer with an exceptional service record will be recommended to the board notwithstanding "a", "b" and or "c" respectively.
- D. **OFFICIAL AWARD DATE.** Awards become official at the time bids are accepted by the Board.
- E. **FILING OF OBJECTION.** Any objection to an award by the Board must be filed in writing and must be received by the Purchasing Department no later than 9:00 a.m. on the first Monday following the official award.
- F. **NOTIFICATION OF AWARD.** The purchase order and/or contract mailed or delivered to the successful bidder(s) is the official authorization to deliver and install, if applicable the materials described therein.

**SECTION VII
DELIVERY, INSTALLATION AND BILLING**

- A. **DELIVERY AND INSTALLATION.** Delivery and installation for all equipment/supplies herein specified shall be completed within two hundred seventy (270) calendar days after receipt of order. Liquidated damages are five hundred dollars (\$500.00/day). The successful bidder shall agree to commence preparations for the work required upon notification that the bid has been approved by the School Board. Deliveries shall be made on any day with the exception of Saturdays, Sundays and holidays. Merchandise shall be unloaded by the successful bidder at the designated delivery point and received there by a designated agent of the Board. Care shall be taken so receipt and storage pending installation does not interfere with any other school activities that may be taking place at the site.
- B. A delivery ticket or copy of the invoice shall accompany each delivery.
- C. **RECEIVING, INSPECTION AND TESTING.** Delivered items which do not fulfill all requirements will be rejected and refused. Rejected merchandise shall be removed and promptly replaced by the successful bidder at no cost to the School Board.
- D. **INVOICES.** Invoices must be those of the successful bidder and must show the purchase order number, bid number, complete unit description, quantity, price and total. Invoices (total or partial) will not be paid prior to delivery of materials and/or work being completed. All invoices shall be submitted in duplicate to the Rapides Parish School Board, Accounts Payable Department, P. O. Box 7117, Alexandria, Louisiana 71306. If applicable to this purchase, Federal tax exemption certificates will be signed by the Rapides Parish School Board. **TAXES:** Rapides Parish School Board of Alexandria, Louisiana Due to advice from

our legal counsel, awarded contractors and subcontractors will now be issued tax exempt certificates for this project. Requests for certificates must be received by RPSB from the awarded general contractor. Time period on project must be reflective of actual construction time of work."

SECTION VIII

WORKMANSHIP

All skilled labor shall be performed in the best and most workmanlike manner by factory mechanics skilled in their respective trades, thus producing results of the first class only. The School Board must be satisfied with the manufactures' credentials prior to beginning work.

Section IX

Part 1

INSURANCE REQUIREMENTS

VENDOR INSURANCE:

Vendor shall supply, a uniform Certificate of Insurance with \$1,000,000 Commercial General Liability (combined single limit) coverage, \$300,000 Automobile Liability and minimum statutory limit of workers' compensation and employee liability coverage. Certificate shall name Rapides Parish School Board as additional insured. Failure to meet or exceed the insurance limits stated herein shall result in disqualification of that bidder's entire bid. Certificate of Insurance shall be delivered to the Physical Plant Office, attn.: Roy F. Rachal within five (5) working days from the date of notification of award and or receipt of purchase order. No work shall commence prior to receipt thereof.

MANUFACTURER'S INSURANCE:

The manufacturer must have product liability insurance of at least \$10,000,000 from a reputable insurance company and must have manufactured the specified products for at least 10 years. The successful bidder must provide proof thereof within five (5) working days from date of notification of award or receipt of purchase order, whichever comes first. No work shall commence prior to receipt of proof of manufacturer's insurance.

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: Rapides Parish School Board
P.O. Box 7117
Alexandria, LA 71309

BID FOR: Tioga Elementary School
Addition to Gymnasium
Bid 11-25-07
46310 Pardue Road
Ball, Louisiana 71405

The undersigned bidder hereby declares and represents that she/ he; a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: Ashe Broussard Weinzettle Architects and dated October 2025.

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

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

_____ Dollars (\$ _____)

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

Alternate No. 1

All work required to ADD: Restroom 101 and 103, including all associated MEP for the lump sum of:

_____ Dollars (\$ _____)

Alternate No. 2

All work required to ADD: Gym Storage Addition for the lump sum of:

_____ Dollars (\$ _____)

Alternate No. 3

All work required to ADD: N/A for the lump sum of:

_____ N/A _____ Dollars (\$ _____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

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

** If someone other than a corporate officer signs for the Bidder/ Contractor, a copy of a Corporate Resolution or other signature authorization shall be required for submission of bid. Failure to include a copy of the appropriate signature authorization, if required, may result in the rejection of the bid unless the bidder has complied with LA. R.S. 38:2212(B)5.

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

Project Scope

SERVICES:

Provide Labor and Materials to the complete the Tioga Elementary School Addition to Gymnasium.

UNIT PRICES:

Unit prices are not required for this bid.

Non Mandatory Pre-Bid Meeting: Friday, December 5, 2025, 10:00 a.m., Tioga Elementary School, 4310 Pardue Road, Ball, Louisiana 71450.

Contractor's License: Pursuant to the Louisiana State Licensing Board for Contractors, commercial projects of \$50,000 or more require a license. If your quote exceeds \$50,000 you must be properly licensed by the State of Louisiana. A space for your license # is provided on the bid form.

Bid Security: All bids must be accompanied by an original bid security equal to five (5%) of the total amount bid and must be in the form of a Bid Bond written by a company licensed to do business in the State of Louisiana.

Performance Bond: The successful Bidder shall be required to furnish a Performance Bond and Payment Bond, in an amount equal to 100% of the Contract amount, written by a surety or insurance company meeting the requirements noted in L.R.S. 38:2219 A. (1)(a), (b) and (c).

Pre-Award Inquiries: All inquiries regarding this bid shall be made in writing and mailed, emailed or faxed to:

Rapides Parish School Board Purchasing Department
619 Sixth Street
Alexandria, La 71301
Email: kathy.baden@rpsb.us
Fax: 318 449 -3188

Bid 11-25-07: Tioga Elementary School Addition to Gymnasium

STATE OF _____

PARISH OF _____

ATTESTATIONS AFFIDAVIT

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

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

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

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

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

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

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

- A. At the time of bidding, Appearer is registered and participates in a status verification system to verify that all hires in the state of Louisiana are legal citizens of the United States or are legal aliens.
- B. If awarded the contract, Appearer shall continue, during the term of the contract, to utilize a status verification system to verify the legal status of all new employees in the state of Louisiana.
- C. If awarded the contract, Appearer shall require all subcontractors to submit to it a sworn affidavit verifying compliance with Paragraphs (A) and (B) of this Subsection.

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

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

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

NAME OF BIDDER

NAME OF AUTHORIZED SIGNATORY OF BIDDER

DATE

TITLE OF AUTHORIZED SIGNATORY OF BIDDER

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER

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

Notary Public

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

STATE OF LOUISIANA

PARISH OF _____

_____ being first duly sworn, deposes and says that:

He/She is the _____ of _____,
the Bidder that has submitted the attached Bid;

He/She is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

Such Bid is genuine and is not a collusive or sham Bid;

Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with another Bidder, firm or person to submit a collusive or sham Bid in connection with the 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 communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix an overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Rapides Parish School Board or any person interested in the proposed Contract; and

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 affiant.

(Signed) _____

(Title) _____

SUBSCRIBED AND SWORN to me this the _____ day of _____, 20____,

by _____

NOTARY PUBLIC

Printed Name: _____

My Commission Expires: _____

AFFIDAVIT - CONTRACTOR

STATE OF _____

PARISH OF _____

This _____ day of _____, 20____, personally came and appeared before me, the undersigned Notary Public, duly commissioned and qualified within and for the Parish of _____, State of _____, represented herein by _____, who after being by me duly sworn did depose and say that he/she has been selected as Contractor for the Tioga Elementary School Addition to Gymnasium for the Rapides Parish School Board and that he does hereby certify in compliance with L.R.S. 38:2224, that he has employed no person, corporation, firm, association or other organization, either directly or indirectly, to secure the contract for the above mentioned public project, other than persons regularly employed by him whose services in connection with the construction of said public project or in securing the contract for same were in the regular course of their duties for him; and, that no part of the contract price received, or to be received by him, 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 him whose services in connection with the construction of said public project were in the regular course of their duties for him.

APPEARER FURTHER DECLARES that he will, in all respects, comply with the public contract laws of the State of Louisiana, including Title 38 of the Louisiana Revised Statutes, and particularly Section 2224 of said Title 38 of the Louisiana Revised Statutes.

WITNESSES:

CONTRACTORS

BY: _____

Sworn to and subscribed before me this _____ day of _____, 20____.

Notary Public

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)



THE OWNER:
(Name, legal status and address)



THE ARCHITECT:
(Name, legal status and address)



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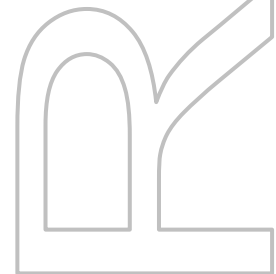
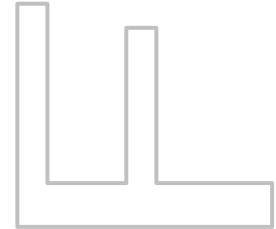
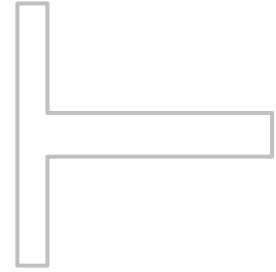
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ARTICLE 1 GENERAL PROVISIONS

§ 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 or proposal 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. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

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

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 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 retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and 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 the 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 suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, 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 suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon written protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to written protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

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 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 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.

§ 2.3.2 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.

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

§ 2.3.4 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.

§ 2.3.5 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.

§ 2.3.6 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.

§ 2.4 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.

§ 2.5 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 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 default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for 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. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

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 its 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.

§ 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 2.3.4, 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 submit 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, subject to Section 15.1.7, 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. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be 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 notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative 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.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 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

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless 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.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 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 14 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 that an equitable adjustment be made 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, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim 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 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 notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice 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 and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably 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, or fails to provide submittals in accordance with the approved 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 make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and 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 how 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 the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect 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 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.

§ 3.12.10.1 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 be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and 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.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the

form specified by the Architect.

§ 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, 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, or patching shall be restored to the condition existing prior to the cutting, fitting, or 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 construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its 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 and 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 the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with 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 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 an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the 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 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 Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 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.

§ 4.2 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.

§ 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 promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) 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

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 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 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, 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 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 order 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 Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 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 the subcontractors of a Separate Contractor.

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

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice 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 for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, 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 that the Contractor, by these Contract 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; 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.

§ 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 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 term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 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 any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its 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 or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has 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 notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work 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. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 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 that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

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

§ 6.3 Owner's Right to Clean Up

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. The Contractor shall proceed promptly with changes in the Work, 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 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine 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 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .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, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

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

§ 7.3.7 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.

§ 7.3.8 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 may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

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

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

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

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

§ 8.2 Progress and Completion

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

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 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 (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended 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

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

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent 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. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and 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 supplier, unless such Work has been performed by others whom the Contractor intends to pay.

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

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that 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 (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole 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 in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. 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. 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 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 suppliers 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 either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

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

§ 9.5.4 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 supplier to whom the 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 Contractor shall reflect such payment on its next Application 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 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 and suppliers 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 or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to 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 or provided by 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, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 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' 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 shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

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

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

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

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and 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 the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the 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 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 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. 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 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, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and 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, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance 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 the lien, claim, security interest, or encumbrance, 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, corrected, 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 the 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;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a 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, a Subcontractor, or a Sub-subcontractor; 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 implement, 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 the owners and users of adjacent sites and utilities of the safeguards.

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

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is 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, notice of the 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 and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. 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 notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's 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 the material or substance or who are to perform the task of removal or safe containment of the 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 by the amount of the Contractor's reasonable additional costs of shutdown, 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 hazardous 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 hazardous 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.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances 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 reimburse 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 Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 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.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 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; (2) the Architect and Architect's consultants; and (3) Separate Contractors, 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 those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 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, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement 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 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

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, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before 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 any 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 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 2.5.

§ 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 of the Owner or Separate Contractors, whether completed or partially completed, 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 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, excluding that jurisdiction's choice of law rules. 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

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 the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 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.

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

§ 13.4 Tests and Inspections

§ 13.4.1 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 tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 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 13.4.1, 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 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 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.

§ 13.4.4 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.

§ 13.4.5 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.

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

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties 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.

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, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, 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 reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, 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' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work 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' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .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 reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner 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' 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 under 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 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 Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

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, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the 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 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by 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 under this Section 15.1.3.1 shall 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.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 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.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision,

subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 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.

§ 15.1.6.2 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.

§ 15.1.7 Waiver of 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 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, 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. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a 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.

§ 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 the 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 receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, 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 15.1.7, 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.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 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. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. 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 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party 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 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party 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 those of the Owner and Contractor under this Agreement.

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions modify, change, delete from or add to the General Conditions of the Contract for Construction, AIA Document A201, 2017 Edition. Where any Article of the General Conditions is modified or any Section, Paragraph, Subparagraph or Clause thereof is modified or deleted by these supplements, the unaltered provisions of that Section, Article, Paragraph, Subparagraph or Clause shall remain in effect.

Articles, Sections, 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 Section 1.1.1 delete the third sentence, and add the following sentence:
The Contract Documents shall include the Bid Documents as listed in the Instructions to Bidders and any modifications made thereto by addenda.

1.1.8 Initial Decision Maker

Delete all after the words, “shall not show partiality to the Owner or Contractor”.

1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE [REFER TO *La R.S. 38:2317*]

1.5.1 Delete the first sentence of the paragraph.

1.5.1 In the third sentence: delete the remainder after the word “publication”.

1.7 DIGITAL DATA USE AND TRANSMISSION

In the first sentence after the words, “in digital form” delete “. The parties will use AIA Document E203 2013, Building Information Modeling and Digital Data Exhibit”.

1.8 BUILDING INFORMATION MODELS USE AND RELIANCE

Delete Section 1.8.

ARTICLE 2

OWNER

2.2 EVIDENCE OF THE OWNER’S FINANCIAL ARRANGEMENTS

Delete Section 2.2.

2.3 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.3.1 In the first sentence, delete: all before “the Owner shall secure...”

Delete Section 2.3.2 and substitute the following:

2.3.2 The term Architect, when used in the Contract Documents, shall mean the prime Designer (Architect, 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 Agreement and is referred to throughout the Contract Documents as if singular in number.

2.3.3 Delete the words: “to whom the Contractor has no reasonable objection and”.

ARTICLE 3

CONTRACTOR

3.4 LABOR AND MATERIALS

3.4.2 Delete Section 3.4.2.

Delete Section 3.4.3 and substitute with the following:

3.4.3 Contractor and its employees, officers, agents, representatives, and Subcontractors shall conduct themselves in an appropriate and professional manner, in accordance with the Owner’s requirements, at all times while working on the Project. Any such individual who behaves in an inappropriate manner or who engages in the use of inappropriate language or conduct while on Owner’s property, as determined by the Owner, shall be removed from the Project at the Owner’s request. Such individual shall not be permitted to return without the written permission of the Owner. The Owner shall not be responsible or liable to Contractor or any Subcontractor for any additional costs, expenses, losses, claims or damages incurred by Contractor or its Subcontractor as a result of the removal of an individual from the Owner’s property pursuant to this Section. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

3.5 WARRANTY

3.5.2 Replace reference to “Section 9.8.4” with “Section 9.8.6”.

3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS (La R.S. 40:1724[A])

3.7.1 Delete Section 3.7.1.

3.7.2 In Section 3.7.2, replace the word “public” with the word “State”.

Delete Section 3.7.5 and substitute the following:

- 3.7.5 If, during the course of the Work, the Contractor discovers human remains, unmarked burial or archaeological sites, burial artifacts, or wetlands, which are not indicated in the Contract Documents, the Contractor shall follow all procedures mandated by State and Federal law, including but not limited to La R.S. 8:671 et seq., the Office of Coastal Protection and Restoration, and Sections 401 & 404 of the Federal Clean Water Act. Request for adjustment of the Contract Sum and Contract Time arising from the existence of such remains or features shall be submitted in writing to the Owner pursuant to the Contract Documents.

3.8 ALLOWANCES

Delete Sections 3.8.1, 3.8.2, and 3.8.3 in their entirety and add the following new Section 3.8.1:

- 3.8.1 Allowances shall not be made on any of the Work.

3.9 SUPERINTENDENT

- 3.9.1 Add the following to the end of the paragraph:
Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

3.10 CONTRACTOR'S CONSTRUCTION AND SUBMITTAL SCHEDULES

- 3.10.1 Add the following: For projects with a contract sum greater than \$1,000,000.00, the Contractor shall include with the schedule, for the Owner's and Architect's information, a network analysis to identify those tasks which are on the critical path, i.e., where any delay in the completion of these tasks will lengthen the project timescale, unless action is taken. A revised schedule shall be submitted with each Application and Certificate for Payment. No payment shall be made until this schedule is received.

- 3.10.3 In the first sentence, delete the word "general".

After the first sentence, add the following:

If the Work is not on schedule, as determined by the Architect, and the Contractor fails to take action to bring the Work on schedule, then the Contractor shall be deemed in default under this Contract and the progress of the Work shall be deemed unsatisfactory. Such default may be considered grounds for termination by the Owner for cause in accordance with Section 14.2.

Add the following Sections:

- 3.10.4 Add the following: Submittal by the contractor of a schedule or other documentation showing a completion date for his Work prior to the completion date stated in the contract shall not impose any obligation or responsibility on the Owner or Architect for the earlier completion date.
- 3.10.5 In the event the Owner employs a commissioning consultant, the Contractor shall cooperate fully in the commissioning process and shall require all subcontractors and

others under his control to cooperate. The purpose of such services shall be to ensure that all systems perform correctly and interactively according to the provisions of the Contract Documents.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

Add the following: This requirement is of the essence of the contract. The Architect shall determine the value of these documents and this amount shall not be approved for payment to the Contractor until all of the listed documents are delivered to the Architect in good order, completely marked with field changes and otherwise complete in all aspects.

ARTICLE 4

ARCHITECT

4.2 ADMINISTRATION OF THE CONTRACT

4.2.1 In the first sentence, delete the phrase: “the date the Architect issues the final Certificate for Payment” and replace with the phrase “final payment is due, and with the Owner’s concurrence, from time to time during the one year period for correction of Work described in Section 12.2.”

4.2.2 In the first sentence, after the phrase: “become generally familiar with”; insert the following: “and to keep the Owner informed about”.

In the first sentence, after the phrase “portion of the Work completed”, insert the following: “to endeavor to guard the Owner against defects and deficiencies in the Work,”

4.2.4 In the first sentence, delete all after “The Owner and Contractor”, and add the following “may communicate directly with each other, when deemed necessary by the Owner, and the Owner will notify the Architect of any decision.”

4.2.10 Add the following sentence to the end of Section 4.2.10: There shall be no restriction on the Owner having a Representative.

4.2.11 Add the following sentence to the end of Section 4.2.11:

If no agreement is made concerning the time within which interpretation required of the Architect shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretation until 15 days after written request is made for them.

4.2.14 Insert the following sentence between the second and third sentences of Section 4.2.14:

If no agreement is made concerning the time within which interpretation required of the Architect shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretation until 15 days after written request is made for them.

ARTICLE 5

SUBCONTRACTORS

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

Delete Section 5.2.1, and substitute the following:

- 5.2.1 Unless otherwise required by the Contract Documents, the Contractor shall furnish at the Pre-Construction Conference, to the Owner and the Architect, in writing, the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. No Contractor payments shall be made until this information is received.

Delete Section 5.2.2, and substitute the following:

- 5.2.2 The Contractor shall be solely responsible for selection and performance of all subcontractors. The Contractor shall not be entitled to claims for additional time and/or an increase in the contract sum due to a problem with performance or nonperformance of a subcontractor.

Delete Sections 5.2.3 and 5.2.4 and substitute the following:

- 5.2.3 The Contractor shall notify the Architect and the Owner when a subcontractor is to be changed and substituted with another subcontractor.

5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

Delete Sections 5.4, 5.4.1, 5.4.2 and 5.4.3

ARTICLE 7

CHANGES IN THE WORK

7.1 GENERAL

Add the following Sections:

- 7.1.4 As part of the pre-construction conference submittals, the Contractor shall submit the following prior to the Contractor's initial request for payment:
- 7.1.4.1 Fixed job site overhead cost itemized with documentation to support daily rates.
 - 7.1.4.2 Bond Premium Rate with supporting information from the General Contractor's carrier.

7.1.4.3 Labor Burden by trade for both Subcontractors and General Contractor. The Labor Burden shall be supported by the Worker's Compensation and Employer's Liability Insurance Policy Information Page. Provide for all trades.

7.1.4.4 Internal Rate Charges for all significant company owned equipment.

7.1.5 If the General Contractor fails to submit the aforementioned documentation as part of the pre-construction submittals, then pay applications shall not be processed until such time as the Owner receives this information.

7.2 CHANGE ORDERS

Delete Section 7.2.1, and substitute the following Sections:

7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, the Architect, and the Contractor issued after execution of the Contract, authorizing a change in the Work and/or an adjustment in the Contract Sum and/or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time. Any reservation of rights, stipulation, or other modification made on the change order by the contractor shall have no effect.

7.2.2 "Cost of the Work" for the purpose of Change Orders shall be the eligible costs required to be incurred in performance of the Work and paid by the Contractor and Subcontractors which eligible costs shall be limited to:

7.2.2.1 Actual wages paid directly to labor personnel, with a labor burden markup exclusively limited to applicable payroll taxes, worker's compensation insurance, unemployment compensation, and social security taxes for those labor personnel performing the Work. Wages shall be the basic hourly labor rate paid an employee exclusive of fringe benefits or other employee costs. The labor burden percentage for the "Cost of the Work" is limited to categories listed herein. Employer-provided health insurance, fringe benefits, employee training (whether a requirement of employment or not), vacation pay, etc., are examples of ineligible labor burden costs which **shall not** be included, as these costs are already compensated by the Overhead and Profit markup.

Supervision shall not be included as a line item in the "Cost of the Work", except when the change results in a documented delay in the critical path, as described in Section 7.2.7.

7.2.2.2 Cost of all materials and supplies necessary and required to perform the Work, identifying each item and its individual cost, including taxes. Incidental consumables are not eligible costs and shall not be included.

7.2.2.3 Cost of each necessary piece of machinery and equipment required to perform the Work, identifying each item and its individual cost, including taxes. Incidental small tools of a specific trade (i.e., shovels, saws, hammers, air compressors, etc.,) and general use vehicles, such as pickup trucks even for

moving items around the site, fuel for these general use vehicles, travel, lodging, and/or meals are not eligible and shall not be included.

7.2.2.4 Eligible Insurance costs shall be limited to documented increases in “Builder’s Risk” insurance premium / costs only. Commercial General Liability, Automobile Liability, and all other required insurances, where referenced in the Contract shall be considered part of normal overhead. These costs are already compensated by the Overhead and Profit markup.

7.2.2.5 Cost for the General Contractor Performance and Payment Bond premium, where the documented cost of the premiums have been increased due to the Change Order.

7.2.3 Overhead and Profit - The Contractor and Subcontractor shall be due home office fixed overhead and profits on the Cost of the Work, but shall not exceed a total of 16% of the direct cost of any portion of Work.

The credit to the Owner resulting from a change in the Work shall be the sum of those items above, except credit will not be required for Overhead and Profit. Where a change results in both credits to the Owner and extras to the Contractor for related items, overhead and profit shall only be computed on the net extra cost to the Contractor.

7.2.4 The cost to the Owner resulting from a change in the Work shall be the sum of: Cost of the Work (as defined at Section 7.2.2) and Overhead and Profit (as defined at Section 7.2.3), and shall be computed as follows:

7.2.4.1 When all of the Work is General Contractor Work; 8% markup on the Cost of the Work.

7.2.4.2 When the Work is all Subcontract Work; 8% markup on the Cost of the Work for Subcontractor’s Overhead and Profit, plus 8% markup on the Cost of the Work, not including the Subcontractor’s Overhead and Profit markup, for General Contractor’s Overhead and Profit.

7.2.4.3 When the Work is a combination of General Contractor Work and Subcontract Work; that portion of the direct cost that is General Contract Work shall be computed per Section 7.2.4.1 and that portion of the direct cost that is Subcontract Work shall be computed per Section 7.2.4.2.

Premiums for the General Contractor’s bond may be included, but after the markup is added to the Cost of the Work.

Premiums for the Subcontractor’s Bond shall not be included.

7.2.4.4 Subcontract cost shall consist of the items in Section 7.2.2 above plus Overhead and Profit as defined in Section 7.2.3.

7.2.5 Before a Change Order is prepared, the Contractor shall prepare and deliver to the Architect the following information concerning the Cost of the Work, not subject to waiver, within a reasonable time after being notified to prepare said Change Order:

A detailed, itemized list of labor, material and equipment costs for the General Contractor's Work including quantities and unit costs for each item of labor, material and equipment.

An itemized list of labor, material and equipment costs for each Subcontractor's and/or Sub-Subcontractor's Work including quantities and unit costs for each item of labor, material and equipment.

7.2.6 After a Change Order has been approved, no future requests for extensions of time or additional cost shall be considered for that Change Order.

7.2.7 Extended fixed job-site costs are indirect costs that are necessary to support the work in the field. Examples of fixed job-site costs are field office rental, salaries of field office staff, field office utilities and telephone.

Extended fixed job-site costs or equitable adjustment, may be included in a Change Order due to a delay in the critical path, with the exception of weather related delays. In the event of a delay in the critical path, the Contractor shall submit all changes or adjustments to the Contract Time **within twenty-one (21) days** of the event giving rise to the delay. The Contractor shall submit documentation and justification for the adjustment by performing a critical path analysis of its most recent schedule in use prior to the change, which shows an extension in critical path activities.

The Contractor shall notify the Architect in writing that the Contractor is making a claim for extended fixed job-site overhead as required by Section 15.1.2. The Contractor shall provide proof that the Contractor is unable to mitigate financial damages through Alternate Work within this Contract or replacement work. "Replacement Work" is that work which the Contractor is obligated to perform under any construction contract separate from this Contract. Reasonable proof shall be required by the Architect that the delays affected the Completion Date.

7.2.8 "Cost of the Work" whether General Contractor cost or Subcontractor cost shall not apply to the following:

7.2.8.1 Salaries or other compensation of the Contractor's personnel at the Contractor's principal office and branch offices.

7.2.8.2 Any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the Work.

7.2.8.3 Overhead and general expenses of any kind or the cost of any item not specifically and expressly included above in Cost of the Work.

7.2.8.4 Cost of supervision, refer to section 7.2.2.1, with exception as provided in Section 7.2.7.

7.2.9 When applicable as provided by the Contract, the cost to 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

7.3.3 In the first sentence after “following methods” insert: “, but not to exceed a specified amount”.

7.3.4 From .1 of the list, delete all after “Costs of labor, including” and substitute the following “social security, old age and employment insurance, applicable payroll taxes, and workers’ compensation insurance;”

Delete the following from .4 of the list: “permit fees,”

Delete Section 7.3.9 and substitute the following:

7.3.9 Pending final determination of the total costs of a Construction Change Directive to the Owner, amounts not in dispute for such changes in the Work shall be included in Applications for Payment accompanied by a Change Order indicating the parties’ agreement with part or all of such costs.

ARTICLE 8

TIME

8.1 DEFINITIONS

Add the following:

8.1.5 The Contract Time shall not be changed by the submission of a schedule that shows an early completion date unless specifically authorized by change order.

8.2 PROGRESS AND COMPLETION

Add to Section 8.2.1 the following:

Completion of the Work must be within the Time for Completion 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 (14) 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 Contract. 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 the Contractor’s 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 (Saturdays, Sundays and holidays included) of delay until the Work is substantially complete. The Owner shall be entitled to the sum stated in the Contract Documents. Such Liquidated Damages shall be withheld by the Owner from the amounts due the Contractor for progress payments.

Delete Section 8.2.2.

8.3 DELAYS AND EXTENSIONS OF TIME

- 8.3.1 In the first sentence after the words “Owner pending” delete the words “mediation and binding dispute resolution” and add the word “litigation”, and delete the last word “determine” and add the following: “recommend, subject to Owner’s approval of Change Order. If the claim is not made within the limits of Article 15, all rights for future claims for that month are waived.”

ARTICLE 9

PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

Delete Section 9.1.2.

Delete Section 9.2 and substitute the following:

9.2 SCHEDULE OF VALUES

At the Pre-Construction Conference, the Contractor shall submit to the Owner and the Architect a Schedule of Values prepared as follows:

- 9.2.1 The attached Schedule of Values Format shall be used. If applicable, the cost of Work for each section listed under each division, shall be given. The cost for each section shall include Labor, Materials, Overhead and Profit.
- 9.2.2 The Total of all items shall equal the Total Contract Sum. This schedule, when approved by the Architect, shall be used as a basis for the Contractor’s Applications for Payment and it may be used for determining the cost of the Work in deductive change orders, when a specific item of Work listed on the Schedule of Values is to be removed. Once the Schedule of Values is submitted at the Pre-Construction Conference, the schedule shall not be modified without approval from the Owner and Architect.

9.3 APPLICATIONS FOR PAYMENT

Delete Sections 9.3.1, 9.3.1.1, and 9.3.1.2 and substitute the following:

- 9.3.1 Monthly, the Contractor shall submit to the Architect on AIA Document G702– Application and Certification for Payment form, supported by any additional data substantiating the Contractor’s 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 into the Work and of materials, suitably stored, at the site as of the twenty-fifth day of the preceding month, less normal retainage as follows, per La R.S. 38:2248:

9.3.1.1 Projects with Contract price up to \$500,000.00 – 10% of the Contract price.

9.3.1.2 Projects with Contract price of \$500,000.00, or more – 5% of the Contract price.

9.3.1.3 No payment shall be made until the revised schedule required by Section 3.10.1 is received.

9.3.1.4 The normal retainage shall not be due the Contractor until after substantial completion and expiration of the forty-five day lien period and submission to the Architect of an original copy of a clear lien certificate, consent of surety, and invoice for retainage.

Delete Section 9.3.2 and substitute the following:

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. Payments for materials or equipment stored on the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, including applicable insurance.

9.5 DECISIONS TO WITHHOLD CERTIFICATION

Section 9.5.1.7: Delete the word "repeated".

Delete Section 9.5.4.

9.6 PROGRESS PAYMENTS

Delete Section 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 except for projects funded fully or in part by a Federal reimbursement program. For such projects the Owner will make payment in a timely manner consistent with reimbursement.

9.6.2 Delete the phrase: "no later than seven days" from the first sentence.

After the end of the second sentence, add the following:

La R.S. 9:2784 (A) and (C) require a Contractor or Subcontractor to make payment due to each Subcontractor and supplier within fourteen (14) consecutive days of the receipt of payment from the Owner. If not paid, a penalty in the amount of ½ of 1% per day is due, up to a maximum of 15% from the expiration date until paid. The contractor or subcontractor, whichever is applicable, is solely responsible for payment of a penalty.

9.6.4 Delete the first two sentences of Section 9.6.4 and add the following to the end of the Section:

Pursuant to La. R.S. 38:2242 and La. R.S. 38:2242.2, when the Owner receives any claim of nonpayment arising out of the Contract, the Owner shall deduct 125% of such claim from the Contract Sum. The Contractor, or any interested party, may deposit security, in

accordance with La. R.S. 38:2242.2, guaranteeing payment of the claim with the recorder of mortgages of the parish where the Work has been done. When the Owner receives original proof of such guarantee from the recorder of mortgages, the claim deduction will be added back to the Contract Sum.

Delete Section **9.7 FAILURE OF PAYMENT.**

Delete Section 9.8 and substitute the following:

9.8 SUBSTANTIAL COMPLETION

- 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The Architect shall determine if the project is substantially complete in accordance with this Section.
- 9.8.2 When the Contractor considers that the Work is Substantially Complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.
- 9.8.3 Upon receipt of the Contractor's list, the Architect shall make an inspection to determine whether the Work is substantially complete. A prerequisite to the Work being considered as substantially complete is the Owner's receipt of the executed Roofing Contractor's and Roofing Manufacturer's guarantees, where roofing Work is part of the Contract. Prior to inspection by the Architect, the Contractor shall notify the Architect that the project is ready for inspection by the State Fire Marshal's office. 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 for its intended use, the Contractor shall, before the Work can be considered as Substantially Complete, 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 Architect determines that the project is Substantially Complete, he shall prepare a punch list of exceptions and the dollar value related thereto. The monetary value assigned to this list will be the sum of the cost estimate for each particular item of Work the Architect develops based on the mobilization, labor, material and equipment costs of correcting the item and shall be retained from the monies owed the contractor, above and beyond the standard lien retainage. The cost of these items shall be prepared in the same format as the schedule of values. At the end of the forty-five day lien period payment shall be approved for all punch list items completed up to that time. After that payment, none of the remaining funds shall be due the contractor until all punch list items are completed and are accepted by the Architect. If the dollar value of the punch list exceeds the amount of funds, less the retainage amount, in the remaining balance of the Contract, then the Project shall not be considered as substantially complete. If funds remaining are less than that required to complete the Work, the Contractor shall pay the difference.

- 9.8.5 When the preparation of the punch list is complete the Architect shall prepare a Recommendation of Acceptance incorporating the punch list and submit it to the Owner. Upon approval of the Recommendation of Acceptance, the Owner may issue a Notice of Acceptance of Building Contract which shall establish the Date of Substantial Completion. The Contractor shall record the Notice of Acceptance with the Clerk of Court in the Parish in which the Work has been performed. If the Notice of Acceptance has not been recorded seven (7) days after issuance, the Owner may record the Acceptance at the Contractor's expense. All additive change orders must be processed before issuance of the Recommendation of Acceptance. The Owner shall not be responsible for payment for any Work associated with change orders that is not incorporated into the contract at the time of the Recommendation of Acceptance.
- 9.8.6 Warranties required by the Contract Documents shall commence on the date of Acceptance of the Work unless otherwise agreed to in writing by the Owner and Contractor. Unless otherwise agreed to in writing by the Owner and Contractor, security, maintenance, heat, utilities, damage to the Work not covered by the punch list and insurance shall become the Owner's responsibility on the Date of Substantial Completion.
- 9.8.7 If all punch list items have not been completed by the end of the forty-five (45) day lien period, through no fault of the Architect or Owner, the Owner may hold the Contractor in default. If the Owner finds the Contractor is in default, the Surety shall be notified. If within forty-five (45) days after notification, the Surety has not completed the punch list, through no fault of the Architect or Owner, the Owner may, at his option, contract to have the balance of the Work completed and pay for such Work with the unpaid funds remaining in the Contract sum. Finding the Contractor in default shall constitute a reason for disqualification of the Contractor from bidding on future contracts. If the surety fails to complete the punch list within the stipulated time period, the Owner may not accept bonds submitted, in the future, by the surety.

9.9 PARTIAL OCCUPANCY OR USE

Delete Section 9.9.1 and substitute the following:

- 9.9.1 Partial Occupancy is that stage in the progress of the Work when a designated portion of the Work is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the designated portion of the Work for its intended use. The Owner may occupy or use any substantially completed portion of the Work so designated by separate agreement with the Contractor and authorized by public authorities having jurisdiction over the Work. Such occupancy or use may commence provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, 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 the designated 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.

9.10 FINAL COMPLETION AND FINAL PAYMENT

Delete Section 9.10.4 and replace with the following:

9.10.4 The making of final payment shall not constitute a waiver of Claims by the Owner for the following:

9.10.4.1 Claims, security interests, or encumbrances arising out of the Contract and unsettled;

9.10.4.2 failure of the Work to comply with the requirements of the Contract Documents irrespective of when such failure is discovered;

9.10.4.3 terms of special warranties required by the Contract Documents; or

9.10.4.4 audits performed by the Owner, after final payment.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.2 In the first sentence, between the words: “bearing on” and “safety”, add the words: “the health and,”

10.3 HAZARDOUS MATERIALS

10.3.1 In the second sentence after (PCB) add: “or lead”.

10.3.2 After the first sentence, delete all remaining sentences.

Add at the end: “The Contract time shall be extended appropriately.”

Delete Section 10.4 and substitute the following:

10.4 EMERGENCIES

In an emergency affecting the safety of persons or property, the Contractor shall notify the Owner and Architect immediately of the emergency, simultaneously acting at his discretion to prevent damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency Work shall be determined as provided in Article 15 and Article 7.

ARTICLE 11

INSURANCE AND BONDS

AIA A101 – 2017 Exhibit A is not a part of these documents. Delete all of Sections 11.1, 11.2, 11.3, 11.4, and 11.5, and substitute the following:

INSURANCE REQUIREMENTS FOR NEW CONSTRUCTION, ADDITIONS AND RENOVATIONS

11.1 CONTRACTOR'S LIABILITY INSURANCE

The Contractor shall purchase and maintain without interruption for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the Work hereunder by the Contractor, its agents, representatives, employees or subcontractors. The duration of the contract shall be from the inception of the contract until the date of final payment.

11.2 MINIMUM SCOPE AND LIMITS OF INSURANCE

11.2.1 Worker's Compensation

Worker's Compensation insurance shall be in compliance with the Worker's Compensation law of the Contractor's headquarters. Employers Liability is included with a minimum limit of \$1,000,000 per accident/per disease/per employee. If Work is to be performed over water and involves maritime exposure, applicable LHWCA, Jones Act or other maritime law coverage shall be included. A.M. Best's insurance company rating requirement may be waived for Worker's compensation coverage only.

11.2.2 Commercial General Liability

Commercial General Liability insurance, including Personal and Advertising Injury Liability and Products and Completed Operations Liability, shall have a minimum limit per occurrence based on the project value. The Insurance Services Office (ISO) Commercial General Liability occurrence coverage form CG 00 01 (current form approved for use in Louisiana), or equivalent, is to be used in the policy. Claims-made form is unacceptable.

The aggregate loss limit must apply to each project. ISO form CG 25 03 (current form approved for use in Louisiana), or equivalent, shall also be submitted. The State project number, including part number, and project name shall be included on this endorsement.

COMBINED SINGLE LIMIT (CSL) PER OCCURRENCE

<u>Type of Construction</u>	<u>Projects up to \$1,000,000</u>	<u>Projects over \$1,000,000 up to \$10,000,000</u>	<u>Projects over \$10,000,000</u>
New Buildings:			
Each Occurrence Minimum Limit	\$1,000,000	\$2,000,000	\$4,000,000
Per Project Aggregate	\$2,000,000	\$4,000,000	\$8,000,000
Renovations:	The building(s) value for the Project is \$_____.		
Each Occurrence Minimum Limit	\$1,000,000**	\$2,000,000**	\$4,000,000**

Per Project Aggregate	2 times per occur limit**	2 times per occur limit**	2 times per occur limit**
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**While the minimum Combined Single Limit of \$1,000,000 is required for any renovation, the limit is calculated by taking 10% of the building value and rounding it to the nearest \$1,000,000 to get the insurance limit. Example: Renovation on a \$33,000,000 building would have a calculated \$3,000,000 combined single limit of coverage (33,000,000 times .10 = 3,300,000 and then rounding down to \$3,000,000). If the calculated limit is less than the minimum limit listed in the above chart, then the amount needed is the minimum listed in the chart. Maximum per occurrence limit required is \$10,000,000 regardless of building value. The per project aggregate limit is then calculated as twice the per occurrence limit.

11.2.3 Automobile Liability

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

11.2.4 Excess Umbrella

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

11.2.5 Builder's Risk

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

11.2.5.2 Flood coverage shall be provided by the Contractor on the first floor and below for all projects, except as otherwise noted. The builder's risk insurance policy, sub-limit for flood coverage shall not be less than ten percent (10%) of the total contract cost per occurrence. If flood is purchased as a separate policy, the limit shall be ten percent (10%) of the total contract cost per occurrence (with a max of \$500,000 if NFIP). Coverage for roofing projects shall **not** require flood coverage.

11.2.5.3 A Specialty Contractor may provide an installation floater in lieu of a Builder's Risk policy, with the similar coverage as the Builder's Risk policy, upon the

system to be installed in an amount equal to the amount of the contract including any amendments. Flood coverage is not required.

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

11.2.6 Pollution Liability (*required when asbestos or other hazardous material abatement is included in the contract*)

Pollution Liability insurance, including gradual release as well as sudden and accidental, shall have a minimum limit of not less than \$1,000,000 per claim. A claims-made form will be acceptable. A policy period inception date of no later than the first day of anticipated Work under this contract and an expiration date of no earlier than 30 days after anticipated completion of all Work under the contract shall be provided. There shall be an extended reporting period of at least 24 months, with full reinstatement of limits, from the expiration date of the policy if the policy is not renewed. The policy shall not be cancelled for any reason, except non-payment of premium.

11.2.7 Deductibles and Self-Insured Retentions

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

11.3 OTHER INSURANCE PROVISIONS

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

11.3.1.1 Worker's Compensation and Employers Liability Coverage

11.3.1.1.1 To the fullest allowed by law, the insurer shall agree to waive all rights of subrogation against the Owner, its officers, agents, employees and volunteers for losses arising from Work performed by the Contractor for the Owner.

11.3.1.2 Commercial General Liability Coverage

11.3.1.2.1 The Owner, its officers, agents, employees and volunteers are to be added as additional insureds as respects liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor, premises owned, occupied or used by the Contractor. ISO Form CG 20 10 (for ongoing work) AND CG 20 37 (for completed work) (current forms approved for use in Louisiana), or equivalent, are to be used.

11.3.1.2.2 The Contractor's insurance shall be primary as respects the Owner, its officers, agents, employees and volunteers for any and all losses that occur under the contract. The coverage shall contain no special limitations on the scope of protection afforded to the Owner, its officers, officials, employees or volunteers. Any insurance or self-

insurance maintained by the Owner shall be excess and non-contributory of the Contractor's insurance.

11.3.1.3 Builder's Risk

The policy must include an endorsement providing the following:

In the event of a disagreement regarding a loss covered by this policy, which may also be covered by a RPSB self-insurance or commercial property policy through the Contractor and its insurer agree to follow the following procedure to establish coverage and/or the amount of loss:

Any party to a loss may make written demand for an appraisal of the matter in disagreement. Within 20 days of receipt of written demand, the Contractor's insurer and either RPSB or its commercial insurance company shall each select a competent and impartial appraiser and notify the other of the appraiser selected. The two appraisers shall select a competent and impartial umpire. The appraisers shall then identify the policy or policies under which the loss is insured and, if necessary, state separately the value of the property and the amount of the loss that must be borne by each policy. If the two appraisers fail to agree, they shall submit their differences to the umpire. A written decision by any two shall determine the policy or policies and the amount of the loss. Each insurance company agrees that the decision of the appraisers and the umpire if involved shall be binding and final and that neither party will resort to litigation. Each of the two parties shall pay its chosen appraiser and bear the cost of the umpire equally.

11.3.1.4 All Coverages

11.3.1.4.1 All policies must be endorsed to require 30 days written notice of cancellation to the Owner. Ten-day written notice of cancellation is acceptable for non-payment of premium. Notifications shall comply with the standard cancellation provisions in the Contractor's policy. In addition, Contractor is required to notify Owner of policy cancellations or reductions in limits.

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

11.3.1.4.3 The insurance companies issuing the policies shall have no recourse against the Owner for payment of premiums or for assessments under any form of the policies.

11.3.1.4.4 Any failure of the Contractor to comply with reporting provisions of the policy shall not affect coverage provided to the Owner, its officers, agents, employees and volunteers.

11.3.2 Acceptability of Insurers

All required insurance shall be provided by a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located. Insurance shall be placed with insurers with an A.M. Best's rating of **A-: VI or higher**. This rating requirement may be waived for Worker's compensation coverage only.

If at any time an insurer issuing any such policy does not meet the minimum A.M. Best rating, the Contractor shall obtain a policy with an insurer that meets the A.M. Best rating and shall submit another certificate of insurance within 30 days.

11.3.3 Verification of Coverage

Contractor shall furnish the Owner with Certificates of Insurance reflecting proof of required coverage. The Certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The Certificates are to be received and approved by the Owner before Work commences and upon any contract renewal or insurance policy renewal thereafter. The Certificate Holder must be listed as follows:

Name of Owner

Owner Address

City, State, Zip

Attn: Project # _____

The Owner reserves the right to request complete certified copies of all required insurance policies at any time.

Upon failure of the Contractor to furnish, deliver and maintain required insurance, this contract, at the election of the Agency, may be suspended, discontinued, or terminated. Failure of the Contractor to purchase and/or maintain any required insurance shall not relieve the Contractor from any liability or indemnification under the contract.

If the Contractor does not meet the insurance requirements at policy renewal, at the option of the Owner, payment to the Contractor may be withheld until the requirements have been met, OR the Owner may pay the renewal premium and withhold such payment from any monies due the Contractor, OR the contract may be suspended or terminated for cause.

11.3.4 Subcontractors

Contractor shall include all subcontractors as insureds under its policies OR shall be responsible for verifying and maintaining the certificates provided by each subcontractor. Subcontractors shall be subject to all of the requirements stated herein. The Owner reserves the right to request copies of subcontractor's certificates at any time.

If Contractor does not verify subcontractors' insurance as described above, Owner has the right to withhold payments to the Contractor until the requirements have been met.

11.3.5 Worker's Compensation Indemnity

In the event Contractor is not required to provide or elects not to provide Worker's compensation coverage, the parties hereby agree the Contractor, its Owners, agents and employees shall have no cause of action against, and shall not assert a claim against, the Owner, its departments, agencies, agents and employees as an employer, whether pursuant to the Louisiana Worker's Compensation Act or otherwise, under any circumstance. The parties also hereby agree that the Owner, its departments, agencies, agents and employees shall in no circumstance be, or considered as, the employer or statutory employer of Contractor, its Owners, agents and employees. The parties further agree that Contractor is a wholly independent Contractor and is exclusively responsible for its employees, Owners, and agents. Contractor hereby agrees to protect, defend, indemnify and hold the Owner, its departments, agencies, agents and employees harmless from any such assertion or claim that may arise from the performance of this contract.

11.3.6 Indemnification/Hold Harmless Agreement

Contractor agrees to protect, defend, indemnify, save, and hold harmless, the Owner, all Departments, Agencies, Boards and Commissions, its officers, agents, servants, employees and volunteers, from and against any and all claims, damages, expenses and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur, or in any way grow out of, any act or omission of Contractor, its agents, servants and employees, or any and all costs, expenses and/or attorney fees incurred by Contractor as a result of any claims, demands, suits or causes of action, except those claims, demands, suits or causes of action arising out of the negligence of the Owner, all Departments, Agencies, Boards, Commissions, its officers, agents, servants, employees and volunteers.

Contractor agrees to investigate, handle, respond to, provide defense for and defend any such claims, demands, suits or causes of action at its sole expense and agrees to bear all other costs and expenses related thereto, even if the claims, demands, suits, or causes of action are groundless, false or fraudulent. The Owner may, but is not required to, consult with the Contractor in the defense of claims, but this shall not affect the Contractor's responsibility for the handling and expenses of all claims.

11.4 PERFORMANCE 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.

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.

11.4.3 Recordation of Contract and Bond [La R.S. 38:2241 thru 38:2241.1]

The Owner shall record within thirty (30) days the Contract Between Owner and Contractor and Performance and Payment Bond with the Clerk of Court in the Parish in which the Work is to be performed.

ARTICLE 12

UNCOVERING AND CORRECTION OF WORK

12.2 CORRECTION OF WORK

12.2.1 Before Substantial Completion

At the end of the paragraph, add the following sentences:

“If the Contractor fails to correct Work identified as defective within a thirty (30) day period, through no fault of the Designer, the Owner may hold the Contractor in default. If the Owner finds the Contractor in default, the Surety shall be notified. If within thirty (30) days after notification, the Surety has not corrected the nonconforming Work, through no fault of the Architect or Owner, the Owner may contract to have nonconforming Work corrected and hold the Surety and Contractor responsible for the cost, including architectural fees and other indirect costs. If the Surety fails to correct the Work within the stipulated time period and fails to meet its obligation to pay the costs, the Owner may elect not to accept bonds submitted in the future by the Surety. Finding the Contractor in default shall constitute a reason for disqualification of the Contractor from bidding on future state contracts.

12.2.2 After Substantial Completion

12.2.2.1 At the end of the paragraph delete the last sentence and add the following sentences:

“If the Contractor fails to correct nonconforming Work, or Work covered by warranties, within a thirty (30) day period, through no fault of the Architect or Owner, the Owner may hold the Contractor in default. If the Owner finds the Contractor is in default, the Surety shall be notified. If within thirty (30) days after notification, the Surety has not corrected the non-conforming or warranty Work, through no fault of the Architect or Owner, the Owner may contract to have the nonconforming or warranty Work corrected and hold the Surety responsible for the cost including architects fees and other indirect costs. Corrections by the Owner shall be in accordance with Section 2.4. If the Surety fails to correct the nonconforming or warranty Work within the stipulated time period and fails to meet its obligation to pay the costs, the Owner may not accept bonds submitted, in the future, by the Surety.”

ARTICLE 13

MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

Delete all after the word “located”.

13.2 SUCCESSORS AND ASSIGNS

13.2.1 In the second sentence, delete “Except as ... 13.2.2”

Delete Section 13.2.2.

13.3 RIGHTS AND REMEDIES

Add the following Section 13.3.3:

13.3.3 The Ninth Judicial Court in and for the Parish of Rapides, State of Louisiana shall have sole jurisdiction and venue in any action brought under this contract.

13.4 TESTS AND INSPECTIONS

In Section 13.4.1, delete the second sentence and substitute the following:

The Contractor shall make arrangements for such tests, inspections and approvals with the Testing Laboratory provided by the Contractor, and the Contractor shall bear all related costs of tests, inspections and approvals.

Delete the last two sentences of Section 13.4.1.

13.5 INTEREST

Delete Section 13.5.

ARTICLE 14

TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

Delete Section 14.1.1.4.

In Section 14.1.3, after the word “profit,” delete the words “on Work not executed” and substitute the following: “for Work completed prior to stoppage”.

14.2 TERMINATION BY THE OWNER FOR CAUSE

Add the following Section:

14.2.1.5 failure to complete the punch list within the lien period as provided in 9.8.7.

14.2.3 Add the following sentence:

“Termination by the Owner shall not suspend assessment of liquidated damages against the Surety.”

Add the following Section:

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

14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

In Section 14.4.3, delete all after “incurred by reason of the termination,” and add “along with reasonable profit on the Work not executed.”

ARTICLE 15

CLAIMS AND DISPUTES

15.1 CLAIMS

Delete Section 15.1.2, **Time Limit on Claims**, (See La R.S. 38:2189, and 38:2189.1).

15.1.3.1 Add the following to the end of the paragraph:
“A Reservation of Rights and similar stipulations shall not be recognized under this contract as having any effect. A party must make a claim as defined herein within the time limits provided.”

15.1.4.2 In the first sentence of the Section, delete “Initial Decision Maker’s” and replace with “Architect’s”. In the second sentence of the Section, delete “the decision of the Initial Decision Maker” and replace with: “his/her decision”.

Delete Section 15.1.6.2 and substitute the following:

15.1.6.2 If adverse weather conditions are the basis for a claim for additional time, the Contractor shall document that weather conditions had an adverse effect on the scheduled construction. An increase in the contract time due to weather shall not be cause for an increase in the contract sum. At the end of each month, the Contractor shall make one Claim for any adverse weather days occurring within the month. The Claim must be accompanied by sufficient documentation evidencing the adverse days and the impact on construction. Failure to make such Claim within **twenty-one (21) days** from the last day of the month shall prohibit any future claims for adverse days for that month. No additional adverse weather days shall be granted after the original or extended contract completion date, except those adverse weather days associated with a National Weather Service named storm or federally declared weather related disaster directly affecting the project site.

Add the following Section:

15.1.6.3 The following are considered reasonably anticipated days of adverse weather on a monthly basis:

January	<u>11</u> days	July	<u>6</u> days
February	<u>10</u> days	August	<u>5</u> days

March	<u>8</u> days	September	<u>4</u> days
April	<u>7</u> days	October	<u>3</u> days
May	<u>5</u> days	November	<u>5</u> days
June	<u>6</u> days	December	<u>8</u> days

The Contractor shall ask for total adverse weather days. The Contractor's request shall be considered only for days over the allowable number of days stated above.

Note: Contract is on a calendar day basis.

15.2 INITIAL DECISION

15.2.1 In the second sentence, delete the word "will" and replace with: "shall always".

In the second sentence, delete the phrase: ", unless otherwise indicated in the Agreement."

In the third sentence, delete the word "mediation" and replace with: "litigation".

At the end of the third sentence, add: "arising prior to the date final payment is due".

Delete the fourth sentence.

15.2.5 In the middle of the first sentence, delete all after the phrase: "rejecting the Claim".

In the second sentence, delete the phrase: "and the Architect, if the Architect is not serving as the Initial Decision Maker,".

In the third sentence, delete all after: "binding on the parties" and add the following: "except that the Owner may reject the decision or suggest a compromise or both".

Delete Section 15.2.6.

Delete Section 15.2.6.1.

15.3 MEDIATION

Delete Section 15.3.

15.4 ARBITRATION

Delete Section 15.4.

AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the day of in the year
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

The Architect:
(Name, legal status, address and other information)

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes 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 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.

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

☐ The date of this Agreement.

☐ A date set forth in a notice to proceed issued by the Owner.

☐ Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

☐

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

[] Not later than () calendar days from the date of commencement of the Work.

[] By the following date:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date
-----------------	-----------------------------

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be (\$), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price
------	-------

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.

(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance
------	-------	---------------------------

§ 4.3 Allowances, if any, included in the Contract Sum:

(Identify each allowance.)

Item	Price
------	-------

§ 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
------	-----------------------	-------------------------

§ 4.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the _____ day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the _____ day of the _____ month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than _____ (_____) days after the Architect receives the Application for Payment. *(Federal, state or local laws may require payment within a certain period of time.)*

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

§ 5.1.7.1.1 The following items are not subject to retainage:

(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:

(Insert any other conditions for release of retainage upon Substantial Completion.)

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

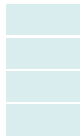
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ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)



§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2017

☐ Litigation in a court of competent jurisdiction

☐ Other (Specify)



If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner’s convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner’s convenience.)



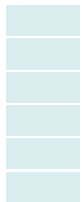
§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner’s representative:

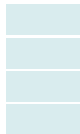
(Name, address, email address, and other information)



§ 8.3 The Contractor’s representative:

(Name, address, email address, and other information)





§ 8.4 Neither the Owner’s nor the Contractor’s representative shall be changed without ten days’ prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with a building information modeling exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with a building information modeling exhibit, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)



§ 8.7 Other provisions:



ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 Building information modeling exhibit, dated as indicated below:
(Insert the date of the building information modeling exhibit incorporated into this Agreement.)



- .5 Drawings

Number

Title

Date

- .6 Specifications

Section

Title

Date

Pages

- .7 Addenda, if any:

Number

Date

Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless

the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[☐] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

[☐] The Sustainability Plan:

Title	Date	Pages
<input type="text"/>		

[☐] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
<input type="text"/>			

.9 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

This Agreement entered into as of the day and year first written above.

OWNER (Signature)

(Printed name and title)

CONTRACTOR (Signature)

(Printed name and title)

AIA® Document A312® – 2010

Performance Bond

CONTRACTOR:

(Name, legal status and address)



SURETY:

(Name, legal status and principal place of business)



OWNER:

(Name, legal status and address)



CONSTRUCTION CONTRACT

Date:

Amount: \$

Description:

(Name and location)



BOND

Date:

(Not earlier than Construction Contract Date)



Amount: \$

Modifications to this Bond:



(Any additional signatures appear on the last page of this Performance Bond.)

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

Signature:

Name and

Title:

SURETY

Company: (Corporate Seal)

Signature:

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:



OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

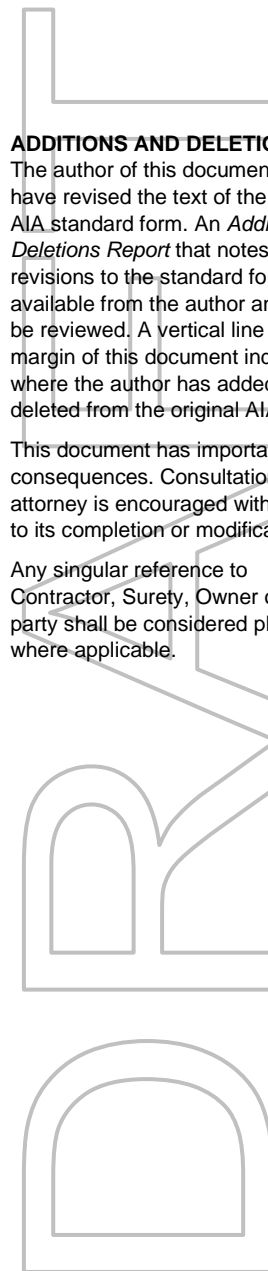


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This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.



ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from

- the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:



(Any additional signatures appear on the last page of this Performance Bond)

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)



AIA® Document A312® – 2010

Payment Bond

CONTRACTOR:

(Name, legal status and address)

**SURETY:**

(Name, legal status and principal place of business)

**OWNER:**

(Name, legal status and address)

**CONSTRUCTION CONTRACT**

Date:

Amount: \$

Description:

(Name and location)

**BOND**

Date:

(Not earlier than Construction Contract Date)



Amount: \$

Modifications to this Bond:



(Any additional signatures appear on the last page of this Payment Bond.)

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature:

Name and

Title:

Signature:

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:**OWNER'S REPRESENTATIVE:**

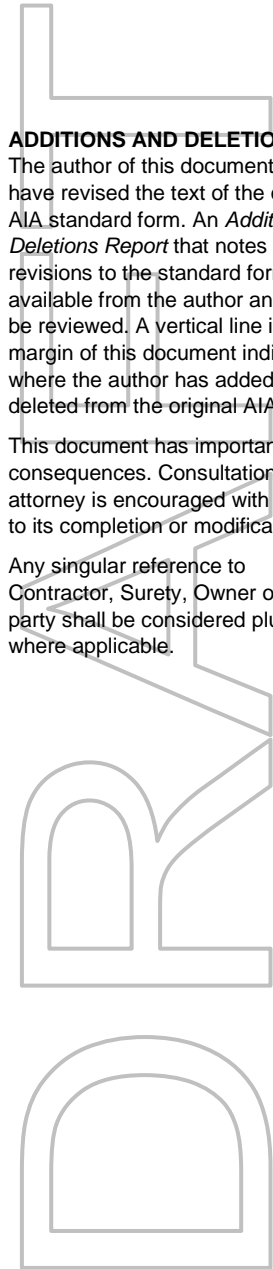
(Architect, Engineer or other party:)

**ADDITIONS AND DELETIONS:**

The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes 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 to or deleted from the original AIA text.

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Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.



ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common-law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

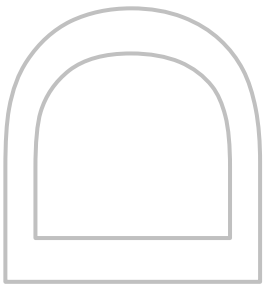
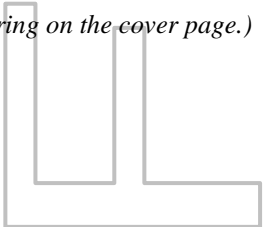
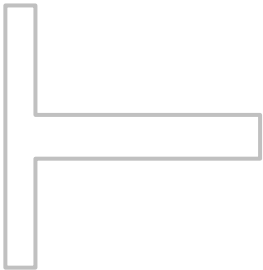
§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:



(Any additional signatures appear on the last page of this Payment Bond)

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)



**VERIFICATION OF EMPLOYEES AFFIDAVIT
AS REQUIRED BY R.S. 38:2212.10
(To be submitted by all Bidders within 10 days after bid opening. Do not submit with bid.)**

I, _____ representing
(Name of Individual)

(Company)

as its _____ certify, in compliance with Louisiana
(Title of Position)

R.S. 38:2212.10, that as a Bidder on:

Project Entitled: _____

By: _____

- A. At the time of Bidding, employer is registered and participates in a status verification system to verify that all employees in the state of Louisiana are legal citizens of the United States or are legal aliens.
- B. If awarded the contract, employer shall continue, during the term of the Contract, to utilize a status verification system to verify the legal status of all new employees in the state of Louisiana.
- C. If awarded the Contract, employer shall require all subcontractors to submit to it a sworn affidavit verifying compliance with Paragraphs (A) and (B) of this Subsection.

SWORN TO AND SUBSCRIBED, before me

this _____ day of _____ 20_____

Signature of Affiant

Seal of Notary

Notary Public

TO: RAPIDES PARISH SCHOOL BOARD

FROM: HAMMONDS, SILLS, ADKINS & GUICE, LLP

DATE: August 6, 2012¹

RE: Hiring of School Board Employees

A. La. R.S. 17:15 and La. R.S. 15:587.1(C)

In hiring new employees, school boards are required to comply with the provisions of La. R.S. 17:15 and La. R.S. 15:587.1(C). The former statute prohibits school boards from hiring any person as a "teacher, substitute teacher, bus driver, substitute bus driver, or janitor, or as a temporary, part-time, or permanent school employee of any kind" who has been convicted of or pled nolo contendere to any crime listed in La. R.S. 15:587.1(C). Within the text of the latter statute, each enumerated offense is identified by reference to the title and section number. As such, if a potential employee has been convicted of or pled nolo contendere to an offense, it can be difficult for school board hiring personnel to determine whether that particular offense is included in the list of offenses identified in La. R.S. 15:587.1(C).² In order to assist school board hiring personnel in making that determination, subsection (B) of this memorandum lists each offense identified in La. R.S. 15:587.1(C) by title and section number and by name. *****Please be advised that this memorandum has been prepared by the law firm of Hammonds & Sills for informational purposes only based upon the law as of the date first written above and does not constitute legal advice. This information is not intended to create, and receipt of it does not constitute, a lawyer client relationship. Readers should not act upon this without seeking advice from legal counsel.*****

B. Title/Section Number and Name of Offenses Listed in 15.587.1³

Title/Section Number	Offense Name	Title/Section Number	Offense Name
R.S. 14:30	First Degree Murder	R.S. 14:30.1	Second Degree Murder

¹ Please be advised that the statutes listed herein may be amended, revised, supplemented or otherwise modified from time to time. As such, the statutes referenced herein may have been revised by subsequent legislation.

² La R.S. 17:15 further provides that school boards may employ an individual who has been convicted of or pled nolo contendere to an offense listed in 15:587.1(C) *if* the hiring is approved in writing by a district judge of the parish and the district attorney or, if employed on an emergency basis, *if* the hiring is approved in writing by the superintendent of the school system.

³ The text of each enumerated offense listed in La. R.S. 15:587.1(C) can be found at <http://www.legis.state.la.us/>.

Title/Section Number	Offense Name	Title/Section Number	Offense Name
R.S. 14:31	Manslaughter	R.S. 14:32.6	First Degree Feticide
R.S. 14:32.7	Second Degree Feticide	R.S. 14:32.8	Third Degree Feticide
R.S. 14:41	Rape	R.S. 14:41.1	[Reserved]
R.S. 14:42	Aggravated Rape	R.S. 14:42.1	Forcible Rape
R.S. 14:43	Simple Rape	R.S. 14:43.1	Sexual Battery
R.S. 14:43.2	Second Degree Sexual Battery	R.S. 14:43.3	Oral Sexual Battery
R.S. 14:43.5	Intentional Exposure to AIDS Virus	R.S. 14:43.6	Administration of medroxyprogesterone acetate (MPA) to certain sex offenders
R.S. 14:44	Aggravated Kidnapping	R.S. 14:44.1	Second Degree Kidnapping
R.S. 14:44.2	Aggravated Kidnapping of a Child	R.S. 14:45	Simple Kidnapping
R.S. 14:74	Criminal Neglect of Family	R.S. 14:78	Incest
R.S. 14:78.1	Aggravated Incest	R.S. 14:79.1	Criminal Abandonment
R.S. 14:80	Felony Carnal Knowledge of a Juvenile	R.S. 14:80.1	Misdemeanor Carnal Knowledge of a Juvenile
R.S. 14:81	Indecent Behavior with Juveniles	R.S. 14:81.1	Pornography Involving Juveniles
R.S. 14:81.1.1	Sexting	R.S. 14:81.2	Molestation of a Juvenile
R.S. 14:81.3	Computer-Aided Solicitation of a Minor	R.S. 14:81.4	Prohibited Sexual Conduct between Educator and Student

Title/Section Number	Offense Name	Title/Section Number	Offense Name
R.S. 14:81.5	Unlawful Possession of Videotape of Protected Person under R.S. 15:440.1	R.S. 14:82	Prostitution
R.S. 14:82.1	Prostitution (persons under 17)	R.S. 14:83	Soliciting for Prostitutes
R.S. 14:83.1	Inciting Prostitution	R.S. 14:83.2	Promoting Prostitution
R.S. 14:83.3	Prostitution by Massage	R.S. 14:83.4	Massage; Sexual Conduct Prohibited
R.S. 14:84	Pandering	R.S. 14:85	Letting Premises for Prostitution
R.S. 14:86	Enticing Persons into Prostitution	R.S. 14:89	Crime Against Nature
R.S. 14:89.1	Aggravated Crime Against Nature	R.S. 14:89.2	Crime Against Nature by Solicitation
R.S. 14:92	Contributing to Delinquency of Juveniles	R.S. 14:93	Cruelty to Juveniles
R.S. 14:93.2.1	Child Desertion	R.S. 14:93.3	Cruelty to the Infirm
R.S. 14:106	Obscenity	R.S. 14:282	Operation of Places of Prostitution
R.S. 14:283	Video Voyeurism	R.S. 14:283.1	Voyeurism
R.S. 14:284	Peeping Tom	R.S. 14:286	Sale of Minor
R.S. 40:966(A)	Distribution or Possession with Intent to Distribute Schedule I Drug	R.S. 40:967(A)	Distribution or Possession with Intent to Distribute Schedule II Drug

Title/Section Number	Offense Name	Title/Section Number	Offense Name
R.S. 40:968(A)	Distribution or Possession with Intent to Distribute Schedule III Drug	R.S. 40:969(A)	Distribution or Possession with Intent to Distribute Schedule IV Drug
R.S. 40:970(A)	Distribution or Possession with Intent to Distribute Schedule V Drug	R.S. 14:2(B)	Crimes of Violence ⁴

⁴ "Crime of violence" means an offense that has, as an element, the use, attempted use, or threatened use of physical force against the person or property of another, and that, by its very nature, involves a substantial risk that physical force against the person or property of another may be used in the course of committing the offense or an offense that involves the possession or use of a dangerous weapon. The following enumerated offenses and attempts to commit any of them are included as "crimes of violence": (1) Solicitation for murder; (2) First degree murder; (3) Second degree murder; (4) Manslaughter; (5) Aggravated battery; (6) Second degree battery; (7) Aggravated assault; (8) Mingling harmful substances; (9) Aggravated rape; (10) Forcible rape; (11) Simple rape; (12) Sexual battery; (13) Second degree sexual battery; (14) Intentional exposure to AIDS virus; (15) Aggravated kidnapping; (16) Second degree kidnapping; (17) Simple kidnapping; (18) Aggravated arson; (19) Aggravated criminal damage to property; (20) Aggravated burglary; (21) Armed robbery; (22) First degree robbery; (23) Simple robbery; (24) Purse snatching; (25) Extortion; (26) Assault by drive-by shooting; (27) Aggravated crime against nature; (28) Carjacking; (29) Illegal use of weapons or dangerous instrumentalities; (30) Terrorism; (31) Aggravated second degree battery; (32) Aggravated assault upon a peace officer with a firearm; (33) Aggravated assault with a firearm; (34) Armed robbery; use of firearm; additional penalty; (35) Second degree robbery; (36) Disarming of a peace officer; (37) Stalking; (38) Second degree cruelty to juveniles; (39) Aggravated flight from an officer; (40) Aggravated incest; (41) Battery of a police officer; (42) Trafficking of children for sexual purposes; (43) Human trafficking and (44) Home invasion.

Title/Section Number	Offense Name	Title/Section Number	Offense Name
R.S. 15:541	Sex Offenses ⁵ (including sex offenses against minors ⁶)		

⁵ "Sex offense" means deferred adjudication, adjudication withheld, or conviction for the perpetration or attempted perpetration of or conspiracy to commit human trafficking when prosecuted under the provisions of R.S. 14:46.2(B)(2) or (3), R.S. 14:46.3 (trafficking of children for sexual purposes), R.S. 14:78 (incest), R.S. 14:78.1 (aggravated incest), R.S. 14:89 (crime against nature), R.S. 14:89.1 (aggravated crime against nature), R.S. 14:89.2(B)(3) (crime against nature by solicitation), R.S. 14:80 (felony carnal knowledge of a juvenile), R.S. 14:81 (indecent behavior with juveniles), R.S. 14:81.1 (pornography involving juveniles), R.S. 14:81.2 (molestation of a juvenile or a person with a physical or mental disability), R.S. 14:81.3 (computer-aided solicitation of a minor), R.S. 14:81.4 (prohibited sexual conduct between an educator and student), R.S. 14:92(A)(7) (contributing to the delinquency of juveniles), R.S. 14:93.5 (sexual battery of the infirm), R.S. 14:106(A)(5) (obscenity by solicitation of a person under the age of seventeen), R.S. 14:283 (video voyeurism), R.S. 14:41 (rape), R.S. 14:42 (aggravated rape), R.S. 14:42.1 (forcible rape), R.S. 14:43 (simple rape), R.S. 14:43.1 (sexual battery), R.S. 14:43.2 (second degree sexual battery), R.S. 14:43.3 (oral sexual battery), R.S. 14:43.5 (intentional exposure to AIDS virus), or a second or subsequent conviction of R.S. 14:283.1 (voyeurism), committed on or after June 18, 1992, or committed prior to June 18, 1992, if the person, as a result of the offense, is under the custody of the Department of Public Safety and Corrections on or after June 18, 1992. A conviction for any offense provided in this definition includes a conviction for the offense under the laws of another state, or military, territorial, foreign, tribal, or federal law which is equivalent to an offense provided for in this Chapter, unless the tribal court or foreign conviction was not obtained with sufficient safeguards for fundamental fairness and due process for the accused as provided by the federal guidelines adopted pursuant to the Adam Walsh Child Protection and Safety Act of 2006.

⁶ "Sexual offense against a victim who is a minor" means a conviction for the perpetration or attempted perpetration of, or conspiracy to commit, any of the following: (a) Sexual battery (R.S. 14:43.1) when the victim is under the age of eighteen, except when prosecuted under the provisions of R.S. 14:43.1(C)(2); (b) Oral sexual battery (R.S. 14:43.3); (c) Human trafficking when prosecuted under the provisions of R.S. 14:46.2(B)(3); (d) Aggravated incest (R.S. 14:78.1) under the circumstances not listed as those which constitute an "aggravated offense" as defined in this Section; (e) Pornography involving juveniles (R.S. 14:81.1); (f) Molestation of a juvenile (R.S. 14:81.2), except when prosecuted under the provisions of R.S. 14:81.2(D)(1); (g) Computer-aided solicitation of a minor (R.S. 14:81.3); (h) Prostitution; persons under seventeen (R.S. 14:82.1); (i) Enticing minors into prostitution (R.S. 14:86); (j) Pandering in violation of R.S. 14:84(1), (3), (5), and (6); (k) Repealed by Acts 2008, No. 816, § 2 and (l) Any conviction for an offense under the laws of another state, or military, territorial, foreign, tribal, or federal law which is equivalent to the offenses listed in Subparagraphs (a) through (k) of this Paragraph.



Designation of Construction Contractor as Agent of a Governmental Entity and Exemption Certificate

General Information

Purpose of the R-1020 Form: Agencies and instrumentalities of federal or Louisiana state or local government may designate a construction contractor as its authorized agent for the purpose of purchasing construction materials, leasing and renting tangible personal property, and purchasing taxable services. Form R-1020 serves as the documentation by which the government entity and contractor document the agency relationship to vendors of materials and services. It also serves as documentation that the contractor's purchases are sales tax exempt, and therefore serves as an exemption certificate, which the vendor must retain on file to support the deduction he will claim on his sales tax return. Effective 11-1-2004, the R-1032 exemption certificate will no longer be necessary.

Use of the R-1020 Form: The form must be signed by both parties, contractor and governmental entity. After signature, both the contractor/agent and the governmental entity must keep an original copy of the form on file, along with other documents that pertain to the construction project. (Effective 11-1-2004) Do not send a copy of the R-1020 form to the Louisiana Department of Revenue. Retain your copy of the original certificate on file. The contractor/agent must reproduce the original copy as needed to attach a copy to each purchase order for materials for the project. The reproduced copy will serve as the exemption certificate that will document the exempt sale of materials to the contractor/agent.

Subcontractors. A designated contractor may not re-designate his subcontractors as authorized agents for the governmental entity. Each subcontractor must obtain its own designation from the governmental entity.

Title to Property: Any materials purchased by the agent through the use of this certificate immediately become the property of the governmental entity upon delivery to the contractor/agent.

Restrictions as to Vendors: The governmental entity may choose to restrict the agent/contractor to making purchases from a pre-selected list of vendors and providers of services. This restriction, if applicable, must be incorporated into a contractual agreement between the governmental entity and the designated agent. If there are no vendor restrictions, the contractor/agent may use the R-1020 Exemption Certificate to make sales tax exempt purchases from any vendor.



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

_____, an agency of the United 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			Acceptance of Agency		
Signature of Authorized Designator		Date (mm/dd/yyyy)	Signature of Contractor or Subcontractor Authorized Acceptor		Date (mm/dd/yyyy)
Name of Authorized Designator			Name of Contractor's or Subcontractor's Acceptor		
Name of Governmental Entity			Name of Contractor		
Address			Address		
City	State	ZIP	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.



AIA®

Document G701™ – 2017

Change Order**PROJECT:** *(Name and address)***CONTRACT INFORMATION:**

Contract For: General Construction

Date:

CHANGE ORDER INFORMATION:

Change Order Number: 001

Date:

OWNER: *(Name and address)***ARCHITECT:** *(Name and address)***CONTRACTOR:** *(Name and address)***THE CONTRACT IS CHANGED AS FOLLOWS:***(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits. Also include agreed upon adjustments attributable to executed Construction Change Directives.)*

The original Contract Sum was	\$	0.00
The net change by previously authorized Change Orders	\$	0.00
The Contract Sum prior to this Change Order was	\$	0.00
The Contract Sum will be increased by this Change Order in the amount of	\$	0.00
The new Contract Sum including this Change Order will be	\$	0.00

The Contract Time will be increased by Zero (0) days.

The new date of Substantial Completion will be

NOTE: This Change Order does not include adjustments to the Contract Sum or Guaranteed Maximum Price, or the Contract Time, that have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.**ARCHITECT** *(Firm name)***CONTRACTOR** *(Firm name)***OWNER** *(Firm name)***SIGNATURE****SIGNATURE****SIGNATURE****PRINTED NAME AND TITLE****PRINTED NAME AND TITLE****PRINTED NAME AND TITLE****DATE****DATE****DATE**



AIA[®] Document G704™ – 2017

Certificate of Substantial Completion

PROJECT: *(name and address)*

CONTRACT INFORMATION:

Contract For:

Date:

CERTIFICATE INFORMATION:

Certificate Number: 001

Date:

OWNER: *(name and address)*

ARCHITECT: *(name and address)*

CONTRACTOR: *(name and address)*

The Work identified below has been reviewed and found, to the Architect's best knowledge, information, and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated below is the date established by this Certificate.

(Identify the Work, or portion thereof, that is substantially complete.)

ARCHITECT *(Firm Name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE OF SUBSTANTIAL COMPLETION

WARRANTIES

The date of Substantial Completion of the Project or portion designated above is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

(Identify warranties that do not commence on the date of Substantial Completion, if any, and indicate their date of commencement.)

WORK TO BE COMPLETED OR CORRECTED

A list of items to be completed or corrected is attached hereto, or transmitted as agreed upon by the parties, and identified as follows:

(Identify the list of Work to be completed or corrected.)

The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment, whichever occurs first. The Contractor will complete or correct the Work on the list of items attached hereto within () days from the above date of Substantial Completion.

Cost estimate of Work to be completed or corrected: \$

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work, insurance, and other items identified below shall be as follows:

(Note: Owner's and Contractor's legal and insurance counsel should review insurance requirements and coverage.)

The Owner and Contractor hereby accept the responsibilities assigned to them in this Certificate of Substantial Completion:

CONTRACTOR *(Firm Name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE

OWNER *(Firm Name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE

**DIVISION 01
GENERAL REQUIREMENTS**

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SECTION 01 11 00

SUMMARY OF THE WORK

PART 1 GENERAL

1.1 SCOPE

This Project Manual and accompanying Drawings provide for labor, materials, plant, supplies, equipment, facilities and appurtenances necessary for preparation of and work necessary for construction and completion of the project titled, TIOGA ELEMENTARY SCHOOL, ADDITION TO GYMNASIUM complete and in accordance with all requirements of the Contract Documents.

1.2 PROJECT DESCRIPTION

- A. Project consists of two (2) building additions:
 - 1. Gym Addition – one-story, structural steel framing, steel roof purlins, brick veneer/metal siding, low slope standing seam metal roof, slab-on-grade, with associated M/E/P, and sitework.
 - 2. Gym Storage Addition –low-slope TPO membrane roof, wood-framed roof joists, brick veneer on CMU back-up walls, slab on grade with associated structural revisions, M/E/P system revisions/additions.
- B. Work identified as Additive Alternates are discussed in detail in Section 01 23 00 and indicated on the Drawings. Contractor shall clarify that his understanding of the extent of the Alternates is complete by careful review of the Drawings.
- C. Erect and maintain all required temporary walls, lights, barricades and warning signs, as may be necessary to protect the public and workmen.
- D. Contractor shall become familiar with an at all times shall observe and comply with all Federal, State and Local laws and/or ordinances and regulations in any manner affecting the conduct of the work.

END OF SECTION

SECTION 01 14 00

CONTRACTOR'S USE OF THE PREMISES

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: This section applies to situation in which the Contractor or his representatives including, but not necessarily limited to, suppliers, subcontractors, employees and field engineers, enter upon the Owner's property.
- B. Related work: Documents affecting work of this Section include, but are not limited to, General Conditions, Supplementary Conditions and Sections of Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.

1.3 SCOPE

- A. Owner, Architect and Contractor will meet to determine extent of site available for Contractor's use for storage of materials, parking and construction area. It is the intent of this project to work only in those areas and in no way disturb the remaining portions of the building site or campus.
- B. Contractor to prepare with Architect a procedure for his use of the premises for storage, personnel, etc., prior to start of work.
- C. No after hours access to the site is permitted unless specifically approved by the Architect and coordinated with the Owner. No work shall be done by Subcontractors without the direct supervision of General Contractor's Job Superintendent.
- D. Due to the location of the project on an occupied building, it will be necessary to restrict and control all parking and entry into the site to only that necessary to accomplish the work. No parking is allowed except in the designated parking area.
- E. Parking of Contractor's employees automobiles is to be the responsibility of Contractor and shall follow all regulations and ordinances controlling such. At no time shall any vehicles restrict or prevent public use of street or entry or present a nuisance to the general public.
- F. It is the intent to minimize inconvenience to staff by vehicular traffic and deliveries related to construction activities and to maintain safety for students and staff from such traffic. Roads shall not be blocked to traffic at any time.
- G. At each day's end Contractor to secure all portions of the work and all entry into the work site so as to maintain property security requirements. Contractor and Architect to arrange such security requirements prior to start of work under the direction of Owner.
- H. No Contractor equipment shall be left near the building when Contractor is not working. All equipment shall be returned to its designated parking area at the end of the Contractor's work day. Ignition key shall never be left with any vehicle or equipment.
- I. All sidewalks, steps, access drives associated with the building shall remain open and clear to allow traffic at all times.

- J. Contractor shall take photographs of the existing site conditions prior to start of work. At the completion of the project, Contractor shall repair all damage to the site caused by construction activities. Extent of repairs shall return site to conditions existing prior to start of work.
- K. Firearms are not permitted on school property.
- L. Contractor's crew shall not interact in any way with students or staff.
- M. Loud music is not permitted.
- N. Smoking is not permitted on school property.
- O. Contractor's crew shall have identification work at all times: either company logo shirts or company I.D. badges.

END OF SECTION

SECTION 01 15 20

APPLICATION FOR PAYMENT

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Comply with procedures described in this Section when applying for progress payment and final payment under the Contract.
- B. Related Work:
 - 1. Documents affecting work of this Section included, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
 - 2. The Contract Sum and the schedule for payments are described in the Form of Agreement.
 - 3. Payments upon Substantial Completion and Completion of the Work are described in the General Conditions and in Section 01 77 00 of these Specifications.

1.2 QUALITY ASSURANCE

- A. Prior to start of construction, secure the Architect's approval of the schedule of values required to be submitted under Paragraph 9.2 of the General Conditions.
- B. During progress of the work, modify the schedule of values as approved by the Architect to reflect changes in the Contract Sum due to Change Orders or other modifications of the Contract.
- C. Base requests for payment on the approved schedule of values.

1.3 SUBMITTALS

- A. Formal Submittal: Unless otherwise directed by the Architect:
 - 1. Make formal submittal of request for payment by filling in the agreed data, by typewriter or neat lettering in ink, on AIA Document G702-1992, "Application and Certificate for Payment", and G703-1992 Continuation Sheet.
 - 2. Sign the Application and Certificate for Payment. Please note that the application does need to be notarized.
 - 3. Submit the original of the Application and Certificate for Payment, plus three (3) identical copies, to the Architect.
 - 4. Contractor can only invoice for materials stored on the site. Contractor may not invoice for materials stored in a bonded warehouse or elsewhere.
 - 5. Contractor must include copies of supportive invoices and other documentation for any stored materials included in the application.
 - 6. The Architect will review the formal submittal and, when approved, will sign the Application and Certificate for Payment, and will distribute:
 - a. Original copy and one copy to Owner;
 - b. One copy to Contractor;
 - c. One copy to Architect's file; and
 - 7. Owner will, upon approval, disburse payment directly to the Contractor.

END OF SECTION

SECTION 01 23 00

BASE BID AND ALTERNATES

PART 1 GENERAL

1.1 METHOD OF BIDDING

- A. Base Bids will be received for all work necessary to complete TIOGA ELEMENTARY SCHOOL, ADDITION TO GYMNASIUM, as shown on Drawings and Specifications; exclusive of the Alternates, which are described below.

1.2 BASE BID

- A. All work indicated for construction of New Administrative Building, Remodeling for New Classroom Building, Upgrade to Roads, Paving, Drainage.
- B. Where a separate Base Bid condition is not shown in Drawing form, Contractor shall install typical items and typical work present in adjacent sections of the building.

1.3 ADDITIVE ALTERNATES

- A. Additive Alternate Number One (1)
Provide all labor and materials to add:
 - 1. Two (2) Restrooms 101 and 103, including all associated MEP
- B. Additive Alternate Number Two (2)
Provide all labor and materials to add:
 - 1. Gym Storage Addition

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination.
- B. Field engineering.

1.2 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise noted, conceal pipe, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work of separate Sections in preparation for Substantial Completion.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 FIELD ENGINEERING

- A. Employ a Land Surveyor registered in the State of Louisiana for assistance in laying out the work and establishing key reference points.
- B. Contractor to locate and protect survey control and reference points.
- C. Verify set-backs and easements; confirm drawing dimensions and elevations.
- D. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- E. Maintain complete and accurate log of control and survey work as work progresses.
- F. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- G. Promptly report to Architect loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- H. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

PART 2 **PRODUCTS**
Not Used

PART 3 **EXECUTION**
Not Used

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 GENERAL

1.01 DESCRIPTION

- A.** Work included: To enable orderly review during progress of the work, and to provide for systematic discussion of problems, the Architect will conduct project meetings throughout the construction period
- B.** Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and normally are not part of project meetings content

1.02 QUALITY ASSURANCE

- A.** For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.03 SUBMITTALS

- A.** Agenda items: To the maximum extent practicable, advise the Architect at least 24 hours in advance of project meetings regarding items to be added to the agenda.
- B.** Minutes:
 - 1. The Architect will compile minutes of each project meeting, and will furnish a copy to the Owner, and the Contractor.
 - 2. Recipients of copies may make and distribute such other copies as they wish.

PART 2 PRODUCTS

(No products are required in this Section)

PART 3 EXECUTION

3.01 PROJECT MEETING SCHEDULE

- A.** Except as noted below for Preconstruction Conference, project meetings with the Owner will be held monthly. A date and time schedule for these meetings will be established at the Preconstruction Conference.
- B.** Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.02 PROJECT MEETING LOCATION

- A.** The Architect will establish meeting location. To the maximum extent practicable, meetings will be held at the project job site.

3.03 PRECONSTRUCTION CONFERENCE

- A.** Preconstruction Conference will be scheduled to be held within 15 working days after the Owner has issued the Notice to Proceed.
 - 1. The meeting will be attended by the Owner, Architect, the Contractor and major Sub-Contractors.
- B.** Pre-Construction Conference Agenda
 - 1. The Architect will prepare an agenda for this meeting.

3.04 PROJECT MEETINGS

- A.** Attendance:
 - 1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout the process of the work.
 - 2. Subcontractors, materials suppliers and others may be invited to attend those project meetings in which their aspect of the work is involved.
- B.** Minimum Agenda:
 - 1. Review, revise as necessary, and approve minutes of previous meetings.
 - 2. Review progress of the work since last meetings, including status of submittals for approval.
 - 3. Identify problems which impede planned progress.
 - 4. Develop corrective measures and procedures to regain planned schedule.
 - 5. Complete other current business.
- C.** Revisions to Minutes:
 - 1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
 - 2. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
 - 3. Challenge to minutes shall be settled as priority portion of "old business" at the next regularly scheduled meeting.

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: To assure adequate planning and execution of all demolition and construction work so that the project is completed within the Contract Time, and so that Owner can maintain normal operations and plan accordingly as outlined below, the below listed construction schedule sequence is to be followed throughout the duration of the project. It is the responsibility of the Contractor to ensure that all Sub-Contractors are familiar with the schedule sequence, as well as the coordination of all Sub-Contractor work as related to the schedule.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
 - 2. Requirements for progress schedule: General Conditions.
 - 3. Construction period: Form of Agreement.
- C. Definitions:
 - 1. "Day" as used throughout the Contract, unless otherwise stated, means "calendar day".

PART 2 EXECUTION

2.1 SCHEDULE SEQUENCE

- A. Prior to start of construction Contractor, Owner, and Architect shall finalize details of this Construction Progress Schedule, including number of days, so that Owner can plan accordingly for the continued operation of their facilities.
- B. Contract Time shall be two hundred seventy (270) consecutive calendar days. Start of Contract Time will be set by the Notice to Proceed. Liquidated damages, of \$500/calendar day, will be charged to the Contractor for each day the project is not complete past this Completion Date, subject to extensions as outlined elsewhere in the Project Manual.
- C. A digital set of drawings of the existing School Building is available upon request for review and investigation.

2.2 PERIODIC REPORTS

- A. Architect will require periodic reports of adherence to the above-described Construction Progress Schedule so as to verify progress as per schedule.
Overall Schedule will be updated at each monthly progress meeting.

2.3 REVISIONS

- A. Make only those revisions to the above-described Construction Progress Schedule as agreed to in advance by the Owner and the Architect.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Make submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
 - 2. Individuals requirements for submittals also may be described in pertinent Sections of these Specifications.
- C. Work not included:
 - 1. Unrequired submittals will not be reviewed by the Architect.
 - 2. The Contractor may require his Subcontractors to provide drawings, setting diagrams and similar information to help coordinate the Work, but such data shall remain between the Contractor and his Subcontractors and will not be reviewed by the Architect.

1.2 QUALITY ASSURANCE

- A. Coordination of submittals:
 - 1. Prior to each submittal, carefully review and coordinate all aspects of each items being submitted.
 - 2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
 - 3. By affixing the Contractor's signature to each submittal, certify that this coordinate has been performed.
- B. Substitutions:
 - 1. The following products do not require further approval except for interface within the Work:
 - a. Products specified by reference to standard specifications such as ASTM and similar standards.
 - b. Products specified by manufacturer's name and catalog model number.
 - 2. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved in writing for this Work by the Architect.
 - 3. Use "Substitution Request Form" provided in this section.
- C. "Or Equal"
 - 1. Where the Phrase "or equal" or "or equal as approved by Architect", occurs in the Contract Documents, do not assume that the materials, equipment, or methods will be approved as equal unless the item has been specifically so approved for this Work by the Architect, prior to bidding.
 - 2. The decision of the Architect shall be final and shall be set forth in an addendum.

1.3 SUBMITTALS

- A. Make submittals of Shop Drawings, Samples, substitution requests and other items in accordance with the provision of this Section, or as requested by Architect.

PART 2 PRODUCTS

2.1 SHOP DRAWINGS

- A. Scale and measurements: Make Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.
- B. Types of prints required:
 - 1. Submit Shop Drawings in the form of clear readable prints or electronically as PDFs. Submit a minimum of one (1) full copy of all shop drawings.
- C. Review comments of the Architect and his Consultants will be shown on the prints in red ink when it is returned to the Contractor. The Contractor may make and distribute such copies as are required for his purposes.

2.2 MANUFACTURERS' LITERATURE

- A. Where contents of submitted literature from manufacturer include data not pertinent to the submittal, clearly shown which portions of the contents is being submitted for review.
- B. Submit the number of copies which are required to be returned, plus one copy which will be retained by the Architect.

2.3 SAMPLES

- A. Provide Sample or Samples identical to the precise article proposed to be provided. Identify as described under "Identification of Submittals" below.
- B. Number of Samples required:
 - 1. Unless otherwise specified, submit Samples in the quantity which is required to be returned, plus one which will be retained by the Architect.
 - 2. By pre-arrangement in specific cases, a single Sample may be submitted for review and, when approved, be installed in the Work at a location agreed upon by the Architect.

2.4 COLORS AND PATTERNS

- A. Unless the precise color and pattern is specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Architect for selection.
- B. Architect shall prepare selections for approval by Owner.

PART 3 EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

- A. Consecutively number all submittals.
 - 1. When material is resubmitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
 - 2. On resubmittals, cite the original submittal number of reference.

- B. Accompany each submittal with a letter of transmittal showing all information required for positive identification and checking. General Contractor shall review, stamp, date and sign all shop drawing submittals.
- C. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.
- D. Maintain an accurate submittal log for the duration of the Work, showing current status of all submittals at all times. Make the submittal log available to the Architect for his review upon request.

3.2 GROUPING OF SUBMITTALS

- A. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.
 - 1. Partial submittals may be rejected as not complying with the provisions of the Contract.
 - 2. The Contractor may be held liable for delays so occasioned.

3.3 TIMING OF SUBMITTALS

- A. Make submittals far enough in advance of scheduled dates for installation to provide time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.
- B. In scheduling, allow at least fifteen (15) working days for review by the Architect following receipt of the submittal.

3.4 ARCHITECT'S REVIEW

- A. Review by the Architect does not relieve the Contractor from responsibility for errors which may exist in the submitted data.
- B. Revisions:
 - 1. Make revisions required by the Architect.
 - 2. If the Contractor considers any required revision to be a change, the Architect shall be notified as provided for in Paragraph 7.3 of the General Conditions.
 - 3. Make only those revisions directed or approved by the Architect.

SUBSTITUTION REQUEST FORM

Project: Tioga Elementary School
Addition to Gymnasium
46310 Pardue Road
Ball, Louisiana 71405
RPSB Bid No. 11-25-07
(Architects Project No. 2023.11.3.3)

Mail/Email: Ashe Broussard Weinzettle Architects
301 Jackson Street, Suite 205
Tel: (318) 473-0252
Fax: (318) 442-6007

Attn: Jim Weinzettle
Email: jimweinzettle@abwarchitects.com

SECTION	PARAGRAPH	SPECIFIED ITEM: _____
_____	_____	PROPOSED SUBSTITUTE: _____

Attach complete description, designation, catalog or model number, Spec Data sheet, and other technical data, including laboratory tests if applicable.

Fill In Blanks Below:

1. Will substitution affect dimensions indicated on drawings? _____

2. Will substitution affect wiring, piping, ductwork, etc., indicated on drawings? _____

3. What affect will substitution have on other trades? _____

4. Differences between proposed substitution and specified item? _____

5. If necessary, will the undersigned pay for Architect's cost, required to revise working drawings, caused by substitution? _____
6. Manufacturer's warranties of specified items and proposed items are:
[] Same [] Different (explain) _____

Submitted By:

Firm: _____

Address: _____

Signature

Date: _____

Telephone: _____

Fax: _____

Electronic File Request and Release Form

Project: Tioga Elementary School
Addition to Gymnasium
46310 Pardue Road
Ball, Louisiana 71405
RPSB Bid No. 11-25-07
(Architects Project No. 2023.11.3.3)

Mail/Email: Ashe Broussard Weinzettle Architects
301 Jackson Street, Suite 205
Tel: (318) 473-0252
Fax: (318) 442-6007

Attn: Jim Weinzettle
Email: jimweinzettle@abwarchitects.com

At your request, we will provide electronic files for your convenience and use in the preparation of shop drawings related to the above referenced project, the RECIPIENT agrees to the following terms and conditions:

Ashe Broussard Weinzettle Architects will provide to the RECIPIENT certain drawings, specifications, or other documents prepared by Ashe Broussard Weinzettle Architects or its sub consultants in electronic format and/or on electronic media. These documents are hereinafter collectively referred to as "ELECTRONIC FILES". Our ELECTRONIC FILES are compatible with: Autodesk AutoCad 2010 and legacy formats. We make no representation as to the compatibility of these files with the RECIPIENT'S hardware or your software beyond the specified release of the referenced specifications.

Data contained on these ELECTRONIC FILES are part of our instruments of service and shall not be used by the RECIPIENT or anyone else receiving these data through or from the RECIPIENT for any purpose other than those outlined for the referenced project. Any other use or reuse by the RECIPIENT or by others will be at the RECIPIENT'S sole risk and without liability or legal exposure to Ashe Broussard Weinzettle Architects or its sub consultants. The RECIPIENT agrees to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against Ashe Broussard Weinzettle Architects, our partners, employees, agents, or sub consultants that may arise out of, or in connection with, the RECIPIENT'S use of the ELECTRONIC FILES.

Furthermore, the RECIPIENT shall, to the fullest extent permitted by law, indemnify and hold us harmless against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs, arising out of or resulting from the RECIPIENT'S use of these ELECTRONIC FILES.

These ELECTRONIC FILES are not construction documents or record documents of as-built conditions. Differences may exist between these ELECTRONIC FILES, site conditions and signed or sealed hard-copy construction documents. We make no representation regarding the accuracy or completeness of the ELECTRONIC FILES the RECIPIENT receives. In the event that a conflict arises between the signed or sealed hard-copy construction documents prepared by us and the ELECTRONIC FILES, the signed or sealed hard-copy construction documents shall govern. The RECIPIENT is responsible for determining if any conflict exists. By the use of these ELECTRONIC FILES, the RECIPIENT is not relieved of their duty to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate work with that of other contractors for the project.

Because information presented on the ELECTRONIC FILES can be modified, unintentionally or otherwise, we reserve the right to remove all indication of ownership and/or involvement from each electronic display.

We will furnish you electronic files of the following drawings:

We make no warranties, either express or implied, of merchantability and fitness for any particular purpose. In no event shall we be liable for any loss of profit or any consequential damages as a result of your use, reuse or misuse of these electronic files.

Please execute this Agreement in the space provided below to indicate your acceptance of the terms and conditions of the release in this Agreement. Upon receipt of the executed Agreement, we will transfer the ELECTRONIC FILES to the appropriate address or email.

READ AND ACCEPTED BY:

Signature of Authorized Representative: _____

Date: _____

Printed Name: _____

Company: _____

Title: _____

END OF SECTION

SECTION 01 35 43

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 DESCRIPTION

- A. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and recreational purposes. The control of environmental pollution requires consideration of, but is not limited to air, water and land, and involves noise, solid waste management and management of radioactive and other hazardous materials.

1.2 APPLICABLE REGULATION

- A. In order to prevent, and to provide for abatement and control any environmental pollution arising from the construction activities of the Contractor and his/her Subcontractors in the performance of this contract, they shall comply with the current applicable federal, state and local laws and regulations concerning environmental pollution control and abatement.

1.3 PROTECTION OF LAND RESOURCES

- A. It is intended that the land resources within the project boundaries and outside of limits of permanent work performed under this Contract be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the Project. Insofar as possible, the contractor shall confine his/her construction activities to areas defined by the plans or specifications, to areas to be cleared by other operations, or to quarry, borrow or waste areas indicated on the plans. At the onset of borrow excavation, topsoil shall be saved for use in restoring the borrow area. Waste and borrow areas shall be leveled or trimmed to regular lines and shaped to provide a neat appearance. In all instances the restored area shall be well-drained, so as to prevent the accumulation of stagnant water. Except in areas marked on the plans to be cleared, the Contractor shall not deface, injure or destroy trees or shrubs, nor remove or cut them without special authority.
- B. Restoration of Landscape Damage: Any trees or other landscape feature scarred or damaged by the Contractor's equipment or operations, shall be restored as nearly as possible to its original condition at the Contractor's expense. The Contracting Officer will decide what method of restoration shall be used and whether damaged trees shall be treated and healed or removed and replaced.
- C. Post-Construction Cleanup or Obliteration: The Contractor shall obliterate all signs of temporary construction facilities such as haul roads, work areas, structure, foundations of temporary structure, stockpiles of excess or waste materials, or any other vestiges of construction as directed by the Contracting Officer. It is anticipated that excavation, filling and plowing of roadways will be required to restore the area to near natural conditions which will permit the growth of vegetation thereon. The disturbed areas shall be graded and filled as necessary, and shall be spread to a depth of approximately four inches over the entire area and the entire Area seeded. Restoration to original contours is required unless otherwise directed by the Contracting Officer.

1.4 PROTECTION OF WATER RESOURCES

- A. The Contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acids or other harmful materials. It is the responsibility of the Contractor to investigate and comply with all applicable federal, state, parish and municipal laws concerning pollution of rivers and streams. all work under this Contract shall be performed in such a manner that pollution/pollutants will not be introduced into streams through or adjacent to the project area.
- B. Erosion Control: Surface drainage from cuts and fills within the construction limits, whether or not completed and from borrow and waste disposal areas, shall, if turbidity producing materials are present, be held in suitable sedimentation ponds or shall be graded to control erosion within acceptable limits. Temporary erosion and sediment control measures such as berms, dikes, drains or sedimentation basins, required to meet the above standards, shall be provided and maintained until permanent drainage and erosion control facilities are completed and operative. The area of bare soil exposed at any time by construction proletrarian should be held to a minimum. Steam crossing by fording with equipment is prohibited. Fills and waste areas shall be constructed by selective placement to eliminate silts or clays on the surface that will erode and contaminate adjacent streams.
- C. Spillages: At all times of the year, special measures shall be taken to prevent chemicals, fuels, oils, grease, bituminous materials, waste washings, herbicides and insecticides, and cement drainage from entering surface or ground waters. In the event of a fuel, oil or chemical spill the Contractor will take immediate containment measures to prevent the spill from entering the base drainage system. All spills will be reported immediately to the Authority having jurisdiction.
- D. Disposal: Disposal of any materials, wastes, effluents, trash, garbage, oil, grease, on the project site is expressly forbidden. If any waste material is dumped in unauthorized areas, the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area at the Contractor's own expense. If necessary, contaminated ground shall be excavated, disposed of as directed by the Contracting Officer and replaced with suitable fill material, compacted and finished with topsoil; all at the expense of the Contractor.

1.5 DISPOSAL OF REMOVED MATERIAL

- A. Unless otherwise specified in other sections of these specifications or unless reusable under the terms of this Contract, all removed material shall be disposed of off site. This disposal shall be in accordance with all applicable federal, state, parish and municipal laws.

1.6 PESTICIDES (INSECTICIDES, FUNGICIDES, HERBICIDES)

- A. Application of all pesticides shall be accomplished by a certified pest control operator. Delivery and storage of pesticides will be monitored by certified personnel to insure the adequacy of containers and the safe storage of adjacent undisturbed area at the Contractor's own expense. If necessary, contaminated ground shall be excavated, disposed or as directed by the Contracting Officer, and replaced with suitable fill material, compacted and finished with topsoil; all at the expense of the Contractor.

1.7 BURNING

- A. No open burning shall be permitted.

1.8 HAZARDOUS MATERIALS

- A. The Contractor will comply with all local, state and federal laws pertaining to the protection of the environment and emission of hazardous pollutants in the performance of this Contract. No equipment or components containing polychlorinated biphenyls (PCB) will be allowed.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance and control of installation.
- B. References.
- C. Field samples.
- D. Mock-up.
- E. Manufacturers' field services and reports.

1.2 RELATED SECTIONS

- A. Section 01 33 00 - Submittals: Submission of Manufacturers' Instructions and Certificates.
- B. Section 01 45 29 - Testing Laboratory Services.
- C. Section 01 66 00 – Product Storage and Handling Requirements for material and product quality.

1.3 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.4 REFERENCES

- A. Conform to reference standard by date of issue current on date for receiving bids.
- B. Obtain copies of standards when required by Contract Documents.
- C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.5 TOLERANCES

- A. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with contract documents, request clarification from Architect before proceeding.

- B. Adjust products to appropriate dimensions; position before securing products in place.

1.6 FIELD SAMPLES

- A. Install field samples at the site as required by individual specifications Sections for review.
- B. Acceptable samples represent a quality level for the Work.
- C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Architect.

1.7 MOCK-UP

- A. A. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals, and finishes. Accepted mock-ups shall be comparison standard for remaining work. Mock-ups can be part of the work and can remain in place after review and approval.
- B. Where mock-up is specified in individual Sections to be removed, clear area after mock-up has been accepted by Architect.
- B. Mock-up Required:
 - a. Exterior Windows: installed in wall, including sill pan flashing, shims, membrane flashing system, integration with WRB, head flashing, etc.
 - b. Sill and Base Flashing at Brick Veneer
 - c. Roof-Wall Flashing
 - d. Brick Veneer – 48" x 48" section of brick veneer to determine match of color/type of brick and color of mortar with existing.

1.8 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment and training of maintenance personnel as applicable, and to initiate instructions when necessary.
- B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- C. Submit report in duplicate within seven (7) days of observation to Architect for review.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 42 19

REFERENCE STANDARDS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included:

1. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.
2. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship which meet or exceed the specifically named code or standard.
3. It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the Architect, to deliver to the Architect all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested in writing by the Architect, and generally will be required to be copies of a certified report of tests conducted by a testing agency approved for that purpose by the Architect.

B. Related Work:

1. Related work described elsewhere; e.g., specific naming of codes or standards occurs on the Drawings and in other Sections of these Specifications.

1.2 QUALITY ASSURANCE

- A. Familiarity with pertinent codes and standards: In procuring all items used in this work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for this use in this work meet or exceed the specified requirements.

- B. Rejection of non-complying items: The Architect reserves the right to reject items incorporated into the work which fail to meet the specified minimum requirements. The Architect further reserves the right, and without prejudice to other recourse the Architect may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Architect and the Owner.

- C. Applicable standards listed in these Specifications include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

- | | |
|-------------|---|
| 1. AASHTO - | American Association of State Highway and Transportation Officials, 341 National Press Building, Washington, D.C. 20004 |
| 2. ACI - | American Concrete Institute, Box 19150 Redford Station, Detroit, Michigan 48129 |
| 3. AISC - | American Institute of Steel Construction, Inc., 1221 Avenue of the Americas, New York, New York 10020 |
| 4. ADAAG | Americans with Disabilities Act Accessibility Guidelines |
| 5. ANSI - | American National Standards Institute (successor to USASI and ASA), 1430 Broadway, New York, New York 10018 |
| 6. ASTM - | American Society of Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103 |
| 7. AWS - | American Welding Society, Inc., 2501 N.W. 7th Street, Miami, Florida 33125 |

- 8. AWWA - American Water Works Association, Inc., 6666 West Quincy Avenue, Denver, Colorado 80235
- 9. CRSI - Concrete Reinforcing Steel Institute, 228 North LaSalle Street, Chicago, Illinois 60610
- 10. IBC International Building Code, 2009 Edition
- 11. NEC - National Electrical Code (See NFPA)
- 12. NEMA - National Electrical Manufacturers Association, 155 East 44th Street, New York, New York 10017
- 13. NFPA - National Fire Protection Association, 470 Atlantic Avenue, Boston, Massachusetts 02210
- 14. SDI - Steel Deck Institute, 135 Addison Avenue, Elmhurst, Illinois 60125
- 15. SSPC - Steel Structures Painting Council, 4400 5th Avenue, Pittsburgh, Pennsylvania 15213
- 16. UL - Underwriter's Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois 60611
- 17. USAB - United States Access Board (Americans with Disabilities Act Accessibility Guidelines) 1331 F Street, NW,, Suite 1000, Washington, DC 20004-1111.
- 18. Fed Specs and
Fed Standards - Specifications Sales (3FRI), Building 197, Washington Navy Yard, General Services Administration, Washington, D.C. 20407

END OF SECTION

SECTION 01 45 29
TESTING LABORATORY SERVICES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Test proposed fill materials
- B. Test fill materials and existing ground for proper compaction
- C. Test concrete for required and proper strength at 7 days and 28 days

1.2 RELATED WORK

- A. Documents affecting work of the Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.3 SELECTION AND PAYMENT FOR TESTING SERVICES

- A. The Owner shall engage and pay for the services of an independent testing laboratory to perform inspection and tests of materials and construction as defined in the General Conditions, except that in the event of a test failure the Contractor shall pay for retesting.
- B. The Contractor is to select the testing lab, and pay, for all concrete design mix testing.

1.4 COOPERATION OF CONTRACTOR - CONTRACTOR RESPONSIBILITIES

- A. The Contractor shall cooperate with the laboratory and:
 - 1. Make available, without cost, samples of all materials to be tested in accordance with applicable standard specifications.
 - 2. Furnish such nominal labor and sheltered working space as is necessary to obtain samples at the project.
 - 3. Advise the laboratory of the identity of materials' sources and instruct the suppliers to allow tests or inspections by the laboratory.
 - 4. Notify the laboratory sufficiently in advance of operations to allow for completion of initial tests and assignment of inspection personnel.
 - 5. Notify the laboratory sufficiently in advance of cancellation of required testing operations. The Contractor shall be responsible to the laboratory for changes due to failure to notify if requirements for testing are canceled.

1.5 QUALITY ASSURANCE

- A. Tests shall be performed in accordance with ASTM Standard Specifications as applicable for tests to be performed.
- B. Laboratory authorized to operate in State in which Project is located.
- C. Testing equipment shall be calibrated at reasonable intervals with devices of an accuracy traceable to either NBS Standards or accepted values of natural physical constraints.

1.6 LABORATORY RESPONSIBILITIES

- A. Test Reports

The laboratory shall promptly submit written reports of each test and inspection made to the Owner, Architect, Engineers, Contractor, and to such other parties the Owner may specify.

- B. Test soil samples proposed for fill materials to conform to Contract Documents.
- C. Test soil compaction.
- D. Test concrete paving and cast-in-place concrete.
- E. Provide qualified personnel at site after due notice; cooperate with Architect and Contractor in performance of services.
- F. Ascertain compliance of materials with requirements of Contract Documents.
- G. Promptly notify Architect, Engineer and Contractor of observed irregularities or non-conformance of Work or products.
- H. Perform additional inspections and tests required by Architect, Engineer or Contractor.

1.7 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of Contractor.
- D. Laboratory has no authority to stop Work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Refer to specification sections listed under paragraph 1.2 Related Work.

PART 3 EXECUTION

3.1 COMPACTED FILL

- A. After grading and compaction of subgrade surfaces, to receive concrete work, to depth and percentage of maximum density required, perform laboratory tests prior to depth and percentage of maximum density required, perform laboratory tests prior to placement of concrete. Contractor shall submit samples of fill material for testing before fill or backfill work begins. Make densities of proposed fill material and field tests of compacted fill.
- B. Field Tests of Compacted Fill: Minimum requirements for fill compaction tests shall be two (2) tests, one (1) for each 1500 sq. ft. for each lift of fill. Tests shall be made on the sub-grade at the same rate prior to commencing fill operations. See Section 02 30 00 of these Specifications.

3.2 ADDITIONAL TESTS

- A. If additional test are thought to be necessary due to non-compliance with the Contract Documents, additional testing as directed by the Architect shall be conducted. If work does not conform to the Contract Documents, cost of such additional tests and cost of correcting work will be paid for by the Contractor. If tests indicate that work complies with the Contract Documents, costs of additional tests will be paid by the Owner.

3.3 MAINTENANCE

- A. Where completed graded or compacted areas are disturbed by subsequent construction operations or rain, scarify surface, re-shape, and compact and re-test for required density. Contractor to pay for re-testing of areas disturbed by construction operations or by rain if acceptable dewatering provisions are not followed by Contractor.

3.4 TESTING AND INSPECTION REPORTS

- A. Inspection Reports: Submit written inspection reports so that Owner, Architect, Landscape Architect, Civil Engineer and Contractor shall receive reports within three (3) days of date in inspection.
- B. Test Reports: Submit written test reports to Owner, Architect, Engineer, and Contractor as soon as possible after test are made.
- C. Problems: If there appears to be problems at the project site based on sight inspection, notify Architect by telephone immediately.
- D. Neither laboratory inspections, tests, survey reports and/or soil boring reports with engineering recommendations and recommendations of the Architect, Landscape Architect and/or Civil Engineer relative to any of the foregoing relieve the Contractor of his obligation under this contract.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: provide temporary facilities and controls needed for the Work including, but not necessarily limited to:
 - 1. Temporary utilities such as heat, water, electricity and telephone;
 - 2. Field office for the Contractor's personnel;
 - 3. Sanitary facilities;
 - 4. Enclosures such as tarpaulins, barricades and canopies;
- B. Related work:
 - 1. Documents affecting work of the Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
 - 2. Except that equipment furnished by Subcontractors shall comply with requirements of pertinent safety regulations, such equipment normally furnished by the individual trades in execution of their own portions of the work are not part of this Section.
 - 3. Permanent installation and connection of the various utilities line are described in other Sections.

1.2 PRODUCT HANDLING

- A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

PART 2 PRODUCTS

2.1 UTILITIES

- A. Water: Contractor shall make arrangements as needed for a temporary water service for the duration of the Work. Contractor may use existing water supply so long as such use does not interfere with owner's use of water supply.
- B. Electricity: Contractor shall make arrangements as needed for a temporary electrical service for the duration of Work. Portable generators may not be used during school hours.
- C. Heating: Provide and maintain heat necessary for proper conduct of operations needed in the Work.

2.2 FIELD OFFICES AND SHEDS

- A. Contractor's facilities:
 - 1. Contractor may establish a field office within a job trailer at their option.
 - 2. Contractor may make arrangements to store building materials on site within a secured, fenced area, so long as such storage does not interfere with Owner's use of the site.
- B. Sanitary facilities:
 - 1. Provide temporary sanitary facilities in the quantity required for use by all personnel.
 - 2. Maintain in a sanitary condition at all times.

3. Keep secure at all times after Contractors work day, either locked or behind barricades.

2.3 ENCLOSURES

- A. Provide and maintain for the duration of construction all scaffolds, tarpaulins, canopies, warning signs, steps, platforms, fences and other temporary construction necessary for proper completion of the Work in compliance with pertinent safety and other regulations.

2.4 TEMPORARY FIRE PROTECTION

- A. During construction period and until fire protection needs are fulfilled by permanent facilities, provide and maintain types and forms of temporary fire protection needed to protect facilities against fire losses. Store combustible materials in recognized fire-safe locations and containers.

PART 3 EXECUTION

3.1 MAINTENANCE AND REMOVAL

- A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.
- B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Architect.
- C. Temporary fencing and barricades shall prevent access by students and staff to stored materials and to building area.

END OF SECTION

SECTION 01 66 00

PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Protect products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.3 MANUFACTURER'S RECOMMENDATION

- A. Except as otherwise approved by the Architect, determine and comply with manufacturer's recommendations on product handling, storage and protection.

1.4 PACKAGING

- A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
 - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
 - 2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.
- B. The Architect may reject as non-complying such material and products that do not bear identification satisfactory to the Architect as to manufacturer, grade, quality and other pertinent information.

1.5 PROTECTION

- A. Protect finished surfaces, including jambs and soffits of openings used as passageways, through which equipment and materials are handled.
- B. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.
- C. Maintain finished surfaces clean, unmarred and suitably protected until accepted by the Owner.

1.6 REPAIRS AND REPLACEMENTS

- A. In the event of damage, promptly make replacements and repairs to the approval of the Architect and at no additional cost to the Owner.

- B. Additional items required to secure replacements and to make repairs will not be considered by the Architect to justify an extension in the Contract Time of Completion.

END OF SECTION

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: This Section establishes general requirements pertaining to cutting (including excavating), fitting and patching or the work required to:
 - 1. Make the several parts fit properly;
 - 2. Uncover work to provide for installing, inspection, or both, of ill-timed work;
 - 3. Remove and replace work not conforming to requirements of the Contract Documents; and
 - 4. Remove and replace defective work.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
 - 2. In addition to other requirements specified, upon the Architect's request uncover work to provide for inspection by the Architect of covered work, and remove samples of installed materials for testing.
 - 3. Do not cut or alter work performed under separate contracts without the Architect's written permission.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

- A. Request for Architect's consent:
 - 1. Prior to cutting which effects structural safety, submit written request to Architect for permission to proceed with cutting.
 - 2. Should conditions of the work, or schedule, indicate a required change of materials or methods for cutting and patching, so notify the Architect and secure his written permission and the required Change Order prior to proceeding.
- B. Notices to Architect:
 - 1. Prior to cutting and patching performed pursuant to the Architect's instructions, submit cost estimate to the Architect. Secure the Architect's approval of cost estimates and type of reimbursement before proceeding with cutting and patching.
 - 2. Submit written notice to the Architect designating the time the work will be uncovered, to provide for the Architect's observation.

PART 2 PRODUCTS

2.1 MATERIALS

- A. For replacement of items removed, use materials complying with pertinent Sections of these Specifications.

2.2 PAYMENT OF COSTS

- A. The Owner will reimburse the Contractor for cutting and patching performed pursuant to the written Change Order, after claim for such reimbursement is submitted by the Contractor. Perform other cutting and patching needed to comply with the Contract Documents at no additional cost to the Owner.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection:
 - 1. Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, patching and backfilling.
 - 2. After uncovering the work, inspect conditions affecting installation of new work.
- B. Discrepancies:
 - 1. If uncovered conditions are not as anticipated, immediately notify the Architect and secure needed directions.
 - 2. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION PRIOR TO CUTTING

- A. Provide required protection including, but not necessarily limited to, shoring, bracing and support to maintain structural integrity of the work.

3.3 PERFORMANCE

- A. Perform required excavating and backfilling as required under pertinent other Sections of these Specifications.
 - 1. Perform cutting and demolition by methods which will prevent damage to other portions of the work and provide proper surfaces to receive installation of remaining and new work.
 - 2. Perform fitting and adjusting of products to provide finished installation complying with the specified tolerances and finishes.
- B. All patching work shall include re-finish of surfaces to nearest corner of wall, floor, or ceiling to result in a seamless appearance.

END OF SECTION

SECTION 01 74 23

FINAL CLEANING

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
 - 2. In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these specifications.

1.2 QUALITY ASSURANCE

- A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.
- B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

- A. Provide required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

- A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 EXECUTION

3.1 PROGRESS CLEANING

- A. General:
 - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
 - 2. Do not allow accumulation of scrap, debris, waste material and other items not required for construction of this Work.
 - 3. At least twice each month, and more often if necessary, completely remove all scrap, debris and waste material from the job site.
 - 4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.
- B. Site:

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of Subparagraph 3.1-A-1 above.
3. Maintain the site in a neat and orderly condition at all times.

C. Structures:

1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep interior spaces clean.
 - a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.
4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed.
 - a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Architect, may be injurious to the finish floor material.

3.2 FINAL CLEANING

A. "Clean", for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris and waste. Conduct final progress cleaning as described in Article 3.1 above.

C. Site:

1. Unless otherwise specifically directed by the Architect, broom clean paved areas on the site and public paved areas adjacent to the site.
2. Completely remove resultant debris.

D. Structures:

1. Exterior:
 - a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges and other foreign matter.
 - b. Remove all traces of splashed materials from adjacent surfaces.
 - c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
 - d. In the event of stubborn stains not removable with water, the Architect may require light sandblasting or other cleaning at no additional cost to the Owner.
2. Interior:
 - a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges and other foreign matter.
 - b. Remove all traces of splashed material from adjacent surfaces.
 - c. Remove paint droppings, spots, stains and dirt from finished surfaces.
3. Glass: Clean inside and outside.

4. Aluminum frames: Clean all aluminum frame surfaces of all dirt, grime, excess caulk sealant, carpet glue, etc.
 5. Polished surfaces: To surfaces requiring routine application of buffed polish, apply polish recommended by manufacturer of the material being polished.
- E. Schedule final cleaning as approved by the Architect to enable the Owner to accept a completely clean Work.

3.3 CLEANING DURING OWNER'S OCCUPANCY

- A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Architect in accordance with the General Conditions of the Contract.

END OF SECTION

SECTION 01 77 00

CONTRACT CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included:
 - 1. Provide an orderly and efficient transfer of the completed Work to the Owner.
 - 2. All closeout procedures as outlined in the Supplementary Conditions are to be followed at the conclusion of construction.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
 - 2. Activities relative to Contract Closeout are described in, but not necessarily limited to, Paragraphs 9.8, and 9.9 of the General Conditions, as modified by Supplemental Conditions.
 - 3. "Substantial Completion" is defined in Paragraph 9.8 of the General Conditions, as modified by Supplemental Conditions.

1.2 QUALITY ASSURANCE

- A. Prior to requesting inspection by the Architect, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for the requested inspection.

1.3 CLOSEOUT PROCEDURES

- A. Comply with procedures stated in the Supplementary Conditions of the Contract for Substantial Completion issuance of Recommendation of Acceptance.
- B. When Contractor considers Work has reached final completion, submit written certification that Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect's inspection.
- C. In addition to submittals required by the condition of the Contract, provide submittals required by governing authorities, and submit a final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due to Contractor.
- D. Architect will issue a final Change Order reflecting approved adjustments to Contract Sum not previously made by Change Order.

1.4 FINAL CLEANING (See Section 01 74 23 Final Cleaning)

- A. Execute prior to final inspection.
- B. Vacuum clean and dust the interior of all enclosed spaces and thoroughly clean exterior surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment. Provide new light bulbs.

- C. Remove all waste and surplus materials, rubbish, and construction facilities from the project and from the site. Perform final cleaning just prior to final acceptance. Reclean areas unacceptable to the Architect and/or Owner.

1.5 WARRANTIES AND BONDS

- A. Provide duplicate, notarized copies. Execute Contractor's submittals and assemble documents executed by subcontractors, suppliers, and manufacturers. Provide table of contents and assemble in binder with durable plastic cover.
- B. Submit material prior to final application for payment.
- C. Materials and equipment put into use for the Contractor's convenience or to aid in the completion of the Work will be maintained by the Contractor.
- D. Warranties shall not begin on any item in this project until acceptance by the Owner for his beneficial use and no earlier than the date of Substantial Completion.

1.6 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, and maintenance materials in quantities specified in each Section, in addition to that used for construction of Work. Coordinate with Owner, deliver to Project Site and obtain receipt prior to final payment.

END OF SECTION

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: To aid the continued instruction of operating and maintenance personnel and to provide a positive source of information regarding the products incorporated into the Work, furnish and deliver the data described in this Section and in pertinent other Sections of these Specifications.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
 - 2. Required contents of submittals also may be amplified in pertinent other Sections of these Specifications.

1.2 QUALITY ASSURANCE

- A. In preparing data required by this Section, use only personnel who are thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Section and skilled in technical writing to the extent needed for communicating the essential data.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.
- B. Unless otherwise directed in other Sections or in writing by the Architect, submit one printed copy and one PDF copy of the final Manual to the Architect prior to instruction of Owner's operation and maintenance personnel.
- C. Contractor to submit required Operation and Maintenance Data as part of close-out Procedures for Phase One.

PART 2 PRODUCTS

2.1 INSTRUCTION MANUALS

- A. Where instruction Manuals are required to be submitted under other Sections of these Specifications, prepare in accordance with the provisions of this Section.
- B. Format:
 - 1. Size: 8-1/2" x 11"
 - 2. Paper: White bond, at least 20 lb. weight
 - 3. Text: Neatly printed (ink-jet or laser)
 - 4. Drawings: 11" in height preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the Manual and provide a drawing pocket inside rear cover or bind in with text.

5. Flysheets: Separate each portion of the Manual with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets may be in color.
 6. Binding: Use heavy-duty plastic or fiberboard covers with binding mechanism concealed inside the Manual; 3-ring binders will be acceptable; all binding is subject to the Architect's approval.
 7. Measurements: Provide all measurements in U. S. Standard units such as feet-and-inches, lbs, and cfm; where items may be expected to be measured within ten years in accordance with metric formula, provide additional measurements in the "international System of Units" (SI).
- C. Provide front and back covers and along the spine for each Manual, using durable material approved by the Architect and clearly identified on or through the cover with at least the following information:

OPERATING AND MAINTENANCE INSTRUCTIONS

name and address of Work

name of Contractor

general subject of this Manual

space for approval signature of the Architect and

approval date

- D. Contents: Include at least the following:
1. Neatly typewritten index near the front of the Manual, giving immediate information as to location within the Manual of all emergency information regarding the installation.
 2. Complete instructions regarding operation and maintenance of all equipment involved including lubrication, disassembly and reassemble.
 3. Complete nomenclature of all parts of all equipment.
 4. Complete nomenclature and part number of all replaceable parts, name and address of nearest vendor and all other data pertinent to procurement procedures.
 5. Copy of all guarantees and warranties issued.
 6. Manufacturer's bulletins, cuts and descriptive data, where pertinent, clearly indicating the precise items included in this installation and clearly, or otherwise clearly indicating, all manufacturers' data with which this installation is not concerned.
 7. Such other data as required in pertinent Sections of these Specifications.

PART 3 EXECUTION

3.1 INSTRUCTION MANUALS

- A. Preliminary:
1. Prepare a preliminary draft of each proposed Manual.
 2. Show general arrangement, nature of contents in each portion, probably number of drawings and their size and proposed method of binding and covering.
 3. Secure the Architect's approval prior to proceeding.

B. Final: Complete the Manuals in strict accordance with the approved preliminary drafts and the Architect's review comments.

C. Revisions:

1. Following the indoctrination and instruction of operation and maintenance personnel, review all proposed revisions of the Manual with the Architect.
2. If the Contractor is required by the Architect to review previously approved Manuals, compensation will be made as provided for under "Changes" in the General Conditions.

END OF SECTION

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included:

1. Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in Article 3.1 below.
2. Upon completion of the Work, transfer the recorded changes to a set of Record Documents prints, as described in Article 3.2 below.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
2. Other requirements affecting Project Records Documents may appear in pertinent other Sections of these Specifications.

1.2 QUALITY ASSURANCE

A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Architect.

B. Accuracy of records:

1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.
2. Accuracy of records shall be such that future search for items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.

C. Make entries within 24 hours after receipt of information that the change has occurred.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.

B. The Architect's approval of the current status of the Project Record Documents may be a prerequisite to the Architect's approval of requests for progress payment and request for final payment under the Contract.

C. Prior to submitting each request for progress payment, secure the Architect's approval of the current status of the Project Record Documents.

D. Prior to submitting request for final payment, submit the final Project Record Documents to the Architect and secure his approval.

1.4 PRODUCT HANDLING

- A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of all recorded data to the final Project Records Documents.
- B. In the event of loss of recorded data, use means necessary to again secure the data to the Architect's approval.
 - 1. Such means shall include, if necessary in the opinion of the Architect, removal and replacement of concealing materials.
 - 2. In such case, provide replacements to the standards originally required by the Contract Documents.

PART 2 PRODUCTS

2.1 RECORD DRAWINGS

- A. Job set: Promptly following receipt of the Owner's Notice to Proceed, secure from the Architect at no charge to the Contractor one complete set of all Drawings, for the sole purpose of recording a record of changes in the Contract Documents.
- B. Final Record Drawings: At a time nearing the completion of the Work, the Contractor shall secure from the Architect, at no charge to the Contractor, one complete set of all Drawings in the Contract and neatly transfer in red ink, date, and cloud all changes, additions, etc., on these so as to produce one complete set of Drawings indicating all modifications to the original Drawings.

PART 3 EXECUTION

3.1 MAINTENANCE OF JOB SET

- A. Immediately upon receipt of the job set described in Paragraph 2.1-A above, identify each of the Documents with the title, "Record Documents - Job Set".
- B. Preservation:
 - 1. Considering the Contract completion time, the probably number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Architect.
 - 2. Do not use the job set for any purpose except entry of new data and for review by the Architect, until start of transfer of data to final Project Record Documents.
 - 3. Maintain the job set at the site of Work as designated by the Architect.
- C. Making entries on Drawings:
 - 1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
 - 2. Date all entries.
 - 3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
 - 4. In the event of overlapping changes, use different colors for the overlapping changes.
- D. Make entries in the pertinent other Documents as approved by the Architect.
- E. Conversion of schematic layouts:
 - 1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts and similar items, are shown schematically and are not intended to portray precise physical layout.

- a. Final physical arrangement is determined by the Contract, subject to the Architect's approval.
 - b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the Drawings.
2. Show on the job set of Record Drawings, by dimension accurate to within one inch, the centerline of each run of items such as are described in subparagraph 3.1-E-1 above.
 - a. Clearly identify the item by accurate note such as "cast iron drain", "galv. water" and the like.
 - b. Show, by symbol or note, the vertical location of the item ("under slab", "in ceiling plenum", "exposed" and the like).
 - c. Make all identification sufficiently descriptive that it may be related reliably to the Specifications.
3. The Architect may waive the requirements for conversion of schematic layouts where, in the Architect's judgment, conversion serves no useful purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Architect.

3.2 FINAL PROJECT RECORDS DOCUMENTS

- A. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation and examination.
- B. Approval of recorded data prior to transfer:
 1. Following receipt of the Drawings described in Paragraph 2.1-B above, and prior to start of transfer of recorded data thereto,
 2. Make required revisions.
- C. Transfer of data to Drawings:
 1. Carefully transfer change data shown on the job set of Record Drawings to the corresponding final Record Drawings, coordinating the changes are required.
 2. Clearly indicate at each affected detail and other Drawing a full description of changes made during construction and the actual location of items described in Subparagraph 3.1-E-1 above.
 3. Call attention to each entry by drawing a "cloud" around the area or areas affected.
 4. Make changes neatly, consistently and with the proper media to assure longevity and clear reproduction.
- D. Transfer of data to other Documents:
 1. If the Documents other than Drawings have been kept clean during progress of the Work, and if entries thereon have been orderly to the approval of the Architect, the job set of those Documents other than Drawings will be accepted as final Record Documents.
 2. If any such Document is not so approved by the Architect, secure a new copy of that Document from the Architect at the Architect's usual charge for reproduction and handling, and carefully transfer the change data to the new copy to the approval of the Architect.
- E. Review and submittal:
 1. Submit the completed set of Project Record Documents to the Architect as described in Paragraph 1.3-D above.
 2. Participate in review meetings as required.
 3. Make required changes and promptly deliver the final Project Record Documents to the Architect.

3.3 CHANGES SUBSEQUENT TO ACCEPTANCE

- A. The Contractor has no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.**

END OF SECTION

DIVISION 02
EXISTING CONDITIONS

CONTENTS

02 30 00	Subsurface Investigation
02 41 00	Demolition

SECTION 02 30 00
SUBSURFACE INVESTIGATION

PART 1 GENERAL

1.1 DESCRIPTION

A. Soils investigation report:

1. A soils investigation report has been prepared by Geotechnical Testing Laboratory, Inc. and is included in the Project Manual, see APPENDIX A.
2. All borings information occurs in the soils investigation report.

B. Use of data:

1. This report was obtained only for the Architect's use in design and is not a part of the Contract Documents.
2. The report is not a warranty of subsurface conditions.
3. Contractor should visit the site and acquaint themselves with existing conditions.
4. Prior to construction, contractor may make their own subsurface investigations to satisfy themselves as to site and subsurface condition, but such investigations may be performed only under time schedules and arrangements approved in advance by the Architect.

1.2 QUALITY ASSURANCE

- A. A geotechnical engineer will be retained by the Owner to observe performance of work in connection with excavating, trenching, filling, backfilling and grading, and to perform compaction tests.
- B. Re-adjust work performed that does not meet technical or design requirements, but make no deviation from the Contract Documents without specific and written approval from the Architect.

END OF SECTION

SECTION 02 41 00

DEMOLITION

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Carefully demolish and remove from the site those items schedule to be so demolished and removed. Refer to Demolition Plan.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Condition and Sections in Division 1 of these Specifications.
 - 2. Section 01 32 16: Construction Progress Schedule/Phasing
 - 3. Section 01 73 29: Cutting and Patching

1.2 QUALITY ASSURANCE

- A. 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 the methods needed for proper performance of the work of this section.

PART 2 PRODUCTS

(No products are required in this Section)

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 DEMOLITION

- A. By careful study of the Contract Documents, determine the location and extend of selective demolition to be performed.
- B. In company with the Architect, visit the site and verify the extent and location of selective demolition required.
 - 1. Carefully identify limits of selective demolition.
 - 2. Mark interface surfaces as required to enable workmen also to identify items to be removed and items to be left in place intact.
- C. Prepare and follow an organized plan for demolition and removal of items:
 - 1. Shut off, cap and otherwise protect existing public utility lines in accordance with the requirements of the public agency or utility having jurisdiction.
 - 2. Completely remove items scheduled to be demolished and removed, leaving surfaces clean, solid and ready to receive new materials specified elsewhere.
 - 3. In all activities, comply with pertinent regulations of governmental agencies having jurisdiction.

- D. Demolished material shall be considered to be property of the Contractor and shall be completely removed from the job site, unless noted otherwise as to reuse or to be returned to Owner. Certain items as noted to remain property of the Owner.
- E. Use means necessary to prevent dust from becoming a nuisance to the public, to neighbors and to other work being performed on or near the site.
- F. Provide Drawings for location and extent of dustproof partitions to be constructed so as to insure containment of dust and debris.
- G. Refer to Drawings for location and extent of items to be removed but retained for reuse or relocation elsewhere in the Project. Specifically, this includes certain doors, windows, cabinet work and plaster moldings.

3.3 PHASING SEQUENCE

- A. All demolition shall be accomplished in such a way as to minimize the exposure of the existing building environment to the exterior elements.

3.4 REPLACEMENTS

- A. In the event of demolition of items not so scheduled to be demolished, promptly replace such items to the approval of the Architect and at no additional cost to the Owner.

END OF SECTION

**DIVISION 03
CONCRETE**

CONTENTS

03 10 00	Concrete Formwork
03 20 00	Concrete Reinforcement
03 30 00	Cast-In-Place Concrete

SECTION 03 10 00
CONCRETE FORMWORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 RELATED SECTIONS

- A. Cast-In-Place Concrete – Section 03 30 00.

1.3 REFERENCES

- A. American Concrete Institute (ACI)
117 Specifications for Tolerances for Concrete Construction and Materials
- B. American Society for Testing and Materials (ASTM)
 - 1. D994-98 (2003) Standard Specifications for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
 - 2. D1751-04 (2008) Standard Specifications for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
 - 3. D1752-04a (2008) Standard Specification for Preformed Sponge Rubber , Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

1.4 SUBMITTALS

- A. Provide manufacturer's product information (cut sheets) for the following forming materials:
 - 1. Form Ties
 - 2. Expansion Joint Material
 - 3. Formwork Release Agent

PART 2 – MATERIALS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete
 - 1. Forms for exposed finish concrete shall produce a smooth, uniform texture on the surface of the concrete.
 - 2. Use plywood, hardboard, metal, plastic or other approved material.
 - 3. Do not use damaged materials with raised grain, dents or other defects.

- B. Forms for Unexposed Finish Concrete
 - 1. Plywood, hardboard, metal, plastic or other material which will provide a relatively uniform surface that is free of honeycomb, voids or rock pockets.
 - 2. Excavation sidewalls shall not be used as forms.

2.1 FORM TIES

- A. Factory-fabricated, adjustable length, removable or snap-off metal ties designed to support forms and prevent deflection.
 - 1. Provide form ties with integral waterstops when required.
- B. For snap ties, provide a minimum of 1" of breakback.
 - 1. Form ties shall be designed to prevent spalling of concrete upon removal.
 - 2. Cone holes on the surface of the concrete shall be limited to 1" diameter.
- C. Absorptive Field-fabricated wire form ties are not acceptable.

2.3 FORM RELEASE AGENTS

- A. Commercially manufactured form release agents that will prevent formwork absorption of moisture, prevent bonding with the concrete and will not stain the concrete surface.
- B. Formwork release agents shall be compatible with subsequent concrete surface treatments required by the drawings or specifications.

2.4 EXPANSION JOINT MATERIAL

- A. Commercially manufactured expansion joint material; asphalt/bituminous, fiber, sponge rubber/cork or closed cell polyethylene.
- B. Expansion joint material shall meet the applicable ASTM requirements. Provide expansion joint material of the type and width as shown on the drawings.

2.2 OTHER IMBEDDED FORMING ITEMS

- A. Commercially or field fabricated chamfers, rustication strips and other imbedded form materials shall be suitable for intended use.
- B. Provided materials shall be smooth, straight, have a uniform cross-section and are free of defects.

PART 3 – EXECUTION

3.1 GENERAL

- A. Design and Engineering of formwork shall be the responsibility of the Contractor.
- B. Formwork shall be designed and selected to withstand the forces resulting from placement and vibration of concrete, while maintaining required tolerances.

3.2 LAYOUT AND CONSTRUCTION

- A. Locate concrete forms as required to provide flatwork and other features as required by the drawings.
- B. Forms shall be of the size, shape and alignment necessary to construct features as required by the drawings.
 - 1. Provide openings for sleeves, keyways, chamfers as required.
- C. To the extent possible, locate forms so as not to interfere with other trades' work.
- D. Fabricate forms to allow easy removal that does not require pounding or prying against concrete surfaces.
- E. Utilize form ties to secure forms and provide construction within specified tolerances; camber forms when necessary.
- F. Form butt joints solidly and securely, and provide backing material as necessary to prevent leakage and fins.
- G. Locate construction and expansion joints as shown on the drawings. Submit a written request for deviations from the jointing plan shown on the drawings to the A/E for approval prior to implementation.
- H. If construction joints are not shown, locate and form construction joints that least impairs the strength and appearance of the structure or slab.
 - 1. For exposed finishes on vertical concrete surfaces, provide rustication strips at construction joints.
 - 2. Locate and install all joints so that they are either parallel or perpendicular to finished surfaces, as applicable.

3.3 TOLERANCES

- A. Provide formwork that will provide finished slabs and structures meeting the following tolerances:
 - Variation from Plumb in Lines and Surfaces: $\frac{1}{4}$ " per 10', but not more than 1" total
 - Variation from Level or From Grade Indicated: $\frac{1}{4}$ " per 20'
 - Variation In Thickness of Slabs or Walls: Minus $\frac{1}{4}$ " or Plus $\frac{1}{2}$ "

3.4 PREPARING FORM SURFACES

- A. Cover surfaces of formwork with form release agent.
 - 1. Used forms shall be scraped clean and have all fasteners removed.
- B. Apply formwork release agent in accordance with manufacturer's recommendations.
 - 1. Do not allow formwork release agent to puddle in the forms.
- C. Do not allow formwork release agent to contact reinforcing steel or existing concrete surfaces requiring a bond.

- D. Reference EPA and OSHA regulations for formwork release agents or at least require EPA and OSHA compliance.

3.5 REMOVING FORMS

- A. Forms may be removed at the Contractor's discretion, but subject to the requirements of this section.
- B. When removing forms, utilize tools and methods that will prevent damage to concrete surfaces.
 - 1. Do not pry against, or pound on concrete surfaces to complete removal.
- C. Maintain curing and protection operations after removal of formwork.
- D. Forms for Flatwork:
 - 1. Forms for flatwork may be removed as soon as concrete is sufficiently hard to not be damaged during removal operations, but no sooner than 24 hours after final placement of concrete.
- E. Forms for Walls and Structures:
 - 1. Forms for walls and structures may be removed as soon as concrete has reached its specified 28-day compressive strength, but no sooner than 7 days after final placement of concrete.
- F. If the Contractor desires to remove forms prior to the concrete reaching its specified 28-day compressive strength, he may submit a written request for deviations to the A/E for approval prior to implementation.

END OF SECTION 03 10 00

SECTION 03 20 00
CONCRETE REINFORCEMENT

PART 1 – GENERAL

1.1 RELATED SECTIONS

- A. Cast-In-Place Concrete – Section 03 30 00.

1.3 PERFORMANCE REQUIREMENTS

- A. Comply with applicable requirements of the following standards, except as herein modified:
 - 1. ACI "Manual of Standard Practice for Detailing Reinforced Concrete Structures", ACI 315, latest edition.
 - 2. "Building Code Requirements for Reinforced Concrete", ACI 318.
 - 3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice".
 - 4. American Welding Society, AWS D1.4 "Structural Welding Code - Reinforcing Steel".

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. Shop drawings are required, complete, for all items under this Section.
 - 2. No part of any concrete work for this project shall be installed for which reinforcement shop drawings have not been submitted and reviewed for that part.
 - 3. Details of reinforcing shall conform to applicable reinforcements of reference specifications and standards as listed herein.
 - 4. Drawings shall indicate location, general spacing, and sizes and grades of the reinforcing members, together with all slots, chases, recesses, and openings required for installation of other items of work.
 - 5. Diagrams and general schedules shall indicate the bends, sizes, and lengths of reinforcing members and they shall clearly indicate by diagram or other easily recognizable mark exactly where the steel is to be placed in the beam, girder, slab, etc.
- B. Certificates:
 - 1. Submit copies of steel mill certificates of mill analysis, tensile and bend tests for reinforcing steel.
 - 2. Mill certificates shall be furnished at time of steel delivery.

PART 2 – MATERIALS

2.1 BARS

- A. ASTM A-615, Grade 60, deformed unless otherwise indicated.

2.3 BARS, WELDING GRADE

- A. ASTM A-706; max. 0.30% carbon; max. 0.60% manganese.

2.4 SUPPORTS FOR REINFORCEMENT

- A. Chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement in place shall be in accordance with CRSI Specifications and as specified hereinafter.
- B. Grade Beams and Slabs on Grade:
 - 1. Supports with sand plates or precast concrete blocks 3 in x 3 in. thickness required for bottom layer of steel.
 - 2. Concrete for blocks shall be of same density as concrete in which it is placed.
 - 3. Masonry units will not be allowed.
- C. Exposed Concrete:
 - 1. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected. (CRSI, Class 2).

2.2 TIE WIRE

- A. Shall be 18 ga. black annealed.

2.3 SHOP FABRICATION

- A. All bends and hooks shall conform to standard hook and radial bending details of ACT 315.
- B. Bars shall be bent cold. Heating of reinforcement or bending by any method not approved will not be permitted.
- C. Bars having kinks or bends not required by approved Bending Schedule shall not be used.
- D. Steel shall be bent by fabricator and delivered to the job in a prepared condition ready for installation unless otherwise approved.

PART 3 – EXECUTION

3.1 CLEANING

- A. Metal reinforcement shall be clean and free from rust, mill scale, oil, earth, ice, and other materials which reduce or destroy bond with concrete.

3.2 INSTALLATION

- A. Comply with the specified standards, and Concrete Reinforcing Steel Institute recommended practice for "Placing Reinforcing Bars" for details and methods of reinforcement placement and supports and as herein specified.

3.3 PLACING REINFORCEMENT

- A. Metal Reinforcement shall be accurately placed in accordance with the Drawings, details, and approved shop drawings.
 - 1. All reinforcement shall have the clearances shown on Drawings and as herein specified.

- B. Adequate chairs shall be placed under all reinforcing to prevent sagging or to prevent being bent when it is in slabs that will be walked on when pouring is taking place.
- C. All wire tying of reinforcing shall be tight loop or a double loop which will prevent bars from slipping or turning over as the concrete operation proceeds, using tie wire.
 - 1. Loose ends of the wires shall be close cut to prevent their becoming exposed in the finished surfaces.
 - 2. Stirrups in beams and girders and ties in columns shall be wired to principal reinforcing members.
- D. When splices other than those shown on Drawings are required, character and detail of splice shall be as approved.
- E. Welding shall not be carried out on any reinforcement without prior approval.
- F. Contractor shall have as many qualified men on hand as necessary to check the steel continuously as the concrete placing is in progress.
 - 1. Their job shall be to make sure there are no changes in the positioning of the steel and to keep the personnel who are placing the concrete from walking on or otherwise dislocating the steel.
- G. Tying:
 - 1. Saddle tie reinforcing at intersections with tie wire.
 - 2. Wire stirrups to both top and bottom bars.
- H. Outside Bars:
 - 1. Place outside bars of slab reinforcement, both main and temperature, parallel to beams or walls, not more than 1/2 bar spacing away from adjacent face of such parallel members.

3.4 SPLICES

- A. General:
 - 1. Do not splice bars at points of maximum stress.
 - 2. Stagger splices in continuous adjacent bars.
- B. Unless indicated otherwise in Drawings, lap reinforcing steel as follows:
 - 1. Unscheduled Bars: 36 bar diameters at splices.
 - 2. Horizontal Wall Steel: 90 degree bends and 12 inch returns at corners.

3.5 ANCHORS AND FITTINGS

- A. Provide all anchors and fittings, etc., required for proper construction of concrete work and the bonding of masonry that is to be anchored to concrete.
- B. Locations, spacing, type of fittings and anchors, etc., shall be according to standard practice and as shown on Drawings.

3.6 RODS AND STIRRUPS

- A. Where there are no stirrups scheduled and/or indicated on the Drawings for beams, No. 3 bar stirrups shall be provided in accordance with the beam schedule notes as listed on the Drawings, or closer if necessary to tie and support the steel in place.
- B. Furnish cut rods of No. 3 or No. 4 bars as may be required for supporting top steel in beams, girders, etc., to hold it in position. These rods shall be securely hung from spreaders or braces on the formwork.

3.7 CONCRETE PROTECTION FOR REINFORCEMENT

A. General:

1. Reinforcement (including stirrups) shall be protected by the thickness of concrete indicated on the drawings.

B. Minimum Coverage:

1. Unless otherwise shown, the thickness of concrete over reinforcement including stirrups shall be as follows:
 - Where concrete is deposited against ground without forms, not less than 3 inches.
 - Where concrete may be exposed to the ground but where placed in forms, not less than 2 inches.
 - All concrete exposed to the weather, not less than 2 in.
 - In slabs not exposed to weather, not less than 3/4 in.

- C. In all cases, the thickness of concrete over reinforcement shall be at least equal to the diameter of the bars except at slabs and joists.

3.8 BLOCK-OUTS OR PENETRATIONS IN ALL CONCRETE

- A. Shall have reinforcing bars 1/2 in. dia. x 2 ft. - 0 in., placed diagonal to the corners of the block-out, or in a square pattern at circular penetrations, unless indicated otherwise.

3.9 INSPECTION OF STEEL PLACEMENT

- A. Contractor shall give 24 hours notice to obtain approval of placement of reinforcing steel before concrete is placed.
- B. Such inspection is in nature of assisting Contractor to minimize errors, and in no case will it operate to relieve Contractor of his responsibility to provide materials and workmanship required by Contract Documents.

END OF SECTION 03 20 00

SECTION 03 30 00

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 1 Specification Sections, apply to this Section.

1.2 RELATED SECTIONS

- A. Concrete Formwork – Section 03 10 00.
- B. Concrete Reinforcement – Section 03 20 00.

1.3 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.
- B. Cast-in-place concrete includes the following:
 - 1. Foundations.
 - 2. Slabs-on-grade.

1.4 SUBMITTALS

- A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect.
- C. Shop drawings for reinforcement detailing, fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement.
- D. Material certificates in lieu of material laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

1.5 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
 - 2. ACI 318, "Building Code Requirements for Reinforced Concrete."
 - 3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."
- B. Concrete Testing Service: The Contractor will employ a testing agency to perform material

evaluation tests and to design concrete mixes.

- C. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.
- D. Provide 72 hour notice prior to pouring concrete to allow for form work and reinforcement placement inspection by the Engineer and Architect.

PART 2 – PRODUCTS

2.1 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
 - 1. Use one brand of cement throughout Project unless otherwise acceptable to Architect.
- B. Fly Ash: ASTM C 618, Type C.
- C. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.
 - 1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.
 - 2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.
- D. Water: Potable.
- E. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.
- F. Water-Reducing Admixture: ASTM C 494, Type A.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Chemtard, ChemMasters Corp.
 - b. Eucon WR-75, Euclid Chemical Co.
 - c. WRDA, W.R. Grace & Co.
 - d. Pozzolith Normal or Polyheed, Master Builders, Inc.
 - e. Metco W.R., Metalcrete Industries.
 - f. Prokrete-N, Prokrete Industries.
 - g. Plastocrete 161, Sika Corp.
- G. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Super P, Anti-Hydro Co., Inc.
 - b. Eucon 37, Euclid Chemical Co.
 - c. WRDA 19 or Daracem, W.R. Grace & Co.
 - d. Rheobuild or Polyheed, Master Builders, Inc.
 - e. Superslump, Metalcrete Industries.
 - f. PSPL, Prokrete Industries.
 - g. Sikament 300, Sika Corp.
- H. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Q-Set, Conspec Marketing & Manufacturing Co.

- b. Accelguard 80, Euclid Chemical Co.
 - c. Daraset, W.R. Grace & Co.
 - d. Pozzutec 20, Master Builders, Inc.
 - e. Accel-Set, Metalcrete Industries.
- I. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Eucon Retarder 75, Euclid Chemical Co.
 - b. Daratard-17, W.R. Grace & Co.
 - c. Pozzolite R, Master Builders, Inc.
 - d. Protard, Prokrete Industries.
 - e. Plastiment, Sika Corporation.

2.2 RELATED MATERIALS

- A. Sand Cushion: Clean, manufactured or natural sand.
- B. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154, as follows:
- 1. Polyethylene sheet not less than 12 mils thick.
- C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- D. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
- 1. Waterproof paper.
 - 2. Polyethylene film.
 - 3. Polyethylene-coated burlap.
- E. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. A-H 3 Way Sealer, Anti-Hydro Co., Inc.
 - b. Spartan-Cote, The Burke Co.
 - c. Conspec #1, Conspec Marketing & Mfg. Co.
 - d. Day-Chem Cure and Seal, Dayton Superior Corp.
 - e. Eucocure, Euclid Chemical Co.
 - f. Horn Clear Seal, A.C. Horn, Inc.
 - g. L&M Cure R, L&M Construction Chemicals, Inc.
 - h. Masterkure, Master Builders, Inc.
 - i. CS-309, W.R. Meadows, Inc.
 - j. Seal N Kure, Metalcrete Industries.
 - k. Kure-N-Seal, Sonneborn-Chemrex.
 - l. Stontop CS2, Stonhard, Inc.
- F. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Aquafilm, Conspec Marketing and Mfg. Co.
 - b. Eucobar, Euclid Chemical Co.
 - c. E-Con, L&M Construction Chemicals, Inc.
 - d. Confilm, Master Builders, Inc.
 - e. Waterhold, Metalcrete Industries.

- G. Bonding Agent: Polyvinyl acetate or acrylic base.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Polyvinyl Acetate (Interior Only):
 1. Superior Concrete Bonder, Dayton Superior Corp.
 2. Euco Weld, Euclid Chemical Co.
 3. Weld-Crete, Larsen Products Corp.
 4. Everweld, L&M Construction Chemicals, Inc.
 5. Herculox, Metalcrete Industries.
 6. Ready Bond, Symons Corp.
 - b. Acrylic or Styrene Butadiene:
 1. Acrylic Bondcrete, The Burke Co.
 2. Strongbond, Conspec Marketing and Mfg. Co.
 3. Day-Chem Ad Bond, Dayton Superior Corp.
 4. SBR Latex, Euclid Chemical Co.
 5. Daraweld C, W.R. Grace & Co.
 6. Hornweld, A.C. Horn, Inc.
 7. Everbond, L&M Construction Chemicals, Inc.
 8. Acryl-Set, Master Builders Inc.
 9. Intralok, W.R. Meadows, Inc.
 10. Acrylpave, Metalcrete Industries.
 11. Sonocrete, Sonneborn-Chemrex.
 12. Stonlock LB2, Stonhard, Inc.
 13. Strong Bond, Symons Corp.
- H. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Burke Epoxy M.V., The Burke Co.
 - b. Spec-Bond 100, Conspec Marketing and Mfg. Co.
 - c. Resi-Bond (J-58), Dayton Superior.
 - d. Euco Epoxy System #452 or #620, Euclid Chemical Co.
 - e. Epoxitite Binder 2390, A.C. Horn, Inc.
 - f. Epabond, L&M Construction Chemicals, Inc.
 - g. Concrevice Standard Liquid, Master Builders, Inc.
 - h. Rezi-Weld 1000, W.R. Meadows, Inc.
 - i. Metco Hi-Mod Epoxy, Metalcrete Industries.
 - j. Sikadur 32 Hi-Mod, Sika Corp.
 - k. Stonset LV5, Stonhard, Inc.
 - l. R-600 Series, Symons Corp.

2.3 PROPORTIONING AND DESIGNING MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
1. Do not use the same testing agency for field quality control testing.
 2. Limit use of fly ash to not exceed 20 percent of cement content by weight.
 3. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect.
 4. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:
 - a. 3000-psi, 28-day compressive strength; water-cement ratio, 0.58 maximum (non-air-entrained), 0.52 maximum (air-entrained).

5. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
 - a. Reinforced foundation systems: As indicated on plans.
 - b. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to 2-to-3-inch slump concrete.
6. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.

2.4 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability or when pumping concrete.
- B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
- C. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.5 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
 1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 – EXECUTION

3.1 GENERAL

- A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 VAPOR RETARDER/BARRIER INSTALLATION

- A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.
- B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.
 1. Cover sand cushion with vapor retarder/barrier.

3.3 JOINTS

- A. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- B. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces as indicated.

- C. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.
 - 1. Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
 - 2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.

3.4 INSTALLING EMBEDDED ITEMS

- A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.
- B. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.5 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.
 - 1. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.
- C. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
 - 1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
 - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.
- D. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
 - 1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
 - 2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 - 3. Maintain reinforcing in proper position on chairs during concrete placement.

- E. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 - a. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - b. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- F. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
 - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
 - a. Fog spray forms, reinforcing steel, and subgrade just before placing concrete.
 - b. Keep subgrade moisture uniform without puddles or dry areas.
 - 3. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

3.6 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.
- B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- C. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.
 - 1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. Related Unformed Surfaces: At horizontal offsets and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.7 MONOLITHIC SLAB FINISHES

- A. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.
 - 1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- B. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.
 - 1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 25 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.
- C. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.
- D. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.8 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
 - 1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- B. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.
- C. Provide moisture curing by the following methods:
 - 1. Keep concrete surface continuously wet by covering with water.
 - 2. Use continuous water-fog spray.
 - 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.

- D. Provide moisture-retaining cover curing as follows:
 - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- E. Apply curing compound on exposed interior slabs and on exterior slabs:
 - 1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - 2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
- F. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- G. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.
 - 1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.9 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.
- B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
 - 1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
 - 2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
 - 1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
 - 1. Repair finished unformed surfaces containing defects that affect the concrete's durability.

Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.

2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- E. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- F. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
- G. Repair methods not specified above may be used, subject to acceptance of Architect.

3.10 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. General: The Contractor will employ a testing agency to perform tests and to submit test reports.
- B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect.
1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - b. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
 - c. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
 - d. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
 - a. When total quantity of a given class of concrete is less than 50 cu. yd., Architect may waive strength testing if adequate evidence of satisfactory strength is provided.
 - b. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

- C. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
- D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- E. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed and this retesting shall be paid for by the Contractor.

END OF SECTION 03 30 00

DIVISION 04
MASONRY

CONTENTS

04 20 00	Unit Masonry
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SECTION 04 20 00

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.

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Face brick.
3. Mortar and grout.
4. Steel reinforcing bars.
5. Masonry joint reinforcement.
6. Ties and anchors.
7. Embedded flashing.
8. Miscellaneous masonry accessories.
9. Masonry-cell insulation.

B. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete" for dovetail slots for masonry anchors.
2. Division 04 Section "Cast Stone Masonry" for furnishing cast stone trim.
3. Division 05 Section "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
4. Division 05 Section "Metal Fabrications" for furnishing steel lintels and shelf angles for unit masonry.
5. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry units.
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

1. Prism Test: For each type of construction required, according to ASTM C 1314.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For the following:
 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.
 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection:
 1. Face brick, in the form of straps of five or more bricks.
- D. Samples for Verification: For each type and color of the following:
 1. Exposed CMUs.
 2. Concrete facing brick.
 3. Face brick, in the form of straps of five or more bricks.
 4. Special brick shapes.
 5. Weep holes.
 6. Accessories embedded in masonry.

1.6 INFORMATIONAL SUBMITTALS

- A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
 1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- B. Qualification Data: For testing agency.
- C. Material Certificates: For each type and size of the following:
 1. Masonry units.
 - a. Include data on material properties.
 - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
 - c. For exposed brick, include test report for efflorescence according to ASTM C 67.
 - d. For masonry units, include data and calculations establishing average net-area compressive strength of units.
 2. Cementitious materials. Include brand, type, and name of manufacturer.

3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 4. Grout mixes. Include description of type and proportions of ingredients.
 5. Reinforcing bars.
 6. Joint reinforcement.
 7. 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 C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.7 QUALITY ASSURANCE

- 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. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- D. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Division 01 Section "Quality Requirements" for mockups.
1. Build sample panels for each type of exposed unit masonry construction in sizes approximately 48 inches long by 48 inches high by full thickness.
 2. Clean one-half of exposed faces of panels with masonry cleaner indicated.
 3. Protect approved sample panels from the elements with weather-resistant membrane.
 4. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
 - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.8 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 designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and 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.

1.9 PROJECT 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.
 - 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover 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 contained in ACI 530.1/ASCE 6/TMS 602.
 - 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 contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 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 indicated as bullnose.
- B. CMUs: ASTM C 90.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi.
 - 2. Density Classification: Normal weight.
 - 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.3 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
 - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 - 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 - 3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 - 4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

- B. Face Brick: Facing brick complying with ASTM C 216.

1. Grade: SW.
2. Type: FBX.
3. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
4. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
5. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.
6. Application: Use where brick is exposed unless otherwise indicated.
7. Color and Texture: As selected by Architect.

2.4 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.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C 91.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Capital Materials Corporation; Flamingo Color Masonry Cement.
 - b. Cemex S.A.B. de C.V.; Brikset Type N.
 - c. Essroc, Italcementi Group; Brixment.
 - d. Holcim (US) Inc.; Mortamix Masonry Cement.
 - e. Lafarge North America Inc.; Magnolia Masonry Cement.
 - f. Lehigh Cement Company; Lehigh Masonry Cement.
 - g. National Cement Company, Inc.; Coosa Masonry Cement.
- E. Mortar Cement: ASTM C 1329.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Lafarge North America Inc.; Lafarge Mortar Cement or Magnolia Superbond Mortar Cement.
- F. 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.
 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- G. Aggregate for Grout: ASTM C 404.
- H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with

ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Euclid Chemical Company (The); Accelguard 80.
- b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.
- c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.

I. Water: Potable.

2.5 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

1. Exterior Walls: 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. Wire Size for Veneer Ties: 0.148-inch diameter.
5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

D. Masonry Joint Reinforcement for Multiwythe Masonry:

1. Ladder type with 1 side rod at each face shell of hollow masonry units more than 4 inches wide, plus 1 side rod at each wythe of masonry 4 inches wide or less.
2. Tab type, either ladder or truss design, with 1 side rod at each face shell of backing wythe and with rectangular tabs sized to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.
3. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.

2.6 TIES AND ANCHORS

A. 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/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
2. Galvanized Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 zinc coating.
3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
4. Stainless-Steel Bars: ASTM A 276 or ASTM A 666, Type 304.

B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway

through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.

- C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units.
 2. Where wythes are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
 3. Wire: Fabricate from 3/16-inch-diameter, hot-dip galvanized steel wire.
- D. 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. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire.
 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.187-inch-diameter, hot-dip galvanized steel wire.
- E. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.
- F. Adjustable Masonry-Veneer Anchors:
1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
 - a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
 2. Contractor's Option: Unless otherwise indicated, provide any of the following types of anchors:
 3. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Dayton Superior Corporation, Dur-O-Wal Division; D/A 213 or.
 - 2) Heckmann Building Products Inc.; 315-D with 316 or Pos-I-Tie.
 - 3) Hohmann & Barnard, Inc.; DW-10 or DW-10-X.
 - 4) Wire-Bond; 1004, Type III or SureTie.
 - b. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, 2-3/4 inches wide by 3 inches high; with projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section.
 - c. Anchor Section: Sheet metal plate, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 3-5/8 inches long, stamped into center to provide a slot between strap and plate for inserting wire tie.

- d. Anchor Section: Gasketed sheet metal plate, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch wide by 6 inches long, stamped into center to provide a slot between strap and plate for inserting wire tie. Provide anchor manufacturer's standard, self-adhering, modified bituminous gaskets manufactured to fit behind anchor plate and extend beyond pronged legs.
 - e. Anchor Section: Corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed, washer head that covers hole in sheathing.
 - f. Fabricate sheet metal anchor sections and other sheet metal parts from 1.05-inch-thick, steel sheet, galvanized after fabrication.
 - g. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.187-inch-diameter, hot-dip galvanized steel wire.
4. Slip-in, Masonry-Veneer Anchors: Units consisting of a wire tie section and an anchor section designed to interlock with metal studs and be slipped into place as sheathing is installed.
- a. Products: Subject to compliance with requirements, provide the following:
 - 1) Hohmann & Barnard, Inc.; AA308.

2.7 MISCELLANEOUS ANCHORS

- A. Unit Type Inserts in Concrete: Cast-iron or malleable-iron wedge-type inserts.
- B. Dovetail Slots in Concrete: Furnish dovetail slots with filler strips, of slot size indicated, fabricated from 0.034-inch, galvanized steel sheet.
- C. Anchor Bolts: Headed steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

2.8 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with Division 07 Section "Sheet Metal Flashing and Trim" and as follows:
 - 1. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. weight or 0.0216 inch thick or ASTM B 370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. weight or 0.0162 inch thick.
 - 2. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
 - 3. Metal Drip Edge: Fabricate from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
- B. Application: Unless otherwise indicated, use the following:
 - 1. Where flashing is indicated to receive counterflashing, use metal flashing.

2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
 3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge.
 4. Where flashing is fully concealed, use metal flashing.
- C. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from high-density polyethylene incorporating chemical stabilizers that prevent UV degradation. Cell flashing pans have integral weep spouts that are designed to be built into mortar bed joints and weep collected moisture to the exterior of CMU walls and that extend into the cell to prevent clogging with mortar.
1. Products: Subject to compliance with requirements, provide the following:
 - a. Mortar Net USA, Ltd.; Blok-Flash.
- D. Solder and Sealants for Sheet Metal Flashings: As specified in Division 07 Section "Sheet Metal Flashing and Trim."
- E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane, or PVC.
- B. 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.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Advanced Building Products Inc.; Mortar Break.
 - b. Archovations, Inc.; CavClear Masonry Mat.
 - c. Dayton Superior Corporation, Dur-O-Wal Division; Polytite MortarStop.
 - d. Mortar Net USA, Ltd.; Mortar Net.
 2. Provide one of the following configurations:
 - a. Strips, full-depth of cavity and 10 inches high, with dovetail shaped notches 7 inches deep that prevent clogging with mortar droppings.
 - b. Strips, not less than 3/4 inch thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with

- c. mortar.
- d. Sheets or strips full depth of cavity and installed to full height of cavity.
- d. Sheets or strips not less than 3/4 inch thick and installed to full height of cavity with additional strips 4 inches high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from clogging with mortar.

E. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and 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. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
 - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
 - c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
 - d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.10 MASONRY-CELL INSULATION

A. Molded-Polystyrene Insulation Units: Rigid, cellular thermal insulation formed by the expansion of polystyrene-resin beads or granules in a closed mold to comply with ASTM C 578, Type I. Provide specially shaped units designed for installing in cores of masonry units.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Concrete Block Insulating Systems; Korfil.
 - b. Shelter Enterprises Inc.; Omni Core.

2.11 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.

2.12 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 portland cement-lime, masonry cement, or mortar cement mortar unless otherwise indicated.

3. For exterior masonry, use portland cement-lime, masonry cement, or mortar cement mortar.
 4. For reinforced masonry, use portland cement-lime, masonry cement, or mortar cement mortar.
 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- 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 masonry below grade or in contact with earth, use Type M.
 2. For reinforced masonry, use Type S.
 3. For mortar parge coats, use Type S.
 4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
- 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 Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

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 work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness

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shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D. 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.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 - 1. Mix units from several pallets or cubes as they are placed.

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 except due to warpage of masonry units within tolerances specified for warpage of units.
- 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. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
- 5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

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 or bonded by lapping not less than 2 inches. 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 racking 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 non-load-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. Wedge non-load-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.

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow brick and CMUs as follows:
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1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units 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. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
1. For glazed masonry units, use a nonmetallic jointer 3/4 inch or more in width.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.6 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:
1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 4.5 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
 - a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
 - b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type ties to allow for differential movement regardless of whether bed joints align.
 2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
 - a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
 - b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties.
 - c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties to allow for differential movement regardless of whether bed joints align.
 3. Header Bonding: Provide masonry unit headers extending not less than 3 inches into each wythe. Space headers not over 8 inches clear horizontally and 16 inches clear vertically.
 4. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.
- B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove

mortar fins protruding into cavity.

- C. Coat cavity face of backup wythe to comply with Division 07 Section "Bituminous Dampproofing."

3.7 MASONRY-CELL INSULATION

- A. Pour fill foamed-in-place insulation into concrete masonry unit cells.

3.8 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 12 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. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.9 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.

3.10 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:
 - 1. Fasten screw-attached anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 - 2. Insert slip-in anchors in metal studs as sheathing is installed. Provide one anchor at each stud in each horizontal joint between sheathing boards.
 - 3. Embed tie sections in masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and face of sheathing.
 - 4. Locate anchor sections to allow maximum vertical differential movement of ties up and

UNIT MASONRY

- down.
5. Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than 1 anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.

3.11 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion 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. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
 2. Install preformed control-joint gaskets designed to fit standard sash block.
 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
 4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.
- C. Form expansion joints in brick as follows:
 1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
 2. Build flanges of factory-fabricated, expansion-joint units into masonry.
 3. Build in compressible joint fillers where indicated.
 4. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Division 07 Section "Joint Sealants."
- D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 07 Section "Joint Sealants," but not less than 3/8 inch.
 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.12 LINTELS

- A. Install steel lintels where indicated.
- B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.13 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 4 inches, and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches on interior face.
 3. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under building paper or building wrap, lapping at least 4 inches.
 4. Install metal drip edges with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- E. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
1. Space weep holes 24 inches o.c. unless otherwise indicated.
- F. Place pea gravel in cavities as soon as practical to a height equal to height of first course above top of flashing, but not less than 2 inches, to maintain drainage.
- G. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- H. Install vents in head joints in exterior wythes at spacing indicated. Use open head joints to form vents.
1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.14 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 ACI 530.1/ASCE 6/TMS 602.
- 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 ACI 530.1/ASCE 6/TMS 602 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.

3.15 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.
- B. Inspections: Level 1 special inspections according to the "International Building Code."
 - 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.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.
- F. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- G. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- H. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- I. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.
- J. Prism Test: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.

3.16 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. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 - 6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
 - 7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.17 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. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 - 1. Crush masonry waste to less than 4 inches in each dimension.
 - 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Division 31 Section "Earth Moving."
 - 3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 20 00

SECTION 04 22 00

CONCRETE UNIT MASONRY

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Provide concrete unit masonry (CMU), non-load bearing, load-bearing, solid shapes and bond beams where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Work:
 - 1. Documents affecting work of this Section included, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division:
 - 04 20 00 Unit Masonry
 - 07 10 00 Dampproofing and Waterproofing
 - 07 92 00 Joint Sealant.

1.2 QUALITY ASSURANCE

- A. 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 the methods needed for proper performance of the work of this Section.
- B. The following ASTM standards shall apply: ASTM C33, ASTM C90, ASTM C129, ASTM C140, ASTM C331, ASTM C1093.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.
- B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications and other data needed to provide compliance with the specified requirements.
- C. Samples
 - 1. Actual samples of standard colors.
 - 2. Full size units of each type selected.
- D. Mock-up Panel
 - 1. Allow for one (1) 48" x 48" wall section showing typical running bond wall and joint type.
 - 2. Allow for one (1) additional 48" x 48" wall section if required by Architect's review.
 - 3. Panel may be part of actual wall and may remain in place if approved by Architect.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.
- B. Store masonry units above ground on level platforms, which allow air circulation under the stacked units.
- C. Cover and protect against wetting prior to use.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Concrete Masonry Units (smooth) - Where indicated on Drawings provide lightweight blocks, high pressure steam cured at 350 degrees. Moisture content to be .030% as measured by ASTM-C426, load bearing conforming to requirements of ASTM-C-90-75. To be of nominal 4 x 8 x 16, 6 x 8 x 16 and 8 x 8 x 16 sizes, except as noted. Certain units to be non-load bearing and others to be load bearing, see STRUCTURAL for load bearing conditions. To be laid running bond and as per Drawings. To be painted. Units to be free from chips and cracks.
- B. Two Hour Rated Concrete Masonry Units - Where indicated on the Drawings, provide lightweight blocks meeting all criteria indicated in 2.1A above and with the Block Classification D-2 for 2 hour wall construction, meeting all requirements of UL Design No. U-906.
- C. Special shapes include 2" thick solid concrete masonry units used as tops of CMU veneer columns, see Drawings for locations.
- D. Bond beams - see STRUCTURAL, but in general provide CMU lintel blocks, size as required for span, reinforced with 2#6 bars min. filled with concrete.
- E. Dimensions:
 - 1. Provide units of the dimensions shown on the Drawings.
 - 2. Where dimensions are not shown on the Drawings, provide units having nominal face dimensions of 16" long by 8" high by the depth shown or otherwise required.
 - 3. Where CMU is hidden within masonry wall, Contractor may use most convenient size to suit condition.
- F. Accessory Shapes:
 - 1. Provide accessory shapes as indicated or otherwise required, such as lintel blocks, corners, jambs, headers, bond, L-corners, half-height, etc.
 - 2. Exposed faces of corner block units to consistently match, smooth/smooth or ground face/ground face.
 - 3. Provide solid sill shapes as indicated on the Drawings.

2.2 REINFORCEMENT AND ACCESSORIES

- A. Comply with the following as minimums:
 - 1. Bars: ASTM A615, Grade 40, unless otherwise shown on the Drawings, using deformed bars for Number 3 and larger.
 - 2. Bending: ACI 318.
 - 3. Continuous Masonry Wire Reinforcing:
 - a. Provide welded wire units prefabricated in straight lengths of not less than 10', with matching corner and tee units. Fabricate from cold-drawn steel wire complying with ASTM A82, with deformed continuous side rods and plain cross rods, and a unit width of 1 ½" to 2" less than thickness of wall or partition. Provide manufacturer's standard mill galvanized finish.
 - b. Use truss type fabricated with single pair of 9 gauge side rods, and 9 gauge continuous diagonal cross rods spaced not more than 16" o.c.
 - c. Products by Hohmann & Barnard, Dur-O Wall are acceptable or approved equals.
- B. Fabricate reinforcement in accordance with recommendations contained in the CRSI "Manual of Standard Practices".
- C. See Section 04 20 00 Unit Masonry, Section 3.5 JOINT REINFORCEMENT, for specifics regarding joint reinforcement at all exterior walls where concrete masonry units are used.

2.3 MORTAR

- A. Ingredients:

1. Portland Cement: Comply with ASTM C150, Type I.
2. Lime:
 - a. Provide hydrated lime complying with ASTM C207, or quicklime complying with ASTM C5.
 - b. When quicklime is used, slake and then screen through a 16 mesh sieve. After slaking and screening, but before using, store and protect for no less than ten (10) days.
3. Aggregate: Provide clean, sharp, well graded aggregate free from injurious amounts of dust, lumps, shale, alkali, surface coatings, and organic matter and complying with ASTM C144.
4. Water: Provide water free from deleterious amounts of acids, alkalis, and organic materials.

B. Mixing:

1. Provide mortar Type "S", and in accordance with ASTM C270.
2. Proportions:
 - a. For Type "S" mortar, provide one part Portland Cement to 1/2 part hydrated lime and 4-1/2 parts sand by volume.
3. Mechanically mix in a bath mixer for not less than three minutes using only sufficient water to produce a mortar which is spreadable and of a workable consistency.
4. Re-temper mortar with water as required to maintain high plasticity.
 - a. On mortar boards, re-temper only by adding water within a basin formed with mortar, and by working the mortar into the water.
 - b. Discard and do not use mortar which is unused after 1-1/2 hours following initial mixing.

2.4 GROUT

A. Ingredients:

1. Portland Cement: Comply with ASTM C150, Type I.
2. Aggregate: Provide clean, sharp, well graded aggregate free from injurious amounts of dust, lumps, shale, alkali, surface coatings and organic matter.
3. Admixtures: Do not use admixtures unless specifically approved in advance by the Architect.
4. Water: Provide water free from injurious amounts of acids, alkalis and organic materials.

B. Mixing:

1. Provide "fine grout" or "coarse grout" as designated on the Drawings or otherwise directed by the Architect, and in accordance with ASTM C476.
2. When the minimum grout compressive strength is required to be more than 2000 psi, provide laboratory design mix prepared as required for design mixes of concrete under Section 03300 of these Specifications.
3. Proportions:
 - a. For "fine grout", provide one part Portland Cement to 2-1/4 parts minimum to 3 parts maximum of damp loose sand, with sufficient water to achieve fluid consistency.
 - b. For "coarse grout", provide one part Portland Cement to 3 parts maximum of damp loose sand to two parts coarse aggregate, with sufficient water to achieve fluid consistency.
4. "Fluid consistency" is interpreted as meaning as fluid as possible for pouring intimately in place without segregation.

- C. Use "fine grout" where called for on the Drawings, where the grout space is less than 3" in its least dimension, and where otherwise directed by the Architect or required by governmental agencies having jurisdiction.

2.5 FLASHING

- A. Reference Section 07 15 00 Dampproofing for all requirements.

- B. Install at base of walls, shelf angles, lintels, heads, and sills of exterior wall openings or as shown in the Drawings. Lap continuous flashing pieces 6" and seal laps. Turn up ends of discontinuous flashing to form end dams. Extend flashing 1/2" beyond wall face, turn down and form drip edge, using separate metal flashing as needed.

- C. Insure weep holes are clear and open for drainage by use of fiberglass mesh products at flashing and at weep holes.
 - D. Install weep holes at 24" o.c. min.
- 2.6 Moisture Barrier Coating on CMU: See Section 07 15 00 Dampproofing. To be used where CMU is a back-up to brick veneer.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. do not proceed until unsatisfactory conditions are corrected.

3.2 ENVIRONMENTAL CONDITIONS

- A. Do not place masonry units when air temperature is below 40 degrees Fahrenheit.
- B. Protect masonry construction from direct exposure to wind and sun when erected in ambient air temperature of 99 degrees Fahrenheit in the shade, with relative humidity less than 50%.

3.3 INSTALLATION

A. General:

1. Do not commence installation of the work of this Section until horizontal and vertical alignment of foundation is within 1" of plumb and the lines shown on the Drawings.
2. Lay only dry masonry units.
3. Use masonry saws to cut and fit masonry units.
4. Set units plumb, true to line and with level courses accurately spaced.
5. Clean the top surface of foundation free from dirt, debris and laitance and expose the aggregate prior to start of installing first course.
6. Accurately fit the units to plumbing, ducts, openings and other interfaces, neatly patching all holes.
7. Keep the walls continually clean, preventing grout and mortar stains. If grout does run over, clean immediately.
8. Insure air space remains free of mortar droppings by use of good construction practices. Use "Mortar-Net Solutions", "Mortar Break", Mortar Maze", or approved equal mortar deflection mesh at all base flashing and vent filler mesh at weep holes installed as per manufacturer's recommendations.

- B. Unless otherwise shown on the Drawings, provide running bond with vertical joints located at center of masonry units in the alternate course below.

- C. Do not use chipped or broken units. If such units are discovered in the finished wall, the Architect may require their immediate removal and replacement with new units at no additional cost to the Owner.

D. Laying up:

1. Place units in mortar with full shovel bed and head joints.
2. Align vertical cells of hollow units to maintain a clear and unobstructed system of flues.
3. Tooled joints.
4. Provide expansion joints to correspond with exterior brick expansion joints, 30'-0" o.c. maximum, and 48" from corners.
5. At interior CMU walls, provide expansion joints 30'-0" o.c., maximum.

E. Reinforcement:

1. Provide reinforcement as shown on the Drawings or as required by these Specifications, fully embedded in grout or in mortar or mortar joints.
2. If used, provide required metal accessories to ensure adequate alignment of steel during grout filling operations.

F. Flashing: Reference Section 07 15 00 Dampproofing for all requirements.

G. Tooling:

1. Tool joints to a dense, smooth surface.
2. Unless otherwise shown on the Drawings, provide joints of "tooled" pattern throughout.

3.4 GROUTING

A. Perform grouting in strict accordance with the provisions of the governing building code.

1. Solidly fill vertical cells containing reinforcement.
2. Consolidate grout at time of pour by puddling with a mechanical vibrator, filling all cells of the masonry, and then reconsolidating later by puddling before the plasticity is lost.

3.5 CLEANING

A. Inspection and adjustment:

1. Upon completion of the work of the Section, make a thorough inspection of installed masonry and verify that units have been installed in accordance with the provisions of this Section.
2. Make necessary adjustments.

B. Clean surfaces of masonry as required for proper application of the specified finishes.

END OF SECTION

DIVISION 05
STEEL

CONTENTS

05 12 00	Structural Steel Framing
05 50 00	Metal Fabrications

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Structural steel.
 - 2. Grout.
- B. Related Sections include the following:
 - 1. Division 1 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
 - 2. Division 9 painting Sections for surface preparation and priming requirements.

1.3 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.4 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand ASD-service loads indicated and comply with other information and restrictions indicated.
 - 1. Select and complete connections using AISC's "Manual of Steel Construction, Allowable Stress Design," Part 4.
- B. Construction: Type 2, simple framing except where noted otherwise.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- 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.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
- C. Welding certificates.
- D. Qualification Data: For installer and fabricator.
- E. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:

1. Structural steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Shop primers.
4. Nonshrink grout.

F. Source quality-control test reports.

1.6 QUALITY ASSURANCE

- A. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- C. Comply with applicable provisions of the following specifications and documents:
 1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 2. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
 3. AISC's "Specification for the Design of Steel Hollow Structural Sections."
 4. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
 5. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.7 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 erosion and deterioration.
 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
 2. 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.

1.8 COORDINATION

- A. Furnish 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.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

- A. Angles & Pipe Sections: ASTM A 36.
- B. Wide Flange: ASTM A992.
- C. Plate and Bar: ASTM A 36.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
 1. Weight Class: Standard
- F. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
 - 1. Finish: Plain
- B. Unheaded Anchor Rods: ASTM A 307, Grade A
 - 1. Configuration: Hooked.
 - 2. Nuts: ASTM A 563 hex carbon steel.
 - 3. Plate Washers: ASTM A 36/A 36M carbon steel.
 - 4. Washers: ASTM F 436 hardened carbon steel.
 - 5. Finish: Plain.
- C. Headed Anchor Rods: ASTM A 307, Grade A
 - 1. Nuts: ASTM A 563 hex carbon steel.
 - 2. Plate Washers: ASTM A 36/A 36M carbon steel.
 - 3. Washers: ASTM F 436 hardened carbon steel.
 - 4. Finish: Plain.
- D. Threaded Rods: ASTM A 307, Grade A
 - 1. Nuts: ASTM A 563 hex carbon steel.
 - 2. Washers: ASTM F 436 carbon steel.
 - 3. Finish: Plain.
- E. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.

2.3 PRIMER

- A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

2.4 GROUT

- A. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404, Size No. 2. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
 - 1. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
 - 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.

- 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. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning".
- F. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural steel. Straighten as required to provide uniform, square, and true members in completed wall framing.
- G. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Base-Plate 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.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 - 1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 - 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
 - 3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
 - a. Grind butt welds flush.
 - b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

2.7 SHOP PRIMING – INTERIOR STEEL

- A. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2. Surfaces to be field welded.
 - 3. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
 - 1. SSPC-SP 2, "Hand Tool Cleaning."
 - 2. SSPC-SP 3, "Power Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 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 inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.
 - D. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.
- 2.8 Exterior steel for front canopy shall have high performance coating, refer to Division 9 painting Sections.
- 2.9 Structural Steel loose lintels and bent plate lintels shall be hot dipped galvanized.
- 2.10 SOURCE QUALITY CONTROL
- A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
 - B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
 - C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
 1. Liquid Penetrant Inspection: ASTM E 165.
 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 3. Ultrasonic Inspection: ASTM E 164.
 4. Radiographic Inspection: ASTM E 94.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, 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.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design".
- B. Base Plates: Clean concrete of bond-reducing materials, and roughen surfaces prior to setting base plates. Clean bottom surface of base plates.
 - 1. Set base plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of base plate.
 - 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 base plate before packing with grout.
 - 4. Promptly pack grout solidly between bearing surfaces and base plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure.[Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.]
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 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 [unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1].
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 - 1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design" for bearing, adequacy of temporary connections, alignment, 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 will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
 - 4. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances.
 - a. Grind butt welds flush.
 - b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.
- B. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.
 - 1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.6 REPAIRS AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 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 and accessories and abutting structural steel.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
 - 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 9 painting Sections.

END OF SECTION 051200

SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Loose bearing and leveling plates.
 - 2. Loose steel lintels.
 - 3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 4. Miscellaneous metal trim.
- B. Related Sections include the following:
 - 1. Division 5 Section "Structural Steel" for structural-steel framing system components.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Nonslip aggregates and nonslip-aggregate surface finishes.
 - 2. Paint products.
 - 3. Grout.
- B. Shop Drawings: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
 - 1. Provide templates for anchors and bolts specified for installation under other Sections.
- C. Samples for Verification: For each type and finish of extruded nosing and tread.
- D. Mill Certificates: Signed by manufacturers of stainless-steel sheet certifying that products furnished comply with requirements.
- E. Welding Certificates: Copies of certificates for welding procedures and personnel.
- F. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."
 - 2. AWS D1.3, "Structural Welding Code--Sheet Steel."
 - 3. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

1.6 COORDINATION

Coordinate installation of anchorages for metal fabrications. 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.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.
- C. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

- D. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 PAINT

- A. Shop Primers: Provide primers that comply with Division 9 Section "Painting."
- B. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
- C. Shop Primer for Ferrous Metal: Organic zinc-rich primer, complying with SSPC-Paint 20 and compatible with topcoat.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Carboline 621; Carboline Company.
 - b. Aquapon Zinc-Rich Primer 97-670; PPG Industries, Inc.
 - c. Tneme-Zinc 90-97; Tnemec Company, Inc.
- D. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FASTENERS

- A. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36.
- D. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).
- E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- F. Wood Screws: Flat head, carbon steel, ASME B18.6.1.
- G. Plain Washers: Round, carbon steel, ASME B18.22.1 (ASME B18.22M).
- H. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1 (ASME B18.21.2M).
- I. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Alloy Group 1 or 2 stainless-steel bolts complying with ASTM F 593 (ASTM F 738M) and nuts complying with ASTM F 594 (ASTM F 836M).
- J. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

2.5 GROUT

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.6 CONCRETE FILL

- A. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

2.7 FABRICATION, GENERAL

- 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. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Shear and punch metals cleanly and accurately. Remove burrs.
- C. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
- H. Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

- J. Remove sharp or rough areas on exposed traffic surfaces.
- K. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.8 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates after fabrication.

2.9 LOOSE STEEL LINTELS

- A. Fabricate loose structural-steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Bolt to wood framing where indicated.
- C. Size loose lintels to provide bearing length at each side of openings equal to one-twelfth of clear span, but not less than 8 inches (200 mm), unless otherwise indicated.
- D. Galvanize loose steel lintels located in exterior walls.

2.10 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports that are not a part of structural-steel framework as necessary to complete the Work.
- B. General: Provide steel framing and supports indicated and as necessary to complete the Work.
- C. Fabricate units from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors 1-1/4 inches (32 mm) wide by 1/4 inch (6 mm) thick by 8 inches (200 mm) long at 24 inches (600 mm) o.c., unless otherwise indicated.
 - 3. Furnish inserts if units must be installed after concrete is placed.
- D. Galvanize miscellaneous framing and supports where indicated.

2.11 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.

2.12 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
 - 1. ASTM A 123, for galvanizing steel and iron products.
 - 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- E. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.2 SETTING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Use nonshrink grout, nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings, if any.
- B. Anchor supports for operable partitions securely to and rigidly brace from building structure.
- C. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified above for setting and grouting bearing and leveling plates.
 - 1. Do not grout baseplates of columns supporting steel girders until girders are installed and leveled.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 Section "Painting."
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 50 00

DIVISION 06
WOOD AND PLASTIC

CONTENTS

06 10 00	Rough Carpentry
06 20 00	Finish Carpentry

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Types of work included in this Section for rough carpentry:
 - 1. Roof Deck Panels;
 - 2. Sheathing;
 - 3. Furring and concealed wood blocking

1.2 RELATED SECTIONS

- A. Concrete Formwork – Section 03 10 00.

1.3 SUBMITTALS

- A. Affidavit: Submit prior to installation of treated materials, affidavits from treating facility certifying treatment method used, name of treatment material, retention of treatment material (lbs./cu.ft.), and depth of penetration.
- B. Product Data: Submit manufacturer's specifications and installation instructions on insulating sheathing.

1.4 STORAGE

- A. Store lumber off ground, well ventilated, and covered. Suitable and effective protection from damage shall be provided for finished work and material, and shall remain in place until final clean-up.

PART 2 – PRODUCTS

2.1 LUMBER

- A. Standards: Comply with DOC PS20, "American Softwood Lumber Standard" for lumber and with the applicable grading rules of inspection agencies certified by American Lumber Standards committee Board of Review.
- B. Identification: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grade stamp of inspection agency and identifying grading agency, grade, species, moisture content at time of surfacing and mill.
- C. Moisture Content: Maximum moisture content for lumber products shall be 19 percent on air dried stock.
- D. Surfacing: Shall be surface four sides (S4S).
- E. Grade: Dimension No. 2 Southern Pine as graded by Southern Pine Inspection Bureau or Douglas Fir standard grade.

- F. Preservative Treatment: Lumber specified or indicated to receive preservative treatment shall be treated in accordance with AWPAs Standard Specifications. Each piece shall bear quality mark of an inspection agency approved by the American Lumber Standards Committee. Treatment shall be applied after members are shaped. Subsequent to treatment, all saw cuts, borings, etc., shall be saturated with two coats of same preservative used for treatment. Coating shall be applied prior to installation of treated member. At Contractor's option, one of the following methods of treatment shall be used.

<u>Location</u>	<u>Type</u>	<u>Trade Name</u>	<u>Use Category</u>	<u>AWPA Pres. Std.</u>
Above Ground	Fuor-Chrome	Wolman Salts	USC3	P-5
Above Ground	Ammonical Copper-Quat (ACQ)	ACQ Preserve	USC3	P-5
Above Ground	Copper Boron Azole (CBA)	Naturwood	USC3	P-5

2.2 BOARDS

- A. Shall be No. 2 Southern Pine as graded by SPIB or Douglas Fir, Construction Boards per WWPA. Refer to allowable stress in General Notes of Structural drawings.

2.3 PERFORMANCE RATED WOOD PANELS

- A. General: Conform to DOC PS-1 or PS-2, Exposure 1, structural rating as indicated hereinafter. Each panel shall be identified with grade trademark of American Plywood Association.
- B. Roof Sheathing: OSB Sheathing, span rating 48/24, 5/8 inch thick.
- C. Exterior Wall Sheathing: OSB Sheathing, span rating 48/24, 1/2 inch thick.

2.4 FASTENERS

- A. Provide rough hardware, including nails, screws, bolts, anchors, ties and metal fastenings as required for proper construction and erection of work, or proper type and size suitable for purpose intended and approved by Architect. 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.

PART 3 – EXECUTION

3.1 WORKMANSHIP

- A. All work shall be in accordance with best standard practice and shall be under the constant supervision of a competent foreman. Carefully plan and lay out the work as necessary to carry out the intent of the Drawings, and to accommodate other work properly. Wood framing shall be accurately sawcut and fitted, true to line, grade and level, and permanently secured in proper position with nails, lag screws, bolts or other fastenings and fittings. Lumber framing shall be substantial and rigid in all parts and connections.

3.2 WALL SHEATHING INSTALLATION

- A. Apply sheathing to exterior studs where indicated, with 1 ½ inch long staples or nails (screws). Fasten three (3) inch o.c. at edges and six (6) inch o.c. on intermediate supports. Abut ends of sheathing at center of supports. Install sheathing with long edge parallel to floor line.
- B. Apply asphalt saturated organic felt horizontally with two (2) inch overlap and a six (6) inch end lap. Fasten to sheathing with corrosion-resistant staples. Cut back felt ½ inch on each side of control and expansion joints.

3.3 WALL SHEATHING INSTALLATION AT SHEAR WALLS

- A. Fasten to exterior studs with screws at pattern as indicated.

3.4 WOOD PRESERVATIVE TREATMENT

- A. Following wood members to receive preservative as specified: wood used in roof construction including fascia backup, cants, nailers. Two brush coats of same wood preservative shall be applied to field cuts.

3.5 BLOCKING INSTALLATION

- A. Anchor blocking and nailers using counter-sunk bolts, washers, and nuts. Wedge, align, and anchor blocking and nailers to provide rigid and secure installation of both blocking and other related work. Locate blocking to facilitate installation grilles, registers and fixtures.

3.6 FURRING INSTALLATION

- A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finished work. Unless otherwise indicated, provide 1 inch x 2 inch furring at 16 inch o.c. vertically. Provide hangers and attachment devices for suspended furring.

3.7 FASTENING DEVICES

- A. Use power-actuated-steel nails, expansion screws, toggle bolts, metal plugs, or metal inserts for installation of rough carpentry members to masonry or concrete construction. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials.

3.8 ROOF SHEATHING

- A. Install panels with long dimension perpendicular to supports, with end joints staggered between panels and located over supports. Allow 1/8 inch space between joints. Place fasteners as indicated.

END OF SECTION 06 10 00

SECTION 06 20 00

FINISH CARPENTRY

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Install wood, nails, screws and other items as needed, and perform finish carpentry for the construction shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. 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 the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 GRADE STAMPS

- A. Identify lumber by the grade stamp of the West Coast Lumber Inspection Bureau, or such other grade stamp as is approved in advance by the Architect.
- B. Identify plywood as to species, grade and glue type by the stamp of the American Plywood Association.

2.2 MATERIALS

- A. Provide materials in the quantities needed for the Work as indicated on the Drawings and meeting or exceeding the standards of quality specified.
- B. Clear wood trim (interior) shall be stain-grade MAPLE.

2.3 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor, subject to approval by the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 WORKMANSHIP

- A. Product joints which are true, tight and well nailed with all members assembled in accordance with the Drawings.
- B. Jointing:
 - 1. Make joints to conceal shrinkage; miter exterior joints; cope interior joints; miter or scarf end-to-end joints.
 - 2. Install trim in pieces as long as possible, jointing only where solid support is obtained.
- C. Fastening:
 - 1. Install items straight, true, level, plumb and firmly anchored in place.
 - 2. Where blocking or backing is required, coordinate as necessary with other trades to ensure placement of required backing and blocking in a timely manner.
 - 3. Nail trim with finish nails of proper dimension to hold the member firmly in place with splitting the wood.
 - 4. Nail exterior trim with galvanized nails, making joints to exclude water and setting in waterproof glue or the sealant described in Section 07 92 00, Joint Sealants, of these Specifications.
 - 5. On exposed work, set nails for putty.
 - 6. Screw, do not drive, wood screws; except that screws may be started by driving and then screwed home.

3.3 INSTALLATION OF OTHER ITEMS

- A. Install items in strict accordance with the Drawings and the recommended methods of the manufacturer as approved by the Architect, anchoring firmly into position at the prescribed locations, straight, plumb and level.

3.4 FINISHING

- A. Sandpaper finished wood surfaces thoroughly as required to produce a uniformly smooth surface, always sanding in the direction of the grain; except do not sand wood which is designed to be left rough.
- B. No coarse grain sandpaper mark, hammer mark, or other imperfection will be accepted.

3.5 CLEANING UP

- A. Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the Work, free from accumulation of sawdust, cut-ends and debris.

B. Sweeping:

1. At the end of each working day, and more often if necessary, thoroughly sweep surfaces where refuse from this portion of the Work has settled.
2. Remove the refuse to the area of the job site set aside for its storage.
3. Upon completion of this portion of the Work, thoroughly broom clean all surfaces.

END OF SECTION

DIVISION 07
THERMAL AND MOISTURE PROTECTION

CONTENTS

07 15 00	Dampproofing
07 21 00	Thermal Insulation
07 25 00	Weather Barriers
07 27 26	Fluid Applied Membrane Air Barriers
07 41 13	Metal Roof Panels
07 42 10	Preformed Metal Siding
07 60 00	Flashing and Sheet Metal
07 84 00	Firestopping
07 90 00	Sealants
07 92 00	Joint Sealants

SECTION 07 15 00

DAMPPROOFING

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Work of this Section includes dampproofing systems, complete. In general, dampproofing includes dampproof courses at base flashing of masonry walls, under window sills, above windows and doors, and at other locations shown.

PART 2 PRODUCTS

2.1 DAMPPROOFING

- A. Metal flashings: 5 ounce copper laminated to heavy duty Kraft paper with high melting point asphalt; tri-directional glass reinforcing fibers embedded in asphalt.
- B. Mastic: Federal Specification SS-C-153, Type 1 or ASTM D-2822-75, Type 1 Flashing Cement.
- C. Flexible Flashings - .040" synthetic rubber membrane, 12" wide minimum "Pre-Kleened EPDM" by Carlisle, "FLASHGARD" by Firestone or equal. (Contractor may use this material, or equal, at his option at all flashings so long as 1 1/2" stainless steel flashing edge extends past weep holes and metal flashing is completely sealed to membrane flashing.)

PART 3 EXECUTION

3.1 DAMPPROOFING

- A. Apply one coat flashing cement. Insert dampproofing strips lapping 4" at joints with flashing cement between laps. Turn up backing courses as detailed, min. 8" behind sheathing.
- B. Extend metal flashing edge 1/2" past exterior wall face, turn down, and make a hemmed edge. Turn up inside as detailed to run behind sheathing. Make end dams at window sills.
- C. Take all necessary measures to insure water is prevented from entering the wall assembly and is directed to the exterior.

END OF SECTION

SECTION 07 21 00
BUILDING INSULATION

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Provide building insulation where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. 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 the methods needed for proper performance of the Work of this Section.
- B. Upon completion of this portion of the Work, complete and post a certificate of insulation compliance in accordance with pertinent requirements of governmental agencies having jurisdiction.

1.3 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01 64 00.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Provide and install the following insulation types where shown on the Drawings, or otherwise needed to achieve the degree of insulation required under pertinent regulations of governmental agencies having jurisdiction.
 - 1. Wall Insulation: At 2x6 wood stud exterior walls, provide Owens-Corning, EcoTouch Pink or Rockwood Mineral wool, R-19, 5 ½", unfaced batt insulation with flame spread rating of not more than 25, and smoke development of not more than 450, meeting FS-HH-1-521. At all interior stud cavity walls, provide Owens-Corning, EcoTouch, Pink, R-11, 3 ½" unfaced batt insulation with flame spread rating of not more than 25 and smoke development of not more than 450, meeting FS-HH-1-521. Increase thickness to 5 ½" at 2x6 stud walls.
 - 2. Roof/Wall Insulation at Metal Siding/Roofing: provide 4" total thickness vinyl faced fiberglass blanket insulation with thermal block rigid insulation at roof purlins and wall girts.
 - a. Owens Corning, Utility Blanket Metal Building Insulation
 - b. Certainteed Metal Building Insulation
 - c. Approved equal.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Remove, or protect against, projections in construction framing which may damage or prevent proper insulation.
- C. Install plastic spacers to insure air flow is continuous, as required by framing condition.

3.2 INSTALLATION

- A. Install the work of this Section in strict accordance with the original design, requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Owner anchoring all components firmly into position.

END OF SECTION

SECTION 07 25 00

WEATHER BARRIERS

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work Included: Furnish and install air barrier/weather resistant barrier over exterior of wall sheathing at all locations regardless of whether or not indicated on drawings to protect exterior sheathing and interior walls.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
 - 2. Section 06 10 00 - Rough Carpentry
 - 3. Section 07 21 00 - Thermal Insulation
 - 4. Section 07 60 00 - Flashing and Sheet Metal

1.2 QUALITY ASSURANCE

- A. 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 the methods needed for proper performance of the Work of this Section.
- B. Install job mock-up using specified air barrier/secondary weather resistant barrier with system of fastening and taping seams as per manufacturer's instructions. Obtain architect's approval of system for appearance and workmanship standard.

1.3 SUBMITTALS

- A. Comply with pertinent provision of Section 01 33 00.
- B. Product data: Within 60 calendar days after the Contractor has received the Owner's Notice to proceed, submit:
 - 1. Product specifications, technical data and installation instructions of manufacturer equaling or exceeding those specified.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01 66 00.

PART 2 PRODUCTS

2.1 MATERIALS

- A. A flash spunbonded olefin, non-woven, non-perforated secondary weather resistant barrier equal to DuPont™ Tyvek® CommercialWrap® by DuPont Weatherization Systems or Pinkwrap® by Owens Corning®.

2.2 PERFORMANCE CHARACTERISTICS

- A. AATCC-127, Water Penetration Resistance, exceeded at 280
- B. TAPPI T-460, Gurley Hill (sec/100cc) Air infiltration at >1500 seconds
- C. ASTM E 96 Method B (g/m²-24 hr.) Water vapor transmission of 200

- D. TAPPI T-41D, Basis weight of 2.7 oz/yd.
- E. ASTM 396 Method B, Water Vapor Transmission, 28 perms
- F. ASTM #1677, Air Retarder Material Standard Specification, Type I air barrier

2.3 Sealing Tape/Fasteners

- A. DuPont™ Tyvek® Tape, DuPont Weatherization Systems.
- B. For wood frame construction: DuPont™ Tyvek® Wrap Caps, as manufactured by DuPont Building Innovations: #4 nails with large 1-inch plastic cap fasteners.
- C. Caulks or Sealants: polyurethane or elastomeric sealants
 - 1. OSI® Quad Pro-Series®, solvent release butyl rubber sealant
 - 2. DAP® Dynaflex 230™
 - 3. Other products as approved and recommended by air barrier/weather resistant barrier manufacturer.

PART 3 EXECUTION

3.1 Installation

- A. Install Air Barrier over exterior side of exterior wall sheathing.
 - 1. Install Air Barrier after sheathing is installed and before windows and doors are installed. Install lower level barrier prior to upper layers to ensure proper shingling of layers.
 - 2. Overlap Air Barrier at corners of building by a minimum of 12 inches.
 - 3. Overlap Air Barrier vertical seams by a minimum of 6 inches.
 - 4. Ensure barrier is plumb and level with foundation, and unroll extending Air Barrier over window and door openings.
 - 5. Attach Air Barrier to wood, insulated sheathing board or exterior gypsum with plastic cap nails every 12" to 18" on vertical stud line with wood stud framing, and screws with washers to metal stud framing. When attaching to masonry, use adhesive recommended by manufacturer.
 - 6. Prepare window and door rough opening as follows:
 - a. Horizontally cut Air Barrier along bottom of header.
 - b. Vertically cut Air Barrier down the center of window openings from the top of the window opening down to 2/3 of the way to the bottom of the window openings.
 - c. Diagonally cut Air Barrier from the bottom of the vertical cut to the left and right corners of opening.
 - d. Fold side and bottom flaps into window opening and fasten every 6 inches. Trim off excess.
 - e. Integrate compatible membrane strip flashing system with weather barrier.
 - 7. Prepare each rough door opening by cutting a standard "I" pattern in the Air Barrier.
 - a. Horizontally cut Air Barrier along bottom of door frame header and along top of sill.
 - b. Vertically cut Air Barrier down the center of door openings from the top of the door opening (header) down to the bottom of the door opening (sill).
 - c. Fold side flaps inside around door openings and fasten every 6 inches. Trim off excess.
 - 8. Tape all horizontal and vertical seam of Air Barrier with DuPont™ Tyvek® Tape.
 - 9. Seal all tears and cuts in Air Barrier with DuPont™ Tyvek® Tape.

END OF SECTION

SECTION 07 27 26
FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fluid-applied membrane air barriers including, but not limited to, the following:
 - 1. Fluid Applied Vapor Permeable Air Barrier
 - 2. Flashings
 - 3. Flashing Primer
 - 4. Sealant
 - 5. Thru-wall Flashing

1.2 RELATED REQUIREMENTS

- A. Section 05 40 00 - Cold-Formed Metal Framing: Exterior metal stud walls.
- B. Section 06 16 00 - Sheathing: Exterior wood sheathing.
- C. Section 07 21 00 - Thermal Insulation: Exterior continuous thermal insulation board.
- D. Section 07 92 00 - Joint Sealants: Sealants applied to adjacent work.

1.3 PRICE AND PAYMENT PROCEDURES

- A. Substitutions:
 - 1. Bidders are not restricted to the specific brand, make, manufacturer or specification named; they are used only to set forth and convey to prospective Bidders the general style, type, character and quality of the products required to meet the design intent. Equivalent substitution products will be acceptable, but only with written approval as described in Section 01 25 00 – Substitution Procedures.

1.4 ABBREVIATIONS, ACRONYMS, AND DEFINITIONS

- A. Air Barrier: Airtight barrier made of material that is relatively air impermeable but water vapor permeable, both to degree specified, with sealed seams and with sealed joints to adjacent surfaces.
- B. AWB: Assemblies that form an air- and weather-resistive barrier system.

1.5 REFERENCE STANDARDS

- A. ASTM C719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle); 2022.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- C. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.
- D. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).
- E. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.
- F. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
- G. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method; 1983 (Reapproved 2018).
- H. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers; 2022.
- I. ASTM D5590 - Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay; 2017 (Reapproved 2021).
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- K. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- L. ASTM E1677 - Standard Specification for Air Barrier (AB) Material or Assemblies for Low-Rise Framed Building Walls; 2023.
- M. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2023.
- N. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.
- O. ASTM E2357 - Standard Test Method for Determining Air Leakage Rate of Air Barrier Assemblies; 2024.
- P. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2023.

1.6 ADMINISTRATIVE REQUIREMENTS

- A. Preliminary Coordination Meeting: Convene on-site (6) six weeks prior to starting the work of this section to establish a direct line of communication, review initial questions regarding the

project, and review project submittal and mock-up requirements

1. Require attendance by the owner, general contractor's project manager and superintendent, manufacturer's representative, installer, and all relevant sub-contractors including but not limited to MCM installer, door, storefront, curtain wall, and louver installers.
 2. General contractor to ensure a complete set of contract documents (plans and specifications) are available for review.
 3. Meeting minutes to be furnished by the Architect to all parties within (7) seven business days.
 4. Review tentative construction progress schedule and phasing requirements, material availability, truck transportation, parking, anticipated material storage areas, equipment set-up locations, vertical transportation, and personnel.
 5. Review all testing and inspection requirements.
 6. Review mock-up requirements and site placement.
 7. Establish a date for tentative Pre-Installation Meeting.
- B. Pre-Installation Meeting: Convene (2) two weeks before starting work of this section to verify project requirements, coordinate with installers of other work, establish condition and completeness of building substrate, and review manufacturers' installation instructions and warranty requirements, and to review the mock-up.
1. Require attendance by the owner, general contractor's project manager and superintendent, manufacturer's representative, installer, and all relevant sub-contractors including but not limited to MCM installer, door, storefront, curtainwall, and louver installers.
 2. Review construction progress schedule and phasing requirements.
 3. General contractor to ensure reviewed and approved submittals are available for reference.
 4. Review of Mockup:
 - a. Examine substrate and AWB conditions.
 - b. Review flashings, special details, wall penetrations, openings, and condition of other affecting construction conditions.
 - c. Conduct field testing.
 5. Review procedures for protection of work and adjacent construction both during and

after installation.

6. Review procedures for repair and replacement of panels damaged after installation.
7. Review safety precautions.
8. Architect to furnish meeting minutes containing proceedings including corrective measures and actions required, and furnish a copy of record to all parties within (7) seven business days.
9. If mock-up corrective measures are required, establish a date for re-review onsite by all parties involved prior to starting work of this section.

1.7 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on material characteristics, performance criteria, and limitations.
- C. Shop Drawings: Provide drawings of all joint conditions.
- D. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.
- E. Test Reports:
 1. For each product type specified, test performed by a qualified testing agency.
 2. NFPA 285 wall assembly compliance:
 - a. Air Barrier Manufacturer statement that anticipated wall assembly complies with NFPA 285
- F. Certificates: Product certification that the assembly components are supplied and warranted by single source Air Barrier Manufacturer.
- G. Manufacturer's qualification statement.
- H. Installer's qualification statement.
- I. Testing agency's qualification statement.
- J. Manufacturer's Field Quality-Control Reports: Provide within 48 hours of field review. State what was observed and what changes, if any, were requested or required.
- K. Closeout Submittals:
 1. Executed Warranty: Manufacturer and Installer warranty documents as specified within the Warranty section of this specification. Ensure that forms have been completed in Owner's name and registered with manufacturer..

- 2. Maintenance Data: Care of finishes and warranty requirements.
 - L. Warranty Documentation: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.
- 1.8 QUALITY ASSURANCE
- A. Single Source Responsibility:
 - 1. Obtain air barrier, flashings, sealants and primers from a single Air Barrier Manufacturer regularly engaged in the manufacturing and supply of the specified products.
 - 2. Verify product compliance with federal, state, and local regulations.
 - B. Manufacturer Qualifications:
 - 1. Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
 - 2. Air Barrier Manufacturer must not issue warranties for terms longer than they have been manufacturing and supplying specified products for similar scope of Work.
 - C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer.
 - D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.
 - E. Perform Work in accordance with Air Barrier Manufacturer published literature and as specified in this section.
 - F. Maintain one (1) copy of Air Barrier Manufacturer's installation instructions on site.
 - G. Allow the Air Barrier Manufacturer representative site access during installation.
 - H. Contact the Air Barrier Manufacturer a minimum of two weeks prior to scheduling a meeting.
- 1.9 MOCK-UPS
- A. See Section 01 40 00 - Quality Requirements for additional requirements.
 - B. Install at the project site an integrated wall mock-up using specified products and manufacturer approved details. Obtain Owner's and Architect's acceptance of workmanship standard.
 - C. Provide a mock-up for evaluation of fabrication workmanship.
 - D. Provide mock-up of air barrier assembly as detailed in the construction documents illustrating interface with adjacent construction, other termination conditions, as well as application and execution details.

1. Apply air barrier assembly to mock-up components, including wall substrates, window and door frames and sills, insulation, flashing, corner conditions, junctions with roof system and foundation wall, and typical penetrations and gaps, indicating material interface details and seals.
 - E. Locate where directed during the Preliminary Coordination Meeting.
 - F. Mock-up may not remain as part of work. Maintain during construction for workmanship comparison; remove and legally dispose of materials when directed by Architect.
 - G. Approval of mock-up does not constitute approval of deviations from the Contract Documents contained in mock-up unless the Architect specifically approves such deviations in writing.
- 1.10 DELIVERY, STORAGE, AND HANDLING
- A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.
 - B. Store materials as recommended by the Air Barrier Manufacturer and conform to applicable safety regulatory agencies. Refer to all applicable data including, but not limited to, Safety Data Sheets, Product Data sheets, product labels, and specific instructions for personal protection.
 - C. Deliver materials to project site in original packaging with seals unbroken and properly labeled.
 - D. Keep solvents away from open flame or excessive heat.
 - E. Store materials in their original undamaged packaging within clean, dry, and protected location at a temperature less than 90 degrees F.
 - F. Store rolled materials on end.
- 1.11 FIELD CONDITIONS
- A. Maintain temperature and humidity recommended by materials manufacturer before, during, and after installation.
 1. Do not apply air barrier products when air or substrate temperatures are above 100 degrees F or below 20 degrees F.
 2. Do not perform Work during rain.
 3. Do not perform Work on frost covered or wet substrates.
 4. Allow wet substrates to dry prior to applying air barrier products.
 5. Protect top and backside of substrate walls against bulk water during and after application of air barrier.
- 1.12 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage to repair or replace air barrier coatings and accessory products that demonstrate deterioration or failure within a 10-year period after Date of Substantial Completion due to material failure under normal use; failure includes water or air penetration through air barrier assembly.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fluid-Applied Membrane Air Barrier:
 - 1. Henry Company; Air Bloc 17MR: www.henry.com
 - 2. Carlisle Coatings & Waterproofing (CCW); Barritech VP: www.carlisleccw.com
 - 3. GCP Applied Technologies, Inc; Perm-A-Barrier VPL: www.gcpat.com/en

2.2 FLUID-APPLIED MEMBRANE AIR BARRIER ASSEMBLY

- A. Applications:
 - 1. CMU walls and exterior sheathing on steel stud walls:
 - a. See Section 04 22 00 Concrete Unit Masonry
 - b. See Section 06 16 00 for exterior sheathing.
 - c. See Section 07 92 00 for joint sealants applied to adjacent work.
- B. Fluid-Applied Membrane Air Barrier: Single-component, vapor permeable, 100 percent silicone elastomeric air barrier **meeting IBC 1403.2 requirements for water-resistive barriers.**
 - 1. Air Permeance: 0.004 cfm/sq ft maximum leakage when tested at 1.57 psf pressure difference in accordance with ASTM E2178.
 - 2. Vapor Permeance: ~~10 perms, minimum, 5 perms maximum~~ **20 perms, maximum, 5 perms minimum**, when tested in accordance with ASTM E96/E96M using ~~Desiccant~~ **Wet (B) Method** at 73.4 degrees F.
 - 3. Air Barrier Leakage: Not greater than 0.04 cfm/sq ft of surface area at pressure of 1.57 psf when tested in accordance with ASTM E2357.
 - 4. Elongation: 250 percent, when tested in accordance with ASTM D412.
 - 5. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed

- index of 450 or less, when tested in accordance with ASTM E84.
6. Fire Propagation Characteristics: Provide air barrier coatings and accessory materials that are tested for compliance with NFPA 285 when used within exterior wall assembly.
 7. Nail Sealability: Pass head of water test in accordance with ASTM D1970/D1970M.
 8. Volatile Organic Compound (VOC) Content: ~~20~~ 100 g/L, maximum.
 9. Sealants, Tapes, and Accessories: As recommended by coating manufacturer.
- C. Primer: Water-based silicone adhesion promoter.
1. Apply primer over plywood or damp oriented strand board (OSB) substrates as recommended by manufacturer.
- D. Preformed Flashing and Transition Seals: Factory formed silicone extrusion profile for adhered application to overlay face of joint.
1. Coordinate size and installation with Sections 08 43 13 - Aluminum-Framed Storefronts and 08 44 13 - Glazed Aluminum Curtain Walls to maintain a continuous air barrier system.
- E. Weatherproofing Silicone Sealant: ASTM C920, Type S, Grade NS, Class 50, Uses NT, M, G, and A; not expected to withstand continuous water immersion or traffic.
1. Joint Movement Capability: Plus or minus 50 percent, minimum, when tested in accordance with ASTM C719.
 2. Staining: None to concrete or brick when tested in accordance with ASTM C1248.
 3. Products:
 - a. Basis of Design: Henry 925 BES Sealant
- F. Liquid Flashing: One part, neutral-cure silicone sealant, trowelable liquid flashing.
1. Applied Thickness: 20 to 50 mils, 0.020 to 0.050 inch, nominal.
 2. Joint Movement Capability: Plus or minus 25 percent, minimum, when tested in accordance with ASTM C719.
 3. Tensile Strength: Greater than 210 psi, when tested in accordance with ASTM D412.
 4. Elongation: Greater than 250 percent, when tested in accordance with ASTM D412.
 5. Products:
 - a. Basis of Design: Henry AirBloc LF Liquid Applied Flashing

- G. Thu-Wall Flashing: Self-adhered water resistive air and vapor retarder, SBS rubberized asphalt compound integrally laminated to thermoplastic film:

- 1. Basis of Design: Henry Blueskin TWF Self-Adhered Thru-Wall Flashing

2.3 ACCESSORIES

- A. Thinners and Cleaners: As recommended by material manufacturer.
- B. Crack Fillers: Provide substrate manufacturer's recommended crack fillers or sealants compatible with air barrier assembly components and adjacent materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept work of this section.
- B. Verify that surfaces are clean, dry, and free of frost, dust, dirt, grease, oil, curing compounds, form release agents, laitance, efflorescence, mildew, excess alkalinity, and other conditions affecting performance of this work.
- C. Substrate must be continuous and secure.
- D. Sheathing fasteners must be installed into solid backing and set flush with sheathing.
- E. Top and backside of substrate walls must be protected against bulk water during and after application of air barrier.
- F. Curing compounds must be resin based without oil, wax or pigments. Substrates must be free of form release agents.
- G. Preinstallation Testing: Prior to application of air barrier coatings, perform following tests to verify condition of substrate in accordance with manufacturer's instructions.
 - 1. Adhesion: Perform field adhesion tests in accordance with ASTM D4541 to determine if primer is required to adhere air barrier coatings to substrates.
 - 2. Alkalinity: Verify substrate is within alkalinity range acceptable to manufacturer.
 - 3. Moisture Level: Verify substrate moisture content is acceptable to manufacturer, and substrate is visibly dry and free of moisture.
 - a. Test for capillary moisture by plastic sheet method in accordance with ASTM D4263.
- H. Notify contractor and Architect in writing of any conditions that are not acceptable.
- I. Proceed with work once conditions comply with air barrier coating manufacturer's recommendations.

3.2 PREPARATION

- A. Protect work of other trades against damage from application of air barrier coatings.
- B. Protect adjacent surfaces not designated to receive air barrier coatings; provide protection for pedestrians, vehicles, landscaping, and surrounding areas to prevent contact with coating materials.
- C. Clean substrates to remove contaminants and foreign material by pressure cleaning, wire brushing, grinding or other method recommended by air barrier coatings manufacturer.
- D. Prepare substrates in accordance with air barrier coating manufacturer's written instructions.
- E. Repair deteriorated or damaged substrates, repair masonry joints, and fill cracks, voids, honeycombs, and other defects using materials as recommended by air barrier coating manufacturer, and allow patching materials to fully cure.
 - 1. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
 - 2. Fill cracks larger than 1/16 inch wide using applicable joint sealant, and fill cracks larger than 1 inch wide using joint sealant and compatible bond breaker where movement is expected.
- F. Primer: Apply primer to substrates where required based upon preinstallation testing and air barrier coating manufacturer's recommendations, using application methods and rate of application recommended by manufacturer; allow primer to fully dry prior to application of air barrier coating.

3.3 APPLICATION

- A. Apply air barrier system materials in accordance with manufacturer's instructions.
- B. Transition Strips and Silicone Sealants: Install with approved sealants in accordance with manufacturer's written instructions.
 - 1. Form sealed joints to windows, wall framing systems, door and louver frames, roofing system perimeters, and at interface with other adjacent materials utilizing compatible components that form air barrier assembly.
 - 2. Ensure laps and bonds are adhered to substrates.
- C. Air Barrier Coating: Apply air barrier coating using application methods and rate of application recommended by manufacturer, using nap roller or airless sprayer, in accordance with requirements of authorities having jurisdiction (AHJ).
 - 1. Provide wet application not less than 30 mils, 0.030 inch thick, or more as required by substrate conditions, with dry film thickness (DFT) not less than 15 mils, 0.015 inch thick.

2. Apply additional coats as required to provide uniform, continuously cured, airtight and watertight film.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Do not cover installed air barriers until required inspections have been completed.
- C. Owner may retain testing agency to perform the following tests:
 1. Verification that substrate preparation meets requirements.
 2. Testing and certification that coating materials comply with requirements for thickness and continuity.
 3. Testing of application for compliance with adhesion and film thickness requirements.
- D. If testing indicates products or current installation does not meet requirements, Owner may have materials removed from substrates that are not in compliance, and have other necessary corrections made to ensure application meets designated requirements.
- E. Obtain approval of installation procedures by air barrier manufacturer and Architect based on mock-up installed in place, prior to proceeding with remainder of installation.

3.5 CLEANING

- A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
- B. During completion of this work, remove overspray and excess material, using materials and methods approved by manufacturer that will not damage adjacent materials.
- C. Clean and repair adjacent surfaces damaged by air barrier coating application.

3.6 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.
- B. Allow air barrier coatings to fully cure before exposure to traffic or other construction operations.
- C. Prevent damage to coatings from construction operations or other causes.
- D. Replace damaged air barrier coatings prior to concealment behind subsequent construction.

END OF SECTION 07 27 26

SECTION 07 41 13

METAL ROOF PANELS

PART 1 GENERAL

1.1 SUMMARY

A. SECTION INCLUDES

1. Standing-seam metal roof panels, including trim and accessories, to match existing at Gym Building.
2. RELATED SECTIONS
 - a) Section 07 62 00 - Sheet Metal Flashing and Trim
 - b) Section 07 72 00 - Roof Accessories
 - c) Section 07 92 00 - Joint Sealants

1.2 REFERENCES

- A. AISI S-100 - North American Specification for the Design of Cold-Formed Steel Structural Members.
- B. ASCE-7: American Society of Civil Engineers -Minimum Design Loads for Buildings and Other Structures; version adopted by local Building Code authority having jurisdiction.
- C. ASTM A792 - Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- D. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding System by Uniform Static Air Pressure Difference
- E. ASTM E1646 - Standard Test Method for Rate of Water Penetration Through Exterior Metal Roof Panel Systems By Uniform Static Air Pressure Difference.
- F. ASTM E1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.
- G. ASTM E2140 - Standard Test method for water penetration of metal roof panel systems by static water pressure head.
- H. Factory Mutual 4471 Appendix G - Susceptibility to Leakage Test Procedure for Class 1 Panel Roofs.
- I. UL 580 - Tests for Uplift Resistance of Roof Assemblies.
- J. UL 1897 - Uplift Tests for Roof Covering Systems.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-installation Meetings:

1. Schedule meeting to discuss roof project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements before start of work onsite.
2. Required attendees: Contractor, metal roof installer, and any other subcontractors who have equipment penetrating the roof or Work that requires roof access or traffic.

1.4 SUBMITTALS

A. Product Data: Manufacturer literature indicating product specifications, installation instructions, and standard construction details for specified products.

B. Shop Drawings: To be prepared by metal roof system manufacturer.

1. Submit roof plan showing panel layout, profiles, components, accessories, finish colors, gutters and downspouts as applicable.
 - a) Indicate layout of roofing panels and roof panel sizes, including custom fabricated roofing panels if indicated, indicate each trim condition.
 - b) Include details of each condition of installation, including the locations and types of fasteners, sealants and accessories. Indicate locations, gauges, shapes, and methods of attachment of all panels, accessories and trim.
 - c) Indicate products/materials required for construction activities of this section not supplied by manufacturer of products of this section.
 - d) Indicate locations of field applied sealant.
 - e) Indicate locations of field worked conditions.
2. Roof Panel Attachment:
 - a) Roof plan with wind uplift pressure calculations at field, corner and perimeter areas according to version of ASCE-7 referenced by locally-adopted Building Code and the authority having jurisdiction.
 - b) Roof plan indication roof clip spacing pattern at field, corner, perimeters and where panels are to be fixed from thermal movement.
 - c) Roof panel attachment plan must be stamped by licensed engineer in State in which project is constructed, certifying roof attachment meets local Building Code requirements for wind uplift.

C. Samples:

1. Submit two samples, 12" long, full width panel, showing metal gage, and seam.
2. Two samples each for roof panel clip, bearing plate and clip fastener.

3. Submit color samples for Architect's selection. Prior to ordering materials, User Agency representative shall sign/date prefinished metal color selection indicating their approval; Designer shall email a copy of approved color selection to FP&C.
 4. Submit sample warranties:
 - a) Manufacturer Finish Warranty
 - b) Manufacturer Weathertightness Warranty complying with this Specification
 - c) Installer Warranty, Roofing Guarantee R-3 (Metal)
- D. Certificates:
1. Submit roof panel manufacturer's certification that fasteners, clips, backup plates, closures, roof panels and finishes meet the specification requirements.
 2. Submit roof panel manufacturer's certification that installer meets requirements to install roof system and is qualified to obtain required warranties.
- E. Delegated Design Submittals: Submit engineering calculations indicating wind uplift pressure calculations according to local building code for project location with respect to appropriate Importance Factor, Exposure category and Safety Factor. Calculations shall be sealed by a professional engineer licensed to practice structural engineering in the state in which project is located.
- F. Test and Evaluation Reports - Certified test results that indicate roof system meets or exceeds design and performance criteria. Testing to include:
1. Static Water Testing Certification: Manufacturers test data, signed and sealed by a registered professional engineer, in accordance with FM4471 Appendix G, and pass with no leakage. The test specimen must successfully withstand being submerged under 6" of water for a minimum period of 7 days.
 2. ASTM E1680 - Manufacturer's test data, signed and sealed by a registered professional engineer, for air infiltration rates meeting the following:
 - a) 16" panel width - 0.0028 cfm/sf maximum at a differential pressure of +/-20 pounds per square foot.
 - b) 18" panel width - 0.0025 cfm/sf maximum at a differential pressure of +/-20 pounds per square foot.
 - c) 24" panel width - 0.0019 cfm/sf maximum at a differential pressure of +/-20 pounds per square foot.
 3. ASTM E1646 - Manufacturer's test data, signed and sealed by a registered professional engineer, indicating no water penetration up to 20 pounds per square foot differential pressure.
 4. ASTM E1592 - Manufacturers test data, signed and sealed by a registered professional engineer, substantiating that roof system will meet the allowable wind pressures using an appropriate Factor of Safety in accordance with AISI S-100.

5. ASTM E2140 - Manufacturers test data, signed and sealed by a registered professional engineer, on a test specimen with no end lap, indicating that no water leakage was observed during the testing period of 6 hours with a 6" water head on the specimen.

G. Qualification Statements: For Manufacturer and Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Manual indicating requirements and recommendations, to maintain the roof system, in good working condition.
- B. Warranty Documentation: Submit final warranties required in this section.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications: Manufacturer shall have a minimum of ten years experience in the manufacturing of metal roof systems similar to those required for this project. Manufacturer must have a current installer training program.
2. Installer Qualifications: Installer ("roofer") to perform the work of this section, shall have no fewer than 5 years of successful experience with the installation of metal roof systems similar to those required for this project. The installer shall be qualified by the roof panel manufacturer for installation of manufacturer-warranted systems.

B. Field Measurements: Prior to fabrication of panels, take field measurements of structure or substrates to receive panel system. Allow for trimming panel units, where final dimensions cannot be established prior to fabrication.

C. Mock-Ups: Install a six (6) foot wide, quality control area of metal roofing, for review by the Architect. The Architect shall approve the quality of installation for the roof, prior to installing additional metal panels.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements: Deliver panels to jobsite properly packaged to provide protection against transportation damage. Panels too long to ship shall be site formed onto the roof by manufacturer's factory personnel using manufacturer's factory roll forming equipment.

B. Storage and Handling Requirements:

1. Exercise care in unloading, storing and erecting panels to prevent bending, warping, twisting, and surface damage.
2. Store all material and accessories above ground on well skidded platforms. Store under waterproof covering. Provide proper ventilation to panels to prevent condensation build-up between each panel.
3. Remove from site and replace panels which are damaged, or become water-stained during storage and handling.

1.8 WARRANTIES

A. Manufacturer Warranties:

1. Panel Material: Furnish manufacturers 25 year warranty covering the panel against rupture, structural failure, or perforation.
2. Panel Coating: Furnish manufacturer's 40-year warranty panel coating warranty covering cracking, checking, and peeling, and 30 year warranty covering fade and chalk.
3. Metal Roof Weathertightness Warranty:
 - a) Manufacturer's **Single Source** Weathertightness Warranty
 - (1) Warranty term: **20** years commencing on date of substantial completion.
 - (2) Total manufacturer's liability: **NRL (No Repair Limit)** / sq. ft.
 - (3) Warranty must cover: **Wind Speeds up to 75 mph**
 - (a) **If "Wind Speeds up to 75 mph" is chosen Manufacturer must supply engineered installation drawings signed and sealed by an engineer registered in the state in which the project is located.**

B. Installer Warranty: Installer to provide warranty agreeing to repair or replace metal roof panels, trim, or accessories that fails due to poor workmanship or faulty installation.

1. Warranty term: 2 years commencing on date of substantial completion.

PART 2 - PRODUCTS

2.1 ROOF PANEL SYSTEM

- A. Basis of Design: 24 ga, prefinished steel, symmetrical, 18" width, 238T by McElroy Metal, Inc. Bossier City, LA, or approved equal. Panels shall be approved for installation over open framing.
 1. Approved equal: Berridge, "Tee-Lock" Panel
 2. Approved equal: Kingspan/Morin, "Symmetry", 2 ½" seam height.
- B. Substitution Limitations
 1. Requests for approval must be submitted in writing at least ten (10) days prior to bid date, and are accompanied by all related test reports and design calculations listed in section 1.4 and Design and Performance criteria Section 2.2.
 2. Substitute manufactures will be approved by written addendum to all bidders. Voluntary alternates will not be considered. Substitutions will not be permitted after the bid date of this project.
 3. Roof panels proposed for substitution shall fully comply with specified requirements in appearance, assembly, and performance.
- C. Product Options

1. Factory-formed panel, width of 18 inches. Panels shall be symmetrical in design and shall be mechanically seamed with a field operated electric seaming machine approved by the manufacturer.
2. Minimum seam height 2 3/8 inches. Integral seam, double lock and snap together type panels are not acceptable
3. Seam cap matching panel finish with two rows of integral factory hot applied sealant. Sealant should not come in contact with clip, and clip should not require sealant to maintain a weathertight condition.
4. Galvalume coated sheet steel, Type AZ-50, Grade 50 as described in ASTM A792; 24 gauge.
5. Finish: Two coat coil applied, baked-on full-strength (70% resin, PVF2) fluorocarbon coating consisting of a nominal 0.25 mil dry film thickness primer, and a nominal dry film thickness of 0.7 - 0.8 mil color coat for a total 0.9 to 1.1 mil total system dry film thickness. Finish to be selected from manufacturer's standard color selection. The back side of the material should be 0.25 mil primer and 0.25 mil polyester wash coat.
6. Roof panel system must allow individual roof panel removal and replacement from any point on the roof without damage to adjacent roof panel(s).
7. Roof panel system must be approved by manufacturer to be installed on slopes as low as 1/2:12.
8. Panels must be furnished and installed in continuous lengths from ridge to eave with no overlaps. Panels too long to ship will be manufactured on site using manufacturer's employees and equipment.
9. Panel surface characteristics to be Plank and Pencil.
10. Manufacturer weathertightness warranty meeting requirements of this Section.

2.2 PERFORMANCE/DESIGN CRITERIA

- A. Thermal Movement: Metal Roofing system, including flashing, shall accommodate unlimited thermal movement without buckling or excess stress on the structure.
- B. Roof panel and trim attachments will be designed to satisfy the requirements of the roof design (shown in shop drawings).
- C. Maximum wind uplift capacity of roof system shall be determined using ASTM E 1592 test results, with an appropriate Factor of Safety in accordance with AISI S-100.
- D. Panel system shall be designed in accordance with the local building code and ASCE7 for project location with respect to appropriate Exposure category, Importance Factor and Factor of Safety in accordance with AISI S-100.
- E. Tested and listed by Underwriters Laboratories to comply with UL 580 for wind uplift Class 90 rating.

2.3 ACCESSORIES

- A. Panel Clip Screw - screw required in wind uplift rating requirements and design specification for application, with corrosion-resistant coating, in length necessary to penetrate substrate minimum 3/4 inch., as supplied by roof panel manufacturer.
- B. Roof Panel Clip:
 - 1. Intermittent Clip: 16 gauge galvanized steel, one-piece, designed to allow roof panel thermal movement and not contact roof panel cap, as supplied by roof panel manufacturer, meeting wind uplift requirements and design criteria of this section.
 - 2. Intermittent Clip Bearing Plate: If required, in gauge, size and finish as supplied by and approved by roof panel manufacturer for use in roof panel manufacturer's full assembly warranted systems.
 - 3. Multi-Span Clip: as provided by roof panel manufacturer for full assembly warranted systems.
- C. Trim and flashing will be of the same gauge and finish unless approved otherwise by the metal roof system manufacturer.
 - 1. Ridge closures, consisting of metal channel surrounding factory precut closed cell foam, will not be secured through the field of the panel.
 - 2. Trim will be installed specifically as displayed in the manufacturer provided shop drawings. Proposed changes must be approved in writing by the metal roof system manufacturer.
- D. Concealed supports, angles, plates, accessories and brackets: gauge and finish as recommended, and furnished by manufacturer.
- E. Accessory Screw: Size and screw type as provided by panel manufacturer for each use, with prefinished hex washer head in color to match panels where exposed to view.
- F. Rivets: full stainless steel, including mandrel, in size to match application.
- G. Field Sealant:
 - 1. Exposed Sealant: Color coordinated urethane or polymer sealant as supplied by panel manufacturer.
 - 2. Non-exposed Sealant: Non-curing, non-skinning, butyl tape or tube sealant as supplied by manufacturer.
- H. Sealant Tape: non-drying, 100 percent solids, high grade butyl tape, as supplied by panel manufacturer, in sizes to match application.
- I. Pipe Penetration Flashings: 20 year warranted flexible boot type, with stainless steel compression ring. Use silicone type at hot pipes.
- J. Metal Roof Curbs: 0.063 minimum thickness welded aluminum, or 18 gauge minimum welded stainless steel, factory-insulated, with integral cricket, and designed to fit roof panel module, sized to meet application.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Must be certified and qualified by Manufacturer.**

3.2 EXAMINATION

- A. Verification of Conditions**

- 1. Ensure surfaces are ready for panel application.**
- 2. Inspect and ensure surfaces are free from objectionable warp, wave, and buckle before proceeding with installation of pre-formed metal roofing.**
- 3. Ensure substrate is ready to receive metal roofing. Report items for correction and do not proceed with metal roof panel system installation until resolved.**

3.3 PREPARATION

- A. Install substrate boards, hat channels, purlins, or furring channels in accordance with manufacturer's recommendations.**
- B. Coordinate Work, with installation of other associated Work, to ensure quality application.**
- C. Coordinate Work with installation of associated metal flashings and building walls.**
- D. Coordinate Work to minimize foot traffic and construction activity on installed finished surfaces.**
- E. Coordinate location of pipe penetrations to allow centering of pipe in panel.**
- F. Coordinate location of roof curbs, to allow proper integration with roof panel seams.**

3.4 INSTALLATION

- A. Comply with and install roofing and flashings in accordance with all details shown on manufacturer's approved shop drawings and manufacturer's product data, instructions, and installation manuals, within specified erection tolerances.**
- B. Install field panels in continuous lengths, without endlaps**
- C. Do not install panels damaged by shipment or handling.**
- D. Install intermittent clips with bearing plates, if required, and continuous clips, if required, according to the engineered design pattern in the field, perimeter, and corner areas of the roof.**
- E. Fix panels at location depicted on reviewed shop drawing(s).**
- F. Fold up pan of panel at ridge, hip and headwalls. Commonly referred to as breadpanning.**
- G. Allow for required panel clearance at penetrations for thermal movement.**
- H. Install concealed supports, angles and brackets as furnished by manufacturer to form complete assemblies.**

- I. Remove roof panel and flashing protective film prior to extended exposure to sunlight, heat, and other weather elements.
- J. Field-apply sealant tape and gun-grade sealant according to reviewed shop drawings and manufacturer's requirements for airtight, watertight installation.
- K. Ensure sealant beads and tapes are applied prior to sheet metal installation to achieve a concealed bead. Neatly trim exposed portions of sealant without damaging roof panel or flashing finish.
- L. Align pipe penetrations to occur at center of roof panel. Report and have corrected improperly-placed penetrations before proceeding with panel installation. Remove and replace roof panels which have improperly-placed penetration flashings.
- M. Align roof curbs to fit roof panel module and overlap standing seam(s). Allow for proper drainage on both sides of curb.
- N. Install sheet metal flashings according to manufacturer's recommendations, reviewed shop drawings and in accordance with provision of Section 07 62 00.

3.5 CLEANING

- A. Clean exposed surfaces of work promptly after completion of installation.
- B. Clean mud, dirt, and construction-related debris from panels before panels are scratched or marred.

3.6 PROTECTION

- A. Protect Work as required to ensure roofing will be without damage at time of final completion.
- B. Do not allow excessive foot traffic over finished surfaces.
- C. Do not track mud, dirt, or construction-related debris onto panel surfaces.
- D. Touch-up paint of any kind is not allowed on prefinished metals. If metal is marred, scratched, scuffed, bent, dented, rusted, etc. then Contractor shall replace damaged Work before final completion.

END OF SECTION

Section 07 42 10

Preformed Metal Siding

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes
 - 1. Factory-formed: exposed-fastener, metal wall panels.
 - 2. Finish must conform to the "Metal Construction Association Certified Premium Painted™" designation

1.3 RELATED SECTIONS

- A. Division 5 Section "Cold Formed Metal Framing"
- B. Division 6 Section "Rough Carpentry"
- C. Division 7 Section "Flashing and Sheet Metal"

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide metal wall panel assemblies that comply with performance requirements specified as determined by testing manufacturers' standard assemblies similar to those indicated for this Project, by a qualified testing and inspecting agency.
- B. System shall meet performance criteria as installed. Either test data or signed and sealed engineering calculations shall document the performance of the panel system to meet design loads required.

1.5 SUBMITTALS

- A. Product Data: Manufacturer's current product specifications and installation instructions.
- B. Shop Drawings: Include small-scale elevations, as required. Show details of trim and flashing conditions, fastening and anchorage methods, weatherproofing techniques, terminations, and penetrations.

C. Samples:

1. **Selection Samples:** Submit actual metal chips with full range of colors available for Architect's selection.
 2. **Verification Samples:** Submit two samples of each type of metal panel required, not less than 12 inches (305mm), and illustrating finished panel profile.
- D. Product Test Reports:** Submit copies of test reports or load tables verifying performance capability of panel system:
1. **Metal Wall Panels:** Include reports for:
 - a. Fastener test and pull-out calculations
 - b. Load tables
 - c. Maintenance Data

1.6 QUALITY ASSURANCE

- A. **Installer:** Company specializing in the type of work required for this project, with not less than 2 years of documented experience.
- B. **Pre-Installation meeting:** Convene meeting not less than one week prior to beginning installation between general contractor, installing contractor, owner's representative and manufacturer.

1.7 DELIVERY, STORAGE & HANDLING

- A. Do not deliver materials of this section to project site until suitable facilities for storage and protection are available.
- B. Protect materials from damage during transit and at project site. Store under cover, but sloped to provide positive drainage. Do not expose materials with strippable protective film to direct sunlight or extreme heat.
- C. Do not allow storage of other materials or allow staging of other work on installed metal panel system.
- D. Upon receipt of delivery of metal panel system, and prior to signing the delivery ticket, the installer is to examine each shipment for damage and for completion of the consignment.

1.8 WARRANTY

- A. **Special Warranty on Finishes:** Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal roofing that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 1. **Fluoropolymer Finish Warranty Period:** 20 years from date of Substantial Completion.
- B. **Special Installer's Warranty:** Specified form in which Wall Installer agrees to repair or replace components of custom-fabricated sheet metal wall that fail in materials or workmanship within 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Manufacturer's Qualifications:** All panels are to be factory formed and packaged per job requirements.
 - 1. Manufacturer shall have a minimum of ten (10) years' experience in the factory fabrication of metal wall panels.
 - 2. Manufacturer must be certified to ISO 9001:2008 with design.
- B. Specification is based upon the products of ATAS International, Inc. Other manufacturer of metal wall systems shall be accepted as an alternate product with prior written approval. These substitution requests must meet specifications and must be submitted a minimum of ten (10) days prior to date of bid.
- C. Coordinate with insulation requirements as noted by Architect.
- D. Secondary framing members as required for load criteria and wind requirements.

2.2 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. **Exposed-fastener, Lap seam Metal Wall Panels:** Provide Factory-formed, designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weather tight installation.
- B. **Corrugated-Profile, Exposed-Fastener Metal Wall Panels:** Formed with alternating curved ribs spaced at 2.67 inches o.c. across width of panel.
 - 1. **Basis-of Design Product:** ATAS International, Inc.; Corrugated Panel - BWC374
 - 2. **Available Manufacturers:**
 - a. ATAS International, Inc.
 - 3. **Material:** 24 ga., 55% A1-Zn alloy coated steel with acrylic coating
 - a. **Texture:** Embossed
 - b. **Finish:** KYNAR 5000® PDVF or HYLAR 5000® Finish
 - c. **Color:** Manufacturer's standard color to be chosen by Architect
 - 4. **Panel Coverage:** 37-1/4"
 - 5. **Panel Height:** 7/8"
 - 6. **Panel Application/Orientation:** Ceiling/see Drawings.

2.3 FABRICATION

- A. **Panels:**
 - 1. Panels to be Factory fabricated in a controlled environment.
 - 2. Panels to be tension leveled during roll forming process.

3. Panels to be produced in longest lengths possible, except when modular units are utilized.
- B. Form all components true to shape, accurate in size, square and free from distortion or defects. Cut panels to precise lengths indicated on approved shop drawings or as required by field conditions.
- C. Accessories: Factory fabricates trim and flashing components in standard 12-foot lengths.
 1. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.
 2. Fabricate wall panels as required to maintain fabrication tolerances and to withstand design loads.
- D. Fabricate metal wall panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weathertight seals.
- E. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- F. Panels, fabrication and installation shall meet the requirements of the Metal Construction Association Preformed Metal Wall Guidelines

PART 3 - EXECUTION

3.1 PREPARATION

- A. Field Measurements
 1. Field measurements should be taken by the installer for verification of dimensional correctness in relationship to original plans, prior to providing manufacturer with a bill of material.
- B. Delivery, Storage and Handling
 1. Do not deliver materials of this section to project site until suitable facilities for storage and protection are available.
 2. Protect materials from damage during transit and at project site. Store under cover, but sloped to provide positive drainage. Do not expose materials with strippable protective film to direct sunlight or extreme heat.
 3. Do not allow storage of other materials or allow staging of other work on installed metal panel system.
 4. Upon receipt of delivery of metal panel system, and prior to signing the delivery ticket, the installer is to examine each shipment or damage and for completion of the consignment.
- C. Sequencing and Scheduling
 1. Installer shall coordinate with general contractor as to scheduled delivery time after receipt of field verified bill of material by manufacturer as it relates to actual project scheduling.

3.2 METAL WALL PANEL INSTALLATION, GENERAL

- A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings.

Install panels perpendicular to girts and subgirts, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Field cutting of metal wall panels by torch is not permitted.
 2. Rigidly fasten metal wall panels and allow for thermal expansion and contraction as required by the panel manufacturer. Pre-drill panels as required.
 3. Install screw fasteners.
 4. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 5. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated or, if not indicated, as necessary for waterproofing and material compatibility.
 6. Provide weatherproof seals for pipe and conduit penetrating exterior walls.
- B. Fasteners: Use fasteners of size and length as required for compatibility with substrate.
1. Wall Panels: Use stainless-steel fasteners or metallic coated fasteners for surfaces exposed to the exterior and aluminum or galvanized steel fasteners for surfaces exposed to the interior.
 2. Exposed fasteners shall have a high performance factory applied coating to match paint color.
 3. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal wall panel manufacturer.
- C. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal wall panel assemblies.

3.3 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete sheet metal roofing assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
 2. Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual" and NRCA Waterproofing Manual. Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 3. Panels, fabrication and installation shall meet the requirements of the Metal Construction Association Preformed Metal Wall Guidelines.
- B. Coordinate with installation of:
1. Cold Formed Metal Framing, as noted in Section 5

2. Rough Carpentry, as noted in Section 6
3. Flashing and Sheet Metal, as noted in Section 7

3.4 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed. Maintain in a clean condition during construction.
- B. Protection:
 1. Provide as required completed work of this section will be without damager or deterioration at date of substantial completion.
- C. Touch up minor abrasions with matching paint provided by panel manufacturer. Remove and replace panels that cannot be satisfactorily touched up. See Metal Construction Association Technical Bulletin #95-1051.
- D. Sweep and remove chips, shavings and dust from roof on a daily basis during installation period. Leave installed work clean, free from grease, finger marks and stains. Remove all protective masking from material immediately after installation of product.
- E. Upon completion of installation, remove scraps and debris from project site.
- F. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt and sealant.

END OF SECTION 07 41 10

SECTION 07 60 00

FLASHING AND SHEET METAL

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Provide flashing and sheet metal not specifically described in other Sections of these Specifications but required to prevent penetration of water through the exterior shell of the building.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. 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 the methods needed for proper performance of the work of this Section.
- B. In addition to complying with pertinent codes and regulations, comply with pertinent recommendations contained in current edition of "Architectural Sheet Metal Manual" published by the Sheet Metal and Air-conditioning Contractors National Association (SMACNA).
- C. Standard commercial items may be used for flashing, trim, reglets and similar purposes provided such items meet or exceed the quality standards specified.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.
- B. Product data: Within 45 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
 - 3. Shop Drawings in sufficient detail to show fabrication, installation, anchorage and interface of the work of this Section with the work of adjacent trades;
 - 4. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
 - 5. Samples, 8" x 8" of each type of material proposed to be used.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 MATERIALS AND GAGES

- A. Where sheet metal is required, and no material or gage is indicated on Drawings provide the highest quality and gage commensurate with the referenced standards.

2.2 PREFINISHED STEEL SHEETS

- A. 26 gauge, hot dipped galvanized steel (G90) commercial quality, primed and finished on one (1) side with Kynar 500 fluoropolymer coating 1.0 mil DPT. Vincent "Color Clad", Petersen "Pac-Clad", or approved equal.

2.3 ALUMINUM

- A. Provide prefinished aluminum .040" thickness, Kynar 500 or equal coating, .040" thickness, typical where indicated on the Drawings, and as needed for complete weathertightness.
- B. Zinc Coating:
 - 1. Where galvanizing is required, provide zinc coating by hot-dip galvanize to all surfaces.
 - 2. Weight - Provide not less than 1-1/4" oz. per sq. ft., nor more than 1-1/2 oz. per sq. ft., to surfaces required to be galvanized.
 - 3. Comply with ASTM A93.

2.4 NAILS, RIVETS AND FASTENERS

- A. Use only soft iron rivets having rust-resistive coating, galvanized nails and cadmium plated screws and washers in connection with galvanized iron and steel.
- B. Use color-coordinated prefinished fasteners where fasteners will be visible.
- C. Use fasteners of same or compatible metal with respective flashing metal type.

2.5 FLUX

- A. Where flux is required, use raw muriatic acid.

2.6 SOLDER

- A. Where solder is required, comply with ASTM B32.

2.7 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.
- B. Flashing: Where indicated on the Drawings, provide .040" aluminum, prefinished in color selected by Architect. Install with concealed clips or "zee" channels to avoid through-fasteners. Submit shop drawings of profiles for Architect's review and approval.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 WORKMANSHIP

A. General:

1. Form sheet metal accurately and to the dimensions and shapes required, finishing molded and broken surfaces with true, sharp and straight lines and angles and, where intercepting other members, coping to an accurate fit and soldering securely.
2. Unless otherwise specifically permitted by the Architect, turn exposed edges back 1/2".

B. Form, fabricate and install sheet metal so as to adequately provide for expansion and contraction in the finished work.

C. Weatherproofing:

1. Finish watertight and weathertight where so required.
2. Make lock seam work flat and true to line, sweating full of solder.
3. Make lock seams and lap seams, when soldered, at least 1/2" wide.
4. Where lap seams are not soldered, lap according to pitch, but in no case less than 3".
5. Make flat and lap seams in the direction of flow.
6. At roof edge flashing, provide splice plates 8" wide, centered on joint, embed in sealant, all hidden fasteners. Under each joint, install a section of flexible flashing membrane 8" wide by the depth of the metal flashing less 1/2" each end, equal to WR Grace or Firestone.
7. Where metal flashing extends underneath siding or roofing material, typically provide a hemmed edge to prevent passage of water. Secure hemmed edge with clips or large head nails adjacent to hemmed edge - do not penetrate flashing with fasteners.
8. Use two-part "snap-lock" flashing/counterflashing as per details at roof-wall intersections.

D. Joints:

1. Join parts with rivets or sheet metal screws only where absolutely necessary for strength and stiffness. Typically install with hemmed edges over concealed clips or zee-clips.
2. Provide suitable watertight expansion joints for runs of more than 40'-0", except where closer spacing is indicated on the Drawings or required for proper installation.
3. At all parapet coping and expansion joint covers, all joints to be 1/2" tall standing seam.

E. Nailing:

1. Secure metal by means of concealed clips or cleats, without nailing through the metal, unless absolutely necessary to be done otherwise.
2. In general, space nails, rivets and screws not more than 8" apart and, where exposed to the weather, use lead washers.
3. For nailing into wood, use barbed roofing nails 1-1/4" long by 11 gage.
4. For nailing into concrete, use drilled plugholes and plugs.
5. All nails or fasteners shall be prefinished to match metal finish.

3.3 EMBEDMENT

- A. Embed metal in connection with roofs in a solid bed of sealant, using materials and methods described in Section 07 92 00 of these Specifications or other materials and methods approved in advance by the Architect.**

3.4 TESTS

- A. Upon request of the Architect, demonstrate by hose or standing water that the flashing and sheet metal are completely watertight.**

3.5 CLEAN-UP

- A. **Cleaning:** After completion of work, remove all debris from site. Clean roofing cement, sealant, and paint from flashing, floors, and adjacent surfaces. Remove strippable film from flashing. Leave all surfaces neat and clean.

END OF SECTION

SECTION 07 84 00

FIRESTOPPING

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Above finished ceilings provide metal studs, fire-resistant gypsum board, sealant systems and accessories at all walls within the project area which are smoke or fire barriers, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Section in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. 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 the methods needed for proper performance of the work of this Section.
- B. In addition to complying with the pertinent codes and regulations of government agencies having jurisdiction, comply with pertinent recommendations contained in the Fire Resistance Directory (1991) of the Underwriters Laboratories for specific fire rated sealant system.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.
- B. Product data: Within 45 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications and other data needed to provide compliance with the specified requirements.
 - 3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART II PRODUCTS

2.1 SEALANT SYSTEMS

- A. Acceptable products are by Bio-Fireshield, Inc., Metalines, Inc., Nelson Electric, Dow-Corning, Thermal Ceramics or other manufacturers and products approved by the Architect to be equal.

PART III EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Identify new walls within the project area which are barriers meant to resist passage of smoke only or are also meant to resist the spread of fire. Determine the hourly rating of any fire barrier. Verify any questionable conditions with Architect.
- B. Install additional gypsum board on metal framing as appropriate to seal large openings in any barrier. Comply with appropriate UL Design for all closure walls at barrier. Verify proposed method of closure with Architect prior to start of Work.
- C. Locate all new penetrations through barrier wall. Identify penetration as to type: metal electrical conduit, telephone cable, PVC plumbing line (sewer, vent or water supply), metal plumbing line (sewer, vent or water supply), HVAC ductwork, etc. Identify all penetrations as to size. Indicate location of all penetrations on Drawings as part of work required by Section 01 78 39, Project Record Documents.
- D. Select appropriate sealant system according to type and size of penetration and type of barrier wall. Provide list of proposed systems to Architect for his review and approval prior to installation.
- E. After receiving Architect's approval, install all sealant systems according to manufacturer's recommendations to provide a complete and durable seal around the penetration.

PART IV GUARANTEE

4.5 GUARANTEE/WARRANTY

- A. Submit written guarantee agreeing to repair or replace sealants which fail performance as fire-resistant, smoke-tight and water-tight joints or fail in joint adhesion or cohesion, abrasion resistance, water resistance, extrusion resistance, migration resistance, stain resistance and general durability; or appears to deteriorate in any other manner not clearly specified by submitted manufacturer's data, as inherent quality of material for exposure indicated. Guarantee for two (2) year period, signed by Applicator and Contractor.

END OF SECTION

SECTION 07 90 00

SEALANTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes sealants and joint backing, precompressed foam sealers, and accessories.
- B. Related Sections:
 - 1. Section 04 20 00 - Unit Masonry
 - 2. Section 04 22 00 - Concrete Unit Masonry
 - 3. Section 07 10 50 - Cold Fluid-Applied Waterproofing
 - 4. Section 07 84 00 - Firestopping: Firestopping sealants.
 - 5. Section 08 80 00 - Glazing: Glazing sealants and accessories.
 - 6. Section 09 29 00 - Gypsum Board

1.2 REFERENCES

- A. ASTM C834 - Latex Sealing Compounds.
- B. ASTM C919 - Practice for Use of Sealants in Acoustical Applications.
- C. ASTM C920 - Elastomeric Joint Sealants.
- D. ASTM C1193 - Guide for Use of Joint Sealants.
- E. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.
- D. Warranty: Include coverage for installed sealants and accessories failing to achieve airtight seal, watertight seal, exhibit loss of adhesion or cohesion, and sealants, which do not cure.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with documented experience.
- B. Applicator: Company specializing in performing Work of this section with documented experience and approved by manufacturer.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 66 00 – Product Storage and Handling Requirements.
- B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.6 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

- B. Coordinate Work with sections referencing this section.

PART 2 PRODUCTS

2.1 JOINT SEALERS

- A. Manufacturers:
1. Dow Corning Corp.
 2. GE Silicones.
 3. Pecora Corp.
 4. Sika Corp.
 5. Substitutions: Section 01 33 00 – Submittal Procedures.
- B. Products Description:
1. High Performance General Purpose Exterior (Nontraffic) Sealant: Sealant Type 1: polyurethane, ASTM C920, Grade P, Class 25; single component.
 - a. Color: Standard colors matching finished surfaces.
 - b. Applications: Use for:
 - 1) Control, expansion, and soft joints in masonry.
 - 2) Joints between concrete and other materials.
 - 3) Joints between metal frames and other materials.
 - 4) Other exterior nontraffic joints for which no other sealant is indicated.
 - 5) Joints between cement board wall panels and between cement board wall panels and dissimilar materials: Sealant manufacturer shall obtain certification from cement board manufacturer accepting products for applications detailed and confirming bondability to panel surfaces.
 2. General Purpose Traffic Bearing Sealant Type 2: Polyurethane; ASTM C920, Grade P, Class 25; single or multi-component, self leveling.
 - a. Color: Standard colors matching finished surfaces.
 - b. Applications: Use for exterior and interior pedestrian and vehicular traffic bearing joints.
 3. Exterior Foam Expansion Joint Sealer Sealant Type 3: Precompressed foam sealer; Polyurethane with water-repellent.
 - a. Color: Face color as selected to match masonry grout color.
 - b. Size: As required to provide weathertight and watertight seal when installed.
 - c. Applications: Use for exterior wall expansion joints.
 4. Sealant Backer Rod: Compressible rod stock open cell polyurethane foam. Provide size and shape of rod which will control joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back side, and provide a highly compressible backer to minimize the possibility of sealant extrusion when joint is compressed.
 5. General Purpose Interior Sealant: Sealant Type 5 Acrylic emulsion latex; ASTM C834, single component, paintable.
 - a. Color: Standard colors matching finished surfaces.
 - b. Applications: Use for interior wall and ceiling control joints, joints between door and window frames and wall surfaces, and other interior joints for which no other type of sealant is indicated.
 6. Plumbing Fixtures/Tile Sealant: Sealant Type 6: Clear silicone; ASTM C920; single component, mildew resistant.
 - a. Applications: Use for joints between plumbing fixtures and floor and wall surfaces, and joints between countertops and wall surfaces.

2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded

rubber; oversized 30 to 50 percent larger than joint width.

- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate surfaces and joint openings are ready to receive work.
- B. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- A. Remove loose materials and foreign matter impairing adhesion of sealant.
- B. Clean and prime joints.
- C. Perform preparation in accordance with ASTM C1193.
- D. Protect elements surrounding Work of this section from damage or disfiguration.

3.3 INSTALLATION

- A. Perform installation in accordance with ASTM C1193.
- B. Perform acoustical sealant application work in accordance with ASTM C919.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave unless detailed otherwise.
- H. Pre-compressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.
- I. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

3.4 CLEANING

- A. Section 01 74 23 - Final Cleaning.
- B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 74 23 – Final Cleaning.
- B. Protect sealants until cured.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Work of this Section includes caulking and sealing complete.
 - 1. Caulking compound used on interior joints where caulking is indicated.
 - 2. Sealing compound, including back-up filler, used primarily for exterior work, perimeters of exterior windows, doors, louvers and panels, control joints in masonry and elsewhere as indicated by "Sealant" on Drawings.
 - 3. Sealant for glazing specified in Section 08 80 00, Glazing.

1.2 APPLICABLE STANDARDS

- A. The following standards form part of this Specification as indicated by references thereto:
 - 1. Federal Specifications (FS):
 - a. TT-C-00598B(2) - "Caulking Compound, Oil and Resin Base, Type for Building Construction
 - b. TT-S-001543A (COM-NBS) - "Sealing Compound: Silicone Rubber Base (for Caulking, Sealing and Glazing in Buildings and other Structures)"
 - 2. American Association for State Highway Officials (AASHO):
 - a. M 543-54 - "Preformed Expansion Joint Fillers for Concrete"

1.3 QUALITY ASSURANCE

- A. Submit brand name of products intended for use for approval before proceeding with work.
- B. Applicator must have minimum five (5) years successful experience in application of types of materials and who agrees to employ only skilled tradesmen for caulking and sealing work.
- C. Obtain elastomeric materials only from manufacturer who will, if required, send qualified technical representative to project site for purpose of advising applicator of proper schedules and precautions for proper use of materials.

1.4 SAMPLES

- A. Submit samples of each color of sealant and caulking required for each type of compound exposed to view. Samples reviewed by Architect for color and texture only. Compliance with other requirements is the responsibility of the Contractor.

1.5 GUARANTEE

- A. Submit written guarantee agreeing to repair or replace sealants which fail performance as air-tight and water-tight joints or fail in joint adhesion or cohesion, abrasion resistance, water resistance, extrusion resistance, migration resistance, stain resistance and general durability; or appears to deteriorate in any other manner not clearly specified by submitted manufacturer's data, as inherent quality of material for exposure indicated. Guarantee for 2-year period, signed by Applicator and Contractor.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Caulking: Light color, elastic and waterproof; shall not stain or corrode metal; gum consistency, light grey color. Conform to TT-C-00598.
- B. Sealant Backer Rod: Conform to requirements of AASHTO M 543. Rod of polyethylene foam, soft extruded, flexible and compressible. White color, odorless, compression-deflection, 7 psi at 25%, tensile strength 20-30 psi, temperature resistance -40 degrees Fahrenheit. Foam compatible with butyl, polysulfide, polyurethane and silicone.
- C. Sealant: Sealing compound conforming to TT-S-001543A.
- D. Primer: Recommended by manufacturer of sealant.

PART 3 EXECUTION

3.1 PREPARATORY WORK

- A. Carefully examine joint surfaces, backing and conditions under which caulking and sealing work is to be performed. Notify Architect, in writing, of conditions detrimental to proper and timely completion of work and sealant performance. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Weather Conditions: Do not install under adverse weather conditions or when temperatures are below or above manufacturer's recommended limitations for installation. Proceed only when forecasted weather conditions are favorable for proper development of high early bond strength. Whenever joints set is affected by ambient temperature variations, install sealants only when temperatures are in lower third of manufacturer's recommended installation range, so sealant will not be subjected to excessive elongation and bond stress at subsequent low temperatures. Coordinate time schedule to avoid project delay.
- C. Compatibility: Before purchase of sealant, investigate its compatibility with joint surfaces and other materials in joint system. provide only materials which are known to be fully compatible with actual installation conditions.

3.2 INSTALLATION - SEALING COMPOUND

- A. Preparation of Joint Surface: Make sure, before sealing, that joints are free of dust, oil, grease, water, frost, loose mortar or other foreign materials. Remove dust or other loose debris with stiff brush or compressed air. Eliminate traces of oil, grease or lacquers with solvent wash, using toluene, xylene, or preferably methyl-ethyl ketone (MEK) applied with clean brush and wiped dry with frequently changed rags. Successful performance of sealant working joints depends on adhesion to joint surfaces. To obtain good adhesion, clean and dry joints are necessary and must be obtained.
- B. Primer: Follow manufacturer's instructions on primer on various substrates. apply primer only to sides of working joints and not to back surfaces, wherever such separation is possible. Do not spill primer on unwanted surfaces; it may change appearance of some surfaces. apply primer along joint surfaces before insertion of backup filler. Use masking tape along joint edge before application of primer. Remove masking tape immediately after joint has been tooled, before sealant skins over.
- C. Backup Filler: Fill joints to receive sealant to depth of 3/8" from face with polyethylene foam backer rod using diameter approximately 25% to 50% greater than joint width.
- D. Sealant: Apply sealant directly from original package to joint or, if bulk purchase is made and cartridges or bulk guns are filled by other than manufacturer, containers must be free from contamination, including other sealants or caulking compounds. apply sealant with hand operated

caulking gun, air operated pressure gun or by use of pumps and hoses. Force sealant into joint in full bead, making certain that continuous void free contact is made with joint sides. Tool joints within 5 minutes of application to produce slightly concave surface and insure maximum contact with sides of joint and elimination of air pockets. Tolling may be done with metal or wooden pointing tool or with thumb, using water (with or without soap) or solvent for lubrication. Leave joint with smooth, slightly concave surface for neat workmanlike appearance. Remove sealant smears from metal or glass surfaces with solvent such as xylene, or methyl-ethyl ketone while sealant is still uncured. On porous surfaces, allow spills or smears to cure overnight, then remove by abrasion. Leave sealed joints undisturbed and protected from appreciable movement for at least 48 hours, preferably longer.

END OF SECTION

**DIVISION 08
DOORS AND WINDOWS**

CONTENTS

08 11 13	Hollow Metal Doors and Frames
08 14 00	Wood Doors
08 71 00	Finish Hardware

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

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. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 01 Section "General Conditions".
2. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
3. Division 08 Section "Flush Wood Doors".
4. Division 08 Section "Clad Wood Doors".
5. Division 08 Section "Stile and Rail Wood Doors".
6. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
7. Division 08 Section "Door Hardware".
8. Division 08 Section "Access Control Hardware".
9. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. 10. SDI-113 Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door & Frame Assemblies.
10. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
11. ASTM C1199 - Standard Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods
12. ASTM E1423 - Practice for Determining Steady State Thermal Transmittance of Fenestration Systems.
13. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
14. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
15. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
16. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
17. **FEMA P-361** 2015/2021 - Design and Construction Guidance for Community Safe Rooms.
18. ICC 500 - 2014/2020 ICC/NSSA Standard for the Design and Construction of Storm Shelters.
19. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
20. TAS-201-94 - Impact Test Procedures.
21. TAS-202-94 - Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components using Uniform Static Air Pressure.
22. TAS-203-94 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.
23. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
24. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- B. Maintenance manual must be provided for tornado/hurricane storm shelter impact protective systems.
- C. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- D. Shop Drawings: Include the following:
 1. Elevations of each door design.
 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 4. Locations of reinforcement and preparations for hardware.
 5. Details of anchorages, joints, field splices, and connections.

6. Details of accessories.
7. Details of moldings, removable stops, and glazing.
8. Details of conduit and preparations for power, signal, and control systems.

E. Samples for Verification:

1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40" above sill) or UL 10C.
 1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
 2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
 3. Smoke Control Door Assemblies: Comply with NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- E. **Storm Shelter Openings:** Provide complete door systems for hurricane or tornado storm shelters, and other areas of refuge, complying and tested according to ICC 500 (2014/2020), ICC/NSSA Standard for the Design and Construction of Storm Shelters.
 1. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- F. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
 - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
 - 1. CECO Door Products (C).
 - 2. Curries Company (CU).
 - 3. Steelcraft (S).

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.
- B. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
 - 1. Design: Flush panel.
 - 2. Core Construction: Manufacturer's standard polystyrene. Where indicated, provide doors fabricated as thermal-rated assemblies with a minimum R-value of 2.8 or better.
 - 3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053-inch - 1.3-mm) thick steel, Model 2.
 - 4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
 - 5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
 - 6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
 - 1. Design: Flush panel.
 - 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.
 - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
 - 3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053-inch - 1.3-mm) thick steel, Model 2.

4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

D. Manufacturers Basis of Design:

1. CECO Door Products (C) Polystyrene Core - Legion Series.

2.4 HOLLOW METAL DOOR AND SHUTTER ASSEMBLIES FOR STORM SHELTERS

A. General: Provide complete tornado or hurricane storm shelter resistant assemblies constructed, test, and listed/labeled to resist the design pressures for components and cladding and missile impact resistance as described in ICC 500 (2014/2020), ICC/NSSA Standard for the Design and Construction of Storm Shelters.

1. Door and shutter systems, tested and complying with ICC 500 (2014/2020) and FEMA P-361 (2015/2021), Design and Construction Guidance for Community Safe Rooms and supported by third party test results.
2. Sheets fabricated on exterior openings from commercial quality hot dipped zinc coated steel complying with ASTM A924 A60. Gauges to be in accordance with manufacturers tested assemblies.
3. Vertical Edges: Vertical edges to have the face sheets joined by a continuous weld extending the full height of the door. Welds are to be ground, filled and dressed smooth. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
4. Top Edge: Reinforce top of doors with a continuous steel channel extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached and welded in place with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".

B. Manufacturers Basis of Design:

1. CECO Door Products (C) - StormPro Series.

2.5 HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
3. Manufacturers Basis of Design:

- a. CECO Door Products (C) - SU SR Series.
 - b. CECO Door Products (C) - Mercury 3 Thermal Break TQB Series.
- C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
 - 1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
 - 2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
 - 3. Manufacturers Basis of Design:
 - a. CECO Door Products (C) - DU Series.
 - b. CECO Door Products (C) - SU Series.
- D. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.6 FRAMES FOR STORM SHELTERS

- A. General: Subject to the same compliance standards and requirements as standard hollow metal frames, provide complete tornado or hurricane storm shelter resistant assemblies tested and labeled as complying with ICC 500 (2014/2020) and FEMA P-361 (2015/2021) and supported by third party test listings.
 - 1. Fabricate exterior frames from 14 gauge hot dipped zinc coated steel that complying with ASTM designations A924 A60.
 - 2. Manufacturers Basis of Design:
 - a. CECO Door Products (C) - StormPro Series.
 - b. Curries Company (CU) - StormPro Series.
 - c. Steelcraft

2.7 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 - 2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
 - 3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.
 - 4. Storm Shelter Anchors: Masonry T-shaped, wire masonry type, or existing opening type anchors as per manufacturers listing or anchor detail sheets including welded installation methods.

- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.
- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.8 LOUVERS

- A. Metal Louvers: Unless otherwise indicated provide louvers to meet the following requirements.
 - 1. Blade Type: Vision proof inverted V or inverted Y.
 - 2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.
- B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.
 - 1. Manufacturers: Subject to compliance with requirements, provide louvers to meet rating indicated.
 - 2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.9 LIGHT OPENINGS AND GLAZING

- A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.
- B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.
- C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.
- D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

2.10 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.11 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Doors:
 - 1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
 - 2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
 - 3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
 - 4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
- D. Hollow Metal Frames:
 - 1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
 - 3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 - 4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
 - 5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
 - 6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
 - 7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
 - 8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 - 9. Jamb Anchors: Provide number and spacing of anchors as follows:

- a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches on-center and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
 - c. Storm Shelter Openings: Provide jamb, head, and sill anchors in accordance with manufacturer's certified assembly listings.
- 10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
 - 11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
- 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 - 2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
 - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 - 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.12 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

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. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.
- E. Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
 1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.5 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION 081113

SECTION 08 14 00

WOOD DOORS

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Provide wood doors complete in place with finish hardware installed where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
 - 2. Section 08 12 14, Standard Steel Frames.
 - 3. Section 08 71 00, Finish Hardware.
- C. Door Styles:
 - 1. Flush

1.2 QUALITY ASSURANCE

- A. 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 the methods needed for proper performance of the work of this Section.
- B. In addition to complying with pertinent codes and regulations of governmental agencies having jurisdiction, comply with:
 - 1. "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute, for the grade and grades specified.
 - 2. Certification and stamps will not be required.
 - 3. Fire-Rated Wood Doors: Where fire-resistance classifications are shown or schedule for wood door assemblies, provide doors which comply with the requirements of NFPA No. 80 "Standards for Fire Doors and Windows" and which have been tested and rated with single point hardware by UL.
 - 4. Provide UL Label on door and panel.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures for submittals and substitutions.
- B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications and other data needed to provide compliance with the specified requirements;
 - 3. Samples, approximately 8"x 8" in size, of each of the proposed door face materials.
- C. Warranty - Wood Doors: Submit written agreement in door manufacturer's standard form signed by the manufacturer, installer and contractor, agreeing to repair or replace defective doors which have been warped (bow, cup or twist) or which show photographing of construction below in face veneers, or do not conform to tolerance limitations of NWMA.

1. The warranty shall also include refinishing and reinstallation which may be required due to repair or replacement of defective doors.
2. Warranty shall be in effect during the following period of time after the date of acceptance:
 - a. Solid Core Interior Doors: Five (5) years.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.
- B. Delivery:
 1. Deliver doors and frames to site after plaster and cement are dry, and after building has reached average prevailing humidity of its locality.
 2. Deliver prefinished doors in manufacturer's original containers, clearly marked with manufacturer's name, brand name, size, thickness, and identifying symbol on the covering.
 3. Seal all four edges of unfinished doors when delivered to the job site.
- C. Storage:
 1. Stack flat on 2"x 4" lumber, laid 12" from ends and across center.
 2. Under bottom door and over top of stack, provide plywood or corrugated cardboard to protect door surfaces.
 3. Store doors in area where there will be not great variations in heat, dryness and humidity.
- D. Do not drag doors across one another; lift doors and carry them into position.

PART 2 PRODUCTS

2.1 MATERIALS AND COMPONENTS

- A. General: Provide wood doors complying with the applicable requirements of NWMA I.S.1 for the kinds and types of doors indicated and as further specified.
- B. Face panels: Manufacturer's standard 2 or 3 ply face panels, unless otherwise indicated. Wood type to be STAIN GRADE, MAPLE or equal.
- C. Exposed surfaces: Provide the kind shown or scheduled and as further specified, provide same exposed surface material on both faces of each door, unless otherwise indicated.
- D. Fire-Rated doors: Provide exposed faces and edges to match non-fire-rated doors in the same area of the building, unless otherwise indicated. Provide trim for openings (if any) which have been tested and listed for the kind of door and rating indicated.

2.2 SOLID CORE WOOD DOORS

- A. Type II water-resistant bond.
- B. Core construction: Solid wood block, wood particleboard, or mineral with wood lock blocks, as required by door manufacturer to comply with specified warranty period.
- C. Face panels: Manufacturer's standard 2 or 3 ply face panels.
- E. Acceptable Manufacturers:
 - 1. Algoma Hardwoods, Inc.
 - 2. Eggers Industries
 - 3. Mohawk Flush Doors
 - 4. Weyerhaeuser
 - 5. Benton
 - 6. Jeld-Wen
 - 7. Trimlite
 - 8. Substitutes: Section 01 33 00 – Submittal Procedures.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory condition are corrected.

3.2 INSTALLATION

- A. Fitting and machining:
 - 1. Unless doors are completely fitted and machine at the mill, fit them for width by planing and fit them for height by sawing:
 - a. Bottom: 1/2" clearance maximum
 - b. Top: 1/2" clearance maximum
 - c. Lock edge and hinge edge: Bevel 1/8" in 2" maximum
 - 2. Machine doors for hardware in accordance with recommendations of the hardware manufacturers, as those recommendations have been approved by the Architect.
- B. Receive and retain custody of finish hardware furnished for the work of this Section under Section 08710 of these Specifications and, except as otherwise directed by the Architect, install all such finish hardware in strict accordance with the recommendations of its manufacturer.
- C. Replace or re-hang doors which are hingebound and do not swing or operate freely.
- D. See painting section of these specifications for requirements for finishing wood doors.

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical door hardware.
 - 3. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Division 08 Section "Operations and Maintenance".
 - 2. Division 08 Section "Door Schedule".
 - 3. Division 08 Section "Door Hardware Schedule".
 - 4. Division 08 Section "Hollow Metal Doors and Frames".
 - 5. Division 08 Section "Flush Wood Doors".
 - 6. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. TAS-201-94 - Impact Test Procedures.
 - 8. TAS-202-94 - Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components using Uniform Static Air Pressure.
 - 9. TAS-203-94 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.
 - 10. State Building Codes, Local Amendments.

- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.
 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

1.4 CLOSEOUT SUBMITTALS

- A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.
- B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

1.5 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
1. Function of building, purpose of each area and degree of security required.
 2. Plans for existing and future key system expansion.
 3. Requirements for key control storage and software.
 4. Installation of permanent keys, cylinder cores and software.
 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.7 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.8 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

- B. Storm Shelter Openings: Furnish a complete set of operational and maintenance instructions as needed for Owner's continued adjustment, maintenance, and repairs of door hardware as required by ICC 500 (2020), ICC/NSSA Standard for the Design and Construction of Storm Shelters.

PART 2 - PRODUCTS

2.1 MATERIALS

2.2 BUTT HINGES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.
 5. Manufacturers:
 - a. Hager Companies (HA) - BB Series, 5-knuckle.
 - b. Ives (IV) - 5BB Series, 5-knuckle.
 - c. McKinney (MK) - TA/T4A Series, 5-knuckle.

- B. Hinges at Storm Shelter Assemblies: At a minimum, provide heavy weight hinges with stainless steel screws used in accordance with and specified as part of a Severe Storm Shelter Opening meeting ICC 500 and FEMA 361.

1. Quantity: Provide the following hinge quantity:
 - a. Three Hinges: For shutters with heights 36 to 60 inches, and doors at height of 80 inches.
 - b. Four Hinges: For shutters with heights > 60 inches to 80 inches, and doors with heights greater than 84 inches.
2. Quantity: Provide the following hinge quantity:
 - a. Three Hinges: For shutters with heights 36 to 60 inches, and doors at height of 80 inches.
 - b. Four Hinges: For shutters with heights > 60 inches to 80 inches, and doors with heights greater than 84 inches.
 - c. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - d. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - e. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
3. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
4. Hinge Weight and Base Material: At a minimum, provide heavy weight hinges with stainless steel screws used in accordance with and specified as part of a certified Storm Shelter Opening meeting ICC 500.
5. Manufacturers:
 - a. McKinney (MK) - SP3386/SP3786.
 - b. Ives

2.3 CONTINUOUS HINGES

- A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:.
 - a. Hager Companies (HA).
 - b. Ives (IV).
 - c. Pemko (PE).

- B. Pin and Barrel Continuous Hinges: ANSI/BHMA A156.26 Grade 1-600 pin and barrel continuous hinges with minimum 14 gauge Type 304 stainless steel hinge leaves, concealed stainless pin, and twin self-lubricated nylon bearings at each knuckle separation. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

- a. Hager Companies (HA).
- b. Markar Products; ASSA ABLOY Architectural Door Accessories (MR).
- c. Pemko (PE).

2. Manufacturers (Storm Shelter Assemblies):

- a. Markar Products; ASSA ABLOY Architectural Door Accessories (MR).
- b. No Substitution.

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

1. Manufacturers:

- a. Match Existing, Field Verify.
- b. No Substitution.

- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6. Keyway: Match Facility Standard.

- C. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Field verify and key cylinders to match Owner's existing system.

- D. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).

E. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:
 - a. Lund Equipment (LU).
 - b. MMF Industries (MM).
 - c. Telkee (TK).

2.6 MORTISE LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:
 - a. ASSA ABLOY ACCENTRA (YA) - 8800FL Series.
 - b. Corbin Russwin Hardware (RU) - ML2000 Series.
 - c. Sargent Manufacturing (SA) - 8200 Series.
 - d. Schlage (SC) - L9000 Series.

2.7 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.

2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.8 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. Exit devices shall have a five-year warranty.
2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:
 - a. ASSA ABLOY ACCENTRA (YA) - 7000 Series.
 - b. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.

- c. Sargent Manufacturing (SA) - 80 Series.
 - d. Von Duprin (VD) - 35A/98 XP Series.
- C. Multi-Point Exit Devices (Storm Shelter Openings): Multi-point exit devices specifically engineered for out-swinging door applications on tornado or hurricane resistant storm shelter openings. Extra heavy duty steel component construction with each of the latching points automatically activated when the device is locked. The multi-point exit device is approved for usage as part of a complete ICC 500 (2014/2020) and FEMA P-361 (2015/2021) door, frame and hardware assembly.
 - 1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - FE5400S Series.
 - b. Sargent Manufacturing (SA) - FM8700 Series.
 - c. Von Duprin

2.9 SURFACE DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
 - 1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
 - 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 - 3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
 - 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 - 5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 - 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.
 - 1. Large body cast iron surface mounted door closers shall have a 30-year warranty.
 - 2. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - DC8000 Series.
 - b. LCN Closers (LC) - 4040XP Series.

- c. Sargent Manufacturing (SA) - 281 Series.
- C. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
 - 1. Heavy duty surface mounted door closers shall have a 30-year warranty.
 - 2. Manufacturers:
 - a. ASSA ABLOY ACCENTRA (YA) - 4400 Series.
 - b. Corbin Russwin Hardware (RU) - DC6000 Series.
 - c. LCN Closers (LC) – 4040XP Series.
 - d. Sargent Manufacturing (SA) - 351 Series.

2.10 SURFACE MOUNTED CLOSER HOLDERS

- A. Electromagnetic Door Holders: ANSI A156.15, Grade 1 electromagnetic door holder/releases with a minimum 25 to 40 pounds holding power and fail-safe operation; power failure releases door to close.
 - 1. Manufacturers:
 - a. LCN Door Closers (LC) - SEM7800 Series.
 - b. Norton Rixson (RF) - 900 Series.
 - c. Sargent Manufacturing (SA) - 1560 Series.

2.11 ARCHITECTURAL TRIM

- A. Door Protective Trim
 - 1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
 - 2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
 - 3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
 - 4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Ives (IV).
 - b. Rockwood (RO).
 - c. Trimco (TC).

2.12 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Manufacturers:
 - a. Ives (IV).
 - b. Rockwood (RO).
 - c. Trimco (TC).

2.13 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 - 1. National Guard Products (NG).
 - 2. Pemko (PE).
 - 3. Zero (ZE).

2.14 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.15 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
- E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
 - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 - 1. Quantities listed are for each pair of doors, or for each single door.
 - 2. The supplier is responsible for handing and sizing all products.
 - 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
 - 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Manufacturer's Abbreviations:
 - 1. MK - McKinney
 - 2. PE - Pemko
 - 3. MR - Markar
 - 4. RU - Corbin Russwin

- 5. YA - ASSA ABLOY ACCENTRA
- 6. RO - Rockwood
- 7. RF - Rixson

Set: 1.0

Doors: 100, 104, 200, 201

Description: Sgl-Storeroom-Closer-Gasket

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Storeroom Lock	CLX3357 NZD	626	
1 Cylinder	Type as required – Match existing		
1 Surface Closer	DC8200/DC8210 M54	689	RU
1 Kick Plate	K1050 10" High BEV CSK	US32D	RO
1 Door Stop	400/441H as req	US26D	RO
1 Gasketing	S88BL		PE

Set: 2.0

Doors: 101, 103

Description: Sgl-Privacy-Closer

3 Hinge, Full Mortise	TA2714	US26D	MK
1 Privacy Lock	CLX3320 NZD	626	RU
1 Surface Closer	DC8200/DC8210 M54	689	RU
1 Kick Plate	K1050 10" High BEV CSK	US32D	RO
1 Door Stop	400/441H as req	US26D	RO
1 Gasketing	S88BL		PE

Notes: Cutout threshold so bottom strike can be mounted directly to the concrete floor and not on the threshold.

Door will have a 5/8" undercut.

Hardware meets ICC500 design intent as tested in an assembly. Confirm hardware meets ICC500 assembly requirements per door manufacturer. Specified hardware for use with StormPro doors.

END OF SECTION 087100

**DIVISION NINE
FINISHES**

CONTENTS

09 29 00	Gypsum Board
09 30 00	Ceramic Tile
09 65 00	Resilient Flooring
09 90 00	Painting and Coating

SECTION 09 29 00

GYPSUM BOARD

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Provide gypsum drywall and accessories where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 01 of these Specifications.
 - 2. Section 06 10 00 Rough Carpentry

1.2 QUALITY ASSURANCE

- A. 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 the methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures for submittals and substitutions.
- B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
 - 3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 GYPSUM WALLBOARD

- A. General:
 - 1. Provide gypsum wallboard complying with Fed. Spec. SS-L-30D, in 48" widths and in such lengths as will result in a minimum of joints.
- B. Types:
 - 1. Provide regular 5/8" gypsum wallboard, tapered edges, as indicated on the Drawings except as noted.

2. Fire-Rated Gypsum Wallboard: Provide 5/8" type "x" gypsum wallboard, ASTM-36. Typical at all fire-rated wall assemblies and at one-hour ceilings as called out in Drawings.
 - a. USG FIRECODE
 - b. National Gypsum "Fire-Shield"
 - c. Approved equal.
3. Gypsum Wallboard, water-resistant, Type WR, 5/8" thickness, tapered edge, chemically treated multi-layered face and back paper and water-resistant gypsum core, typical at all Restrooms.
4. Gypsum Wallboard Exterior: Where indicated on plans at building exterior, Georgia Pacific Dens Glass 5/8" thickness, with fiberglass reinforced facing or equal product.

2.2 METAL TRIM

- A. Form from zinc-coated steel not lighter than 26 gauge, complying with Fed. Spec. QQ-S-775, Type I, Class D or E.
- B. Casing beads:
 1. Provide channel-shapes with an exposed wing, and with a concealed wing not less than 7/8" wide.
 2. The exposed wing may be covered with paper cemented to the metal, but shall be suitable for joint treatment.
- C. Corner beads: Provide angle shapes with wings not less than 7/8" wide and perforated for nailing and joint treatment, or with combination metal and paper wings bonded together, not less than 1-1/4" wide and suitable for joint treatment.
- D. Edge beads for use at perimeter of ceilings:
 1. Provide angle shapes with wings not less than 3/4" wide.
 2. Provide concealed wing perforated for nailing, and exposed wing edge folded flat.
 3. Exposed wing may be factory finished in white color.

2.3 JOINTING SYSTEM

- A. Provide a jointing system, including reinforcing tape and compound, designed as a system to be used together and as recommended for this use by the manufacturer of the gypsum wallboard approved for use on this Work.
- B. Jointing compound maybe used for finishing if so recommended by its manufacturer.

2.4 FASTENING DEVICES

- A. For fastening gypsum wallboard in place on metal studs and metal channels, use flat-head screws, shouldered, specially designed for use with power-driven tools, not less than 1" long, with self-tapping threads and self-drilling points.

2.5 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. General:
 - 1. Install the gypsum wallboard in accordance with the Drawings and with the separate boards in moderate contact but not forced into place.
 - 2. At internal and external corners, conceal the cut edges of the boards by the overlapping covered edges of the abutting boards.
 - 3. Stagger the boards so that corners of any four boards will not meet at a common point except in vertical corners.
- B. Ceilings:
 - 1. Install the gypsum wallboard to ceilings with the long dimensions of the wallboard at eight angles to the supporting members.
 - 2. Wallboard may be installed with the long dimensions parallel to supporting members that are spaced 16" on center when attachment members are provided at end joints.
- C. Walls:
 - 1. Install the gypsum wall board to studs at right angles to the furring or framing members.
 - 2. Make end joints, where required, over framing or furring members.
- D. Attaching:
 - 1. Drive the specified screws with clutch-controlled power screwdrivers, spacing the screws 12" on centers at ceilings and 16" on centers at walls.
 - 2. Where framing members are spaced 24" apart on walls, space screws 12" on centers.
 - 3. Attach double layers in accordance with the pertinent codes and the manufacturer's recommendation as approved by the Architect.
 - 4. Attach to wood as required by governmental agencies having jurisdiction.
- E. Access Doors:
 - 1. By careful coordination with the Drawings and with the trades involved, install the specified access doors where required.
 - 2. Anchor firmly into position, and align properly to achieve an installation flush with the finished surface.

3.3 JOINT TREATMENT

- A. General:
 - 1. Inspect areas to be joint treated, verifying that the gypsum wallboard fits snugly against supporting framework.
 - 2. In areas where joint treatment and compound finishing will be performed, maintain a temperature of not less than 55 degrees for 24 hours prior to commencing the treatment, and until joint and finishing compounds have dried.
 - 3. Apply the joint treatment and finishing compound by machine or hand tool.
 - 4. Provide a minimum drying time of 24 hours between coats, with additional drying time in poorly ventilated areas.
- B. Embedding compounds:

1. Apply to gypsum wallboard joints and fastener heads in a thin uniform layer.
2. Spread the compound not less than 3" wide at joints, center the reinforcing tape in the joint and embed the tape in the compound. Then spread a thin layer of compound over the tape.
3. After this treatment has dried, apply a second coat of embedding compound to joints and fastener heads, spreading in a thin uniform coat to not less than 6" wide at joints and feather edged.
4. Sandpaper between coats as required.
5. When thoroughly dried dry, sandpaper to eliminate ridges and high points.

C. Finishing compounds:

1. After embedding compound is thoroughly dry and has been completely sanded, apply a coat of finishing compound to joints and fastener heads.
2. Feather the finishing compound to not less than 12" wide.
3. When thoroughly dry, sandpaper to obtain a uniformly smooth surface, taking care to not scuff the paper surface of the wallboard.

3.4 CORNER TREATMENT

- A. Internal corners: Treat as specified for joints, except fold the reinforcing tape lengthwise through the middle and fit neatly into the corner.
- B. External corners:
1. Install the specified corner bead, fitting neatly over the corner and securing with the same type fasteners used for installing the wallboard.
 2. Space the fasteners approximately 6" on centers, and drive through the wallboard into the framing or furring member.
 3. After the corner bead has been secured into position, treat the corner with joint compound and reinforcing tape as specified for joints, feathering the joint compound out from 8" to 10" on each side of the corner.

3.5 OTHER METAL TRIM

- A. General:
1. The Drawings do not purport to show all locations and requirements for metal trim.
 2. Carefully study the Drawings and the installation, and provide all metal trim normally recommended by the manufacturer of the gypsum wallboard approved for use in the Work.

3.6 CLEANING UP

- A. In addition to other requirements for cleaning, use necessary care to prevent scattering gypsum wallboard scraps and dust, and to prevent tracking gypsum and joint finishing compound onto floor surfaces.
- B. At completion of each segment of installation in a room or space, promptly pick up and remove from the working area all scrap, debris and surplus material of this Section.

END OF SECTION

SECTION 09 30 00

CERAMIC TILE

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Provide ceramic tile where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
- C. One (1) box of each type of tile to be left at job site as surplus material.

1.2 QUALITY ASSURANCE

- A. 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 the methods needed for proper performance of the work of this Section.
- B. Provide manufacturer's Master Grade Certificate stating type and location of each tile material in this Section.

1.3 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A108.1 - Installation of Ceramic Tile, A collection.
 - 2. ANSI A108.1A - Specifications for Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar.
 - 3. ANSI A108.1B - Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
 - 4. ANSI A108.1C - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar -or- Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
 - 5. ANSI A108.5 - Specifications for Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
 - 6. ANSI A108.6 - Specifications for Ceramic Tile Installed with Chemical-Resistant, Water-Cleanable Tile-Setting and -Grouting Epoxy.
 - 7. ANSI A108.7 - Specifications for Electrically Conductive Ceramic Tile Installed with Conductive Dry-Set Portland Cement Mortar.
 - 8. ANSI A108.9 - Specifications for Ceramic Tile Installed with Modified Epoxy Emulsion Mortar/Grout.
 - 9. ANSI A108.10 - Specifications for Installation of Grout in Tilework.
 - 10. ANSI A118.1 - Standard Specification for Dry-Set Portland Cement Mortar.
 - 11. ANSI A118.3 - Chemical-Resistant, Water-Cleanable, Tile-Setting and -Grouting Epoxy and Water-Cleanable Tile-Setting Epoxy Adhesive.
 - 12. ANSI A118.4 - Latex-Portland Cement Mortar.
 - 13. ANSI A118.6 - Ceramic Tile Grouts.
 - 14. ANSI A118.8 - Modified Epoxy Emulsion Mortar/Grout.
 - 15. ANSI A118.9 - Test Methods and Specifications for Cementitious Backer Units.
 - 16. ANSI A137.1 - Ceramic Tile.

- B. Tile Council of America:
 - 1. TCA - Handbook for Ceramic Tile Installation.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01340.
- B. Product data: Within 45 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications and other data needed to provide compliance with the specified requirements.
 - 3. Samples of each type, class and color of ceramic tile required, not less than 12" square, mounted on plywood or hardboard backing and grouted as specified.
- C. Except when specifically exempted by the Architect, submit Master Grade Certificates for each shipment of ceramic tile prior to arrival of the shipment at the job site.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01 33 00 - Submittal Procedures

PART 2 PRODUCTS

2.1 CERAMIC TILE

- A. Ceramic Tile: All to be of same manufacturer and series.

Floor Tile (CT-1):

- 1. Provide coefficient of friction not less than 0.50 when tested in accordance with ASTM F489, ASTM F609 and the National Bureau of Standards Technical Note 895.
- 2. Color:
 - a. American Olean, Lanesboro, 12" x 24" porcelain
 - b. Dal-tile, Merit, 12"x24", glazed porcelain
 - c. Approved equal
- 3. Provide standard accessories and trim, as typical with this line of tile.
- 4. Tile shall comply with all requirements as per the "Americans with Disabilities Act" (ADA).

Base:

- 1. Ceramic base shall match wall tile.

Wall Tile (CT-2):

- 1. American Olean, Color Story Wall, 4" x 12", glazed ceramic
- 2. Dal-tile, Stencil, 4" x 12", glazed porcelain
- 3. Approved equal

2.2 SETTING METHODS

- A. Comply with pertinent recommendations contained in the Tile Council of American "Handbook for Ceramic Tile Installation".
- B. Methods and materials:
 - 1. Provide thin set method at all floor conditions, as per Tile Council of American, Inc., Specification Number F-115-88.
 - 2. Provide thin set method at all wall conditions, Tile Council of American, Inc., Specification Number W243-88.

3. Upon completion of placing and grouting, clean the work of this Section in accordance with the recommendations of the manufacturers of the materials used.
4. Protect metal surfaces, cast iron and vitreous items from effects of acid cleaning.
5. Flush surfaces with clean water before and after cleaning.
6. Provide tile surfaces clean and free from cracked, broken, chipped, unbonded and otherwise defective units.
7. Provide required protection of tile surfaces until completion of project.

2.3 GROUT

- A. Comply with pertinent sections and recommendations in the Tile Council Handbook in colors selected by Architect, acid resistant grout Durament, Hydrament or approved equal.

2.4 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.
- B. If required on Drawings, furnish and install sections of low profile ADA-accessible 4" deep marble thresholds full width of doorways. Color to be selected by Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. General:
 1. Comply with ANSI A108.5, ANSI A108.10, and the "Handbook for Ceramic Tile Installation" of the Tile Council of America, except as otherwise directed by the Architect or specified herein.
 2. Maintain minimum temperature limits and installation practices recommended by materials manufacturers.
 3. Do not install tile floors over membrane until the membrane has been tested and accepted.
- B. Limits of tile:
 1. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruptions.
 2. Terminate tile neatly at obstructions, edges and corners, without disruption of pattern or joint alignment.
- C. Joining pattern:
 1. Lay tile in grid pattern unless otherwise indicated on the Drawings or directed by the Architect.
 2. Align joints when adjoining tiles on floor, base, trim and walls are the same size.
 3. Layout tile work, and center the tile fields both directions in each space or on each wall area.
 4. Adjust to minimize tile cutting.
 5. Provide uniform joint widths.
- D. Provide expansion and control joints where shown on the Drawings, and where otherwise recommended by the "Handbook for Ceramic Tile Installation" of the Tile Council of America, sealing in accordance with Section 07 90 00 of these Specifications.
- E. Cleaning:

1. Upon completion of placing and grouting, clean the work of this Section in accordance with recommendations of the manufacturers of the materials used.
 2. Protect metal surfaces, cast iron and vitreous items from effects of acid cleaning.
 3. Flush surfaces with clean water before and after cleaning.
- F. Provide tile surfaces clean and free from cracked, broken, chipped, unbonded and otherwise defective units.
- G. Provide required protection of tile surfaces to prevent damage and wear prior to acceptance of the Work by the Owner.

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work of this Section includes vinyl composition flooring, Luxury vinyl tile, and resilient wall base for areas scheduled and detailed. No asbestos fibers allowed.

1.2 APPLICABLE STANDARDS

- A. Conform to applicable portions of:
 - 1. Asphalt and Vinyl Tile Institute Publications.
 - 2. Federal Specifications SS-T-312B: Tile, Floor, Asphalt, Rubber, Vinyl.
 - 3. Federal Specifications SS-W-40A: Wall Base: Rubber and Vinyl Plastic.

1.3 DELIVERY AND STORAGE

- A. Deliver materials to job in original, unopened containers, with manufacturer's brand name clearly marked thereon. Handle and store materials in accordance with manufacturer's instructions. See Section 01 66 00, Product Storage and Handling Requirements.

1.4 SAMPLES

- A. Submit representative samples in duplicate of flooring and wall base for approval. See Section 01 33 00, Submittal Procedures.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Sheet vinyl sports flooring shall be equal to:
 - 1. Tarkett Sports, Indoor, Omni Sports HPL, 7mm,
 - 2. Amarco, Multi-use, rubber backed vinyl coat floor, 7 mm
 - 3. Approved equal.
- B. Resilient Base: to be rubber, 4" cove with reclining curvature at top.
 - 1. Armstrong,
 - 2. Tarkett,
 - 3. Approved equal
- B. Vinyl composition tile flooring shall be equal to:
 - 1. Armstrong, Standard Excelon, Imperial Texture, 1/8" x 12" x 12".
 - 2. Tarkett VCT
 - 3. Approved equal.

PART 3 EXECUTION

3.1 PREPARATION

- A. Examine surfaces to receive materials before work is started.
- B. Correct defects which might interfere with laying resilient materials in proper manner.
- C. Starting of work construed as acceptance of conditions under which work will be done.

- D. Store materials in original packages, at temperature of not less than 70 degrees Fahrenheit for at least 24 hours prior to laying.
- E. Remove grease, dirt and other deleterious substances. Substrate must be free from holes and without high or low points.
- F. Test substrate for moisture-content as per flooring and adhesive manufacturers requirements.

3.2 INSTALLATION - ADHESIVES

- A. Mix and apply in accordance with manufacturer's instruction and recommendations.
- B. Prevent soiling and staining of adjacent surfaces with adhesive.
- C. Apply adhesive at rate of permit installation of flooring within working time of adhesive.
- D. Use high-humidity adhesive as required by conditions.

3.3 INSTALLATION - FLOORING AND BASE

- A. Install flooring in accordance with manufacturer's instructions and recommendations.
- B. Level floors, or run true to plane, to within 1/8" in six feet. Correct minor variations with underlayment. Lay tile with tight joints and straight lines. Cut to fit accurately at joining with other materials. Lay symmetrically about center line of room to avoid use of less than 1/2 tile where practicable. After floor has set sufficiently to become seated, wash with neutral cleaner. Apply one coat of high grade water emulsion wax and thoroughly buff. Restrict traffic unless floors are protected. Leave clean, smooth, free from buckles, cracks and projecting edges.
- C. Backing for base shall be dry and clean. Install base tight to wall and floor. Cement base to wall using adhesive and method recommended by manufacturer. Form in and out angles neatly from as long lengths as possible. Scribe accurately to time at openings. Base must adhere tightly to walls. Leave in clean, unmarred condition, with all edges straight and level.
- D. Do not install base until flooring is complete. Straight base installed prior to carpet installation.

END OF SECTION

SECTION 09 90 00
PAINTING AND COATING

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Paint and finish the exterior and interior exposed surfaces listed on the Painting Schedule in Part 3 of this Section, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
 - 2. Priming or priming and finishing of certain surfaces may be specified to be factory-performed or installer-performed under pertinent other Sections.
- C. Work not included:
 - 1. Unless otherwise indicated, painting is not required on surfaces in concealed areas and inaccessible areas such as furred spaces, foundation spaces, utility tunnels, pipe spaces and duct shafts.
 - 2. Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not required painting under this Section except as may be so specified.
 - 3. Do not paint moving parts of operating units; mechanical or electrical parts such as valve operators; linkages; sending devices; and motor shafts, unless otherwise indicated.
 - 4. Do not paint over required labels or equipment identification, performance rating, name, or nomenclature plates.
- D. Definitions:
 - 1. "Paint," as used herein, means coating systems materials including primers, emulsions, epoxy, enamels, sealers, fillers and other applied materials whether used as prime, intermediate, or finish coats.

1.2 QUALITY ASSURANCE

- A. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Paint coordination:
 - 1. Provide finish coats which are compatible with the prime coats actually used.
 - 2. Review other Sections of these Specifications as required, verifying the prime coats to be used and assuring compatibility of the total coating system for the various substrata.
 - 3. Upon request, furnish information on the characteristics of the specific finish materials to assure that compatible prime coats are used.
 - 4. Provide barrier coats over noncompatible primers, or remove the primer and reprime as required.
 - 5. Notify the Architect in writing of anticipated problems in using the specified coating systems over prime coatings supplied under other Sections.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.
- B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
- C. Samples:
 - 1. Following the selection of colors and glosses by the Architect, submit samples for the Architect's review.
 - a. Provide three (3) Samples of each color and each gloss for each material on which the finish is specified to be applied.
 - b. Except as otherwise directed by the Architect, make Samples approximately 8"x10" in size.
 - c. If so directed by the Architect, submit Samples during progress of the Work in the form of actual application of the approved materials on actual surfaces to be painted.
 - 2. Revise and resubmit each Sample as requested until the required gloss, color and texture is achieved. Such Samples, when approved, will become standards of color and finish for accepting or rejecting the work of this Section.
 - 3. Do not commence to finish painting until approved Samples are on file at the job site.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

1.5 JOB CONDITIONS

- A. Do not apply solvent-thinned paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 45 degrees Fahrenheit, unless otherwise permitted by the manufacturer's printed instructions as approved by the Architect.
- B. Weather conditions:
 - 1. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces, unless otherwise permitted by the manufacturer's printed instructions as approved by the Architect.
 - 2. Applications may be continued during inclement weather only within the temperature limits specified by the paint manufacturer as being suitable for use during application and drying periods.

1.6 EXTRA STOCK

- A. Upon completion of the work of this Section, deliver to the Owner an extra stock equaling 10% of each color, type and gloss of paint used in the Work, tightly sealing each container, and clearly labeling with contents and locations where used.

PART 2 PRODUCTS

2.1 MATERIALS - GENERAL

- A. Top grade products of well-know manufacturers, applied in strict accordance with directions and recommendation of manufacturer. Submit list of materials to be used for approval in writing.

- B. Paint materials mentioned herein are used as standard of quality. Materials equal to those of Pittsburgh Plate Glass Company, Sherwin-Williams Company, Devco & Raynolds Company, DeSoto Company, Tnemac, Rust-o-leum Corporation and Benjamin Moore Company.
- C. Materials and workmanship must conform to requirements of the Occupational Safety and Health Act (OSHA).
- D. Undercoats and thinners:
 - 1. Provide undercoat paint produced by the same manufacturer as the finish coat.
 - 2. Use only the thinners recommended by the paint manufacturer, and use only to the recommended limits.
 - 3. Insofar as practicable, use undercoat, finish coat, and thinner material as parts of a unified system of paint finish.

2.2 COLOR SCHEDULES

- A. The Architect will prepare a color schedule with samples for guidance in painting.
- B. The Architect may select, allocate, and vary colors on different surfaces throughout the Work, subject to the following:
 - 1. Exterior work: A maximum of two (2) different colors will be used.
 - 2. Interior work: A maximum of four (4) different pigmented colors will be used.

2.3 APPLICATION EQUIPMENT

- A. For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint and as approved by the Architect.
- B. Prior to use of application equipment, verify that the proposed equipment is actually compatible with the material to be applied and that integrity of the finish will not be jeopardized by use of proposed equipment.

2.4 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 MATERIALS PREPARATION

- A. General:
 - 1. Mix and prepare paint materials in strict accordance with the manufacturer's recommendations as approved by the Architect.
 - 2. When materials are not in use, store in tightly covered containers.
 - 3. Maintain containers used in storage, mixing, and application of paint in a clean condition, free from foreign materials and residue.

B. Stirring:

1. Stir materials before application, producing a mixture of uniform density.
2. Do not stir into the material any film which may form on the surface, but remove the film and, if necessary strain the material before using.

3.3 SURFACE PREPARATION

A. General:

1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's recommendations as approved by the Architect.
2. Remove removable items which are in place and are not scheduled to receive paint finish; or provide surface-applied protection prior to surface preparation and painting operations.
3. Following completion of painting in each space or area, reinstall the removed items by using workmen who are skilled in the necessary trades.
4. Clean each surface to be painted prior to applying paint or surface treatment.
5. Remove oil and grease with clean cloths and cleaning solvent of low toxicity and flash paint in excess of 200 degrees Fahrenheit, prior to start of mechanical cleaning.
6. Schedule cleaning and painting so that dust and other contaminants from the cleaning process will not fall onto wet newly painted surfaces.

B. Preparation of wood surfaces:

1. Clean wood surfaces until free from dirt, oil and other foreign substance.
2. Smooth finished wood surfaces exposed to view, using the proper sandpaper. Where so required, use varying degrees of coarseness in sandpaper to produce a uniformly smooth and unmarred wood surface.
3. Unless specifically approved by the Architect, do not proceed with painting of wood surfaces until the moisture content of the wood is 12% or less as measured by a moisture meter approved by the Architect.
4. Remove existing painting from areas indicated to fresh surface and provide smooth wood surface for painting.

C. Preparation of metal surfaces:

1. Thoroughly clean surfaces until free from dirt, oil and grease.
2. On galvanized surfaces, use solvent for the initial cleaning, and then treat the surface thoroughly with phosphoric acid etch. Remove etching solution completely before proceeding.
3. Allow to dry thoroughly before application of paint.

3.4 PAINT APPLICATION

A. General:

1. Touch-up shop applied prime coats which have been damaged, and touch-up bare areas prior to start of finish coats application.
2. Slightly vary color of succeeding coats.
 - a. Do not apply additional coats until the completed coat has been inspected and approved.
 - b. Only the inspected and approved coats of paint will be considered in determining the number of coats applied.
3. Sand and dust between coats to remove defects visible to the unaided eye from a distance of five feet.
4. On removable panels and hinged panels, paint the back sides to match the exposed sides.

B. Drying:

1. Allow sufficient drying time between coats, modifying the period as recommended by the material manufacturer to suit adverse weather conditions.
 2. Consider oil-base and oleo-resinous solvent-type paint as dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and when the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- C. Brush applications:
1. Brush out and work the brush coats onto the surface in an even film.
 2. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.
- D. Spray application:
1. Except as specifically otherwise approved by the Architect, confine spray application to metal framework and similar surfaces where hand brush work would be inferior.
 2. Where spray application is used, apply each coat to provide the hiding equivalent of brush coats.
 3. Do not double back with spray equipment to build up film thickness of two coats in one pass.
- E. For completed work, match the approved Samples as to texture, color and coverage. Remove, refinish, or repaint work not in compliance with the specified requirements.
- F. Miscellaneous surfaces and procedures:
1. Exposed mechanical items:
 - a. Finish electric panels, access doors, conduits, pipes, sprinkler pipes, ducts, grilles, registers, vents and items of similar nature to match the adjacent wall and ceiling surfaces, or as directed.
 - b. Paint visible duct surfaces behind vents, registers and grilles flat black.
 - c. Wash metal with solvent, prime and apply two coats of alkyd enamel.
 2. Exposed pipe and duct installation:
 - a. Apply one coat of latex paint on insulation which has been sized or primed under other Sections; apply two coats on each surface when unprepared.
 - b. Match color of adjacent surfaces.
 - c. Remove band before painting, and replace after painting.
 3. Hardware: Paint prime coated hardware to match adjacent surfaces.
 4. Wet areas:
 - a. In toilet rooms and contiguous areas, add an approved fungicide to paints.
 - b. For oil base paints, use 1% phenolmercuric or 4% tetrachlorophenol.
 - c. For water emulsion and glue size surfaces, use 4% sodium tetrachlorophenate.
 5. Interior: Use "stipple" finish where enamel is specified.
 6. Exposed vents: Apply two coats of heat-resistant paint approved by the Architect.
 7. 4" high exposed section of sheetrock or cmu between storefront and rubber base to be painted to match rubber base color.

3.5 PAINTING SYSTEMS

A. Exterior Steel and Iron:

1. Where rusting or mechanical damage has occurred to primer or existing finish, wire brush to bare metal and prime with Moore's Ironclad Retardo Rust Inhibitive Paint.
2. Apply one coat of "Improve Gloss Enamel" to which has been added one ounce per gallon of MilDoEnd as manufactured by the Dianol Division of Mills Pearson Corporation of St. Petersburg, Florida. Apply to film thickness of not less than 2 mils. Apply second coat to not less than same thickness as the first coat.

- a. MilDoEnd shall be kept away from open flame, from children and animals. Do not take internally. Keep bottle closed when not in use. Observe all safety precautions required in handling toxic inflammables.

B. Exterior Paint Systems:

- 1. Existing Concrete Masonry Units:
 - 1st coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
 - 2nd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
(4 mils wet, 1.5 mils dry per coat)
- 2. New Concrete Masonry Units:
 - 1st coat: S-W Prep Rite Block Filler, B25W25 (75-125 sq. ft./ gal.)
 - 2nd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
 - 3rd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
- 3. Existing Plywood or Wood Surfaces:
 - 1st coat: Spot prime as required, S-W Exterior Latex Wood Primer B42W8041
(4 mils wet, 1.4 mils dry per coat)
 - 2nd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
 - 3rd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
(4 mils wet, 1.5 mils dry per coat)
- 4. New Plywood or Wood Surfaces:
 - 1st coat: S-W Exterior Latex Wood Primer B42W8041
(4 mils wet, 1.4 mils dry per coat)
 - 2nd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
 - 3rd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
(4 mils wet, 1.5 mils dry per coat)
- 5. Ferrous metals:
 - 1st coat: Kem Bond HS Primer
 - 2nd coat: Pro Industrial Urethane Alkyd Enamel, B54-150 Series
 - 3rd coat: Pro Industrial Urethane Alkyd Enamel, B54-150 Series
(3.5 mils wet, 2 mils dry per coat)

C. Interior Paint Systems:

- 1. Ferrous metals:
 - 1st coat: S-W Pro Industrial Pro-Cryl Primer, B66-310 Series
 - 2nd coat: S-W Pro Mar 200 Alkyd Semi-Gloss, B34W200 Series
 - 3rd coat: S-W Pro Mar 200 Alkyd Semi-Gloss, B34W200 Series
(4 mils wet, 1.7 mils dry per coat)
- 2. Painted woodwork:
 - 1st coat: S-W Premium Wall and Wood Primer B28W8111
(4 mils wet, 1.8 mils dry per coat)
 - 2nd coat: S-W Pro Mar 200 Alkyd Semi-Gloss, B34W200 Series
 - 3rd coat: S-W Pro Mar 200 Alkyd Semi-Gloss, B34W200 Series
(4 mils wet, 1.7 mils dry per coat)
- 3. Stained woodwork:
 - 1st coat: S-W Wood Classics Oil Stain, A49 Series (450-500 sq. ft./ gal.)
 - 2nd coat: S-W Wood Classics Polyurethane Varnish, A67 Series
 - 3rd coat: S-W Wood Classics Polyurethane Varnish, A67 Series (350-400 sq. ft./ gal.)

4. **Transparent Woodwork:**
 - 1st coat: S-W Wood Classics Polyurethane Varnish, A67 Series
 - 2nd coat: S-W Wood Classics Polyurethane Varnish, A67 Series (350-400 sq. ft./ gal.)
5. **Gypsum Board- Epoxy Paint:**
 - 1st coat: Interior Latex Emulsion (TT-P-650)
 - 2nd coat: Polyester Epoxy, Semi-Gloss Finish (FS-TT-C-545)
 - 3rd coat: Polyester Epoxy, Semi-Gloss Finish (FS-TT-C-545)
6. **Gypsum Board- Regular Paint:**
 - 1st coat: S-W Pro Mar 200 Zero VOC Latex Primer, B28W2600 (4 mils wet, 1.5 mils dry)
 - 2nd coat: S-W Pro Mar 200 Latex Eg-Shel, B20-2200 Series
 - 3rd coat: S-W Pro Mar 200 Latex Eg-Shel, B20-2200 Series (4 mils wet, 1.6 mils dry per coat)

*Ceilings to have flat finish.
7. **Existing Concrete Masonry Units:**
 - 1st coat: S-W Prep Rite Block Filler, B25W25 (75-125 sq. ft./ gal.)
 - 2nd coat: S-W Pro Mar 200 Latex Semi-Gloss, B31-2200 Series (4mils wet, 1.3 mils dry per coat)
8. **New Concrete Masonry Units:**
 - 1st coat: S-W Prep Rite Block Filler, B25W25 (75-125 sq. ft./ gal.)
 - 2nd coat: S-W Pro Mar 200 Latex Semi-Gloss, B31-2200 Series
 - 3rd coat: S-W Pro Mar 200 Latex Semi-Gloss, B31-2200 Series (4mils wet, 1.3 mils dry per coat)
9. **Gypsum Board Preparation:** External angles provided with Perf-A-Trim. Per-A-Tape Cement and Perf-A-Tape Topping Cement mixed in accordance with manufacturer's recommendations. Using suitable tool or machine, thick uniform layer of Perf-A-Tape cement (embedding type), applied 3" wide applied over joint to be reinforced. Tape shall then be centered over joint and sealed into cement, leaving sufficient cement adhesive under tape to provide proper bond. Wall inside vertical corner angles shall be reinforced with reinforcing tape folded to conform to adjoining surfaces and to form a straight, true angle. Joints allowed to dry thoroughly, 24 hour minimum between each application of cement. Tape covered with topping cement, spread evenly over and slightly beyond tapered edge of board and feathered at edges. After previous coat is dry, cover with second coat of topping cement with smooth uniform slight crown over joint and edge feathered slightly beyond preceding coat. Dimples such as nail heads shall receive three coats of cement applied as each coat of cement is applied to joints. Cemented areas sanded after each application of cement has dried. Final coat of cement and subsequent sanding shall leave gypsum board and treated areas uniformly smooth and ready for painting.
10. **Concrete:** Solvent-Based Concrete Sealer equal to H&C® Concrete Sealer Solid Color Solvent-Based, clear. Apply 2 coats at the application rate of 200-250 sq. ft. per gallon and apply in accordance with the manufacturer's recommendations. Apply to all areas of exposed concrete floor slab at building interior.

END OF SECTION

**DIVISION 10
SPECIALTIES**

CONTENTS

10 28 13	Toilet Accessories
10 44 00	Portable Fire Extinguishers
10 44 10	Interior Room Signs

SECTION 10 28 13

TOILET ACCESSORIES

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work in this Section includes toilet and bath accessories complete.
- B. Surface mounted accessories mounted on concealed back plates. Accessories shall have concealed fastenings.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.
- B. Product data: Within 60 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications, catalog cuts and other data needed to demonstrate compliance with the specified requirements;
 - 3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Approved accessories are those equal to those manufactured by Bradley, Miami-Carey, Bobrick, Hall-mack, Ketcham, American Standard, Whitehall Mfg., and Fort Howard Paper Company.

2.2 SCHEDULE OF ACCESSORIES: Model numbers listed refer to Bobrick.

- A. At Restrooms provide each with:
 - 1 B-6806 x 36 grab bar
 - 1 B-6806 x 42 grab bar
 - 1 B-165 1836 mirror
 - 1 B-282 coat hook
 - 1 paper towel holder, Provided by Owner, installed by GC.
 - 1 toilet tissue holder, Provided by Owner, installed by GC.
 - 1 soap dispenser, Provided by Owner, installed by GC.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Locate accessories as directed. Securely install at height as per latest edition of Americans with Disabilities Act (ADA). Rigidly anchor and leave clean and in unmarred condition.

- B. Follow directions of manufacturer for accessory installation for concealed mounting. Use manufacturer's mounting kits.
- C. Verify all mounting heights. Where accessible accessories are called out verify exact required height prior to installation.

END OF SECTION

SECTION 10 44 00

PORTABLE FIRE EXTINGUISHERS

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Provide hand-portable fire extinguishers where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.
- B. Product data: Within 60 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications, catalog cuts and other data needed to demonstrate compliance with the specified requirements;
 - 3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 FIRE EXTINGUISHERS

- A. At each location where shown on the Drawings, provide one (1) multi-purpose chemical fire extinguisher with UL Rating 4A-60BC, 10 lb., ABC dry chemical.
- B. Service, charge and tag each fire extinguisher not more than five calendar days prior to the Date of Substantial Completion of the Work as that date is established by the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturer's recommendations as approved by the Architect, anchoring all components firmly into position for long life under hard use.
- B. Fire extinguisher to be mounted on walls with standard brackets unless noted to be installed in cabinet.
- C. Where indicated to be installed in cabinet, provide Larsen Manufacturing Company Number G2049-R4, 3 ½" projection, 3" depth rough opening, rolled edge, semi-recessed type, vertical series, white face with red letters.
- D. Mount as per latest edition of Americans with Disabilities Act (ADA).

END OF SECTION

SECTION 10 44 10 - INTERIOR ROOM SIGNS

PART 1 GENERAL

.1 SUMMARY

- A. Related Documents: Provisions established within the General and Supplementary Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.
- B. Section Includes:
 - 1. Accessible Restroom Signage
 - 2. Room Identification Signage

.2 QUALITY ASSURANCE

- A. **Obtain all signage products in this and other signage specifications through a single supplier from a single manufacturer.**
- B. Regulatory Requirements: Products shall meet requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and local amendments and modifications.
- C. Installer: Installation shall be performed by installer specialized and experienced in work similar to that required for this project.
- D. **Sign supplier to provide ONLINE REORDER website for use by owner to order additional signs. Reorder website to include sign descriptions, sign drawings & sign cost.**

.3 SUBMITTALS

- A. Submit in accordance with requirements of Division 1.
- B. Product Data: Submit product data for specified products. Include material details for each sign specified.
- C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including dimensions, anchorage, and accessories. Provide floor plans with locations of each sign type.
- D. Submit signage schedule in manufacturer's format for verification of text/copy.
- E. Samples: Submit supplier's standard color chart for selection purposes and selected colors for verification purposes. Submit sample of two (2) sign types.
- F. Installation: Submit supplier's installation instructions.
- G. Closeout Submittals:
 - 1. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.
 - 2. Submit warranty documents specified herein.

.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of Division 1.
 - 1. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
 - 2. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
 - 3. Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.
 - 4. Handle products in accordance with manufacturer's instructions.

.5 WARRANTY

- A. Project Warranty: Comply with requirements of Division 1.

- B. Manufacturer's Warranty: Submit manufacturer's standard warranty document, executed by authorized company official, against defects in materials and workmanship.
 - 1. Warranty Period: Five (5) years from product ship date.

PART 2 PRODUCTS

.1 SIGNAGE SYSTEMS

- A. Acceptable Manufacturers:
- B. The following manufacturer and product are used as a basis of design
 - 1. ASI Signage Innovations, 5200 Commerce Point Harahan, Louisiana 70123; (504) 704-1000 x 124 telephone; (504) 704-1006 facsimile.
Contact: Ercelle Anthony (225) 229-5984; Ercelle.Anthony@asisignage.com
 - 2. Acceptable Product: ASI Venus Series
 - 3. Additional manufacturers shall submit equal product data 10 days before advertised bid date for architect's review. The architect has sole discretion to accept or deny substitutions.
 - 4. Approved equal: Takeform, Vivid. 1-800-528-1398, www.takeform.net

.2 SIGN MATERIALS

- A. Sign Face: High impact cast matte acrylic with integral text and braille.
- B. Tactile Graphics and Text: Provide tactile copy and grade 2 Braille raised 1/32 inch minimum from plaque surface using manufacturer's 3D printed process.
 - 1. Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position, and colors. Text should have matte gloss level and square shoulders.
 - 2. Colors: Background color is first surface painted. Text Color is tipped.
 - 3. Cast acrylic sheet to be laser cut to shape then painted to allow for painted edges.
 - 4. Colors, patterns, font shall be selected by Architect.
- C. Sign Type Description-
 - 1. Frame: ASI Venus Series ; Flat Face with optional Accent Bar.
 - 2. Clear Anodized Aluminum End Caps
 - 3. Inserts: ADA insert. Material: Provide tactile copy and Grade 2 Braille raised 1/32 inch minimum from plaque first surface by manufacturer's aluminum backed photopolymer process. Sign face of single material (.040 aluminum backed photopolymer), tactile characters and Braille integral to photopolymer.
 - 4. Frame panel color: [Clear Anodized Aluminum] To be selected by architect.
 - 5. Insert panel color: [To be selected by Architect from manufacturer's standard color chart.]
 - 6. Letter style[s] and letter size[s]: [To be selected by Architect from manufacturer's standard letter styles chart.]
 - 7. Text or graphic technique:
 - a. [Raised copy to be tipped, color to be selected by Architect from manufacturer's standard color chart]
 - 8. Text schedule: [Architect shall verify correct capitalization.]
 - 9. Wall Mounting: VHB tape and silicone or mechanically fasten with appropriate hardware.
 - 10. Sign Types (typical)
 - a. Sign Type I- 8.85" x 8.74" Restrooms entrances as required.
 - b. Sign Type III – 4" x 8.74" Auxiliary Room doors.

.3 INSTALLATION METHOD

- A. Tape Mount or Screw Mount with counter sunk holes and silicone. Signs on glass to have vinyl backer the same dimension as sign. All others to be screw mounted. Backer to have countersunk holes with face piece tape mounted over backer to conceal mounting.

.4 FABRICATION - GENERAL

- A. General: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
- B. Preassemble signs in the shop to the greatest extent possible to minimize field assembly. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in a location not exposed to view after final assembly.
- C. Conceal fasteners if possible; otherwise, locate fasteners to appear inconspicuous.
- D. Form panels to required size and shape. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.
- E. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.

PART 3 EXECUTION

.1 EXAMINATION

- A. Site Verification of Conditions: Verify installation conditions previously established under other sections are acceptable for product installation in accordance with manufacturer's instructions.
- B. Scheduling of installation by Owner or its representative implies that substrate and conditions are prepared and ready for product installation. Proceeding with installation implies installer's acceptance of substrate and conditions.

.2 INSTALLATION

- A. Install product in accordance with supplier's instructions.
- B. Install product in locations indicated using mounting methods recommended by sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.
- C. Install product level, plumb, and at heights indicated.
- D. Install product at heights to conform to Americans with Disabilities Act Accessibility Guidelines (ADAAG) and applicable local amendments and regulations.
- E. Install signs within the following tolerances and in accordance with manufacturer's recommendations:
 - 1. Interior Signs: Within 1/4 inch vertically and horizontally of intended location.

.3 CLEANING, PROTECTION, AND REPAIR

- A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 5 feet.
- B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project in accordance with provisions in Division 1.

.4 SIGN SCHEDULE

- A. Schedule: Refer to signage schedule and Drawings for sizes, locations, and layout of signage types, sign text copy, and graphics.

END OF SECTION

**DIVISION 11
EQUIPMENT**

CONTENTS

(None in this Project Manual)

**DIVISION 12
FURNISHINGS**

CONTENTS

12 76 00 Telescoping Bleacher Seating

SECTION 12760 - TELESCOPING BLEACHER SEATING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Telescoping Gym Seating includes, manually operated systems of multiple-tiered seating rows comprising of seat, deck components, understructure that permits closing without requiring dismantling, into a nested configuration for storing or for moving purposes.
 - 1. Typical applications include the following:
 - a. Wall Attached Telescoping Gym Seats.
 - 2. Special applications may include the following:
 - c. Rear Wall Column Cutouts Telescoping Gym Seats.
- B. Related Sections:
 - 1. Division 9 finishes sections for adequate floor & wall construction for operation of Telescoping Gym Seats. Flooring shall be level and rear wall plumb within 1/8" [3mm] in 8'-0 [2438mm]. Maximum bleacher force on the floor, of a 25'-6" [7772] section, shall be a static point load of less than 300 psi [2.068 N/mm²].

1.02 REFERENCES

- A. National Fire Protection Association (NFPA)
 - 1. NFPA 102 Standard for Assembly Seating, Tents and Membrane Structures.
- B. American Welding society (AWS):
 - 1. AWS D1.1 Structural Welding Code - Steel.
 - 2. AWS D1.3 Structural Welding Code - Sheet Steel.
- C. American Institute of Steel Construction (AISC):
 - 1. AISC - Design of Hot Rolled Steel Structural Members.
- D. American National Standards Institute (ANSI).
- E. American Iron & Steel Institute (AISI):
 - 1. AISI - Design Cold Formed Steel Structural Members.
- F. Aluminum Association (AA):
 - 1. AA - Aluminum Structures, Construction Manual Series.
- G. American Society for Testing Materials (ASTM):
 - 1. ASTM - Standard Specification for Properties of Materials.
- H. National Forest Products Association (NFoPA):
 - 1. NFoPA - National Design Specification for Wood Construction.
- I. Southern Pine Inspection Bureau (SPIB):
 - 1. SPIB - Standard Grading Rules for Southern Pine.
- J. National Bureau of Standards/Products Standard (NBS/PS):

1. PS1 - Construction and Industrial Plywood.

K. Americans with Disability Act (ADA)

1. ADA - Standards for Accessible Design.

1.03 MANUFACTURER'S SYSTEM ENGINEERING DESCRIPTION

A. Structural Performance: Engineer, fabricate and install telescopic gym seating systems to the following structural loads without exceeding allowable design working stresses of materials involved, including anchors and connections. Apply each load to produce maximum stress in each respective component of each gym seat unit.

1. Design Loads: Comply with NFPA 102, 1992 Edition, Chapter 5 for design loads.

B. Manufacturer's System Design Criteria:

1. Gymnasium seat assembly; Design to support and resist, in addition to its own weight, the following forces:

- a. Live load of 120 lbs per linear foot [162.69 N/m] on seats and decking
- b. Uniformly distributed live load of not less than 100 lbs per sq. ft. [135.58N/m] of gross horizontal projection.
- c. Parallel sway load of 24 lbs. [32.53 N/m] per linear foot of row combined with (b.) above
- d. Perpendicular sway load of 10 lbs. [13.56 N-m] per linear foot of row combined with (b.) above

2. Hand Railings, Posts and Supports: Engineered to withstand the following forces applied separately:

- a. Concentrated load of 200 lbs. [90.72 kg] applied at any point and in any direction.
- b. Uniform load of 50 lbs. per foot [.344 N/mm²] applied in any direction.

3. Guard Railings, Post and Supports: Engineered to withstand the following forces applied separately:

- a. Concentrated load of 200 lbs. [90.72 kg] applied at any point and in any direction along top rail.
- b. Uniform load of 50 lbs. per foot [.344 N/mm²] applied horizontally at top rail and a simultaneous uniform load of 100 lbs. per foot [.689 N/mm²] applied vertically downward.

4. Member Sizes and Connections: Design criteria (current edition) of the following shall be the basis for calculation of member sizes and connections:

- a. AISC: Manual of Steel Construction
- b. AISI: Specification for Design of Cold Formed Steel Structural Members
- c. AA: Specification for Aluminum Structures
- d. NFOPA: National Design Guide For Wood Construction.

1.04 SUBMITTALS

A. Section Cross-Reference: Required submittals in accordance with "Conditions of the Contract" and Division 1 General Requirements sections of this "Project Manual."

B. Project Data: Manufacturer's product data for each system. Include the following:

1. Project list: Ten (10) seating projects of similar size, complexity and in service for at least five (5) years.

2. Deviations: List of deviations from these project specifications, if any.
- C. Shop Drawings: Indicate Telescoping Gym Seat assembly layout. Show seat heights, row spacing and rise, aisle widths and locations, assembly dimensions, anchorage to supporting structure, material types and finishes.
 1. Wiring Diagrams: Indicate electrical wiring and connections.
 2. Graphics Layout Drawings: Indicate pattern of contrasting or matching seat colors
- D. Samples: Seat materials and color finish as selected by Architect from manufacturers offered color finishes.
- E. Manufacturer Qualifications: Certification of insurance coverage and manufacturing experience of manufacturer, and copy of a telescopic load test to all loads described in 1.03 above, observed by a qualified independent testing laboratory, and certified by a registered professional structural engineer verifying the integrity of the manufacturer's geometry design and base structural assumptions.
- F. Installer Qualifications: Installer qualifications indicating capability, experience, and official Certification Card issued by manufacturer of telescopic seating.
- G. Engineer Qualifications: Certification by a professional engineer registered in the state of manufacturer that the equipment to be supplied meets or exceeds the design criteria of this specification.
- H. Operating/Maintenance Manuals: Provide to Owner maintenance manuals. Demonstrate operating procedures, recommended maintenance and inspection program.
- I. Warranty: Manufacturers standard warranty documents.

1.05 QUALITY ASSURANCE

- A. Seating Layout: Comply with current NFPA 102 Standard for Assembly seating, Tents, and Membrane Structures, and specifically with Folding and Telescopic Seating, except where additional requirements are indicated or imposed by authorities having jurisdiction.
- B. Welding Standards & Qualification: Comply with AWS D1.1 Structural Welding Code - Steel and AWS D1.3 Structural Welding Code - Sheet Steel.
- C. Insurance Qualifications: Mandatory that each bidder submit with his bid an insurance certificate from the manufacturer evidencing the following insurance coverage:
 1. Workers Compensation - including Employers Liability with the following limits:
 - \$500,000.00 (US) Each Accident
 - \$500,000.00 (US) Disease - Policy Limit
 - \$500,000.00 (US) Disease - Each Employee
 2. Commercial General Liability - including premises/ operations, independent contractors and products completed operations liability. Limits of liability shall not be less than \$5,000,000.00 (US).
- D. Manufacturer Qualifications: Manufacturer who has a minimum of 40 years of experience manufacturing telescoping gym seats and can demonstrate continual design enhancement and 25-year minimum product life-cycle support of telescopic seating.

- E. Installer Qualifications: Engage experienced Installer who has specialized in installation of telescoping gym seat types similar to types required for this project and who carries an official Certification Card issued by telescoping gym seat manufacturer.
- F. Engineer Qualifications: Engage licensed professional engineer experienced in providing engineering services of the kind indicated that have resulted in the successful installation of telescoping bleachers similar in material, design, fabrication, and extent to those types indicated for this project.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver telescopic gym seats in manufacturers packaging clearly labeled with manufacturer name and content.
- B. Handle seating equipment in a manner to prevent damage.
- C. Deliver the seating at a scheduled time for installation that will not interfere with other trades operating in the building.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Coordinate actual dimensions of construction affecting telescoping bleachers installation by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid delay of Work.

1.08 WARRANTY

- A. Manufacturer's Product Warranty: Submit manufacturer's standard warranty form for telescoping bleachers. This warranty is in addition to, and not a limitation of other rights Owner may have under Contract Documents.
 - 1. **Warranty Period: Five years from Date of Acceptance and 10 year on the understructure issued from the Manufacturer.**
 - 2. Beneficiary: Issue warranty in legal name of project Owner.
 - 3. Warranty Acceptance: Owner is sole authority who will determine acceptance of warranty documents.

1.09 MAINTENANCE AND OPERATION

- A. Instructions: Both operation and maintenance shall be transmitted to the Owner by the manufacturer of the seating or his representative.
- B. Service: Maintenance and operation of the seating system shall be the responsibility of the Owner or his duly authorized representative, and shall include the following:
 - 1. Operation of the Seating System shall be supervised by responsible personnel who will assure that the operation is in accordance with the manufacturer's instructions.
 - 2. Only attachments specifically approved by the manufacturer for the specific installation shall be attached to the seating.
 - 3. An annual inspection and required maintenance of each seating system shall be performed to assure safe conditions. At least biannually the inspection shall be performed by a professional engineer or factory qualified service personnel.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturer: Hussey Seating Company, U.S.A. (Basis of Design)
 - 1. Address: North Berwick, Maine, 03906
 - 2. Telephone: (207) 676-2271; Fax: (207) 676-9690
- 3. Product: MAXAM Telescopic Gym Seat System by Hussey Seating Company
 - a. Model: MAXAM26 Series Telescopic Gym Seats, adjustable row spacing in two inch increments from 22 inches [559] to 26 inches [660].
 - b. Aisle Type: : front steps, intermediate aisle steps.
 - c. Seat Type: 10" Courtside Collection (plastic seat modules)
 - 1) Seat color finish: manufacturers 15 standard Courtside Collection
 - d. Rail Type: Self-storing end rail, **auto-rotating aisle handrails**
 - 1.) Rail color finish: Standard black
 - e. Operation: Manual
- 4. Product Description/Criteria: Bank A Bank B
 - a. Bank Length: 22'
 - b. Aisle Widths: 3'
 - c. Number of Tiers: 7
 - d. Row Spacing(s): 22"
 - e. Row Rise: 9 5/8"
 - f. Open Dimension: 13'4"
 - g. Closed Dimension: 3'4"
 - h. Overall Unit Height: 6'3"
 - i. Net Capacity: 18" per seat
(18" [457] for MAXAM)
- 5. Miscellaneous Product Accessories: **end panels, top seat filler**
- 6. Special Applications: rear wall column cutouts.
- 7. Accessible Seating Provisions: **Provide first tier modular recoverable Flex-rows.**
- A. Other Acceptable Manufacturers: Will be considered if in compliance with these specifications. Deviations must be submitted with bid in order that a fair and proper evaluation be made. Those bidders not submitting a list of deviations will be presumed to have bid as specified.
 - 1. **Irwin Folding Bleacher Versa Tract series**
 - 2. **Kodiak Industries (modified to meet Specs)**
 - 3. **Interkal, ESM 10" (local rep-Hahn Enterprises, 504-488-3536)**

2.03 MATERIALS

- A. Lumber: ANSI/Voluntary Product 20, B & B Southern Pine
- B. Plywood: ANSI/Voluntary Product PS1, APA A-C Exterior Grade.
- C. Structural Steel Shapes, Plates and Bars: ASTM A 36.

- D. Uncoated Steel Strip (Non-Structural Components): ASTM A569, Commercial Quality, Hot-Rolled Strip.
- E. Uncoated Steel Strip (Structural Components): ASTM A570 Grade 33, 40, 45, or 50, Structural Quality, Hot-Rolled Strip.
- F. Uncoated Steel Strip (Structural Components): ASTM A607 Grade 45 or 50, High-Strength, Low Alloy, Hot-Rolled Strip.
- G. Galvanized Steel Strip: ASTM A653 Grade 40, zinc coated by the hot-dip process, structural quality.
- H. Structural Tubing: ASTM A500 Grade B, cold-formed.
- I. Polyethylene Plastic: ASTM D 1248, Type III, Class B; molded, color-pigmented, textured, impact-resistant, structural formulation; in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.
- J. Fasteners: Vibration-proof, of size and material standard with manufacturer.

2.04 UNDERSTRUCTURE FABRICATION

- A. Frame System:
 - 1. Wheels: Not less than 5" [127] diameter by 1 1/4" [32] with non-marring soft rubber face to protect wood and synthetic floor surfaces, with molded-in sintered iron oil-impregnated bushings to fit 3/8" [10] diameter axles secured with E-type snap rings.
 - 2. Lower Track: Continuous Positive Interglide System interlocks each adjacent CPI unit using an integral, continuous, anti-drift feature and through-bolted guide at front to prevent separation and misalignment. CPI units at end sections of powered banks and manual sections shall contain a Low Profile Posi-Lock LX to lock each row in open position and allow unlocking automatically. Provide adjustable stops to allow field adjustment of row spacings.
 - 4. Slant Columns: High tensile steel, tubular shape.
 - 5. Sway Bracing: High tensile steel members through-bolted to columns.
 - 6. Deck Stabilizer: High tensile steel member through-bolted to nose and riser at three locations per section. Interlocks with adjacent stabilizer on upper tier using low-friction nylon roller to prevent separation and misalignment. Incorporates multiple stops to allow field adjustment of row spacings.
 - 7. Deck Support: Securely captures front and rear edge of decking at rear edge of nose beam and lower edge of riser beam for entire length of section.
- B. Deck System:
 - 1. Section Lengths: Each bank shall contain sections not to exceed 25'-6" [7772] in length with a minimum of two supporting frames per row, each section.
 - 2. Nose beam and Rear Riser beam: Nose beam shall be continuously roll-formed closed tubular shape of ASTM A653 grade 40, Riser beam shall be continuously roll-formed of ASTM A653 grade 40. Nose and Riser beam shall be designed with no steel edges exposed to spectator after product assembly.
 - 3. Attachment: Through-Bolted fore/aft to deck stabilizers, and frame cantilevers.
 - 4. Decking: 5/8" [16], AC grade clear-top-coated **tongue and groove Southern Yellow Pine**; interior type with exterior glue, 5-ply, all plies with plugged crossbands, produced in accordance with National Bureau of Standards PS-1-97. Plywood shall be cut and installed with top, center and bottom ply grain-oriented from front of deck to rear of deck (nose beam to riser beam). Adjacent pieces

- shall be locked together with tongue and groove joint from front to rear of deck.
Longest unsupported span: MAXAM 26, 21 ½" [546];
5. Deck End Overhang: Not to exceed frame support by more than 5'-7" [1702].

2.05 SEATING FABRICATION -

B. Plastic Seat System – Courtside Collection XC10 (10")

Hussey Courtside Collection Series embodies the latest leading edge innovations in linear telescopic seating modules. Courtside seats utilize a harmonious blend of advanced ergonomic principals, architecturally appealing design, safety, value and performance.

1. Seat Modules: 18" [457] long assembled, gas assisted injection-molded, high density, 100% recyclable HDPE (high density polyethylene) modules in monochromatic colors providing, dual textured scuff resistant 10" [254] or 12" [305] wide seat surface with ½" [13] minimum interlock on seat and face. Unit structural tested to 600 lbs occupant load.

Courtside XC10 Seat Module

2. XC10 – 10" Comfort Profile
 - ✓ 10" wide continuous comfort curve style bench seat
 - ✓ Ergonomically contoured forward "waterfall" edge for enhanced spectator comfort and minimization of sensitive pressure point area, regardless of leg positioning.
 - ✓ Fore & Aft contoured seat surface for uniform support and minimize high pressure points under the buttocks.
 - ✓ Seat height ranges from deck to t/o seat range from 16-1/8" to 18-1/8"
 - ✓ 21-1/2" clear foot space area, regardless of leg positioning.
3. Integrally molded end caps at aisle end locations for clean finished appearance.
4. Optional: Custom color graphic logo design application for end cap insert.
5. Integrally molded recess pockets to accept seat number and row letters.
6. Integrally molded rear closure panel at back of seat to allow for "continuous clean sweep" of debris at deck level and minimized visibility of structural ribbing.
7. Seat Attachment: Each plastic seat module shall be securely anchored by a 12 ga steel clamp bracket that provides a steel-to-steel, through bolted attachment to the front nose beam of the bleacher. Attachment eliminates fore / aft movement of the seat module on the nose beam.
8. Bold contoured design lines for maximum architectural appeal and application with modern or traditional facility spaces.

9. Integrally molded end caps at aisle end locations for clean finished appearance.
10. Integrally molded recess pockets to accept seat number and row letters.
11. Integrally molded rear closure panel at back of seat to allow for "continuous clean sweep" of debris at deck level and minimized visibility of structural ribbing.

Seat Attachment: Each plastic seat module shall be securely anchored by a 12 ga steel clamp bracket that provides a steel-to-steel, through bolted attachment to the front nose beam of the bleacher. Solid attachment of clamp to nose beam eliminates fore / aft movement of the seat module on the nose beam.

2.06 SHOP FINISHES

- A. Understructure: For rust resistance, steel understructure shall be finished on all surfaces with black "Dura-Coat" enamel. Understructure finish shall contain a silicone additive to improve scratch resistance of finish.
- B. Wear Surfaces: Surface subject to normal wear by spectators shall have a finish that does not wear to show different color underneath:
 1. Steel nosing and rear risers shall be pre-galvanized with a minimum spangle of G-60 zinc plating.
 2. Decking shall have use-surfaces to receive both a sealer coat and wear-resistant high gloss clear urethane finish. Optional decking to have 0.030" laminated polyethylene wear surface.
 4. Injection Molded MVP seats or Sentinel Chairs to be selected from (15) fifteen standard and (7) seven select colors. Colors shall be per manufacturer's standards
- C. Railings: Steel railings shall be finished with powder-coated semi - gloss black or optional 15 standard colors to match plastic seat color.
- D. Poolside/ High Humidity finish: Above shop finishes shall include following modifications:
 1. Understructure: All frames and other structural components shall be hot-dip galvanized per ASTM A103
 2. All top-side rails shall be e-coated prior to powder paint coating
 3. All hardware to be zinc-plated
 4. All posi-locks and other steel wear surfaces to be electroless-nickel plated
 5. Decking to be polyethylene-laminated plywood

2.07 FASTENINGS:

- A. Welds: Performed by welders certified by AWS standards for the process employed.
- B. Structural Connections: Secured by structural bolts with prevailing torque lock nuts, free-spinning nuts in combination with lock washers, or Riv-nuts in combination with lock washers.

2.07 Manual OPERATION- Provide a pair of operation handles.

2.10 ACCESSORIES

- B. **Flex-Row: Provide first row modular recoverable seating units to be utilized by persons in wheelchairs and able-bodied persons.** Each Flex-Row unit shall have an unlock handle for easy deployment if wheelchair or team seating access is needed. Unlock handle shall lock the bleacher seats into position when fully opened.
1. Provide a black full-surround steel skirting with no more than $\frac{3}{4}$ " floor clearance for safety and improved aesthetics.
 2. Provide a black injection molded end cap for the nose beam for safety and improved aesthetics.
 3. Provide a mechanical positive lock when the Flex-Row system is in the open and used position.
 4. Flex-Row modular units are designed to achieve multi-use front row seating to accommodate team seating, ADA requirements and facility specific requirements. Flex-Row units are available in modular units from 2 to 7 seats wide as well as full section widths.
- C. **Front Aisle Steps:** Provide at each vertical aisle location front aisle step. Front steps shall engage with front row to prevent accidental separation or movement. Steps shall be fitted with four non-skid rubber feet each $\frac{1}{2}$ " [13] in diameter. Blow molded end caps shall have full radius on all four edges. Quantity and location as indicated.
- D. **Non-Slip Tread:** Provide at front edge of each aisle location an adhesive-backed abrasive non-slip tread surface.
- E. **Intermediate Aisle Steps:** Intermediate aisle steps shall be of boxed fully enclosed type construction. Blow molded end caps shall have full radius on all four edges. Step shall have adhesive-backed abrasive non-slip tread surface. Quantity and location as indicated.
- Intermediate Automatic Rotating Aisle Handrails: Provide single pedestal mount handrails 34" [864] high with terminating mid rail. Permanently attached handrail shall rotate in a permanently mounted socket for rail storage. Rail shall automatically rotate, lock in the use position, unlock and rotate back to the stowed position as the gym seats open and close. Ends of the handrail shall return to the post, and not extend away from it. Rails having openings to avoid interference with closed decks are not acceptable.**
- F. **End Panel:** Provide closure end panels for closed stack position at each exposed bank end. End panels shall be constructed of $\frac{5}{8}$ " [16] Southern pine plywood or grey Polydeck.
- G. **Self Storing End Rails:** Provide steel self-storing 42" [1066] high above seat, end rail with tubular supports and intermediate members designed with 4" [102] sphere passage requirements.
- H. **Top Seat Flush Filler:** Provide at top seat level a flush filler board mounted between top seat and rear wall. Flush filler board shall be constructed of $\frac{4}{4}$ " nominal thickness Southern pine Grade "B & B" clear urethane finished.
- I. **Safety Accessories: Provide the following safety features:**
1. **Coin Round or Roll all edges of exposed metal on top and underneath Bleacher to eliminate sharp edges. Provide safety ease edges, coined edges, or rounded edges for the bleacher understructure components as follows.**

- Diagonal or X braces and deck support or deck stabilizers. Systems provided with sharp edges or corners, to be rounded off in the field and field painted.**
- 2. Provide plastic end cap on nose metal at Bank ends to close off edges to prevent spectator injury.**
 - 3. Provide plastic end cap on back of deck supports on 1st 7 Rows to prevent spectator injury.**
 - 4. On 1st Row, provide front and side skirt boards any where there is an exposed end to prevent players/balls from sliding underneath the 1st Row.**
 - 5. Provide metal cover over motor chains and wheels to protect chains from debris and provide a safety switch that if cover is taken off the power system will not work.**
 - 6. Provide metal end deck cover on each row to cover exposed edge of plywood at the ends of the bleachers.**
 - 7. Powered frames systems without a metal protective housing, covering drive chain and drive wheels are not permitted under this specification**
- J. Extended Rear Deck Filler: Provide at rear deck level an extended rear deck filler mounted between rear wall building columns. Select extended rear deck filler from (12) twelve standard sizes to meet site conditions.
- K. Rear Wall Column Cutouts: Provide custom bleacher cutouts at rear wall building columns. Top row(s) to be cutout and scribe fitted to meet wall column conditions.
- L. Cross Aisles: Provide continuous top cross aisle or elevated front cross aisle per plan of seating. Construction material and finish to match telescopic seating.
- M. End Closure Curtains: Provide closure curtains fabricated of vinyl-coated 14oz Polyester fabric on open ends of telescopic seating. Curtains to be permanently attached to wall or rear closure panel and secured to individual rows of seating. Curtain to open with seating unit into taught secure configuration and fold automatically as seating unit closes.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Verify area to receive telescoping gym seats are free of impediments interfering with installation and condition of installation substrates are acceptable to receive telescoping gym seats in accordance with telescoping gym seats manufacturer's recommendations. Do not commence installation until conditions are satisfactory.

3.02 INSTALLATION

- A. Manufacturer's Recommendations: Comply with telescoping gym seats manufacturer's recommendations for product installation requirements.
- B. General: Manufacturer's Certified Installers to install telescoping gym seats in accordance with manufacturer's installation instructions and final shop drawings. Provide accessories, anchors, fasteners, inserts and other items for installation of telescoping gym seats and for permanent attachment to adjoining construction.

3.03 ADJUSTMENT AND CLEANING

- A. Adjustment: After installation completion, test and adjust each telescoping gym seats assembly to operate in compliance with manufacturer's operations manual.
- B. Cleaning: Clean installed telescoping gym seats on both exposed and semi-exposed surfaces. Touch-up finishes to restore damage or soiled surfaces.

3.04 PROTECTION

- A. General: Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer to ensure telescoping gym seats are without damage or deterioration at time of substantial completion.

END OF SECTION

The following Divisions have no Sections in this Manual

DIVISION 13 – SPECIAL CONSTRUCTION

DIVISION 14 – CONVEYING SYSTEMS

DIVISION 21 - FIRE SUPPRESSION

**DIVISION 22
PLUMBING**

- 22 01 00 BASIC MECHANICAL MATERIALS AND METHODS FOR
PLUMBING AND HVAC
- 22 02 00 MOTORS FOR PLUMBING AND HVAC
- 22 05 00 HANGERS AND SUPPORTS FOR PLUMBING AND HVAC
- 22 05 53 MECHANICAL IDENTIFICATION FOR PLUMBING AND
HVAC PIPING AND EQUIPMENT
- 22 07 19 PIPE INSULATION FOR PLUMBING AND HVAC
- 22 11 16 DOMESTIC WATER PIPING SYSTEMS
- 22 13 16 SOIL, WASTE, AND VENT PIPING
- 22 14 00 FUEL GAS PIPING
- 22 33 00 ELECTRIC, DOMESTIC WATER HEATERS
- 22 42 13 PLUMBING FIXTURES

**DISTRICT 11 BOND PROJECTS
TIOGA ELEMENTARY SCHOOL
ADDITION TO GYMNASIUM
BALL, LOUISIANA**

ABW PROJECT No: 2023.11.3.3

AFJMc + GUTH PN 25-199 (7368)

SEALS

Specification Divisions/Sections prepared under my responsible supervision:

DIVISION 22 PLUMBING

DIVISION 23 HEATING, VENTILATION, AND AIR CONDITIONING

**JOHN C. WILSON, P.E., PRESIDENT
MECHANICAL ENGINEER – LA LICENSE 19008**

SECTION 22 01 00

BASIC MECHANICAL MATERIALS AND METHODS FOR PLUMBING AND HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems
 - 2. Dielectric fittings
 - 3. Flexible connectors
 - 4. Sleeves
 - 5. Escutcheons
 - 6. Grout
 - 7. Mechanical demolition
 - 8. Equipment installation requirements common to equipment sections
 - 9. Painting and finishing
 - 10. Supports and anchorages
 - 11. Access panels
 - 12. Anti-huffing devices

1.3 DEFINITIONS

- A. **Finished Spaces:** Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspace, and tunnels.
- B. **Exposed, Interior Installations:** Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. **Exposed, Exterior Installations:** Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. **Concealed, Interior Installations:** Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
- E. **Concealed, Exterior Installations:** Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. **"Furnish":** Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar 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": Except as otherwise defined in greater detail, the term "provide" means furnish and install, complete in every respect and ready for the intended use, as applicable in each instance.
- I. "Inspect": The term "inspect" or "inspection: when used to describe observation of the Contractor's Work by the Engineer shall mean an endeavor to guard the Owner against defects and deficiencies in the Work and to determine, in general, if the Work is being performed in a manner such that, when completed, it will be in accordance with the Contract Documents.
- J. Wiring: the term "wiring" shall include providing raceway, conductors, and cable in accordance with the requirements of Division 26.
- K. The following are industry abbreviations for plastic materials:
 - 1. ABS: Acrylonitrile-butadiene-styrene plastic.
 - 2. PVC: Polyvinyl chloride plastic.
- L. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Dielectric fittings.
 - 2. Escutcheons.
- B. Shop Drawings: Detail fabrication and installation for metal supports and anchorage for mechanical materials and equipment.

1.5 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code-Steel."
- B. Equipment Selection: Equipment of higher electrical characteristics, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are appropriately modified. The Contractor will be responsible for any added costs for such modifications. If minimum energy ratings or efficiencies of equipment are specified, equipment must meet design and commissioning requirements.
- C. Drawings: The Mechanical Drawings show the general arrangement of piping, equipment, and appurtenances, and shall be followed as closely as actual building construction and the work of other trades will permit. The Mechanical work shall conform to the requirements shown on all the Drawings. Because of the small scale of the Mechanical Drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. The Contractor shall investigate the structural and finish conditions and other building components affecting the work and shall

arrange his work accordingly, providing such offsets, fittings, and accessories as may be required to meet such conditions. No extras will be approved for required additional offsets and fittings. Any offsets or additional fittings required to coordinate mechanical systems with existing conditions and other trades, or that are necessary for the complete installation of the system, including modifications to shop or off-site fabricated piping and/or ductwork, all shall be provided by the Contractor at no additional cost to the Owner.

- D. Codes and Standards: comply with the following codes. Comply with the latest edition except where indicated otherwise or a specific edition is required by the authority having jurisdiction:

1. International Building Code
2. International Fuel Gas Code
3. International Mechanical Code
4. International Plumbing Code with Louisiana Amendments
5. Louisiana State Energy Code
6. NFPA 54, 70, 72, 90A, 90B, and 101
7. All applicable local codes

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and prevent entrance of dirt, debris, and moisture.
- B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.
- C. Protect flanges, fittings, and piping specialties from moisture and dirt.

1.7 COORDINATION

- A. Coordinate mechanical equipment installation with other building components and existing conditions.
- B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.
- C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.
- D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.
- E. Coordinate connection of mechanical systems with exterior underground utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Costs for all utility connections shall be the Contractor's responsibility, including any connections made by the utility company.
- F. Coordinate requirements for access panels and doors if mechanical items requiring access are concealed behind finished surfaces.

- G. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and other concealment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by firms regularly engaged in the manufacture of products required, whose products have been in satisfactory use in similar service.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 and 23 Piping Sections and "Pipe and Fitting Material Schedule" on the Drawings for pipe, tube, and fitting materials and joining methods.
- B. **Pipe Threads:** ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

- A. Refer to individual Division 22 and 23 Piping Sections and "Pipe and Fitting Material Schedule" on the Drawings for special joining materials not listed below.
- B. **Pipe-Flange Gasket Materials:** Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 2. AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. **Flange Bolts and Nuts:** ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. **Plastic, Pipe-Flange Gasket, Bolts, and Nuts:** Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. **Solder Filler Metals:** ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. **Brazing Filler Metals:** AWS A5.8, BAg1, silver alloy.
- G. **Welding Filler Metals:** Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- H. **Solvent Cements for Joining Plastic Piping:**

1. ABS Piping: ASTM D 2235.
2. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
3. PVC to ABS Piping Transition: ASTM D 3138.

- I. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

2.4 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, flanged, solder-joint, plain, or weld-neck end connections that match piping system materials and isolate joined dissimilar metals to prevent galvanic action and stop corrosion.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig (2070-kPa) minimum working pressure at 225 degrees F (107 degrees C).

2.5 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

2.6 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 1. Finish: Polished chrome-plated.
- D. Split-Plate, Stamped-Steel Type: With concealed hinge, spring clips, and chrome-plated finish.
- E. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.7 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
 3. Packaging: Premixed and factory packaged.

2.8 ACCESS PANELS

- A. Access Panels (Toilet and Bath Rooms): Flush stainless steel, 180 degrees door with concealed hinges, key-actuated lock, frame and flexible anchor straps.
- B. Access Panels: (Elsewhere): Flush metal hinged access panel and frame (type as required for surface encountered), prime coat finish, and key actuated cylinder lock.
- C. Access Panels: Minimum size 12 inch x 12 inch. Locate over device to be serviced.

2.9 ANTI HUFFING DEVICES

- A. Provide locking access port caps for all outdoor equipment containing refrigerant. Caps shall be tamper resistant and secured to prevent unauthorized access.

PART 3 - EXECUTION

3.1 MECHANICAL DEMOLITION

- A. Refer to Division 1 Sections, "Cutting and Patching" and "Selective Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove mechanical systems, equipment, and components indicated to be removed.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 and 23 Sections specifying piping systems.
- B. Install components with pressure rating equal to or greater than system operating pressure.
- C. Install piping at right angles or parallel to building walls. Diagonal runs are prohibited, unless otherwise indicated.
- D. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.
- E. Locate groups of pipes parallel to each other, spaced to permit valve servicing.
- F. Install couplings according to manufacturer's written instructions.

- G. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- H. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- I. Install all buried water piping, regardless of content, a minimum of 12 inches below and 12 inches laterally from any buried electrical line. Whether in conduit or direct buried cable, this requirement shall apply regardless of voltage of the electrical line.
- J. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- K. Install piping to permit valve servicing.
- L. Install piping at indicated slopes.
- M. Install piping free of sags and bends.
- N. Install fittings for changes in direction and branch connections.
- O. Pulled-tee, extruded-tee, thread-o-let, weld-o-let, and mitered elbow connections are not acceptable, unless specifically indicated otherwise. Provide manufactured tee and elbow fittings.
- P. Install tees with removable threaded cleanout plugs at each change in direction in all condensate drain piping.
- Q. Select system components with pressure rating equal to or greater than system operating pressure.
- R. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: Cast-brass type with chrome-plated finish, split-casing for existing piping, and one-piece for new piping.
 - c. Insulated and Bare Piping: Split-plate, stamped-steel type with concealed hinge and spring clips.
 - d. Bare Piping at Floor Penetrations in Equipment Rooms: Split-casting, floor-plate type.
- S. Sleeves are not required for core-drilled holes.
- T. Permanent sleeves are not required for holes formed by removable PE sleeves.
- U. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.

3. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Steel Pipe Sleeves: For pipes smaller than NPS 6 (DN 150).
 - b. Steel Sheet Sleeves: For pipes NPS 6 (DN 150) and larger, penetrating interior walls.
 - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Refer to Division 7 Section, "Sheet Metal Flashing and Trim" for flashing.
 - 1) Seal space outside of sleeve fittings with grout.
4. Seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.
- V. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 Section, "Through-Penetration Firestop Systems" for materials.
- W. Verify final equipment locations for roughing-in.

3.3 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements, Division 22 and 23 Sections, and Schedules on the Drawings, specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. 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.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
 - 3. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 4. PVC Nonpressure Piping: Join according to ASTM D 2855.
 - 5. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Non-Pressure Piping Gasketed Joints: Join according to ASTM D 3212.

3.4 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Manufacturer's Installation and Operating Instructions: All equipment and material shall be installed and operated in strict accord with manufacturer's "Installation and Operating Instructions." The manufacturer's installation instructions shall become part of this Specification, and shall take precedence over and/or supplement any Specification herein and as shown and/or described on plans. All individual items of equipment and components thereof shall be 100 percent accessible for repair, removal, or replacement without functional impairment or dismantling of any adjoining major surfaces or assemblies.
- B. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- D. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- E. Install equipment to allow right of way for piping installed at required slope.
- F. Cut and drill floors, roofs, walls, partitions, ceilings, and other surfaces as required to permit installation of mechanical piping, ducts, and equipment. Perform cutting by skilled mechanics of trades involved.

- G. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.
- H. Electrical Work: Wherever equipment requiring electrical power connection is specified, all wiring shall be furnished and installed under Division 26 of the Specifications. Starting switches, protective devices, and other means for the operation and control of equipment shall be furnished under the various Division 22 and 23 Sections, and installed and electrically connected complete under Division 26 unless otherwise specifically noted, except that control devices that are installed in or on ducts, piping, or mechanical equipment shall be mounted under Divisions 22 and 23. If equipment is furnished requiring power wiring different from that indicated on the Electrical Drawings, the Contractor furnishing the equipment shall be responsible for any required revisions and pay any additional costs connected therewith. Wiring revisions shall be submitted to the Architect for approval prior to installation.
 - 1. Contractors furnishing items to be wired shall provide adequate wiring diagrams.
 - 2. Temperature control wiring shall be furnished and installed in raceway under Division 23 according to the requirements of Division 26, specifically Section, "Conductors and Cables," and Section, "Raceways and Boxes."

3.6 EARTHWORK

- A. Refer to Division 2 Section, "Earthwork" for excavation, trenching and backfilling.

3.7 PAINTING

- A. Touching Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting 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 paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Touching Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 9 Section, "Painting."
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.8 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 5 Section, "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.9 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor mechanical materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.10 GROUTING

- A. Mix and install grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

3.11 MISCELLANEOUS

- A. Services: Provide gas, water, sanitary sewer, and services as indicated.
- B. The Contractor shall, before submitting a proposal, verify the location, depth, size, and pressure or grade of existing main gas, water and sewer lines to which he is to make connections for services to the building and shall include in his bid the cost of any required revisions. If for any reason conditions appear that will adversely affect the proper installation and operation of the systems, such conditions shall be reported to the Architect in writing for his decision ten days prior to bid date. All connection charges, cutting and patching of paving, etc. required for connection to utility lines, including those provided by the utility company, shall be paid for or provided by the Contractor. Make provisions for metering as indicated and as required by the serving utilities. Locations of plumbing lines and point of service entrance are shown in accordance with data provided by various departments of city and/or utility companies involved. The points of connection to the utility lines are approximate only and shall be verified by each bidder. Each bidder shall include adequate funds in his bid price to cover all cost of connections to utility lines regardless of exact location, or those who make the connection, and shall hold the Owner harmless as to additional costs or extras regarding utility connections.
- C. Sewage Backwater Valves: Where the flood level rims of plumbing fixtures are below the elevation of the manhole cover of the next upstream manhole in the public sewer, such fixtures shall be protected by a backwater valve installed in the building drain, branch of the building drain or horizontal branch serving such fixtures, regardless of whether indicated on the Drawings or not. Plumbing fixtures that have flood level rims above the elevation of the manhole cover of the next upstream manhole in the public sewer shall not discharge through a backwater valve. Where such

conditions are found to exist, revise piping as required to install backwater valves. Submit proposed revisions to the Architect for approval. Use of floor drains with integral backwater valves is acceptable where flood level elevations involve only floor drains and do not involve fixtures with flood level rims above the finished floor. Backwater valves shall be accessible.

- D. Access Panels: Provide access panels as indicated. In addition, provide access panels for each concealed item requiring service or adjustment that would otherwise be inaccessible whether shown or not. Access panel locations shown on drawings are approximate. Exact location shall be verified with the Architect prior to installation. Deliver access panels to trade responsible for finish surfaces in which access panels are to be installed.
- E. Refrigerant Circuit Access Caps: Provide tamper resistant-locking type caps at each piece of outdoor equipment.

END OF SECTION 22 01 00

SECTION 22 02 00

MOTORS FOR PLUMBING AND HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes basic requirements for factory-installed and field-installed motors.
- B. Related Sections include the following:
 - 1. Division 22 and 23 Sections for application of motors and reference to specific motor requirements for motor-driven equipment.

1.3 SUBMITTALS

- A. Product Data for Field-Installed Motors: For each type and size of motor, provide nameplate data and ratings; mounting arrangements; size, type, and location of winding terminations; conduit entry and ground lug locations; and information on coatings or finishes.
- B. Operation and Maintenance Data: For field-installed motors to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. 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.
- B. Comply with NFPA 70.

1.5 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices. Provide motors that are:
 - 1. Designed and labeled for use with variable frequency controllers, and suitable for use throughout speed range without overheating.
 - 2. Matched to torque and horsepower requirements of the load.
 - 3. Matched to ratings and characteristics of supply circuit and required control sequence.

PART 2 - PRODUCTS

2.1 MOTOR CHARACTERISTICS

- A. Motors 1/2 HP and Larger: Three phase.
- B. Motors Smaller Than 1/2 HP: Single phase.
- C. Frequency Rating: 60 Hz.
- D. Voltage Rating: NEMA standard voltage selected to operate on nominal circuit voltage to which motor is connected.
- E. Duty: Continuous duty at ambient temperature of 105 degrees F (40 degrees C) and at altitude of 3300 feet (1005 meters) above sea level.
- F. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
- G. Enclosure: Open drip-proof, unless otherwise indicated.

2.2 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Energy-Efficient Design: All motors.
 - 1. Comply with Louisiana Energy Code.
 - 2. Comply with EPACT.
- C. Stator: Copper windings, unless otherwise indicated.
 - 1. Multispeed motors shall have separate winding for each speed.
- D. Rotor: Squirrel cage, unless otherwise indicated.
- E. Bearings: Double-shielded, pre-lubricated ball bearings suitable for radial and thrust loading.
- F. Temperature Rise: Match insulation rating, unless otherwise indicated.
- G. Insulation: Class F, unless otherwise indicated.

2.3 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
 - 1. Designed with critical vibration frequencies outside operating range of controller output.
 - 2. Temperature Rise: Matched to rating for Class B insulation.
 - 3. Insulation: Class H.
 - 4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

5. Comply with MG1-31.

2.4 SINGLE-PHASE MOTORS

- A. Type: One of the following, to suit starting torque and requirements of specific motor application:
 1. Permanent-split capacitor.
- B. Shaded-Pole Motors: For motors 1/20 hp and smaller only.
- C. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.
- D. Bearings: Ball type for belt-connected motors and other motors with high radial forces on motor shaft; sealed, pre-lubricated-sleeve type for other single-phase motors.

PART 3 - EXECUTION

3.1 MOTOR INSTALLATION

- A. Anchor each motor assembly to base, adjustable rails, or other support, arranged and sized according to manufacturer's written instructions. Attach by bolting. Level and align with load transfer link.

3.2 FIELD QUALITY CONTROL

- A. Prepare for acceptance tests as follows:
 1. Run each motor with its controller. Demonstrate correct rotation, alignment, and speed at motor design load.
 2. Test interlocks and control features for proper operation.
 3. Verify that current in each phase is within nameplate rating.

3.3 CLEANING

- A. After completing equipment installation, inspect unit components. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.
- B. Clean motors, on completion of installation, according to manufacturer's written instructions.

END OF SECTION 22 02 00

SECTION 22 05 00

HANGERS AND SUPPORTS FOR PLUMBING AND HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes hangers and supports for mechanical system piping and equipment.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for the Valve and Fittings Industry.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 SUBMITTALS

- A. Product Data: For each type of pipe hanger, channel support system component, and thermal-hanger shield insert indicated.
- B. Welding Certificates: Copies of certificates for welding procedures and operators.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Firms regularly engaged in manufacture of supports and hangers, of types and sizes required, whose products have been in satisfactory use in similar service.

2.2 MANUFACTURED UNITS

- A. Pipe Hangers, Supports, and Components: MSS SP-58, factory-fabricated components. Refer to "Hanger and Support Applications" Article in Part 3 for where to use specific hanger and support types.

1. **Nonmetallic Coatings:** On hangers for electrolytic protection where hangers are in direct contact with copper tubing.

2.3 MISCELLANEOUS MATERIALS

- A. **Mechanical-Anchor Fasteners:** Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.
- B. **Structural Steel:** ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger requirements are specified in Sections specifying equipment and systems.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Specification Sections.
- C. **Horizontal-Piping Hangers and Supports:** Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
- D. **Adjustable Steel Clevis Hangers (MSS Type 1):** For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30 (DN15 to DN750).
- E. **Vertical-Piping Clamps:** Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
 1. **Extension Pipe or Riser Clamps (MSS Type 8):** For support of pipe risers, NPS 3/4 to NPS 20 (DN20 to DN500).
 2. **Carbon- or Alloy-Steel Riser Clamps (MSS Type 42):** For support of pipe risers, NPS 3/4 to NPS 20 (DN20 to DN500), if longer ends are required for riser clamps.
- F. **Hanger-Rod Attachments:** Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
 1. **Steel Turnbuckles (MSS Type 13):** For adjustment up to 6 inches (150 mm) for heavy loads.
 2. **Steel Clevises (MSS Type 14):** For 120 to 450 degrees F (49 to 232 degrees C) piping installations.
 3. **Malleable-Iron Sockets (MSS Type 16):** For attaching hanger rods to various types of building attachments.
- G. **Building Attachments:** Except as otherwise indicated, provide factory-fabricated building attachments complying with ANSI/MSS SP-58, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods.
- H. **Saddles and Shields:** Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
- I. **Protection Shields (MSS Type 40):** Of length recommended by manufacturer to prevent crushing insulation.
- J. **Thermal-Hanger Shield Inserts:**

1. Description: 100 psig (690 kPa) minimum, compressive-strength insulation insert encased in sheet metal shield.
2. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with vapor barrier.
3. Insulation-Insert Material for Hot Piping: ASTM C 552, Type II cellular glass.
4. For Hangers and Clamped Systems: Insert and shield shall cover entire circumference of pipe.
5. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Pipe Hanger and Support Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure. All hangers for equipment and piping are to be supported from building structure even if structural enhancements to roof support is required.
- B. Install building attachments within concrete slabs or attach 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, and expansion joints, and at changes in direction of piping.
- C. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- D. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- E. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- F. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9, "Building Services Piping," is not exceeded.
- H. Do not use wire or perforated metal to support piping, and do not support piping from other piping.
- I. Support vertical piping at each floor and roof.
- J. Insulated Piping: Comply with the following:
 1. All hangers and supports shall be external of insulation.
 2. Install MSS SP-58, Type 40 protective shields on all insulated piping. Shields shall span arc of 180 degrees.
 3. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2 (DN8 to DN90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
 - b. NPS 4 (DN100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
 - c. NPS 5 and NPS 6 (DN125 and DN150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
 - d. NPS 8 to NPS 14 (DN200 to DN350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure above or to support equipment above floor.

3.4 METAL FABRICATION

- A. Cut, drill, and fit miscellaneous metal fabrications for heavy-duty steel trapezes and equipment supports.
- B. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.
- C. Any vertical structural members required to form overhead attachments for hangers or equipment supports shall be located adjacent to walls and any horizontal members be adjacent to the roof structure.

3.5 ADJUSTING

- A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.6 PAINTING

- A. Touching Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 9 Sections.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint.

END OF SECTION 22 05 00

SECTION 22 05 53

MECHANICAL IDENTIFICATION FOR PLUMBING AND HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes mechanical identification materials and devices.

1.3 SUBMITTALS

- A. Product Data: For identification materials and devices.
- B. Samples: Of color, lettering style, and graphic representation required for each identification material and device.

1.4 QUALITY ASSURANCE

- A. Comply with ASME A13.1, "Scheme for the Identification of Piping Systems" for lettering size, length of color field, colors, and viewing angles of identification devices.

1.5 SEQUENCING AND SCHEDULING

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

PART 2 - PRODUCTS

2.1 IDENTIFYING DEVICES AND LABELS

- A. General: Products specified are for applications referenced in other Division 22 and 23 Sections. If more than single type is specified for listed applications, selection is Installer's option.
- B. Equipment Nameplates: Metal permanently fastened to equipment with data engraved or stamped.
 - 1. Data: Manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and essential data.
 - 2. Location: Accessible and visible.

- C. Snap-On Plastic Pipe Markers: Manufacturer's standard preprinted, semirigid, snap-on type. Include color-coding according to ASME A13.1, unless otherwise indicated.
- D. Pipes with OD, Including Insulation, Less Than 6 Inches (150 mm): Full-band pipe markers, extending 360 degrees around pipe at each location.
- E. Pipes with OD, Including Insulation, 6 Inches (150 mm) and Larger: Either full-band or strip-type pipe markers, at least 3 times letter height and of length required for label.
- F. Lettering: Manufacturer's standard preprinted captions as selected by Engineer.
 - 1. Arrows: Either integrally with piping system service lettering, to accommodate both directions, or as separate unit, on each pipe marker to indicate direction of flow.
- G. Plastic Tape: Manufacturer's standard color-coded, pressure-sensitive, self-adhesive, vinyl tape, at least 3 mils (0.08 mm) thick.
 - 1. Width: 1-1/2 inches (40 mm) on pipes with OD, including insulation, less than 6 inches (150 mm); 2-1/2 inches (65 mm) for larger pipes.
 - 2. Color: Comply with ASME A13.1, unless otherwise indicated.
- H. Engraved Plastic-Laminate Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated. Fabricate in sizes required for message. Provide holes for mechanical fastening.
 - 1. Engraving: Engraver's standard letter style, of sizes and with terms to match equipment identification.
 - 2. Thickness: 1/16 inch (2 mm), for units up to 20 sq. in. (130 sq. cm) or 8 inches (200 mm) in length, and 1/8 inch (3 mm) for larger units.
 - 3. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.
- I. Plastic Equipment Markers: Manufacturer's standard laminated plastic, in the following color codes:
 - 1. Green: Cooling equipment and components.
 - 2. Yellow: Heating equipment and components.
 - 3. Brown: Energy reclamation equipment and components.
 - 4. Blue: Equipment and components that do not meet criteria above.
 - 5. Hazardous Equipment: Use colors and designs recommended by ASME A13.1.
 - 6. Terminology: Match schedules as closely as possible. Include the following:
 - a. Name and plan number.
 - b. Equipment service.
 - c. Design capacity.
 - d. Other design parameters such as pressure drop, entering and leaving conditions, and speed.
 - 7. Size: 2-1/2 by 4 inches (65 by 100 mm) for control devices and valves; 4-1/2 by 6 inches (115 by 150 mm) for equipment.
- J. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in mechanical identification with corresponding designations indicated. Use numbers, letters, and terms indicated for proper identification, operation, and maintenance of mechanical systems and equipment.

1. Multiple Systems: Identify individual system number and service if multiple systems of same name are indicated.

PART 3 - EXECUTION

3.1 LABELING AND IDENTIFYING PIPING SYSTEMS

- A. Install pipe markers on each system. Include arrows showing normal direction of flow.
- B. Marker Type: Plastic markers, with application systems.
- C. Fasten markers on pipes and insulated pipes smaller than 6 inches (150 mm) OD by one of following methods:
 1. Snap-on application of pre-tensioned, semi-rigid plastic pipe marker.
- D. Fasten markers on pipes and insulated pipes 6 inches (150 mm) in diameter and larger by one of following methods:
 1. Laminated or bonded application of pipe marker to pipe or insulation.
 2. Taped to pipe or insulation with color-coded plastic adhesive tape, not less than 1-1/2 inches (40 mm) wide, lapped a minimum of 3 inches (75 mm) at both ends of pipe marker, and covering full circumference of pipe.
 3. Strapped to pipe or insulation with manufacturer's standard stainless-steel bands.
- E. Locate pipe markers and color bands where piping is exposed; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior nonconcealed locations according to the following:
 1. Near each valve and control device.
 2. Near each branch connection, excluding short takeoffs. Mark each pipe at branch, where flow pattern is not obvious.
 3. Near penetrations through walls, floors, ceilings, or nonaccessible 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 a maximum of 50-foot (15-meters) intervals along each run. Reduce intervals to 25 feet (7.5 meters) in areas of congested piping and equipment.

3.2 EQUIPMENT SIGNS AND MARKERS

- A. Install engraved plastic-laminate signs or equipment markers on or near each major item of mechanical equipment. Include signs for the following general categories of equipment:
 1. Split system air conditioning units (inside and outside units)
 2. Fans/power ventilators

3.3 ADJUSTING AND CLEANING

- A. Relocate mechanical identification materials and devices that have become visually blocked by work of this or other Divisions.

- B. Clean faces of identification devices and glass frames of valve charts.

END OF SECTION 22 05 53

SECTION 22 07 19

PIPE INSULATION FOR PLUMBING AND HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes preformed, rigid and flexible pipe insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.
- B. Related Sections include the following:
 - 1. Division 23 Section, "Duct Insulation" for insulation for ducts and plenums.
 - 2. Division 22 Section, "Hangers and Supports for plumbing and HVAC" for pipe insulation shields and protection saddles.

1.3 SUBMITTALS

- A. Product Data: Identify thermal conductivity, thickness, and jackets, for each type of product indicated.
- B. Installer Certificates: Signed by the Contractor certifying that installers comply with requirements.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the U.S. Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.6 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 22 Section, "Hangers and Supports for Plumbing and HVAC."
- B. Coordinate clearance requirements with piping Installer for insulation application.
- C. Coordinate installation and testing of steam or electric heat tracing.

1.7 SCHEDULING

- A. Schedule insulation application after testing piping systems. Insulation application may begin on segments of piping that have satisfactory test results.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Manufacturers:** Subject to compliance with requirements, manufacturers regularly engaged in the manufacture of piping insulation products of the types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

2.2 INSULATION MATERIALS

- A. **Mineral-Fiber Insulation:** Glass fibers bonded with a thermosetting resin complying with the following:
 - 1. **Preformed Pipe Insulation:** Comply with ASTM C 547, Type 1, with factory-applied, all-purpose, vapor-retarder jacket.
 - 2. **Blanket Insulation:** Comply with ASTM C 553, Type II, without facing.
 - 3. **Fire-Resistant Adhesive:** Comply with MIL-A-3316C in the following classes and grades:
 - a. Class 1, Grade A for bonding glass cloth and tape to unfaced glass-fiber insulation, for sealing edges of glass-fiber insulation, and for bonding lagging cloth to unfaced glass-fiber insulation.
 - b. Class 2, Grade A for bonding glass-fiber insulation to metal surfaces.
 - 4. **Vapor-Retarder Mastics:** Fire- and water-resistant, vapor-retarder mastic for indoor applications. Comply with MIL-C-19565C, Type II.
 - 5. **Mineral-Fiber Insulating Cements:** Comply with ASTM C 195.
 - 6. **Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement:** Comply with ASTM C 449/C 449M.
- B. **Flexible Elastomeric Thermal Insulation:** Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
 - 1. **Adhesive:** As recommended by insulation material manufacturer.
 - 2. **Ultraviolet-Protective Coating:** As recommended by insulation manufacturer.

2.3 FIELD-APPLIED JACKETS

- A. **PVC Jacket:** High-impact, ultraviolet-resistant PVC; 20 mils (0.5 mm) thick; pre-curved ready for shop or field cutting and installing.
 - 1. **Adhesive:** As recommended by insulation material manufacturer.
 - 2. **PVC Jacket Color:** White or gray.
- B. **Standard PVC Fitting Covers:** Factory-fabricated fitting covers manufactured from 20-mil- (0.5 mm) thick, high-impact, ultraviolet-resistant PVC.
 - 1. **Shapes:** 45 and 90 degree, short- and long-radius elbows, tees, valves, flanges, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories for the disabled.
 - 2. **Adhesive:** As recommended by insulation material manufacturer.

2.4 ACCESSORIES AND ATTACHMENTS

- A. **Glass Cloth and Tape:** Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, pre-sized a minimum of 8 oz./sq. yd. (270 g/sq. m).
 - 1. **Tape Width:** 4 inches (100 mm).
- B. **Bands:** 3/4 inch (19 mm) wide, in one of the following materials compatible with jacket:
 - 1. **Stainless Steel:** ASTM A 666, Type 304; 0.020 inch (0.5 mm) thick.
- C. **Wire:** 0.080 inch (2.0 mm), nickel-copper alloy; 0.062 inch (1.6 mm), soft-annealed, stainless steel; or 0.062 inch (1.6 mm), soft-annealed, galvanized steel.

2.5 VAPOR RETARDERS

- A. **Mastics:** Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. **Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.**
- B. **Proceed with installation only after unsatisfactory conditions have been corrected.**

3.2 PREPARATION

- A. **Surface Preparation:** Clean and dry pipe and fitting surfaces. Remove materials that will adversely affect insulation application.

3.3 GENERAL APPLICATION REQUIREMENTS

- A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each piping system.
- C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Apply insulation with longitudinal seams at top and bottom of horizontal pipe runs.
- E. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- F. Seal joints and seams with vapor-retarder mastic.
- G. Keep insulation materials dry during application and finishing.
- H. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.
- I. Apply insulation with the least number of joints practical.
- J. Apply insulation over fittings, valves, and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Refer to special instructions for applying insulation over fittings, valves, and specialties.
- K. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.
 - 1. Apply insulation continuously through hangers and around anchor attachments.
 - 2. Install insert materials and apply insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by the insulation material manufacturer.
 - 3. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect the jacket from tear or puncture by the hanger, support, and shield.
- L. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
- M. Apply adhesives and mastics at the manufacturer's recommended coverage rate.
- N. Apply insulation with integral jackets as follows:
 - 1. Pull jacket tight and smooth.
 - 2. Circumferential Joints: Cover with 3 inch- (75 mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches (100 mm) o.c.
 - 3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches (40 mm). Apply insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches (100 mm) o.c.

- a. Exception: Do not staple longitudinal laps on insulation having a vapor retarder.
- 4. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.
- 5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.
- O. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and floors.
- P. Fire-Rated Wall and Partition Penetrations: Apply insulation continuously through penetrations of fire-rated walls and partitions.

3.4 MINERAL-FIBER INSULATION APPLICATION

- A. Apply insulation to straight pipes and tubes as follows:
 - 1. Secure each layer of preformed pipe insulation to pipe with wire, tape, or bands without deforming insulation materials.
 - 2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic. Apply vapor retarder to ends of insulation at intervals of 15 to 20 feet (4.5 to 6 m) to form a vapor retarder between pipe insulation segments.
 - 3. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.
- B. Apply insulation to flanges as follows:
 - 1. Apply preformed pipe insulation to outer diameter of pipe flange.
 - 2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.
 - 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
 - 4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.
- C. Apply insulation to fittings and elbows as follows:
 - 1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
 - 2. When premolded insulation elbows and fittings are not available, apply mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire, tape, or bands.
 - 3. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.
- D. Apply insulation to valves and specialties as follows:
 - 1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
 - 2. When premolded insulation sections are not available, apply glass-fiber blanket insulation to valve body to thickness equal to adjoining pipe insulation. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to stainer basket without disturbing insulation.
 - 3. Apply insulation to flanges as specified for flange insulation application.

4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.

3.5 FLEXIBLE ELASTOMERIC THERMAL INSULATION APPLICATION

- A. Apply insulation to straight pipes and tubes as follows:
 1. Follow manufacturer's written instructions for applying insulation.
 2. Seal longitudinal seams and end joints with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.
- B. Apply insulation to fittings and elbows as follows:
 1. Apply mitered sections of pipe insulation.
 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

3.6 FIELD-APPLIED JACKET APPLICATION

- A. Apply PVC jacket over all piping, fittings, valves, flanges, etc. located in equipment rooms and mechanical rooms, up to an elevation of 6'-0" above the finished floor of the space. Apply with 1 inch (25 mm) overlap at longitudinal seams and end joints. Seal with manufacturers' recommended adhesive.

3.7 PIPING SYSTEM APPLICATIONS

- A. Insulation materials and thicknesses are specified in schedules at the end of this Section.
- B. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:
 1. Flexible connectors.
 2. Vibration-control devices.

3.8 FIELD QUALITY CONTROL

- A. Insulation applications will be considered defective if sample inspection reveals noncompliance with requirements. Remove defective Work and replace with new materials according to these Specifications.
- B. Reinstall insulation and covers on fittings and valves if required to be uncovered for inspection according to these Specifications.

3.9 INSULATION APPLICATION SCHEDULE, GENERAL

- A. Refer to insulation application schedules for required insulation materials, vapor retarders, and field-applied jackets.
- B. Application schedules identify piping system and indicate pipe size ranges and material, thickness, and jacket requirements.

3.10 INTERIOR INSULATION APPLICATION SCHEDULE

- A. This application schedule is for interior insulation inside the building.
- B. Service: Domestic cold water.
 - 1. Operating Temperature: 35 to 60 deg F (2 to 15 deg C).
 - 2. Insulation Material: Mineral fiber.
 - 3. Insulation Thickness: Apply the following insulation thicknesses:
 - a. Copper Pipe, 1 Inch and Smaller: 1/2 inch.
 - b. Copper Pipe, 1-1/4 Inches and Larger: 1 inch.
 - 4. Field-Applied Jacket: PVC for exposed piping in Equipment Rooms.
 - 5. Vapor Retarder Required: Yes.
 - 6. Finish: None.
- C. Service: Domestic hot water and hot water return.
 - 1. Operating Temperature: 60 to 140 deg F (15 to 60 deg C).
 - 2. Insulation Material: Mineral fiber.
 - 3. Insulation Thickness: Apply the following thicknesses:
 - a. Runouts up to 2 Inches and less than 12 Foot length: 1/2 inch.
 - b. 2 Inches size and less: 1 inch.
 - c. 2-1/2 Inches size and larger: 1-1/2 inches.
 - 4. Field-Applied Jacket: PVC for exposed piping in Mechanical Rooms.
 - 5. Vapor Retarder Required: No.
 - 6. Finish: None.
- D. Service: Condensate drain piping.
 - 1. Operating Temperature: 35 to 75 deg F (2 to 24 deg C).
 - 2. Insulation Material: Flexible elastomeric.
 - 3. Insulation Thickness: 3/4 inch.
 - 4. Field-Applied Jacket: None.
 - 5. Vapor Retarder Required: Yes.
 - 6. Finish: None.
- E. Service: Refrigerant suction and vapor piping.
 - 1. Operating Temperature: 35 to 50 deg F (2 to 10 deg C).
 - 2. Insulation Material: Flexible elastomeric.
 - 3. Insulation Thickness: 3/4 inch.
 - 4. Finish: None.
- F. Service: Exposed sanitary drains and domestic water supplies and stops for fixtures for the disabled.
 - 1. Insulate and jacket with factory insulation and white PVC jacket kit conforming to ADA and equivalent to Truebro "Handi Lav-Guard", McGuire Manufacturing Co. "ProWrap", or approved equivalent.

3.11 EXTERIOR INSULATION APPLICATION SCHEDULE

- A. This application schedule is for aboveground insulation outside the building.
- B. Service: Refrigerant suction and vapor.
 - 1. Operating Temperature: 35 to 50 deg F (2 to 10 deg C).
 - 2. Insulation Material: Flexible elastomeric.
 - 3. Insulation Thickness: 3/4 inch.
 - 4. Finish: Painted with two coats of ultraviolet-protective coating.

END OF SECTION 22 07 19

SECTION 22 11 16

DOMESTIC WATER PIPING SYSTEMS

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Extent of domestic water piping systems work is indicated on the Drawings and schedules and by requirements of this Section.
- B. Applications for domestic water piping systems include the following:
 - 1. Domestic cold-water piping.
 - 2. Domestic hot-water piping.
- C. Refer to appropriate Division 22 and 23 Sections for insulation required in connection with domestic water piping; not work of this Section.
- D. Trenching and backfill required in conjunction with exterior water piping is specified in applicable Division 2 Sections and is included as work of this Section.

1.3 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of domestic water piping systems products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service.
- B. Plumbing Code Compliance: Comply with applicable portions of governing Plumbing Code pertaining to plumbing materials, construction, and installation of products.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's data for domestic water piping systems, materials, and products.

PART 2 - PRODUCTS

2.1 DOMESTIC WATER PIPING MATERIALS AND PRODUCTS

- A. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated and scheduled. Where not indicated or scheduled, provide proper selection as determined by Installer to comply with installation

requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in domestic water piping systems. Where more than one type of material or product is indicated, selection is Installer's option.

2.2 BASIC IDENTIFICATION

- A. General: Provide identification complying with Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC," in accordance with the following listing:

1. Water Service: Underground-type plastic line markers.

2.3 BASIC PIPE, TUBE, AND FITTINGS

- A. General: Provide pipe, tube, and fittings complying with Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC," in accordance with the schedule on the Drawings.

2.4 BASIC HANGERS AND SUPPORTS

- A. General: Provide hangers and supports complying with Division 22 Section, "Hangers and Supports for Plumbing and HVAC."

2.5 BASIC VALVES

- A. Ball Valves – 2 Inches (DN50) and Smaller: MSS SP-110, Class 150, 600 psi (4140 kPa) CWP, ASTM B 584 bronze body and bonnet, 2-piece construction; chrome-plated brass ball, standard port for 1/2 inch (DN15) valves and smaller and conventional port for 3/4 inch (DN20) valves and larger; blowout proof; bronze or brass stem; teflon seats and seals; threaded end connections.

1. Operator: Vinyl-covered steel lever handle.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equivalent:
 - a. Milwaukee, BA100.
 - b. Appollo, #70-100.
 - c. Hammond, #8501.
 - d. Nibco, #585.

- B. Gate Valves 2-1/2 Inches and Larger:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equivalent:
 - a. Crane #461.
 - b. Jenkins #7326.
 - c. Nibco #F-619.
 - d. Hammond #1R1138.

2.6 SPECIAL VALVES

- A. General: Special valves required for domestic water piping systems include the following types:

1. Interior Hose Bibb: 3/4 inch angle sill faucet, polished chrome plated, fixed wheel handle, and with vacuum breaker.
2. Exterior Sillcocks: 3/4 inch size, non-freeze type with anti-siphon backflow preventer and brass casing:
 - a. Wade: Model 8600.
 - b. Josam: Model Z-1321.
3. Exterior Sillcocks: For locations where wall thickness will not permit non-freeze sillcock and piping to be fully concealed, provide mild climate type with integral backflow preventer.
 - a. Wade: Model 8600MT.
 - b. Zurn: Model Z-1333.

2.7 TRAP SEAL PRIMER VALVES

- A. Supply-Type Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, with the following characteristics. Provide where a trap primer is required by code or is shown on the Drawings.
 1. Manufacturers:
 - a. Precision Plumbing Products, Inc.
 2. 125-psig (860-kPa) minimum working pressure.
 3. Bronze body with atmospheric-vented drain chamber.
 4. Inlet and Outlet Connections: NPS 1/2 (DN 15) threaded, union, or solder joint.
 5. Gravity Drain Outlet Connection: NPS 1/2 (DN 15) threaded or solder joint.
 6. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

2.8 DRAIN VALVES

- A. Hose-End Drain Valves: MSS SP-110, NPS 3/4 (DN 20) ball valve, rated for 400-psig (2760-kPa) minimum CWP. Include two-piece, copper-alloy body with standard port, chrome-plated brass ball, replaceable seats and seals, blowout-proof stem, and vinyl-covered steel handle.
 1. Inlet: Threaded or solder joint.
 2. Outlet: Short-threaded nipple with ASME B1.20.7, garden-hose threads and cap.

2.9 WATER HAMMER ARRESTERS

- A. General: ASSE 1010 or PDI-WH 201, piston type with pressurized metal-tube cushioning chamber. Sizes indicated are based on ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.
 1. Manufacturers:
 - a. Josam Co.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.
 - d. Zurn Industries, Inc.; Wilkins Div.

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Excavating, trenching, and backfilling are specified in Division 2 Section, "Earthwork."

3.2 INSTALLATION OF DOMESTIC WATER PIPING

- A. General: Install water distribution piping in accordance with Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC Systems."

3.3 INSTALLATION OF PIPING SPECIALTIES

- A. Water Hammer Arresters: Install in upright position, in locations and of sizes in accordance with PDI Standard WH-201, and elsewhere as indicated.
- B. Trap Seal Primer Valves: Install trap seal primer valves with outlet pitched down toward drain tap a minimum of 1 percent and connect to floor drain, trap or inlet fitting. Adjust valve for proper flow.
- C. Install wood blocking reinforcement for wall mounting and recessed type plumbing specialties.
- D. Install individual ball type shutoff valve in water supply to trap seal primer valve and install minimum 12 inches x 12 inches access panel over valve and trap primer.

3.4 INSTALLATION OF HANGERS AND SUPPORTS

- A. Install hangers and supports in accordance with Division 22 Section, "Hangers and Supports for Plumbing and HVAC."

3.5 EQUIPMENT CONNECTIONS

- A. Piping Runouts to Fixtures: Provide hot and cold water piping runouts to fixtures of sizes indicated, but in no case smaller than required by governing Plumbing Code.
- B. Rough-in and connect all equipment, including kitchen equipment, including any interconnecting piping. Provide stops at each item. Rough-in in accord with equipment suppliers rough-in drawings. Provide all water piping work required for equipment installation, adjust, and leave in operation according to manufacturer's recommendations.

3.6 FIELD QUALITY CONTROL

- A. Test water and hot water piping throughout hydrostatically at 150 p.s.i.g. (four hours).
- B. Repair or replace domestic water piping as required to eliminate leaks and retest as specified to demonstrate compliance.
- C. Sterilization: Sterilize 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 to Architect.

END OF SECTION 22 11 16

SECTION 22 13 16

SOIL, WASTE, AND VENT PIPING

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Extent of soil, waste, and vent piping system work is indicated on Drawings and Schedules, and by requirements of this Section.
- B. Trenching and backfilling required in conjunction with underground drain piping is specified in applicable Division 2 Sections and is included as work of this Section.

1.3 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of piping products of types, materials, and sizes required, whose products have been in satisfactory use in similar service.
- B. Plumbing Code Compliance: Comply with applicable portions of governing Plumbing Code pertaining to plumbing materials, construction, and installation of products.
- C. ANSI Compliance: Comply with applicable American National Standards pertaining to products and installation of soil, waste, and vent piping systems.
- D. PDI Compliance: Comply with applicable Plumbing and Drainage Institute Standards pertaining to products and installation of soil, waste, and vent piping systems.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's data for soil, waste, and vent piping systems materials and products.

PART 2 - PRODUCTS

2.1 SOIL, WASTE AND VENT PIPING MATERIALS AND PRODUCTS

- A. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in soil, waste, and vent piping systems. Where more than one type of materials or product is indicated, selection is Installer's option.

2.2 BASIC PIPE, TUBE AND FITTINGS

- A. General: Provide pipe, tube, and fittings complying with Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC," in accordance with the Schedule on the Drawings.

2.3 BASIC HANGERS AND SUPPORTS

- A. General: Provide hangers and supports complying with Division 22 Section, "Hangers and Supports for Plumbing and HVAC."

2.4 DRAINAGE PIPING PRODUCTS

- A. General: Provide factory-fabricated drainage piping products of size and type indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements and governing regulations.
- B. Cleanout Plugs: Cast-bronze or brass, threaded, countersunk head.
- C. Floor Cleanouts: Cast-iron body and frame; cleanout plug; adjustable round top as follows:
 - 1. Nickel-Bronze Top: Manufacturers standard cast unit of the pattern indicated:
 - a. Pattern: Exposed rim type, with recess to receive 1/8 inch thick resilient floor finish where applicable.
 - b. Pattern: Exposed rim type, with recess to receive 1 inch thick terrazzo floor finish where applicable.
 - c. Pattern: Exposed flush type, standard non-slip scored or abrasive finish.
 - d. Carpet Marker: Include approximately 1-1/4 inches diameter carpet marker for cleanouts that occur in carpeted areas.
- D. Wall Cleanouts: Cast-iron body adaptable to pipe with cast-bronze or brass cleanout plug; stainless steel cover including screws.
- E. Flashing: As approved by metal roof manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION OF SOIL, WASTE AND VENT ABOVE GROUND PIPING

- A. General: Install soil, waste, and vent piping in accordance with Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC," and with governing Plumbing Code.
- B. Flashing: Flash all vent penetrations through roofs as approved by roof manufacturer. Offset vents where necessary to provide 2 feet - 0 inches minimum clearance from other flashing such as outside walls, curbs, etc. All flashing shall be as approved by roofing manufacturer.

3.2 INSTALLATION OF BUILDING DRAIN PIPING

- A. General: Install underground building drains as indicated and in accordance with governing Plumbing Code. 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. Clean interior of piping of dirt and other superfluous material as work progresses. Maintain swab or drag-in-line and pull past each joint as it is completed. Place plugs in ends of uncompleted piping at end of day or whenever work stops.

- B. Install soil, waste and vent piping pitched to drain at minimum slope of 1/4 inch per foot (2 percent) for piping 3 inches and smaller, and 1/8 inch per foot (1 percent) for piping 4 inches and larger.

3.3 INSTALLATION OF HANGERS AND SUPPORTS

- A. Install hangers and supports in accordance with Division 22 Section, "Hangers and Supports for Plumbing and HVAC."

3.4 INSTALLATION OF DRAINAGE PIPING PRODUCTS

- A. Cleanouts: Install in sanitary aboveground piping and sanitary building drain piping as indicated, as required by governing Plumbing Code; and at each change in direction of piping greater than 45 degrees; at minimum intervals of 50 feet for piping 4 inches and smaller and 100 feet for larger piping; and at base of each vertical soil or waste stack. Install floor and wall cleanout covers for concealed piping, select type to match adjacent building finish. Cleanouts shall be same size as pipe up to 4 inches and not less than 4 inches for larger pipe. All cleanouts shall be accessible. All cleanouts shall be opened, cleaned, and greased after all concrete work is completed.
- B. Outside cleanouts shall be brought up flush with finish grade or paving. Where at grade, they shall be set in 14 inches x 14 inches x 5 inches concrete pads.
- C. Inside cleanouts shall be brought up flush with floors and provided with cleanout covers or in wall with wall cleanout cover.

3.5 EQUIPMENT CONNECTIONS

- A. Piping Runouts to Fixtures: Provide soil and waste piping runouts to equipment, plumbing fixtures, and drains with approved trap of sizes indicated; but in no case smaller than required by governing Plumbing Code. Comply with equipment manufacturer's instructions where not indicated otherwise.
- B. Rough-in and connect all kitchen equipment, including any interconnecting piping. Provide waste piping to drains and any required traps or fittings. Rough-in in accord with equipment suppliers rough-in drawings. Provide all waste and vent piping work required for equipment installation, adjust, and leave in operation according to manufacturer's recommendation.

3.6 PIPING TESTS

- A. Test soil, waste, and vent piping system in accordance with requirements of governing Plumbing Code, but not less than 10 foot head water test.

END OF SECTION 22 13 16

SECTION 22 14 00

FUEL 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 DESCRIPTION OF WORK

- A. Extent of natural gas piping system work is indicated on Drawings and Schedules and by requirements of this Section.
- B. Applications for natural gas piping systems include the following:
 - 1. Gas service from street main or main on site to building meter.
 - 2. Building distribution system from gas meter to gas-fired equipment connections.
- C. Trenching and backfill required in conjunction with gas service piping is specified in applicable Division 2 Sections, and is included as work of this Section.

1.3 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of natural gas piping products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service.
- B. Comply with NFPA 54 "National Fuel Gas Code" and International Fuel Gas Code for gas piping materials and components; installations; and inspection, testing, and purging.
- C. Local Utility Compliance: Comply with requirements of serving utility company.
- D. Local and State Codes: Comply with governing code and State Fire Marshal requirements.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's data for gas piping systems materials and products.

PART 2 - PRODUCTS

2.1 NATURAL GAS PIPING MATERIALS AND PRODUCTS

- A. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide materials and products complying with ANSI B31.2 where applicable, base pressure rating on natural gas piping system maximum

design pressures. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in natural gas piping systems. Where more than one type of materials or products are indicated, selection is Installer's option.

2.2 BASIC IDENTIFICATION

- A. General: Provide identification complying with Division 22 Section, "Mechanical Identification for Plumbing and HVAC," in accordance with the following listing:

1. Gas Service: Underground detectable type plastic line markers.

2.3 BASIC PIPE, TUBE, AND FITTINGS

- A. General: Provide pipe, tube, and fittings complying with Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC," in accordance with the Schedule on Drawings.
- B. Gas Transition Fittings: Gas transition fittings shall be manufactured steel fittings approved for jointing metallic and thermoplastic pipe. Approved transition fittings are those that conform to AGA-01 requirements for transitions fittings.
- C. Risers: A manufacturer's standard transition fitting, transition from plastic to plastic-coated steel pipe with O-ring seals and swaged gas-tight with metal insert. Provide manufacturer's standard protective sleeve.

2.4 BASIC HANGERS AND SUPPORTS

- A. General: Provide hangers and supports seals complying with Division 22 Section, "Hangers and Supports for Plumbing and HVAC."

2.5 VALVES

- A. General: Valves required for natural gas piping systems include the following types:

1. Gas Cocks:
 - a. Gas Cocks 2 Inches and Smaller: 150 psi non-shock WOG, bronze straightway cock, flat or square head, threaded ends.
 - b. Gas Cocks 2-1/2 Inches and Larger: 125 psi non-shock WOG, iron body bronze mounted, straightway cock, square head, flanged ends.

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 (DN 50) and smaller; flanged for regulators NPS 2 1/2 (DN 65) and larger.

B. Service 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. Fisher Control Valves and Regulators; Division of Emerson Process Management.**
- 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 regulators.**
- 9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.**
- 10. Overpressure Protection Device: Factory mounted on pressure regulator.**
- 11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.**
- 12. Maximum Inlet Pressure: 100 psig.**

PART 3 - EXECUTION

3.1 INSTALLATION OF BASIC IDENTIFICATION

- A. General: Install mechanical identification in accordance with Division 22 Section, "Mechanical Identification for Plumbing and HVAC."**

3.2 INSTALLATION OF NATURAL GAS PIPING

- A. General: Install natural gas distribution piping in accordance with Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC," and in accordance with applicable codes and serving utility company requirements. The contractor shall include all costs of metering, service lines and connections to serving utility distribution lines in his bid.**
- B. Use sealants on metal gas piping threads which are chemically resistant to natural gas. Use sealants sparingly and apply to only male threads of metal joints.**
- C. Remove cutting and threading burrs before assembling piping.**
- D. Do not install defective piping or fittings. Do not use pipe with threads which are chipped, stripped, or damaged.**
- E. Plug each gas outlet, including valves, with threaded plug or cap immediately after installation, and retain until continuing piping or equipment connections are completed.**
- F. Ground gas piping electrically and continuously within project, and bond tightly to grounding connection.**

- G. Install drip-legs in gas piping where indicated, at equipment connections, and where required by code or regulation.
- H. Install "Tee" fitting with bottom outlet plugged or capped, at bottom of pipe risers.
- I. Use dielectric unions where dissimilar metals are joined together.
- J. Install piping with 1 inch drop in 60 degree pipe run (0.14 percent) in direction of flow.
- K. Install piping parallel.
- L. Do not install gas piping below floor slab or in unventilated concealed spaces. Provide protective metal sleeves for pipes passing through walls, floors, or partitions.
- M. Coordinate with gas utility company as necessary to interface gas piping with gas service supply work.
- N. Include all utility costs for relocation of existing gas service.

3.3 INSTALLATION OF HANGERS AND SUPPORTS

- A. Install hangers and supports in accordance with Division 22 Section, "Hangers and Supports for Plumbing and HVAC."

3.4 INSTALLATION OF VALVES

- A. Gas Cocks: Provide at connection to gas train for each gas-fired equipment item; and on risers and branches where indicated.
- B. Locate gas cocks where easily accessible and where they will be protected from possible injury.

3.5 EQUIPMENT CONNECTIONS

- A. General: Connect gas piping to each gas-fired equipment item, with drip leg and shutoff gas cock. Comply with equipment manufacturer's instructions.

3.6 PIPING TESTS

- A. Test and purge natural gas piping in accordance with ANSI B31.2, and local utility requirements. Test at not less than 100 p.s.i.g. and prove tight for 2 hours.
- B. Repair or replace fuel gas piping as required to eliminate leaks and retest as specified to demonstrate compliance.

3.7 SPARE PARTS

- A. Furnish to Owner, with receipt, 2 valve wrenches for each type of gas valve installed, requiring same.

END OF SECTION 22 14 00

SECTION 22 33 00

ELECTRIC, DOMESTIC WATER HEATERS (LIGHT COMMERCIAL)

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. This Section includes the following for domestic water systems:

- 1. Light commercial, electric water heaters.
- 2. Compression Tanks.
- 3. Accessories.

1.3 SUBMITTALS

- A. Product Data: For each type and size of water heater. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.
- B. Maintenance Data: For water heaters to include in maintenance manuals specified in Division 01.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain same type of water heaters through one source from a single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of water heaters that fail in materials or workmanship within specified warranty period.
 - 1. Failures include storage tanks.
 - 2. Warranty Period: From date of Substantial Completion:

- a. Storage Tanks: 10 years.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Light Commercial, Storage, Electric Water Heaters:
 - a. A.O. Smith: Model DEN, DEL.
 - b. State Industries: Model PCE.
 - c. Bradford White: LD30.
 - 2. Drain Pan Units:
 - a. Safety: W. H. Safety Products, Inc.

2.2 LIGHT-COMMERCIAL, STORAGE, ELECTRIC WATER HEATERS

- A. Description: Comply with UL 174 or UL 1453, and listed by Manufacturer for commercial applications.
- B. Storage Tank Construction: ASME-code steel with 150-psig (1035-kPa) working-pressure rating.
 - 1. Tappings: Factory fabricated of materials compatible with tank for piping connections, relief valve, pressure gage, thermometer, drain, anode rod, and controls as required. Attach tappings to tank before testing and labeling. Include ASME B1.20.1, pipe thread.
 - 2. Interior Finish: Materials and thicknesses complying with NSF 61, barrier materials for potable-water tank linings. Extend finish into and through tank fittings and outlets.
 - 3. Insulation: Comply with ASHRAE 90.1. Surround entire storage tank except connections and controls.
 - 4. Jacket: Steel, with enameled finish.
- C. Heating Elements: Two electric, Screw-in, Immersion type.
 - 1. Temperature Control: Adjustable thermostat with wiring arrangement for non-simultaneous operation.
 - 2. Safety Controls: Automatic, high-temperature-limit and low-water cutoff devices or systems.
- D. Drain Valve: ASSE 1005, corrosion-resistant metal, factory installed.
- E. Anode Rod: Factory installed; magnesium.
- F. Dip Tube: Factory installed. Not required if cold-water inlet is near bottom of storage tank.
- G. Special Requirement: NSF 5 construction.

2.3 COMPRESSION TANKS

- A. Description: Steel, pressure-rated tank constructed with welded joints and factory-installed, butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
1. Manufacturers:
 - a. AMTROL Inc.
 - b. Armstrong Pumps, Inc.
 - c. Smith, A. O.; Aqua-Air Div.
 - d. State Industries, Inc.
 - e. Taco, Inc.
 - f. Watts Regulator Co.
 - g. Wessels Co.
 2. Construction:
 - a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
 - b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
 - c. Air-Charging Valve: Factory installed.
 3. Capacity and Characteristics:
 - a. Working-Pressure Rating: 150 psig (1035 kPa).
 - b. Capacity Acceptable: As indicated on the Drawings.

2.4 WATER HEATER ACCESSORIES

- A. Combination Temperature and Pressure Relief Valves: ASME rated and stamped and complying with ASME PTC 25.3. Include relieving capacity at least as great as heat input and include pressure setting less than water heater working-pressure rating. Select relief valve with sensing element that extends into tank.
- B. Vacuum Relief Valves: Comply with ASME PTC 25.3. Furnish for installation in piping.
1. Exception: Omit if water heater has integral vacuum-relieving device.
- C. Drain Pans: Corrosion-resistant metal with raised edge. Include dimensions not less than base of water heater and include drain outlet not less than NPS 3/4 (DN20).
- D. Piping-Type Heat Traps: Field-fabricated piping arrangement according to ASHRAE 90.1 or ASHRAE 90.2.

PART 3 – EXECUTION

3.1 WATER HEATER INSTALLATION

- A. Install water heaters, level and plumb, according to Layout Drawings, original design, and referenced standards. Maintain Manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.

- B. Install temperature and pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend relief valve outlet with water piping in continuous downward pitch and discharge onto closest floor drain or into open drain as directed.
- C. Install vacuum relief valves in cold-water-inlet piping.
- D. Install water heater drain piping as indirect waste to spill into open drains or over floor drains.
- E. Install piping-type heat traps on inlet and outlet piping of water heater storage tanks without integral or fitting-type heat traps.
- F. Install compression tank.
- G. Fill water heaters with water.
- H. Charge compression tank with air.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to water heater to allow service and maintenance.
- C. Connect hot- and cold-water piping with shutoff valves and unions.
- D. Make connections with dielectric fittings where piping is made of dissimilar metal.
- E. Electrical Connections: Power wiring and disconnect switches are specified in Division 26 Sections. Arrange wiring to allow unit service.
- F. Ground equipment.
 - 1. Tighten electrical connectors and terminals according to Manufacturer's published torque-tightening values. If Manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 FIELD QUALITY CONTROL

- A. In addition to Manufacturer's written installation and startup checks, perform the following:
 - 1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 2. Verify that piping system tests are complete.
 - 3. Check for piping connection leaks.
 - 4. Check for clear relief valve inlets, outlets, and drain piping.
 - 5. Check operation of circulators.
 - 6. Test operation of safety controls, relief valves, and devices.
 - 7. Energize electric circuits.
 - 8. Adjust operating controls.
 - 9. Adjust hot-water-outlet temperature settings. Do not set above 140 degrees F (60 degrees C) unless piping system application requires higher temperature.

3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain water heaters.**
 - 1. Review data in maintenance manuals.**

END OF SECTION22 33 00

SECTION 22 42 13

PLUMBING FIXTURES

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Extent of plumbing fixtures and trim work is indicated by Drawings and Schedules, and by requirements of this Section.
- B. Types of plumbing fixtures required for the project are indicated by the Drawings and Schedules.
- C. Refer to Division 22 Sections for domestic water piping systems used in conjunction with plumbing fixtures; not work of this Section.
- D. Refer to Division 22 Sections for soil and waste piping systems used in conjunction with plumbing fixtures; not work of this Section.

1.3 QUALITY ASSURANCE

- A. Manufacturers: Provide products by one of the manufacturers listed in the Schedule on the Drawings or approved equivalent.
- B. Plumbing Fixture Standards: Comply with applicable portions of governing Plumbing Code pertaining to materials and installation of plumbing fixtures.
- C. Regulatory Requirements: Comply with requirements of CABO A117.1, "Accessible and Usable Buildings and Facilities;" Public Law 90-480, "Architectural Barriers Act;" and Public Law 101-336, "Americans with Disabilities Act;" regarding plumbing fixtures for physically handicapped people.
- D. PDI Compliance: Comply with standards established by Plumbing and Drainage Institute pertaining to plumbing fixture supports.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications for plumbing fixtures and trim, including catalog cut of each fixture type and trim item furnished, roughing-in dimensioned drawings, templates for cutting substrates, fixture carriers, and installation instructions.
- B. Maintenance Data: Submit maintenance data and parts lists for each fixture type and trim item, including instructions for care of finishes. Include this data in maintenance manual.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver plumbing fixtures individually wrapped in factory-fabricated containers.
- B. Handle plumbing fixtures carefully to prevent breakage, chipping, and scoring the fixture finish. Do not install damaged plumbing fixtures; replace and return damaged units to equipment manufacturer.

PART 2 - PRODUCTS

2.1 PLUMBING FIXTURES

- A. General: Provide factory-fabricated fixtures of type, style, and material indicated. For each type fixture, provide fixture manufacturer's standard trim, carrier, seats, and valves as indicated by their published product information; either as designed and constructed, or as recommended by the manufacturer, and as required for a complete installation. Where more than one type is indicated, selection is Installer's option; but, all fixtures of same type must be furnished by single manufacturer. Where type is not otherwise indicated, provide fixtures complying with governing regulations.

2.2 MATERIALS

- A. General: Provide materials which have been selected for their surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, foundry sand holes, stains, discoloration, or other surface imperfections on finished units are not acceptable.
- B. Where fittings, trim and accessories are exposed or semi-exposed, provide bright chrome-plated or polished stainless steel units. Provide copper or brass where not exposed.
- C. Stainless Steel Sheets: Type 302/304, hardest workable temper.
 - 1. Finishes: No. 4, bright, directional polish on exposed surfaces.
- D. Vitreous China: High quality, free from fire cracks, spots, blisters, pinholes, and specks; glaze exposed surfaces.

2.3 PLUMBING FITTINGS, TRIM AND ACCESSORIES

- A. P-Traps: Include removable P-traps where drains are indicated for direct connection to drainage system.
- B. Escutcheons: Where fixture supplies and drains penetrate walls in exposed locations and within cabinets, provide chrome plated cast-brass escutcheons with set screw.
- C. Aerators: Provide aerators of types approved by Health Departments having jurisdiction.
- D. Comply with additional fixture requirements contained in fixture schedule on drawings.
- E. Floor Drains: Provide drains equivalent to that scheduled on drawings. Provide minimum top size of 5 inches for 2 inches size, 6 inches for 3 inches size, and 10 inches for 4 inches size. Include clamping ring for drains in waterproofed membrane floors. Provide drains with water passage size not smaller than outlet size.

- F. Trap Primer Valves: Refer to Division 22 Section, "Domestic Water Piping."

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

- A. Examine roughing-in work of domestic water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Install plumbing fixtures of types indicated where shown and at indicated heights; in accordance with fixture manufacturer's written instructions, roughing-in drawings, and with recognized industry practices. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of the governing Plumbing Code pertaining to installation of plumbing fixtures.
- C. Fasten plumbing fixtures securely to indicated supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies behind or within all construction so as to be rigid and not subject to pull or push movement. Secure with bolts full size of hanger drilling, through-wall where practicable, with back plates.
- D. Provide deep seal P-trap at each floor drain. In waterproofed, membrane floors, secure waterproofing with clamping ring.

3.2 CLEAN AND PROTECT

- A. Clean plumbing fixtures of dirt and debris upon completion of installation.
- B. Protect installed fixtures from damage during the remainder of the construction period.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. Test floor drains for free flow. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.
- B. Inspect each installed unit for damage to finish. If feasible, restore and match finish to original at site; otherwise, remove fixture and replace with new unit. Feasibility and match to be judged by Architect. Remove cracked or dented units and replace with new units.

END OF SECTION 22 42 13

DIVISION 23
HEATING, VENTILATING, AND AIR CONDITIONING

23 05 93	TESTING, ADJUSTING, AND BALANCING
23 07 13	DUCT INSULATION
23 23 03	REFRIGERANT PIPING
23 24 00	CONDENSATE DRAIN PIPING
23 31 13	METAL DUCTS
23 33 00	DUCTWORK ACCESSORIES
23 34 23	POWER VENTILATORS
23 37 13	DIFFUSERS, REGISTERS, AND GRILLES
23 43 16	AIR IONIZATION SYSTEMS
23 81 36	SPLIT-SYSTEM HEAT PUMP UNITS

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. The extent of test-adjust-balance (TAB) work is indicated by the requirements of this Section, and also by Drawings and Schedules, and is defined to include, but is not necessarily limited to, air distribution systems, and associated equipment and apparatus of HVAC work. The work consists of setting speed and volume (flow) adjusting facilities provided for the systems, recording data, conducting tests, preparing and submitting reports, and recommending modifications to the work as required by the Contract Documents.
- B. The component types of testing, adjusting and balancing specified in this Section includes the following as applied to HVAC equipment:
 - 1. Split System Air Conditioning
 - 2. Power Ventilators/Fans
 - 3. Ductwork systems
 - 4. Grilles, registers, and diffusers
 - 5. Temperature controls

1.3 QUALITY ASSURANCE

- A. Installer: A TAB firm with at least 3 years of successful test-adjust-balance experience on projects with testing and balancing requirements similar to those required for this project who is not the Installer of system to be tested and is otherwise independent of the project.
- B. NEBB Compliance (Option): Comply with NEBB's "Procedural Standards for Testing-Adjusting-Balancing of Environmental Systems" as applicable to HVAC air distribution systems and associated equipment and apparatus.
- C. AABC Compliance (Option): Comply with AABC's Pub. No. 12173, "National Standards for Field Measurements and Instrumentation, Total System Balanced", as applicable to HVAC air and hydronic distribution system and associated equipment and apparatus.
- D. Industry Standards: Comply with ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) recommendations pertaining to measurements, instruments and testing, adjusting, and balancing, except as otherwise indicated.

1.4 SUBMITTALS

- A. Submit certified test report signed by the Test and Balance Supervisor who performed the TAB work.
- B. Include identification and types of instruments used and their most recent calibration date with submission of final test report.

1.5 JOB CONDITIONS

- A. Do not proceed with testing, adjusting, and balancing work until the work to be TAB'ed has been completed and is operable. Ensure that there is no latent residual work still to be completed.
- B. Do not proceed until the work scheduled for TAB'ing is clean and free from debris, dirt, and discarded building materials.

PART 2 - PRODUCTS

2.1 PATCHING MATERIALS

- A. Except as otherwise indicated, use same products as used by original Installer for patching holes in insulation, ductwork and housing which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.
- B. At Tester's option, plastic plugs with retainers may be used to patch drilled holes in ductwork and housings.

2.2 TEST INSTRUMENTS

- A. Utilize test instruments and equipment for the TAB work required, of the type, precision, and capacity as recommended in the following TAB standards:
 - 1. NEBB's Procedural Standards for Testing-Adjusting-Balancing of Environmental Systems.
 - 2. AABC's National Standards for Field Measurements and Instrumentation, Total Balance System.

PART 3 - EXECUTION

3.1 GENERAL

- A. Tester must examine the installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable. Notify the Contractor in writing of conditions detrimental to the proper completion of the test-adjust-balance work.
- B. Do not proceed with the TAB work until unsatisfactory conditions have been corrected in a manner acceptable to the Tester.
- C. Test, adjust and balance the environmental systems and components, as indicated, in accordance with the procedures outlined in applicable standards. In addition perform the following:

1. Test all safety devices for proper operation.
 2. Adjust gas burners and gas inputs per Manufacturer's recommendations.
 3. Calibrate temperature control systems and adjust heat anticipators per Manufacturer's recommendations.
 4. Test smoke detector as recommended by Manufacturer.
- D. Test, adjust and balance system during the summer for air conditioning systems and during winter for heating systems, including at least a period of operation at outside conditions within 5°F wet bulb temperature of maximum summer design condition, and within 10°F dry bulb temperature of minimum winter design condition. When seasonal operation does not permit measuring the final temperatures then take the final temperature readings when the seasonal operation does permit.
- E. Prepare report of test results, including instrumentation calibration reports, in format recommended by the applicable standards. In addition certify that safety devices have been checked and are operating properly, that gas inputs and gas burners have been adjusted in accord with manufacturer's recommendations that temperature control systems have been calibrated and are operating properly, that smoke detector is operating properly, and that heat anticipators have been adjusted in accord with manufacturer's recommendations.
- F. Patch holes in insulation, ductwork, and housings, which have been cut or drilled for test purposes, in a manner recommended by the original Installer.
- G. Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings at completion of TAB work. Provide markings with paint or other suitable permanent identification materials.
- H. Prepare a report of recommendations for correcting unsatisfactory HVAC performances when system cannot be successfully balanced.
- I. Retest, adjust, and balance system subsequent to significant system modifications or if report is unsatisfactory, and resubmit test results. Repeat until satisfactory results are obtained.

END OF SECTION 23 05 93

SECTION 23 07 13

DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes semirigid and flexible duct, plenum, and breeching insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.
- B. Related Sections include Section 23 31 13, "Metal Ducts," for duct liner in double wall ducts.

1.3 SUBMITTALS

- A. Product Data: Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.

1.4 DEFINITIONS

- A. IBC: International Building Code.
- B. IMC: International Mechanical Code.
- C. NFPA: National Fire Protection Association.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the U.S. Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.
 - 1. Insulation Installed Indoors: Flame-spread rating of 25 or less, and smoke-developed rating of 50 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate clearance requirements with duct Installer for insulation application.

1.8 SCHEDULING

- A. Schedule insulation application after testing duct systems. Insulation application may begin on segments of ducts that have satisfactory test results.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products manufactured by companies regularly engaged in the manufacture of piping insulation products, of types and sizes required, whose products have been in satisfactory use in similar service.

2.2 INSULATION MATERIALS

- A. Flexible Elastomeric Insulation: Closed-cell, expanded-rubber materials with a self-adhering backing. Comply with ASTM C 1534, Grade 1, Type II for sheet materials.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Armacell LLC; AP/Coil Flex Duct Liner or a comparable product by one of the following:
 - a. Aeroflex USA, Inc.
 - b. K-Flex USA.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL APPLICATION REQUIREMENTS

- A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; and free of voids throughout the length of ducts and fittings.
- B. Refer to the Schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each duct system.
- C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Apply multiple layers of insulation with longitudinal and end seams staggered.
- E. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.
- F. Keep insulation materials dry during application and finishing.
- G. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.
- H. Apply insulation with the least number of joints practical.
- I. Apply insulation over fittings and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
- J. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic. Apply insulation continuously through hangers and around anchor attachments.
- K. Insulation Terminations: For insulation application where vapor retarders are indicated, seal ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
- L. Apply insulation with integral jackets as follows:
 - 1. Pull jacket tight and smooth.
 - 2. Joints and Seams: Cover with tape and vapor retarder as recommended by insulation material manufacturer to maintain vapor seal.
 - 3. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- M. Cut insulation according to manufacturer's written instructions to prevent compressing insulation to less than 75 percent of its nominal thickness.
- N. Install vapor-retarder mastic on ducts and plenums scheduled to receive vapor retarders.
 - 1. Ducts with Vapor Retarders: Overlap insulation facing at seams and seal with vapor-retarder mastic and pressure-sensitive tape having same facing as insulation. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-retarder seal.
 - 2. Ducts without Vapor Retarders: Overlap insulation facing at seams and secure with outward clinching staples and pressure-sensitive tape having same facing as insulation.
- O. Wall Penetrations: Apply insulation for interior applications to a point even with face of interior wall or as necessary to double wall duct from the building exterior.

1. Seal penetrations with vapor-retarder mastic.
 2. Apply insulation for exterior applications tightly joined to interior insulation ends.
 3. Seal insulation to wall flashing with vapor-retarder mastic.
- P. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and partitions, except fire-rated walls and partitions.
- Q. Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire/smoke damper sleeves for fire-rated wall and partition penetrations.
- R. Floor Penetrations: Terminate insulation at underside of floor assembly and at floor support at top of floor.
1. For insulation indicated to have vapor retarders, taper termination and seal insulation ends with vapor-retarder mastic.

3.4 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Installation shall follow the manufacturer's installation instructions of ASTM C 1710.
- B. 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.
- C. Square and Rectangular Ducts and Plenums:
1. Provide a $\frac{1}{4}$ -inch (6.4-mm) more per side for a tight, compression fit.
 2. Cut sheet insulation with the following dimensions:
 - a. Width of duct plus $\frac{1}{4}$ -inch (6.4-mm), one piece.
 - b. Height of duct plus $\frac{1}{4}$ -inch (6.4-mm), plus thickness of insulation, two pieces.
 - c. Width of duct plus $\frac{1}{4}$ -inch (6.4-mm), plus two times the thickness of insulation, one piece.
 3. Insulate the bottom of the duct with the sheet from (a) above, then the sides with the two sheets from (b) above, and finally the top of the duct with the sheet from (c) above.
 4. Insulation without self-adhering backing:
 - a. Apply 100 percent coverage of manufacturer adhesive on the metal surface, then the insulation, except for the last $\frac{1}{4}$ -inch (6.4-mm) where sheet will butt together.
 - b. Roll sheet down into position.
 - c. Press two sheets together under compression and apply adhesive at the butt joint to seal the two sheets together.
 5. Insulation with self-adhering backing:
 - a. Peel back release paper in 6- to 8-inch (150- to 203-mm) increments and line up sheet.
 - b. Press firmly to activate adhesive.
 - c. Align material and continue to line up correctly, pressing firmly while slowly removing release paper.
 - d. Allow $\frac{1}{4}$ -inch (6.4-mm) overlap for compression at butt joints.
 - e. Apply adhesive at the butt joint to seal the two sheets together.
 6. Insulate duct brackets following manufacturer's written installation instructions.

3.5 DUCT SYSTEM APPLICATIONS

- A. Insulation materials and thicknesses are specified in schedules at the end of this Section.**
- B. Materials and thicknesses for systems listed below are specified in schedules at the end of this Section.**
- C. Insulate the following plenums and duct systems:**
 - 1. Indoor exposed supply-, return-, and outside-air ductwork.**
- D. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:**
 - 1. Factory-insulated plenums, casings, and filter boxes and sections.**
 - 2. Flexible connectors.**
 - 3. Vibration-control devices.**
 - 4. Testing agency labels and stamps.**
 - 5. Nameplates and data plates.**

3.6 INDOOR DUCT AND PLENUM APPLICATION SCHEDULE

- A. Service: Supply-, return-, and outside-air ducts, exposed and backs of supply air diffusers.**
 - 1. Material: Flexible Elastomeric.**
 - 2. Thickness: 1 inch (25 mm).**
 - 3. Number of Layers: One.**
 - 4. Internal Duct Lining**

END OF SECTION 23 07 13

SECTION 23 23 03

REFRIGERANT 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.
- B. Section 23 63 15 Mini-Split System Heat Pump Units.

1.2 SUMMARY

- A. This Section includes refrigerant piping used for air-conditioning applications.
 - 1. Refrigerant pipes and fittings.
 - 2. Refrigerant valves and specialties.
 - 3. Refrigerants.

1.3 PERFORMANCE REQUIREMENTS

- A. Line Test Pressure for Refrigerant:
 - 1. Suction Lines for Air-Conditioning Applications: 300 psig (2068 kPa).
 - 2. Suction Lines for Heat-Pump Applications: 535 psig (3689 kPa).
 - 3. Hot-Gas and Liquid Lines: 535 psig (3689 kPa).

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of copper tube, valve and refrigerant piping specialty indicated. Include pressure drop, based on manufacturer's test data, for the following:
 - 1. Copper tube and fittings
 - 2. Thermostatic expansion valves.
 - 3. Isolation service valves.
 - 4. Solenoid valves.
 - 5. Hot-gas bypass valves.
 - 6. Bypass filters.
 - 7. Filter dryers.
 - 8. Strainers.
 - 9. Pressure-regulating valves.
- B. Shop Drawings: Provide a scaled coordination drawings of refrigerant piping and specialties, including pipe, tube, and fittings, sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall, roof and floor penetrations, and equipment connection

details. Show interface and spatial relationships between piping and equipment. Include vertical distances, expansion loops and obstacles requiring risers or dips,

1. Shop Drawing Scale: 1/4 inch equals 1 foot (1:48).
2. Refrigerant piping indicated on Drawings is schematic only. Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.

C. Piping System Tests, to be submitted to Owner and Architect prior to equipment start up;

1. Piping System Vacuum test results (12 hour minimum).
2. Piping System Pressure test results (24 hour minimum).

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Field quality-control test reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.
- B. Piping Test Reports: Include copies of test reports previously submitted.
- C. As Built Drawings: Update scaled coordination drawings provided under 1.4.B. Include accurate equipment locations, vertical distances, pipe sizes, Y-branch, branch selector box, and isolation valve locations.
- D. Warranty certificates.

1.7 WARRANTY:

- A. Mechanical contractor shall provide a labor warranty for a period of five (5) years from the date of project turnover. Warranty shall cover the repair of refrigerant leaks, defects in piping or workmanship, replacement of failed components, and any lost refrigerant, during the warranty period.
- B. Any time a refrigerant leak is repaired, or the refrigerant system is opened for replacement of components:
 1. Existing refrigerant shall be weighed out and noted.
 2. After repairs are made, the entire system shall be pressure and vacuum tested to manufacturer's specifications.
 3. After system passes pressure and vacuum tests, system shall be charged with virgin refrigerant to the manufacturer's specifications (total system charge).
- C. Warranty excludes routine maintenance.

1.8 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
- B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."
- C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.9 PRODUCT STORAGE AND HANDLING

- A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

1.10 COORDINATION

- A. Coordinate size and location of concrete pads and, equipment supports.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube:
 - 1. ASTM B 280, Type ACR.
 - 2. Manufactured in straight length hard tube.
 - 3. Plugged and charged with Nitrogen.
 - 4. B-280/B-819 cleanliness requirement.
- B. Soft Copper Tube:
 - 1. Commercial grade refrigerant tubing (ASTM B-743 and ASTM B-88)
 - 2. No. C1222000 DHP (phosphorus deoxidized, high residual phosphorus)
- C. Wrought-Copper Fittings: ASME B16.22.
 - 1. Use long radius elbows only.
- D. Wrought-Copper Unions: ASME B16.22.
- E. Wye branches and Headers: Provided by equipment manufacturer.
- F. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.
- G. Brazing Filler Metals: AWS A5.8, Type BCuP-5; 15% silver content, 5% phosphorus content.
- H. Flexible Connectors:
 - 1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.

2. End Connections: Socket ends.
3. Offset Performance: Capable of minimum 3/4-inch (20-mm) misalignment in minimum 7-inch- (180-mm-) long assembly.
4. Pressure Rating: Factory test at minimum 500 psig (3450 kPa).
5. Maximum Operating Temperature: 250 deg F (121 deg C).

I. Flexible Connectors:

1. Body: Stainless-steel bellows with woven, flexible, stainless-steel-wire-reinforced protective jacket
2. End Connections:
 - a. NPS 2 (DN 50) and Smaller: With threaded-end connections.
 - b. NPS 2-1/2 (DN 65) and Larger: With flanged-end connections.
3. Offset Performance: Capable of minimum 3/4-inch (20-mm) misalignment in minimum 7-inch- (180-mm-) long assembly.
4. Pressure Rating: Factory test at minimum 500 psig (3450 kPa).
5. Maximum Operating Temperature: 250 deg F (121 deg C).

2.2 VALVES AND SPECIALTIES

A. Service Valves:

1. Body: Forged brass with brass cap including key end to remove core.
2. Core: Removable ball-type check valve with stainless-steel spring.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Copper spring.
5. Working Pressure Rating: 500 psig (3450 kPa).

B. Solenoid Valves: Comply with ARI 760 and UL 429; listed and labeled by an NRTL.

1. Body and Bonnet: Plated steel.
2. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless steel.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Threaded.
5. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with 1/2-inch (16-GRC) conduit adapter, and 24-V ac coil.
6. Working Pressure Rating: 400 psig (2760 kPa).
7. Maximum Operating Temperature: 240 deg F (116 deg C).
8. Manual operator.

C. Straight-Type Strainers:

1. Body: Welded steel with corrosion-resistant coating.
2. Screen: 100-mesh stainless steel.
3. End Connections: Socket or flare.
4. Working Pressure Rating: 500 psig (3450 kPa).
5. Maximum Operating Temperature: 275 deg F (135 deg C).

D. Moisture/Liquid Indicators:

1. Body: Forged brass.
2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.

3. Indicator: Color coded to show moisture content in ppm.
4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
5. End Connections: Socket or flare.
6. Working Pressure Rating: 500 psig (3450 kPa).
7. Maximum Operating Temperature: 240 deg F (116 deg C).

E. Replaceable-Core Filter Dryers: Comply with ARI 730.

1. Body and Cover: Painted-steel shell with ductile-iron cover, stainless-steel screws, and neoprene gaskets.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated alumina.
4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS 1/4 (DN 8) connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig (14 kPa).
8. Working Pressure Rating: 500 psig (3450 kPa).
9. Maximum Operating Temperature: 240 deg F (116 deg C).
10. Locking mechanism to prevent huffing.

2.3 REFRIGERANTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Atofina Chemicals, Inc.
2. DuPont Company; Fluorochemicals Div.
3. Honeywell, Inc.; Genetron Refrigerants.
4. INEOS Fluor Americas LLC.

B. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS FOR REFRIGERANT

A. Variable Refrigerant Volume (VRV) Systems

1. Suction Lines NPS 4 (DN 100) and Smaller for VRV Applications: Copper, Type ACR, hard drawn tubing and wrought-copper fittings with brazed joints.
2. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump/Heat-Recovery VRV Applications: Copper, Type ACR, hard drawn tubing and wrought-copper fittings with brazed joints.
3. Suction and Liquid lines between branch selector boxes and evaporator units may be commercial grade soft copper tubing (ASTM B-743 and ASTM B-88) with wrought-copper fittings and brazed joints.
4. Safety-Relief-Valve Discharge Piping: Copper, Type L, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

B. Non Variable Refrigerant Volume Systems

1. Suction Lines NPS 4 (DN 100) and Smaller for Conventional Air-Conditioning Applications: Copper, Type L, drawn-temper tubing and wrought-copper fittings with soldered joints.

2. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type L, annealed- or drawn-temper tubing and wrought-copper fittings with brazed.
3. Safety-Relief-Valve Discharge Piping: Copper, Type L, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

3.2 VALVE AND SPECIALTY APPLICATIONS

- A. Install service valve in liquid, hot gas, and suction line at each outdoor unit frame with Schrader port oriented towards outdoor unit access.
- B. Bypass filter assembly
 1. Locations: Install in suction line and liquid line between outdoor unit and building piping system.
 - a. Suction: Replaceable core filter assembly
 - b. Liquid: Filter -Drier assembly
 2. Install a full-size, three-valve bypass filter assembly.
 - a. At startup, and as required, valve refrigerant to flow through the filter assembly with filter media installed.
 - b. After two (2) weeks of continuous operation after startup, valve refrigerant to bypass the filter assembly. Contractor shall evacuate and weigh refrigerant in bypass and remove replaceable core filter media. At the time of removal, the equipment manufacturer's representative shall inspect filter with the contractor on site. Upon manufactures representative's acceptance, contractor shall leave filter media removed and shall evacuate bypass suction assembly to under 500 microns, break vacuum with R-410A refrigerant, and charge bypass so standing pressure is equal to that of main piping. If filter cleanliness is not accepted by the manufacturer's representative, the process shall be repeated, at a time interval dictated by the representative, until acceptance at no cost to the Owner.
- C. Install solenoid valves upstream from each expansion valve and hot-gas bypass valve. Install solenoid valves in horizontal lines with coil at top.
- D. Install thermostatic expansion valves as close as possible to distributors on evaporators.
 1. Install valve so diaphragm case is warmer than bulb.
 2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
 3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.
- E. Install safety relief valves where required by ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.
- F. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.
- G. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for device being protected:
 1. Solenoid valves.
 2. Thermostatic expansion valves.

- 3. Hot-gas bypass valves.
- 4. Compressor.
- H. Install filter dryers in liquid line between compressor and thermostatic expansion valve, and in the suction line at the compressor.
- I. Install flexible connectors at compressors.

3.3 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping according to ASHRAE 15.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- D. 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.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping adjacent to machines to allow service and maintenance.
- G. Install piping plumb/level, free of sags and bends.
- H. Install fittings for changes in direction and branch connections. All wye fittings and headers are to be installed plumb/level either horizontal or vertical and be supported.
- I. Oil traps.
 - 1. Oil traps shall be installed at the outdoor unit frame where required by the manufacturer.
 - 2. Oil traps shall not be installed in other parts of the piping system except where approved by the equipment manufacturer.
- J. Select system components with pressure rating equal to or greater than system operating pressure.
- K. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- L. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
- M. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- N. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
 2. Install horizontal suction lines with a uniform slope downward to compressor.
 3. Install traps and double risers to entrain oil in vertical runs.
 4. Liquid lines may be installed level.
- O. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb. Protect isolation valves from heat damage by wrapping with a wet rag.
- P. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- Q. Piping expansion shall be taken into account and where required, expansion loops shall be installed per manufacturer's installation documentation. Piping supports shall allow piping and insulation to move freely to accommodate expansion and contraction.
- R. Install saddle or other means at piping supports to allow the pipe and insulation to move linearly in the support.
- S. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section - Basic Mechanical Material and Methods.

3.4 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.
- D. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
 2. Use Type BAG, cadmium-free silver alloy for joining copper with bronze or steel.
- F. Steel pipe can be threaded, but threaded joints must be seal brazed or seal welded.
- G. Welded Joints: Construct joints according to AWS D10.12/D10.12M.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.5 HANGERS AND SUPPORTS

- A. Hanger, support, and anchor products are specified in Section "Hangers and Supports for Plumbing and HVAC."
- B. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet (6 m) long.
2. Roller hangers and spring hangers for individual horizontal runs 20 feet (6 m) or longer.
3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6 m) or longer, supported on a trapeze.
4. Spring hangers to support vertical runs.
5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:

1. NPS 1/2 (DN 15): Maximum span, 60 inches (1500 mm); minimum rod size, 1/4 inch (6.4 mm).
2. NPS 5/8 (DN 18): Maximum span, 60 inches (1500 mm); minimum rod size, 1/4 inch (6.4 mm).
3. NPS 1 (DN 25): Maximum span, 72 inches (1800 mm); minimum rod size, 1/4 inch (6.4 mm).
4. NPS 1-1/4 (DN 32): Maximum span, 96 inches (2400 mm); minimum rod size, 3/8 inch (9.5 mm).
5. NPS 1-1/2 (DN 40): Maximum span, 96 inches (2400 mm); minimum rod size, 3/8 inch (9.5 mm).
6. NPS 2 (DN 50): Maximum span, 96 inches (2400 mm); minimum rod size, 3/8 inch (9.5 mm).
7. NPS 2-1/2 (DN 65): Maximum span, 108 inches (2700 mm); minimum rod size, 3/8 inch (9.5 mm).
8. NPS 3 (DN 80): Maximum span, 10 feet (3 m); minimum rod size, 3/8 inch (9.5 mm).
9. NPS 4 (DN 100): Maximum span, 12 feet (3.7 m); minimum rod size, 1/2 inch (13 mm).

D. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:

1. NPS 2 (DN 50): Maximum span, 10 feet (3 m); minimum rod size, 3/8 inch (9.5 mm).
2. NPS 2-1/2 (DN 65): Maximum span, 11 feet (3.4 m); minimum rod size, 3/8 inch (9.5 mm).
3. NPS 3 (DN 80): Maximum span, 12 feet (3.7 m); minimum rod size, 3/8 inch (9.5 mm).
4. NPS 4 (DN 100): Maximum span, 14 feet (4.3 m); minimum rod size, 1/2 inch (13 mm).

E. Support multi-floor vertical runs at least at each floor.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections by installing contractor:

1. Comply with ASME B31.5, Chapter VI.
2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
 - a. Perform vacuum test. System shall maintain specified vacuum for 12 hours minimum.
 - b. Fill system with nitrogen to the required test pressure.
 - c. System shall maintain test pressure at the manifold gage throughout duration of test (24 hours minimum).

- d. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
 - e. Remake leaking joints using new materials, and retest until satisfactory results are achieved.
- C. Tests and inspections by Factory Authorized service representative.
 - 1. Onsite review of all equipment and piping and identify deficiencies to the installing contractor and engineer.
- D. Pressure Test Reports
 - 1. Submit to the owner/architect the following test reports.
 - a. Vacuum Test reports of all piping systems.
 - 1) Identify piping system by unit designation.
 - 2) Indicate piping description (supply, suction, hot gas, etc.), location.
 - 3) Indicate test start time/date and vacuum reading.
 - 4) Indicate test final time/date and vacuum reading.
 - 5) Include installer's signature as well as manufacturer's authorized representative's signature.
 - 6) Provide photographic documentation of each system vacuum report (starting and final gauge readings with time and date).
 - 7) Owner and/or Architect reserve the right to witness testing. Contractor shall provide minimum 48 hours advance notice to Owner and Architect prior to testing. If contractor fails to provide notice the Owner and/or Architect may require retesting of all systems.
 - b. Pressure test reports of all piping systems.
 - 1) Identify piping system by unit designation.
 - 2) Indicate piping description (supply, suction, hot gas, etc.), location.
 - 3) Indicate test start time/date and pressure reading.
 - 4) Indicate test final time/date and pressure reading.
 - 5) Include installer's signature as well as manufacturer's authorized representative's signature.
 - 6) Provide photographic documentation of each system pressure test report (starting and final gauge readings with time and date).
 - 7) Owner and/or Architect reserve the right to witness testing. Contractor shall provide minimum 48 hours advance notice to Owner and Architect prior to testing. If contractor fails to provide notice the Owner and/or Architect may require retesting of all systems.

3.7 SYSTEM CHARGING

- A. A factory authorized service company shall charge system using the following procedures:
 - 1. Install core in filter dryers after leak test but before evacuation.
 - 2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers (67 Pa). If vacuum holds for 12 hours, system is ready for charging.
 - 3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig (14 kPa).
 - 4. Charge system with a new filter-dryer core in charging line.
 - 5. Provide all refrigerant gas and oil required to properly charge the system.

3.8 ADJUSTING

- A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.
- B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.
- D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
 - 1. Open shutoff valves in condenser water circuit.
 - 2. Verify that compressor oil level is correct.
 - 3. Open compressor suction and discharge valves.
 - 4. Open refrigerant valves except bypass valves that are used for other purposes.
 - 5. Check open compressor-motor alignment and verify lubrication for motors and bearings.
- E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 23 23 03

SECTION 23 24 00

CONDENSATE DRAIN PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes piping for drain lines and condensate drain piping.
- B. Related Sections include the following:
 - 1. Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC" for general piping materials and installation requirements.
 - 2. Division 22 Section, "Hangers and Supports for Plumbing and HVAC" for pipe supports, product descriptions, and installation requirements. Hanger and support spacing is specified in this Section.

1.3 COORDINATION

- A. Coordinate layout and installation of drain piping and suspension system components with other construction, including natural gas piping system.
- B. Coordinate piping installation with roof curbs, equipment supports, and roof penetrations.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. General: Refer to Piping and Fitting Material Schedule on the drawings for applications of pipe and fitting materials.

PART 3 - EXECUTION

3.1 PIPING INSTALLATIONS

- A. Refer to Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC" for basic piping installation requirements.
- B. Install drains, consisting of a tee fitting, threaded nipple with threaded cap for system cleanout. Provide cleanout at each change in direction and at connection to unit.

- C. Install piping at a uniform grade of 0.2 percent downward in direction of flow.
- D. Increase/reduce pipe sizes using eccentric reducer fitting installed with level side down.
- E. Unless otherwise indicated, install branch connections to mains using tee fittings in main pipe.

3.2 HANGERS AND SUPPORTS

- A. Supports are specified in Division 22 Section, "Hangers and Supports for Plumbing and HVAC".
- B. Install supports for steel piping with the following maximum spacing and with continuous slope from unit connection to drain line termination.
 - 1. NPS 3/4 (DN 20): Maximum span, 5 feet (1.5 m).
 - 2. NPS 1 (DN 25): Maximum span, 6 feet (1.8 m).
 - 3. NPS 1-1/2 (DN 40): Maximum span, 8 feet (2.4 m).
 - 4. NPS 2 (DN 50): Maximum span, 8 feet (2.4 m).
 - 5. NPS 2-1/2 (DN 65): Maximum span, 9 feet (2.7 m).
 - 6. NPS 3 (DN 80): Maximum span, 10 feet (3 m).

3.3 PIPE JOINT CONSTRUCTION

- A. Refer to Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC" and schedule on the drawings for joint construction requirements for soldered and brazed joints in copper tubing.

3.4 TERMINAL EQUIPMENT CONNECTIONS

- A. Size for piping connections shall be same as for equipment connections. Increase pipe size at connection as indicated on drawings.

3.5 CLEANING

- A. Flush drain piping systems with clean water.

END OF SECTION 23 24 00

SECTION 23 31 13

METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes metal ducts for supply, return, outside, and exhaust air-distribution systems in pressure classes from minus 7 to plus 10 inch wg (minus 1750 to plus 2500 Pa). Metal ducts include the following:
 - 1. Rectangular ducts and fittings.
 - 2. Duct liner.
- B. Related Sections include Division 23 Section 23 30 00, "Ductwork Accessories," for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 SYSTEM DESCRIPTION

- A. Duct system design, as indicated, has been used to select size and type of air moving and distribution equipment and other air system components. Changes to layout or configuration of duct system must be specifically approved in writing by Architect. Accompany requests for layout modifications with calculations showing that proposed layout will provide original design results without increasing system total pressure.
- B. Ducts shall be single-wall except where indicated to be double-wall on the Drawings.

1.4 SUBMITTALS

- A. Shop Drawings: CAD-generated and drawn to 1/4 inch equals 1 foot (1:50) scale. Show fabrication and installation details for metal ducts.
 - 1. Duct layout indicating sizes and pressure classes.
 - 2. Elevations of top and bottom of ducts.
 - 3. Fittings.
 - 4. Reinforcement and spacing.
 - 5. Seam and joint construction.
 - 6. Penetrations through fire-rated and other partitions.
 - 7. Equipment installation based on equipment being used on Project.
 - 8. Duct accessories, including access doors and panels.
 - 9. Hangers and supports, including methods for duct and building attachment.
- B. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code–Steel," for hangers and supports and AWS D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.
- B. Codes and Standards:
 - 1. SMACNA Standards: "HVAC Duct Construction Standards, Metal and Flexible."
 - 2. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
 - 3. International Mechanical Code.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

- A. 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: Lock-forming quality; complying with ASTM A 653/A 653M and having G60 (Z180) coating designation and G90 for ducts located on building exterior. Ducts shall have mill-phosphatized finish for surfaces exposed to view.
- C. Carbon-Steel Sheets: ASTM A 366/A 366M, cold-rolled sheets; commercial quality; with oiled, matte finish for exposed ducts.
- D. Stainless Steel: ASTM A 480/A 480M, Type 304, and having a No. 2D finish for concealed ducts and No. 4 finish for exposed ducts.
- E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.
- F. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.2 SEALANT MATERIALS

- A. Joint and Seam Sealants, General: The term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics.
- B. Joint and Seam Tape: 2 inches (50 mm) wide; glass-fiber-reinforced fabric.
- C. Flanged Joint Mastic: One-part, acid-curing, silicone, elastomeric joint sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.
- D. Flange Gaskets: Butyl rubber or EPDM polymer with polyisobutylene plasticizer.

2.3 HANGERS AND SUPPORTS

- A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches (100 mm) thick.
 - 2. Exception: Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.
- B. Hanger Materials: Galvanized sheet steel or threaded steel rod.
 - 1. Hangers Installed in Corrosive Atmospheres: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
 - 2. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards–Metal and Flexible" for steel sheet width and thickness and for steel rod diameters.
 - 3. Galvanized-steel straps attached to aluminum ducts shall have contact surfaces painted with zinc-chromate primer.
- C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- D. Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.
 - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 - 2. Supports for Stainless-Steel Ducts: Stainless-steel support materials.

2.4 RECTANGULAR DUCT FABRICATION

- A. Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction according to SMACNA's "HVAC Duct Construction Standards–Metal and Flexible" and complying with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.
 - 1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure class.
 - 2. Deflection: Duct systems shall not exceed deflection limits according to SMACNA's "HVAC Duct Construction Standards–Metal and Flexible."
- B. Transverse Joints: Prefabricated slide-on joints and components constructed using manufacturer's guidelines for material thickness, reinforcement size and spacing, joint reinforcement and gasket material.
 - 1. Ductmate industries, inc.
 - 2. Lindab, Inc.
- C. Formed-On Flanges: Construct according to SMACNA's "HVAC Duct Construction Standards–Metal and Flexible," Figure 1-4, using corner, bolt, cleat, and gasket details.
 - 1. Duct Size: Maximum 30 inches (750 mm) wide and up to 2 inch wg (500 Pa) pressure class.
 - 2. Longitudinal Seams: Pittsburgh lock sealed with noncuring polymer sealant.
- D. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches (480 mm) and larger and 0.0359 inch (0.9 mm) thick or less, with more than 10 sq. feet (0.93 sq. meter) of nonbraced panel area unless ducts are lined.

PART 3 - EXECUTION

3.1 DUCT APPLICATIONS

- A. Static-Pressure Classes: Unless otherwise indicated, construct ducts according to the following:
 - 1. Supply Ducts: Low pressure, 2 inch wg (500 Pa).
 - 2. Return Ducts (Negative Pressure): 1 inch wg (250 Pa).
 - 3. Exhaust Ducts (Negative Pressure): 2 inch wg (500 Pa).

3.2 DUCT INSTALLATION

- A. Construct and install ducts according to SMACNA's "HVAC Duct Construction Standards—Metal and Flexible," unless otherwise indicated.
- B. Install round and flat-oval ducts in lengths not less than 12 feet (3.7 meters) unless interrupted by fittings.
- C. Install ducts with fewest possible joints.
- D. Install fabricated fittings for changes in directions, size, and shape and for connections.
- E. Install couplings tight to duct wall surface with a minimum of projections into duct. Secure couplings with sheet metal screws. Install screws at intervals of 12 inches (300 mm), with a minimum of 3 screws in each coupling.
- F. Install ducts, unless otherwise indicated, vertically and horizontally and parallel and perpendicular to building lines; avoid diagonal runs.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Exposed supply air/return air duct shall be sealed from dust and debris during storage and after installation.
- I. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.
- J. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions unless specifically indicated.
- K. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.
- L. Seal all joints and seams. Apply sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws.
- M. Electrical Equipment Spaces: Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures.
- N. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls and are exposed to view, conceal spaces between construction openings and ducts or duct insulation with sheet metal flanges of same metal thickness as ducts. Overlap openings on 4 sides by at least 1-1/2 inches (38 mm).

- O. **Fire-Rated Partition Penetrations:** Where ducts pass through interior partitions and exterior walls, install appropriately rated fire dampers, sleeves, and firestopping sealant. Fire and smoke dampers are specified in Division 23 Section 23 33 00, "Ductwork Accessories."
- P. **Roofs:** Where ducts are located on roofs, provide G90 sheet metal shields over top and vertical sides of all duct joints. Solder all seams in joint shields and seal to exterior duct layer for watertight ductwork. Provide roof supports as indicated.
- Q. **Protect duct interiors** from the elements and foreign materials until building is enclosed. Follow SMACNA's "Duct Cleanliness for New Construction."
- R. **Install double wall ducts** from the VAV air unit supply outlet and return air inlet down to below the third floor ceiling.
- S. **Install factory fabricated ducts** per the manufacturer's installation instructions.

3.3 SEAM AND JOINT SEALING

- A. **Seal duct seams and joints** according to SMACNA's "HVAC Duct Construction Standards–Metal and Flexible" for duct pressure class indicated.
 - 1. For pressure classes lower than 2 inch wg (500 Pa), seal transverse joints.
- B. **Seal and test ducts** before external insulation is applied.
- C. **Test ducts** in accordance with SMACNA. Make necessary repairs to sustain test pressure with not more than 5 percent leakage.

3.4 HANGING AND SUPPORTING

- A. **Support horizontal ducts** within 24 inches (600 mm) of each elbow and within 48 inches (1200 mm) of each branch intersection.
- B. **Support vertical ducts** at maximum intervals of 16 feet (5 meters) and at each floor.
- C. **Install upper attachments** to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.

3.5 CONNECTIONS

- A. **Make connections** to equipment with flexible connectors according to Division 23 Section 23 33 00, "Ductwork Accessories."
- B. **Comply with SMACNA's "HVAC Duct Construction Standards–Metal and Flexible"** for branch, outlet and inlet, and terminal unit connections.

END OF SECTION 23 31 13

SECTION 23 33 00
DUCTWORK ACCESSORIES

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Extent of ductwork accessories work is indicated on drawings and in schedules and by requirements of this section.
- B. Types of ductwork accessories required for project include the following:
 - 1. Low pressure manual dampers.
 - 2. Turning vanes.
 - 3. Duct hardware.
 - 4. Duct access doors.
 - 5. Flexible connections.
- C. Refer to other Division 23 Sections for testing, adjusting, and balancing of ductwork accessories; not work of this section.

1.3 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. SMACNA Compliance: Comply with applicable portions of SMACNA "HVAC Duct Construction Standards, Metal and Flexible."
 - 2. NFPA Compliance: Comply with applicable provisions of NFPA 90A "Air Conditioning and Ventilating Systems" pertaining to installation of ductwork accessories.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data for each type of ductwork accessory, including dimensions, capacities, and materials of construction and installation instructions.
- B. Maintenance Data: Submit manufacturer's maintenance data including parts lists for each type of duct accessory. Include this data and product data in maintenance manual; in accordance with requirements of Division 1 and Division 22 Section 22 05 00, "Basic Mechanical Materials and Methods for Plumbing and HVAC".

PART 2 - PRODUCTS

2.1 DAMPERS

A. Low Pressure Manual Dampers: Provide manual volume dampers constructed of galvanized steel.

1. Square and Rectangular Dampers: Dampers shall have minimum 16 gauge frames and minimum 16 gauge roll formed blades. Multi-blade dampers shall have interlocking corrugated edges. Damper linkage shall be concealed in the damper frame. Dampers for ducts smaller than 10 inches by 10 inches may be single blade dampers, all other dampers shall have multiple blades. Provide opposed blade type unless indicated otherwise.
2. Round Dampers: Dampers shall be minimum 20 gauge frame and 20 gauge blade. Blade shall be secured to 3/8" square or 1/2" diameter galvanized or plated axle/shaft that extends beyond frame through bearings and locking hand quadrant.
3. Dampers shall include permanently lubricated oilite bronze bearings pressed securely into damper frame.
4. Dampers shall include factory furnished locking quadrants with 2" elevated dial and "OPEN" and "CLOSED" indicators.

B. Manufacturer: Subject to compliance with requirements, provide balancing dampers of one of the following or approved equivalent:

	<u>Single Blade</u>	<u>Opposed Blade</u>	<u>Parallel Blade</u>	<u>Round Blade</u>
1. Ruskin	MD35	MD35	MD3	MDRS25
2. Air Balance, Inc.	AC-1	AC-2	AC-1	AC-530
3. Greenheck	MBD-15	MBD-15	MBD-15	MBDR-50
4. American Warming and Ventilating	VC-1	VC-2	VC-2	VC-25
5. Safe-Air	612	610	611	BDR
6. PoHorf	CD10	CD425	CD10	CD10R
7. Nailor	1870	1820	1810	1890
8. NCA Manufacturing	MBD-57	MBD-57	MBD-57	MBD-RD-88

2.2 TURNING VANES

A. Fabricated Turning Vanes: Provide fabricated turning vanes and vane runners, constructed in accordance with SMACNA "HVAC Duct Construction Standards".

2.3 DUCT HARDWARE

A. General: Provide duct hardware, manufactured by one manufacturer for all items on project, for the following:

1. Test Holes: Provide in ductwork at fan inlet and outlet and elsewhere as indicated, duct test holes, consisting of slot and cover, for instrument tests.
2. Quadrant Locks: Provide quadrant lock device on one end of shaft and end bearing plate on other end for damper lengths over 12". Provide 2" extended quadrant locks and 2" end extended bearing plates for externally insulated ductwork.
 - a. Duro-dyne, Model 8021.
 - b. Young, Model 443B/404B.

3. Concealed dampers that are not accessible shall be controlled by a concealed regulator, type as indicated. Where type is not indicated, provide type as recommended by manufacturer for application. Include flush chrome plated access panel for each.

- a. Duro-dyne, Model 8009.
- b. Young, Model 301/315.

B. Spin-In Fittings:

1. Flexmaster U.S.A., Inc., Model CB.
2. Sheet Metal Connectors, Inc., Model G.
3. M & M Manufacturing, Model 50.

C. High Efficiency Takeoffs (Rectangular Tap with Transition to Round Branch):

1. Sheet Metal Connectors, Inc., Model HET (24 gage.).
2. Field fabricated as detailed on the drawings.
3. Dace, Model STO.

2.4 DUCT ACCESS DOORS

- A. General: Provide where indicated, duct access doors of size indicated.
- B. Construction: Construct of same or greater gage as ductwork served; provide insulated doors for insulated ductwork with minimum 1 inch insulation (k -value = 0.26 at 75 degrees F mean temperature sandwiched between sheetmetal panels. Provide flush frames for uninsulated ductwork; extended frames for externally insulated duct. Provide one side hinged, other side with one handle-type latch for doors 12 inches high and smaller, 2 handle-type latches for larger doors. Screwdriver operated latches are not acceptable

2.5 FLEXIBLE CONNECTIONS

- A. Provide flexible duct connections wherever ductwork connects to HVAC equipment, fans or other vibration isolated equipment. Construct flexible connections of neoprene-coated flameproof fabric crimped into duct flanges for attachment to duct and equipment. Make airtight joint. Provide adequate joint flexibility to allow for thermal, axial, transverse, and torsional movement, and also capable of absorbing vibrations of connected equipment.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine areas and conditions under which ductwork accessories will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF DUCTWORK ACCESSORIES

- A. Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.

- B. Where ducts take off mains, and where ducts divide, install splitter dampers or volume dampers, each with adjustable locking quadrant control. Provide volume damper unless splitter damper is indicated. Provide adjustable pivoting splitter with locking quadrant control for all splitter dampers. Provide a volume damper after each splitter damper, located in the branch with the lowest resistance.
- C. Concealed dampers that are not accessible shall be controlled by a concealed regulator, type as indicated. Where type is not indicated, provide type as recommended by manufacturer for application. Include flush chrome plated access panel for each.
- D. Install turning vanes in all square or rectangular 90° elbows in supply, return, and exhaust air systems, and elsewhere as indicated.
- E. Install access doors to open against system air pressure, with latches operable from either side.
- F. Install flexible ducts only where indicated and only in extended straight lengths not to exceed 36 inches; bends, sags or elbows will not be permitted.
- G. Coordinate with other work, including ductwork, as necessary to interface installation of ductwork accessories properly with other work.

3.3 FIELD QUALITY CONTROL

- A. Operate installed ductwork accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories, as required to obtain proper operation and leak proof performance.

3.4 ADJUSTING AND CLEANING

- A. Adjusting: Adjust ductwork accessories for proper settings, install fusible links in fire dampers, and adjust for proper action.
- B. Final positioning of manual dampers is specified in Section 23 05 93 "Test, Adjust, and Balance".
- C. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION 23 33 00

SECTION 23 34 23

POWER VENTILATORS

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. This Section includes the following:
 - 1. Ceiling mounted ventilators

1.3 SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated.
- B. Maintenance Data: For power ventilators to include in maintenance manuals specified in Division 01.

1.4 QUALITY ASSURANCE

- A. 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.
- B. AMCA Compliance: Products shall comply with performance requirements and shall be licensed to use the AMCA-Certified Ratings Seal.
- C. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.

1.5 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Belts: One set for each belt-driven unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following or approved equivalent:
 - 1. **Ceiling Mounted Ventilators:**
 - a. Acme; Model V
 - b. Loren Cook Company; Model GC
 - c. Greenheck Fan Corp.; Model SP, CSP
 - d. Twin City Fan Companies; Model T, TL
 - e. Penn Barry Zephyr Series

2.2 CEILING-MOUNTED VENTILATORS

- A. **Description:** Centrifugal fans designed for installing in ceiling or wall or for concealed in-line applications.
- B. **Housing:** Steel, lined with acoustical insulation.
- C. **Fan Wheel:** Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.
- D. **Grille:** Painted steel or aluminum, louvered or egg-crate grille with flange on intake and thumbscrew attachment to fan housing.
- E. **Electrical Requirements:** Junction box for electrical connection on housing and receptacle for motor plug-in.
- F. **Accessories:**
 - 1. **Variable-Speed Controller:** Solid-state control mounted on fan housing to reduce speed from 100 percent to less than 50 percent.
 - 2. **Manual Starter Switch:** Single-pole rocker switch assembly with cover and pilot light.
 - 3. **Motion Sensor:** Motion detector with adjustable shutoff timer.
 - 4. **Isolation:** Rubber-in-shear vibration isolators.
 - 5. **Manufacturer's standard roof jack or wall cap, and transition fittings.**

2.3 MOTORS

- A. **Manufacturer's standard, electrically commutated.**

2.4 SOURCE QUALITY CONTROL

- A. **Sound-Power Level Ratings:** Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.

- B. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install power ventilators level and plumb.
- B. Install units with clearances for service and maintenance.
- C. Suspend ceiling mounted ventilators from structure with hanger rods and vibration isolators.

3.2 CONNECTIONS

- A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories.
- B. Install ducts adjacent to power ventilators to allow service and maintenance.
- C. Ground equipment. Refer to Division 26 Section 260526, "Grounding and Bonding".
- D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values.

3.3 FIELD QUALITY CONTROL

- A. Equipment Startup Checks:
 - 1. Verify that shipping, blocking, and bracing are removed.
 - 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors and starters.
 - 3. Verify that cleaning and adjusting are complete.
 - 4. Verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation.
 - 5. Verify lubrication for bearings and other moving parts.
- B. Starting Procedures:
 - 1. Energize motor.
 - 2. Measure and record motor voltage and amperage.
- C. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new units, and retest.
- D. Refer to Division 23 Section, "Testing, Adjusting, and Balancing," for testing, adjusting, and balancing procedures.

- E. Repair or replace malfunctioning units. Retest as specified above after repairs or replacements are made.

3.4 CLEANING

- A. On completion of installation, internally clean fans according to manufacturer's written instructions. Remove foreign material and construction debris. Vacuum fan wheel and cabinet.
- B. After completing system installation, including outlet fitting and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes.

END OF SECTION 23 34 23

SECTION 23 37 13

DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes ceiling- and wall-mounted diffusers, registers, and grilles.

1.3 SUBMITTALS

- A. Product Data: For each 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 model number and accessories furnished.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The following requirements apply to product selection:
 - 1. Products: Subject to compliance with requirements, provide one of the products scheduled on the drawings.

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 practicable. 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 43 16
AIR IONIZATION SYSTEMS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
1. Performance and design criteria for air ionization systems.
 2. Needlepoint Bipolar Ionization (NPBI™) System Components:
 - a. Non-Auto Cleaning - AC Voltage Output:
 - 1) Modular air ionization system.
 - b. Non-Auto-Cleaning - DC Voltage Output:
 - 1) Flexible ion strip air ionization device, 18 inches (457 mm) long.
 - 2) Flexible ion strip air ionization device, 36 inches (914 mm) long.
 - 3) Needlepoint bipolar air ionization device with BAS alarm contacts.
 - c. Auto-Cleaning - DC Voltage Output.
 - 1) Auto-cleaning needlepoint bipolar ionization system. Up to 2,400 CFM of 6 tons per device.
 - 2) Auto-cleaning needlepoint bipolar ionization system. Up to 4,800 CFM or 12 tons per device.
 - 3) Auto-cleaning needlepoint bipolar ionization devices.

1.3 RELATED WORK

- A. The following items are not included in this Section and are specified under the designated Sections:
1. Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
 2. Section 23 09 23 - Building Management and Control System
 3. Section 23 23 03 - Refrigerant Piping.
 4. Section 23 31 13 - Metal Ducts
 5. Section 23 33 00 - Ductwork Accessories.
 6. Section 23 40 00 - HVAC Air Cleaning Devices; Filters.
 7. Section 26 05 00 - Common Work Results for Electrical; Electrical Wiring.
 8. Section 26 05 23 - Control-Voltage Electrical Power Cables; Control Wiring.

1.4 REFERENCED CODES and STANDARDS

- A. The following codes and standards are referenced throughout. The edition used is that currently enforced by authorities having jurisdiction (AHJ) at the Project's location. In absence of such direction then as referenced by the current enforceable IBC code or as indicated in the Contract Documents, except where specifically referenced.
1. ASHRAE Standards 62.1.
 2. National Electric Code NFPA 70.
 3. UL 867 for electrical safety.
 4. UL 2998 Certification - Zero Ozone Emissions - as required by ASHRAE 62.1-2019.

1.5 DEFINITIONS

- A. NPBI - Needlepoint bipolar ionization system

1.6 ACTION SUBMITTALS

- A. **Product Data:** For each product. Include dimensions; operating characteristics; required clearances and access; rated capacity; fire classification; furnished specialties; and accessories as indicated.
- B. **Product Data:** Manufacturer's technical product data for ionization systems.
1. Schedule of ionization systems indicating unit designation, number of each type required for each unit/application.
 2. Data sheet for each ionization system type, and accessories furnished. Indicate construction, sizes, and mounting details.
 3. Ion performance data for each type of ionization device furnished.
 4. Product drawings detailing physical, electrical and control requirements.
 5. Proof of Compliance with UL-2998: Environmental Claim Validation Procedure for Zero Ozone Emissions from Air Cleaners
 - a. Certificates must be listed on either of the following websites.
 - 1) <https://spot.ul.com/>.
 - 2) <https://sustainabilitydirectory.intertek.com/home>.
- C. **Shop Drawings:** For each Needlepoint Bipolar Ionization (NPBI™) device.
1. Include plans, elevations, sections, details, and attachments to other work.
 2. Show assembly, dimensions, materials, and methods of assembly of components.
 3. Include setting drawings, templates, and requirements for installing.
 4. Include diagrams for power, signal, and control wiring.
- D. **Operating and Maintenance Data:**
1. Submit O&M data and recommended spare parts lists. Include 10 years of operations and energy costs.

1.7 INFORMATIONAL SUBMITTALS

- A. **Product Test Reports:** Ion performance for each type of Needlepoint Bipolar Ionization (NPBI™) system as detailed in this specification.

- B. Field Quality-Control Reports.

1.8 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of Needlepoint Bipolar Ionization (NPBI™) system.

1.9 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company who specializes in manufacturing products specified in this section. Documented Experience: 10 years.
 - 1. A qualified representative of the manufacturer shall be available to inspect the installation of the air ionization system to ensure installation in accordance with manufacturer's recommendation.

1.10 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: In factory fabricated shipping containers.
 - 1. Identify on outside of container type of product and location to be installed.
 - 2. Avoid crushing or bending.
- B. Storage: In original cartons and protect from weather and construction work traffic.
 - 1. Store indoors and in accordance with the manufacturers' recommendation for storage.

1.11 WARRANTY

- A. Equipment is warranted by the manufacturer against defects in material and workmanship for a period of THREE years after shipment.
 - 1. Labor to replace equipment under warranty: Provided by Owner or installing contractor.
 - 2. Warranty will be for full replacement within three-year period and not prorated.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Provide Products manufactured by the following:
 - 1. Global Plasma Solutions.
- B. Substitutions: In accordance with provisions in Section 01 60 00.
 - 1. It is the responsibility of manufactures to confirm non-infringement on intellectual property.

2.2 PERFORMANCE AND DESIGN CRITERIA FOR AIR IONIZATION SYSTEMS

- A. Each piece of air handling equipment, so designated on the plans, details, equipment schedules and/or specifications shall contain a Needlepoint Bipolar Ionization (NPBI™) system with output as described here within.
- B. Project Design:
 - 1. If using ASHRAE Standard 62.1 - IAQP: IAQ Procedure requires a qualified Designer or Engineer to provide Indoor Air Quality calculations using formulas within ASHRAE Standard 62.1 to validate acceptable indoor air quality at the quantity of outside air scheduled with the technology submitted.
 - 2. Unacceptable Technologies:
 - a. Powered particulate filters.
 - b. Polarized media filter.
 - c. Uni-polar ion generators.
 - d. "Plasma" particulate filters.
 - e. High-powered ionization devices.
 - f. Ozone generators.
 - g. Photocatalytic Oxidation (PCO) products.
 - h. Dry hydrogen peroxide products.
- C. Maximum Ozone Emissions per UL 2998:
 - 1. Not Acceptable: Products not certified to UL2998 - Environmental Claim Validation Procedure for Zero Ozone Emissions.
- D. All devices shall be listed on the UL SPOT environmental claim validation website, or the Intertek Sustainability Certification Directory website, proving compliance to UL 2998.
 - 1. Test result reports must be available from Manufacturer upon request.
 - 2. Not Acceptable: Products not listed on either of these websites are not acceptable.
- E. Humidity: Ionization devices do not require preheat protection when relative humidity of entering air exceeds 85 percent. Relative humidity from 0 to 100 percent, condensing, will not cause damage, deterioration, or dangerous conditions within the air ionization system.
- F. Ionization Requirements: Installed as indicated on the Drawings or as specified.
 - 1. Ionization Output: Positive and negative ions shall be produced. Unipolar ionization devices are not acceptable. Output varies from product to product. See specific product specification information for total ion output.
 - a. Ion Output: Ions per cubic centimeter when tested at 1 inch (25 mm) from the ionization system.
 - 1) Manufacturers showing ion output in ions/cc/sec must convert to ions/cc as measured 1 inch (25 mm) from the electrodes without airflow and provide that data during the submittal process. Ion meters measure in ions/cc not ions/cc/sec and these values are required for field verification during commissioning.
- G. NPBI™ Components:
 - 1. Tested by UL or Intertek proving conformance to UL 2998 Third Edition (2020) ozone standard when tested using UL 867 Fifth Edition (2011) methodology. Testing must be large chamber

environment testing and peak ozone test for electronic devices in accordance with the standard.

- a. Submit independent UL 867 test data with ozone results to Engineer of Record during submittal process.
- b. Components achieving UL 867 prior to December 21, 2007, were not tested with the ozone amendment and are not acceptable for consideration.
- c. Increasing interior ion concentration levels, both positive and negative collectively, to a minimum of 2000 ions/cc measured 5 ft (1524 mm) from floor where air is delivered from the duct system.
- d. Produce positive and negative ions.

1) Not Acceptable: Uni-polar ion devices.

- e. Air exchange rates may vary through the full operating range of a constant volume or variable air volume (VAV) system. The quantity of air exchange must not be increased due to requirements of the air ionization system.
- f. Velocity Profile: Maintain minimum air velocity of 300 feet per minute (FPM). Air ionization devices do not have maximum velocity profiles.

H. Ion Systems: General.

- 1. Ionization Devices Enclosures: Non-metallic materials for corrosion prevention and thermal bridging.
- 2. UL 2998 Environmental Claim Validation Procedure for Zero Ozone Emissions from Air Cleaners certification is required. No exceptions.
- 3. Integral Alarm Dry Contacts: For connection to BAS to prove ionization system is receiving adequate input power.
- 4. Capable of operating in 100 percent relative humidity conditions, without damage.
- 5. No maximum velocity limitation.
- 6. Mounting: Magnets or self-tapping sheet metal screws.

I. Design Requirements for Non-Coil Cleaning Installations:

- 1. Installations must include the required number of electrodes and power generators sized to the air handling equipment capacity.
- 2. NPBI™ Electrodes: Made from carbon fiber to prevent oxidation over time. Carbon fiber clusters must contain a minimum of 45,000 needles.
 - a. Not Acceptable: titanium, stainless or any other metal.
 - b. Not Acceptable: Bipolar ionization tubes manufactured of glass, composite, mica, or similar dielectric materials.
 - c. Energize when main unit disconnect is turned on and fan is operating.
 - 1) Not Acceptable: Ionization systems requiring mechanical air pressure switches to cycle electrodes when fan is operating.
 - d. Electrode Pair: Provide electrodes to generate both positive and negative ions.
 - e. Mechanical friction auto-cleaning systems to ensure needle tips are properly cleaned.
 - 1) Not Acceptable: Systems using vibration, high frequency or plunging action as a means of auto-cleaning
- 3. Multi-Voltage Input: [24V to 240V AC or DC] [24V or 110 to 240V AC or DC].
- 4. Magnets for mounting to fan inlet.

5. Auto-Cleaning Mechanisms: Mechanical friction auto-cleaning systems to ensure needle tips are properly cleaned.

- a. Not Acceptable: Systems using vibration, high frequency or plunging action as a means of auto-cleaning.

J. Design Requirements for Coil Cleaning Installations: GPS-iMOD®

1. NPBI™ Electrodes: Made from carbon fiber to prevent oxidation over time. Not Acceptable: titanium, stainless or any other metal.

- a. Provided in 6 inch (152 mm) sections for field assembly by installer. Assemble such that entire finned width of the coil is covered.
- b. One modular ionization bar for every 5 ft (1524 mm) of coil height.
- c. Electrode Spacing: 0.5 inch (13 mm) apart.

- 1) Not Acceptable: Ionization Bars with ion output spaced greater than 1 inch (25 mm) apart.

- d. Output: A minimum of 140M ions/cc per inch of bar measured 1 inch (25 mm) from carbon fiber brushes.
- e. Ionization Bars: Provided with separate power supply capable of powering up to 4 ionization bars requiring no more than 20 watts of power up to a total connected bar length of 48 ft (14.63 m). Single bar length limit is 12 feet.

- 1) The ionization bars and power supply to be alternating current output.
- 2) Provided with an on/off switch with LED light.
- 3) BAS interface capable using dry alarm contacts.

- f. AC Output Power Supply: Accept 24 VAC, 110 VAC or 208 to 240VAC input.

2. NEMA 4 Enclosure: For external power mounts.

K. Electrical Requirements: Wiring, conduit, and junction boxes.

1. Installed within housing plenums in accordance with NEC NFPA 70.
2. NPBI™ Units: Accept electrical service of 24 VAC to 240 VAC, universal 2 wire input, 1 phase, 50/60 Hz.
3. Coordinate electrical requirements with air ionization device manufacturer during submittals.

L. Control Requirements:

1. NPBI™ Devices:

- a. Internal short circuit protection.
- b. Overload protection.
- c. Automatic fault reset circuit breakers.
- d. Capable of interfacing with the BAS system.

- 1) Provide dry contacts to prove the unit is receiving adequate input power.

- e. Not Acceptable: Manual fuses.

2. Ionization output: Varies as airflow velocity changes.

- a. Not Acceptable: Mechanical airflow switch to activate NPBI™ devices, due to high failure rates and possible pressure reversal.

3. Mount and wire NPBI™ devices within air handling units specified or as shown on the Drawings. Follow manufacturer IOM instructions during installation.

2.3 NON-AUTO-CLEANING - AC VOLTAGE OUTPUT

- A. Product: GPS-iMOD®. Modular Bipolar Ionization Device. Made of composite and carbon fiber. Handles 50 to 250 CFM per inch of bar. Voltage selector switch, illuminated On/Off switch, operation status LED, six HV output ports, integral Building Automation System (BAS) alarm contacts, auxiliary terminals for connection of an optional GPS-iDETECT-P™ Ion Sensor. GPS-iMOD® Bar: 6 inch (152 mm) Sections, nine brushes per section, up to 144 inch (3658 mm) total length, with rare earth magnets for easy spacing and mounting.
1. Electrical Listings: UL, cUL.
 2. Standards Compliance: UL 2998, UL 867, IAQP, OSHPD Seismic (OSP), CE, CARB.
 3. Input Voltage: 24/120/208-240 VAC.
 4. Amps: 0.500 A/0.120 A/0.065 A.
 5. Frequency: 50/60 Hz.
 6. Output Voltage: 5 kV RMS.
 7. Output Frequency: 50/60 Hz.
 8. Total Ion Output: Greater than 140M ions/cc per inch of bar.
 9. Temperature Range: -40 to 140 degrees F (-40 to 60 degrees C).
 10. Relative Humidity Range: 0 to 100 percent.
 11. Power Entry: UL Listed, line cord with 3-prong plug.
 12. Power Unit Dimensions (LxWxH): 9.00 x 3.25 x 4.75 inches (229 x 83 x 121 mm).
 13. Ionizer Bar Dimensions (HxW): 1.6 x 0.75 inches (41 x 19 mm).
 - a. Length per Section: 6.0 inches (152 mm). Plus 1.2 inches (30.5 mm).
 - b. Maximum Length: 144 inches (3658 mm)
 14. Power Unit Weight: 4.63 lbs (2.1 kg).
 15. Ionizer Bar Weight: 0.24 lbs (113 grams) per 6.0 inch (152 mm) section.
 16. Install locations: Duct work, in the air flow, between evaporator coil and filter.
 17. Power Requirements: Operate from 24 VAC to 240 VAC without the use of an external power supply or transformer.
 - a. Primary voltage may vary in range of 24 to 240 VAC.

2.4 NON-AUTO-CLEANING - DC VOLTAGE OUTPUT

- A. Product: GPS-iRIB®-18, Flexible needlepoint bipolar ionization strip. Made from flexible chemical, heat, and cold resistant inert polyimide material. Contains a circuit with carbon fiber ion emitters soldered into the circuit traces. Designed for up to 3,200 CFM or 8 tons. Fixed lengths of 18 inches (457 mm), for use up to 36 inch applications, operation status LED, integral Building Automation System (BAS) alarm contacts, hook and loop tape for easy installation, and voltage input range of 110 to 240 VAC.
1. Electrical Listings: UL, cUL.
 2. Compliance and Certifications: UL 2998, UL 867, IAQP, CE, CARB.
 3. Input Voltage: 110 to 240 VAC.
 4. Power Consumption: 5 Watts.
 5. Frequency: 50/60 Hz.
 6. Output Voltage: 2 kV.
 7. Total Ion Output: Greater than 35 M ions/cc per ft.
 8. Airflow Capacity: 0 to 3,200 CFM or 8 tons.
 9. Alarm Contact Rating: 250 VAC / 1A, N.O. "dry" contact.

10. Temperature Range: -40 to 140 degrees F (-40 to 60 degrees C).
11. Relative Humidity Range: 0 to 100 percent.
12. Power Unit Dimensions (WxLxH): 1.75 x 3.75 x 1.00 inches (44 x 95 x 25 mm).
13. Ionizer Strip Dimensions (WxLxH): 1.50 x 18.00 x 0.05 inches (38 x 457 x 1.3 mm).
14. Combined Weight: 0.50 lbs (227 grams).
15. Install locations: In the air flow.
16. Power Requirements: Operate from 24 VAC to 240 VAC without the use of an external power supply or transformer.
 - a. Primary voltage may vary in range of 24 to 240 VAC.
 - b. The high voltage output to be regulated to less than 1 percent variance.

- B. Product: GPS-iRIB®-36, Flexible needlepoint bipolar ionization strip. Made from flexible chemical, heat, and cold resistant inert polyimide material. Contains a circuit with carbon fiber ion emitters soldered into the circuit traces. Designed for up to 3,200 CFM or 8 tons. Fixed lengths of 36 inches (914 mm), for applications over 36 inches, operation status LED, integral Building Automation System (BAS) alarm contacts, hook and loop tape for easy installation, and voltage input range of 110 to 240 VAC.**

1. Electrical Listings: UL, cUL.
2. Compliance and Certifications: UL 2998, UL 867, IAQP, CE, CARB.
3. Input Voltage: 110 to 240 VAC.
4. Power Consumption: 5 Watts.
5. Frequency: 50/60 Hz.
6. Output Voltage: 2 kV.
7. Total Ion Output: Greater than 35 M ions/cc per ft.
8. Airflow Capacity: 0 to 3,200 CFM or 8 tons.
9. Alarm Contact Rating: 250 VAC / 1A, N.O. "dry" contact.
10. Temperature Range: -40 to 140 degrees F (-40 to 60 degrees C).
11. Relative Humidity Range: 0 to 100 percent.
12. Power Unit Dimensions (WxLxH): 1.75 x 3.75 x 1.00 inches (44 x 95 x 25 mm).
13. Ionizer Strip Dimensions (WxLxH): 1.50 x 36.00 x 0.05 inches (38 x 914 x 1.3 mm).
14. Combined Weight: 0.50 lbs (227 grams).
15. Install locations: In the air flow.
16. Power Requirements: Operate from 24 VAC to 240 VAC without the use of an external power supply or transformer.
 - a. Primary voltage may vary in range of 24 to 240 VAC.
 - b. The high voltage output to be regulated to less than 1 percent variance.

- C. Product: [GPS-FC-3-BAS, 24 VAC] [GPS-FC-3T-BAS, 110 to 240 VAC] NPBI™ bipolar ionization device with BAS alarm contacts. Designed for up to 3,200 CFM or 8 tons. Carbon fiber brush emitters, operation status LED, integral Building Automation System (BAS) alarm contacts, mounting tabs, positive and negative ion output.**

1. Electrical Listings: UL.
2. Standards Compliance: UL 2998, IAQP, CE, CARB.
3. Input Voltage: [24 VAC] [110 to 240 VAC].
4. Power Consumption: 1.2 Watts.
5. Frequency: 50/60 HZ.
6. Total Ion Output: Greater than 350 M ions/cc.
7. Airflow Capacity: 0 - 3,200 CFM or 8 tons.
8. Temperature Range: -20 to 140 degrees F (-28.9 to 60 degrees C).
9. Relative Humidity Range: 0-100 percent.
10. Unit Dimensions (LxHxD): 2.6 x 1.9 x 1.3 inches (66 x 48 x 33 mm).
11. Unit Weight: 0.23 lbs (104 grams).

12. Alarm Contact Rating: 24 VAC, 0.1 A, N.O. "dry" contacts.
13. Install locations: Fan Inlet, in the air flow, zoner diffuser.
14. Power Requirements: Operate from 24 VAC to 240 VAC without the use of an external power supply or transformer.
 - a. Primary voltage may vary in range of 24 to 240 VAC.
 - b. The high voltage output to be regulated to less than 1 percent variance.

2.5 AUTO-CLEANING – DC VOLTAGE OUTPUT

- A. Product: GPS-FC24™-AC, Auto-Cleaning Needlepoint Bipolar Ionization System. Handles up to 2,400 CFM or 6 tons. Composite construction allows for mounting in corrosive environments. Universal voltage input, in line On/Off switch, programmable autocleaning cycle, operation status LED, integral Building Automation System (BAS) alarm contacts, magnets for ease of installation and replaceable carbon fiber brush emitters.

1. Electrical Listings: UL, cUL.
2. Compliance and Certifications: UL 2998, UL 867, IAQP, CE, CARB.
3. Input Voltage: 24 to 240 VAC.
4. Amps: Operating: 0.170 to 0.017 A. Cleaning Cycle: 0.33 to 0.03 A.
5. Power: Operating: 4 watts. Cleaning Cycle: 8 watts.
6. Frequency: 50/60 Hz.
7. Total Ion Output: Greater than 300M ions/cc.
8. Airflow Capacity: 0 to 2,400 CFM or up to 6 tons.
9. Temperature Range: -20 to 140 degrees F (-29 to 60 degrees C).
10. Relative Humidity Range: 0 to 100 percent.
11. Ionizer Unit Dimensions (LxWxH): 7.9 x 1.1 x 5.0 inches (200 x 28 x 127 mm).
12. Ionizer Unit Weight: 1.25 lbs (567 grams).
13. Alarm Contact Rating: 250 VAC, 1A, N.O. "dry" contact.
14. Install locations: Fan inlet, In the air flow, zone diffuser.
15. Power Requirements: Operate from 24 VAC to 240 VAC without the use of an external power supply or transformer.
 - a. Primary voltage may vary in range of 24 to 240 VAC.
 - b. The high voltage output to be regulated to less than 1 percent variance.

- B. Product: GPS-FC48™-AC, Auto-Cleaning Needlepoint Bipolar Ionization System. Handles up to 4,800 CFM or 12 tons. Composite construction allows for mounting in corrosive environments. Universal voltage input, in-line On/Off switch, programmable autocleaning cycle, operation status LED, integral Building Automation System (BAS) alarm contacts, magnets for ease of installation and replaceable carbon fiber brush emitters.

1. Electrical Listings: UL, cUL.
2. Compliance and Certifications: UL 867, UL 2998, IAQP, CE, CARB.
3. Input Voltage: 24 to 240V AC/DC.
4. Amps: 0.41 to 0.041 A.
5. Power Consumption: 10 Watts.
6. Frequency: 50/60 HZ.
7. Total Ion Output: Greater than 400 million ions/cc.
8. Airflow Capacity: 0 to 4,800 CFM or up to 12 tons
9. Temperature Range: -20 to 140 degrees F (-29 to 60 degrees C).
10. Relative Humidity Range: 0 to 100 percent.
11. Unit Dimensions (LxWXH): 11.1 x 1.84 x 3.52 inches (282 x 47 x 89 mm).
12. Weight: 1.32 lbs (600 grams).
13. Alarm Contact Rating: 250VAC, 1A, N.O. "dry" contact.

14. Install locations: Fan inlet, in the air flow, zone diffuser.
 15. Power Requirements: Operate from 24 VAC to 240 VAC without the use of an external power supply or transformer.
 - a. Primary voltage may vary in range of 24 to 240 VAC.
 - b. The high voltage output to be regulated to less than 1 percent variance.
- C. Product: GPS-DM48™-AC. Auto-Cleaning, Duct Mounted, needlepoint bipolar ionization system. Handles up to 4,800 CFM or 12 tons. Universal voltage input, integral display, programmable auto-cleaning cycle, operation status display, integral Building Automation System (BAS) alarm contacts, 3/4 quick turn duct adapter, 6 ft of watertight flexible conduit, and carbon fiber brush emitters.
1. Electric Approvals: UL, cUL.
 2. Compliance and Certifications: UL 867, UL 2998, IAQP, CE, CARB.
 3. Input Voltage: 24 to 240 V AC/DC.
 4. Power Consumption: 12 Watts.
 5. Frequency: 50/60HZ.
 6. Total Ion Output: Greater than 400M ions/cc.
 7. Airflow Capacity: 0 to 4,800 CFM or up to 12 tons.
 8. Temperature Range: -20 to 140 degrees F (-29 to 60 degrees C).
 9. Relative Humidity Range: 0 to 100 percent.
 10. Unit Dimensions: 3.75 inches (95 mm) diameter. Length: 7 inches (178 mm).
 11. Weight: 2.31 lbs (1.048 kg).
 12. Alarm Contact Rating: 250 VAC, 1A, N.O. "dry" contact.
 13. Install locations: In duct work, in the air flow.
 14. Includes weathertight seals for external duct mounting.
 15. Power Requirements: Operate from 24 VAC to 240 VAC without the use of an external power supply or transformer.
 - a. Primary voltage may vary in range of 24 to 240 VAC.

PART 3 - EXECUTION

3.1 GENERAL

- A. Contractor is responsible for maintaining air systems until owner accepts the building (Owner Acceptance).

3.2 INSTALLATION, GENERAL

- A. Needlepoint Bipolar Ionization (NPBI™) Systems :

1. Assemble and install equipment in a workman like manner to the satisfaction of the Engineer of Record, and Owner's representative.
2. Damaged or faulty components must be replaced, at no cost additional cost to the owner.
3. Protect components from dust and damage daily throughout construction.

3.3 INSTALLATION, GPS-iMOD® - AC VOLTAGE OUTPUT

- A. Product: GPS-iMOD®, Modular Air Ionization System.

1. Installation Location: Downstream of a MERV 6, or higher, 30 percent particulate filter to prevent unnecessary build-up of particulate on the carbon fiber needle tips.

- a. Mounting Location:
 - 1) Between the particulate filter and cooling coil.

2. Mechanical Installation:

- a. A quantity of 1 GPS-iMOD® bar assembly on each coil up to 60 inches (1524 mm) in height. The bars should be spaced a maximum of 60 inches (1524 mm) apart to get optimal ionization coverage on coils.
 - 1) Install such that the GPS-iMOD® bar covers the entire finned-width of the coil to the nearest 6 inches (152 mm) without exceeding the finned-width of the coil.
 - 2) Follow manufacturers published installation instructions.

3.4 INSTALLATION - NON-AUTO-CLEANING - DC VOLTAGE OUTPUT

- A. Product: GPS-iRIB®-18, Flexible Needlepoint Bipolar Ionization Strip; 18 inches (457 mm) long.

- 1. Installation Location: Ductless Mini-Split and PTAC Mounting and Wiring.
- 2. Mechanical Installation: Follow manufacturers published installation instructions

- B. Product: GPS-iRIB®-36, Flexible Needlepoint Bipolar Ionization Strip; 36 inches (914 mm) long.

- 1. Installation Location: Ductless Mini-Split and PTAC Mounting and Wiring.
- 2. Mechanical Installation: Follow manufacturers published installation instructions

- C. Product: [GPS-FC-3-BAS] [GPS-FC-3T-BAS], NPBI™ Air Ionization System.

- 1. Installation Location: Downstream from filter to prevent build-up of particulates on the ion emitters.
 - a. Locations to mount in preferred order.
 - 1) Downstream from filter and blower, prior to cooling coil.
 - 2) Downstream from filter, blower, and coil.
 - 3) Prior to filter is not recommended. Particulate build up will be greater prior to filter.
 - 4) Cleaning will need to be done more frequently.
- 2. Mechanical Installation: Select a location for installation. Unit needs to be perpendicular to air flow. Mount so ion emitters are exposed to airstream. Air should flow past ion emitters like a football through goal posts.

- a. Ideal Locations:

- 1) Typical Split Systems: Blower inlet on blower housing, the side opposite the blower motor. Housings should be so ion emitters extend slightly above side of blower housing.
- 2) Ceiling Cassette Units: On fan side of protective screen / grille.
- 3) Mini Split Systems: After filter and behind coil. Typically mounted to wall plate.
- 4) Ducted Modules: On intake side after filter between the blower housings.

- b. Follow manufacturers published installation instructions.

3.5 INSTALLATION, AUTO-CLEANING - DC VOLTAGE OUTPUT

- A. Product: GPS-FC48™-AC, NPBI™ Auto-Cleaning Air Ionization System.

- 1. Installation Locations to mount in preferred order.

- a. Downstream from filter.
 - b. Blower inlet on blower housing, the side opposite the blower motor.
 - c. Downstream from filter and blower, prior to cooling coil.
 - d. Downstream from filter, blower, and coil.
 - e. Prior to filter is not recommended. Particulate build up will be greater prior to filter. Cleaning will need to be done more frequently.
 - 2. Alternate Mounting Locations: Supply or return air duct after system filter.
 - 3. Mechanical Installation:
 - a. Follow manufacturers published installation instructions.
- B. Product: GPS-FC24™-AC, NPBI™, Auto-Cleaning Air Ionization System.**
- 1. Installation Locations to mount in preferred order.
 - a. Downstream from filter.
 - b. Blower inlet on blower housing, the side opposite the blower motor.
 - c. Downstream from filter and blower, prior to cooling coil.
 - d. Downstream from filter, blower, and coil.
 - e. Prior to filter is not recommended. Particulate build up will be greater prior to filter. Cleaning will need to be done more frequently.
 - f. Ductless Mini-Split Ceiling Cassette Applications: Mount unit to fan inlet. The emitter brushes should be no closer than 2 inches (51 mm) from any wiring or metal objects.
 - 2. Mechanical Installation:
 - a. Follow manufacturers published installation instructions
- C. Product: GPS-DM48™-AC, NPBI™ Auto-Cleaning Air Ionization System.**
- 1. Installation Location: Supply air duct.
 - a. Alternate Mounting Location: Return air duct after the filter.
 - 1) The duct must have a depth greater than 8 inches (203 mm) for unit to operate properly.
 - 2) Weatherproof housing allows mounting indoors or outdoors.
 - 2. Mechanical Installation:
 - a. Follow manufacturers published installation instructions

3.6 CONTROL WIRE, CABLE AND RACEWAYS INSTALLATION

- A. Comply with NECA 1.**
- B. Wire and Cable Installation:**
 - 1. Comply with installation requirements in Section 260523 "Control-Voltage Electrical Power Cables."
 - 2. Comply with installation requirements in Section 271313 "Communications Copper Backbone Cabling."
 - 3. Comply with installation requirements in Section 271513 "Communications Copper Horizontal Cabling."

4. Install cables with protective sheathing that is waterproof and capable of withstanding continuous temperatures of 90 deg C with no measurable effect on physical and electrical properties of cable.
 - a. Provide shielding to prevent interference and distortion from adjacent cables and equipment.
5. Terminate Wiring in a Junction Box.
 - a. Clamp cable over jacket in junction box.
 - b. Individual conductors in the stripped section of the cable must be slack between the clamping point and terminal block.
6. Terminate field wiring and cable not directly connected to instruments and control devices having integral wiring terminals using terminal blocks.
7. Install signal transmission components according to IEEE C2, REA Form 511a, NFPA 70, and as indicated.
8. Perform continuity and meager testing on wire and cable after installation.

C. Conduit Installation:

1. Comply with Section "260533 "Raceways and Boxes for Electrical Systems" for control-voltage conductors.
2. Comply with Section 270528 "Pathways for Communications Systems" for balanced twisted pair cabling and optical fiber installation.

3.7 FIELD QUALITY CONTROL

- A. Field Inspection: Coordinate field inspection in accordance with the "Quality Assurance" Article in PART 1 of this specification and appropriate sections in Division 01.
 1. Manufacturer's Services: Coordinate manufacturer authorized representative's services in accordance with appropriate sections in Division 01.
- B. Manufacturer's Authorized Representative: Provide start-up supervision and training of Owner's personnel in the proper operation and maintenance of equipment.

3.8 TESTING

- A. Provide the manufacturers recommended high voltage verification electrical test.

3.9 PROTECTION

- A. Protect installed products and accessories from damage during construction.

END OF SECTION 23 43 16

SECTION 23 81 36

SPLIT-SYSTEM HEAT PUMP UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes split-system air-to-air heat pump units consisting of separate indoor units with evaporator and fan and outdoor units with compressor and condenser components. Indoor units are designed for vertical or horizontal mounting, and are connected to ducts. Outdoor units are air cooled and designed for roof or pad mounting as indicated.

1.3 SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For split-system heat pump units to include in emergency, operation, and maintenance manuals.
 - 1. Air cooled outdoor units.
 - 2. Indoor air unit and direct expansion cooling coils.
 - 3. Air filter.
 - 4. Refrigeration components.
- E. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of split-system units and are based on the specific system indicated.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. UL 60335-2-40. Provide Refrigerant Detection System to comply with safety standard for household and similar electrical appliances.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five years from date of Substantial Completion.

1.6 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- B. Filters: Furnish four (4) complete sets of filters for each unit.
 - 1. Install initial set prior to equipment startup.
 - 2. Install second set prior to Test, Adjust and Balance work.
 - 3. Furnish two (2) complete sets of filters for each unit and obtain receipt (signed by owner's personnel.)

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following or approved equal;
 - 1. Heat pumps for 208 volt, three phase power;

	Outdoor Unit	Indoor Unit
Trane	5TWA7	TEM
LennoxSPB	CBA38MV	

2.2 INDOOR, EVAPORATOR-FAN COMPONENTS (5 TONS OR LESS)

- A. Cabinet: Galvanized or enameled steel with removable panels on front and ends in manufacturer's standard color. Provide manufacturer's verification that cabinet leakage does not exceed 2% when tested in accordance with ANSI/ASHRAE Standard 193-2010 "Method of Test for Determining the Air Tightness of HVAC Equipment".
- B. Insulation: Faced, glass-fiber, rigid insulation.
- C. Drain Pans: Corrosion resistant insulated plastic with connection for drain.
- D. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.
- E. Electric Coil: Factory-installed; helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors;

manual-reset thermal cutout; airflow proving device; one-time fuses in terminal box for overcurrent protection; and required heating controls with control circuit transformer.

- F. Fan: Direct drive, centrifugal, as indicated. Fan shall be forward-curve, statically and dynamically balanced.
- G. Fan Motors:
 - 1. Special Motor Features: Multitapped, multispeed for direct drive.
 - a. Electronically Commutated motor (ECM).
 - b. Internal thermal protection.
 - c. Permanently mounted.
 - d. Resiliently mounted.
- H. Disposable Filters: 2" thick, pleated, MERV 8.
- I. Filter Housing: Designed for 2" thick filter and equipped with access panel/door for easy filter removal/replacement.
- J. Single Point Electrical Connections: Units shall have a single point of connection for all electrical power and shall be internally wired at the factory including fan, electric heat, and all required transformers, contactors, etc.

2.3 AIR-COOLED, OUTDOOR COMPRESSOR-CONDENSER COMPONENTS (5 TONS OR LESS)

- A. Casing: Galvanized steel, finished with baked enamel in manufacturer's standard color, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
- B. Louvered heavy gauge steel panels, or hail guards, on all four sides to prevent damage to the coil.
- C. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
 - 1. Compressor Type: Scroll.
 - 2. Two stage compressor.
 - 3. Time/temperature defrost control.
 - 4. High and low pressure switch monitoring with automatic reset.
- D. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.
- E. Refrigerant Detection System: Provide sensors, elements, wiring and controls as required to maintain refrigerant concentration below the Detection Threshold Limit Value (DTLV) in accordance with UL 60335-2-40.
- F. Heat Pump Components: Reversing valve and low-temperature air cut-off thermostat.
- G. Factory installed, 100% molecular-sieve, bead type, bi-flow, liquid line drier.
- H. Fan: Aluminum-propeller type, directly connected to motor.
- I. Motor: Permanently lubricated, totally enclosed, with integral thermal-overload protection.

- J. Low Ambient Kit: Permits cooling operation down to 30 deg F.
- K. Crankcase heater.
- L. Accessories
 - 1. Thermostat: 7 day Programmable
 - 2. Compressor time delay.
 - 3. Automatic-reset timer to prevent rapid cycling of compressor.
 - 4. Freezestat to de-energize compressor if the evaporator entering air temperature is below 34 degrees F.
 - 5. Fire Protection Thermostats: Provide manual reset type adjustable fire protection thermostats set @ 165°F to automatically shut down the indoor unit fan for the following systems:
 - a. Units with a scheduled fan capacity of 2,000 cfm or less that have a recirculating (return air) system and serve all areas used for egress. Locate thermostats in the return air upstream of any connection of exhaust or outside air.
 - 6. Duct Smoke Detectors: Interlock units with smoke detectors by Division 26 contractor.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units level and plumb.
- B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- C. Install and connect refrigerant piping to component's fittings. Install piping to allow access to unit and route as indicated on the drawings.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to unit to allow service and maintenance.
- C. Duct Connections: Duct installation requirements are specified in 23 31 13 "Metal Ducts". Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split-system heat pump units with flexible duct connectors. Flexible duct connectors are specified in 23 33 00 "Ductwork Accessories".
- D. Ground equipment according to Division 26 "Grounding and Bonding".
- E. Electrical Connections: Comply with requirements in Division 16 Sections for power wiring, switches, and motor controls.
- F. Install and connect control wiring. Provide conduit, conductors, and cable in accordance with the requirements of Division 26.

- G. Unless specifically indicated otherwise, provide a welded steel angle frame with insulated sheet metal sides and bottom as detailed on the drawings. Connect outside air duct and return air duct to the plenum each with an opposed blade volume damper. Install dampers in an accessible location to allow easy adjustment for test and balance work.

3.3 FIELD QUALITY CONTROL

- A. **Manufacturer's Field Service:** Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections. Report results in writing.
- B. Perform the following field tests and inspections and prepare test reports:
- C. **Leak Test:** After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
- D. **Operational Test:** After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
- E. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- F. Remove and replace malfunctioning units and retest as specified above.

3.4 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
- B. Complete installation and startup checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION 23 81 36

DIVISION 25 - INTEGRATED AUTOMATION

(None in this Project Manual)

DIVISION 26
ELECTRICAL

26 00 01	ELECTRICAL GENERAL PROVISIONS
26 05 00	BASIC MATERIALS AND METHODS
26 05 26	GROUNDING
26 09 23	OCCUPANCY SENSORS
26 27 13	ELECTRICAL DISTRIBUTION SYSTEM
26 43 13	SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS
26 51 00	LIGHTING FIXTURES

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
 - 2. Electrical Gear (Panelboards, Safety Switches, Circuit Breakers).
 - 3. Dimmer Switches
 - 4. Receptacles
 - 5. Toggle Switches
 - 6. Wiring Device Box Support Brackets
 - 7. Photocells
 - 8. Cover Plates
 - 9. Pull Boxes
 - 10. Wire
 - 11. Occupancy/Motion Sensors
 - 12. Transient Voltage Surge Suppressors (TVSS)/Surge Protective Devices (SPDs)
 - 13. Lighting Emergency Battery Packs/Inverters

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, 2020 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
 - 2. Electrical Gear (Panelboards, Safety Switches, Circuit Breakers).
 - 3. Dimmer Switches
 - 4. Receptacles
 - 5. Toggle Switches
 - 6. Wiring Device Box Support Brackets
 - 7. Photocells
 - 8. Cover Plates
 - 9. Pull Boxes
 - 10. Wire
 - 11. Occupancy/Motion Sensors
 - 12. Transient Voltage Surge Suppressors (TVSS)/Surge Protective Devices (SPDs)
 - 13. Lighting Emergency Battery Packs/Inverters
- 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, Occupancy/Motion Sensors, Photocells,
 - 2. Electrical Gear
 - 3. Dimmer Switches, Receptacles, Toggle Switches, Cover Plates, Device Box Support Brackets, Pull Boxes, Power Poles, Floor Boxes, and Wire
 - 4. Transient Voltage Surge Suppressors (TVSS)/Surge Protective Devices (SPDs)

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.
 - 6. CAD files can be provided upon request (proper release forms must be completed). Contractor shall update CAD files to reflect As-Built conditions and shall submit revised file back to Architect/Engineer as part of the close-out documents.

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. As part of the O & M binders, contractor shall include copies of all studies and test reports performed as part of this project, including but not limited to, the following:
 - 1. Acceptance Testing Reports
 - a. Grounding Tests
 - b. Thermographic Tests
 - c. Torque Values
 - d. Rotation Tests
 - 2. Fire Alarm System 100% Test Report
 - 3. All specified photos of installations including open trenches, grounding terminations, pole foundation rough-ins, etc...
- G. 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
 - 2. Electrical Gear (Panelboards, Safety Switches, Circuit Breakers).
 - 3. Dimmer Switches
 - 4. Receptacles
 - 5. Toggle Switches
 - 6. Wiring Device Box Support Brackets
 - 7. Photocells
 - 8. Cover Plates
 - 9. Pull Boxes
 - 10. Wire
 - 11. Occupancy/Motion Sensors
 - 12. Transient Voltage Surge Suppressors (TVSS)/Surge Protective Devices (SPDs)
 - 13. Lighting Emergency Battery Packs/Inverters

1.15 EXCAVATING AND BACKFILLING

- A. Provide excavating and backfilling necessary for Work of this Division. Comply with provisions of specification section pertaining to 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's 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.
- C. Provide minimum 24 inches of cover to finish grades or paving at raceways.
- D. 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.
- E. Compact fill to satisfaction of Architect and/or Owner's Representative.
- F. 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.
- G. 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

1.16 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.

1.17 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.

1.18 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.

1.19 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.

1.20 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.

1.21 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.

1.22 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, loose or opened connections should not be used for temporary services. The Contractor should use only equipment in first class working condition for construction services.

1.23 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.

1.24 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.

1.25 CAD FILES

- A. ADG will provide, upon request, CAD 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 files, contractors automatically consent to the verbiage contained in the CAD 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 Volt, 3-Phase, 4-wire Wye Systems
 - a. Grounding leads = green
 - b. Grounded neutral leads = white
 - c. Ungrounded phase wires = black, red and blue
- 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 (Schedule 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.

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.
- H. Outlet boxes installed in rated walls shall receive appropriately rated putty pads as manufactured by 3M or STI.

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 (G5362-00* / GFRST20SNAP*)
GFCI Receptacles (Indoor)
 - 6. 20A 125V 2P 3W Duplex (G5362-WT* / GFTWRST20*)
GFCI Receptacles (Outdoor)

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. 5997-DGY, (or approved equivalent) clear, extra deep GFCI Style weather resistant cover. Weatherproof receptacles shall be flush mounted in exterior walls whenever possible.

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.	Panelboards	6'-7" to top of can
4.	Tele/Data Outlets	1'-6" to bottom of outlet
5.	Fire Alarm Audio/Visual	6" from ceiling on wall and in between 80" and 96"
6.	Fire Alarm Hand Stations	4'-0" to top of device
7.	Fire Alarm Visual Only	6" from ceiling on wall *
8.	Electric Water Cooler	Concealed behind unit **

* 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. 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.
- H. 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.

- I. Where the length of a home run from panel to the first outlet exceeds 75 feet (75') for 120-volt circuits, the conductor size shall be No. 10 AWG or that shown on the drawings, whichever is larger.
- J. 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 twenty-four inches (24") 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, intercom and nurse call 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 METAL-CLAD CABLE (600 VOLTS AND BELOW)

- A. The metallic sheath shall be galvanized steel or aluminum corrugated sheath type and shall be terminated at outlet boxes, cabinets, etc. with fittings specifically approved for such use, which shall properly ground the metallic sheath.
- B. Each metal-clad cable assembly shall have one (1) green insulated ground conductor sized as required by NEC for the application as a minimum size.
- C. Where run in walls, cable shall be fastened using B-Line Series BX4 or approved equivalent cable fasteners. Cable shall be fastened to wall stud not more than 8" from entry into device box.
- D. MC Cable shall be supported horizontally and vertically every 5' minimum or closer where required by NEC and applicable federal, state and local ordinances.

3.5 WIRING DEVICES

- A. All wiring devices installed shall be identified as to which panel serves it and which overcurrent 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.

3.6 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. 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.

3.7 COORDINATION WITH OTHER TRADES

- A. Prior to purchasing and installing any wire and/or conduit for all circuitry to mechanical 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 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.

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 bending 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 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, Acuity Controls (Sensor Switch) WSX-PDT.
- 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, Acuity Controls (Sensor Switch) WSX-PDT-2P.
- 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, Sensor Switch CM-PDT-9 (or 10 depending upon coverage required for space) or approved equivalent.
- 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 is 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) 120/208 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. The electrical gear provided and installed as part of this project shall not be series rated.

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. Siemens
 - 5. Approved Equivalent
- H. Minimum short circuit current interrupting ratings for circuit breakers shall be 22,000 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 1 unless noted otherwise. All exterior panelboards shall be rated NEMA 3R.

2.2 LABELS

- A. All switchboards, 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
 120/208 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.**

- B. Color Coding of labels shall be as follows:

Normal Power

White Background with Black Letters

2.3 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.

2.4 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.

2.5 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 values (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 43 13 - SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS



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 field-mounted SPDs for low-voltage (120 to 600 V) power distribution and control equipment.

1.3 DEFINITIONS

- A. I-nominal: Nominal discharge current.
- B. MCOV: Maximum continuous operating voltage.
- C. Mode(s), also Modes of Protection: The pair of electrical connections where the VPR applies.
- D. MOV: Metal-oxide varistor; an electronic component with a significant non-ohmic current-voltage characteristic.
- E. OCPD: Overcurrent protective device.
- F. SCCR: Short-circuit current rating.
- G. SPD: Surge protective device.
- H. VPR: Voltage protection rating.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
 - 2. Copy of UL Category Code VZCA certification, as a minimum, listing the tested values for VPRs, I nominal ratings, MCOVs, type designations, OCPD requirements, model numbers, system voltages, and modes of protection.
 - 3. Copies of test reports from a recognized independent testing laboratory, capable of producing 200kA surge current waveforms, verifying the suppressor can survive published surge current rating on a per mode basis using the ANSI/IEEE C62.41 impulse waveform C3 (8 x 20 microsecond, 20kV/10kA). Test data on an individual module is not acceptable. In house testing will not be accepted.
 - 4. Copy of warranty statement clearly establishing the terms and conditions to the building/facility owner/operator.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For SPDs to include in maintenance manuals.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to replace or replace SPDs that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Fifteen (15) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL SPD REQUIREMENTS

- A. SPD with Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Comply with UL 1449.
- D. MCOV of the SPD shall be the nominal system voltage. MCOV shall be a tested value per section 37.7.3 of UL1449 4th Edition.

2.2 PANEL SUPPRESSORS (Type C)

- A. Basis of Design: Subject to compliance with requirements. Provide comparable product by the following:
 - 1. Current Technology "TG3". Equivalent by Square D SurgeLogic "EM Series"
- B. SPDs: Listed as Type 1 SPD per UL1449 4th Edition
 - 1. Include LED indicator lights for power and protection status.
 - 2. Internal thermal protection that disconnects the SPD before damaging internal suppressor components.
 - 3. Include Form-C contacts rated at 2 to 5 A and 24- V ac to 250-V ac, one normally open and one normally closed, for remote monitoring of protection status.
- C. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per mode shall not be less than 300kA per Phase and 50 kA (Type C) 100kA per Phase. The peak surge current rating shall NOT be the arithmetic sum of the ratings of the individual MOVs in a given mode. SPD manufacturer shall provide independent 3rd party testing validating unit is capable of surviving a single surge at the specified rating.

- D. Comply with UL 1283 with a maximum attenuation of 34dB based on 50ohm insertion loss test per MIL-STD-220B
- E. Protection modes and UL 1449 VPR for grounded wye circuits with 480Y/277V or 208Y/120V, three-phase, four-wire circuits shall not exceed the following:
 - 1. Line to Neutral: 700 V for 208Y/120 V.
 - 2. Line to Ground: 700 V for 208Y/120 V.
 - 3. Neutral to Ground: 700 V for 208Y/120 V.
 - 4. Line to Line: 1200 V for 208Y/120 V.
- F. Protection modes and UL 1449 VPR for 240/120-V, single-phase, three-wire circuits shall not exceed the following:
 - 1. Line to Neutral: 700 V.
 - 2. Line to Ground: 700 V.
 - 3. Neutral to Ground: 700 V.
 - 4. Line to Line: 1200 V.
- G. SCCR: Equal or exceed 200 kA.
- H. Inominal Rating: 20 kA

2.3 ENCLOSURES

- A. Indoor Enclosures: NEMA 250, Type 1.
- B. Outdoor Enclosures: NEMA 250, Type 3R.

2.4 CONDUCTORS AND CABLES

- A. Power Wiring: SPD shall be equipped with mechanical lugs that can accept up to #2 AWG wire. Where conductors between SPD and switchgear exceed 10' in total length, they shall be "High Performance Interconnect" (HPI) cables with Ultra Low impedance characteristics at 10kHz and above.
- B. Class 2 Control Cables: Multi-conductor cable with copper conductors not smaller than No. 18 AWG, complying with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cables: Multi-conductor cable with copper conductors not smaller than No. 14 AWG, complying with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Install an OCPD or disconnect as required to comply with the UL listing of the SPD.

- C. Install SPDs with conductors between suppressor and points of attachment as short and straight as possible and adjust circuit-breaker positions to achieve shortest and straightest leads. Do not splice and extend SPD leads unless specifically permitted by manufacturer. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground. If installed lead length exceeds 10', SPD manufacturer shall provide a low impedance cable that improves the installed performance.
- D. Use crimped connectors and splices only. Wire nuts are unacceptable.
- E. Wiring:
 - 1. Power Wiring: Comply with wiring methods in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
 - 2. Controls: Comply with wiring methods in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.2 FIELD QUALITY CONTROL

- A. Contractor shall perform the following tests and inspections with the assistance of a factory-authorized service representative.
 - 1. Compare equipment nameplate data for compliance with Drawings and Specifications.
 - 2. Inspect anchorage, alignment, grounding, and clearances.
 - 3. Verify that electrical wiring installation complies with manufacturer's written installation requirements.
- B. An SPD will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.3 SYSTEM TESTING

- A. Upon completion of installation, provide the start-up and testing services of a factory-authorized and factory-trained local service representative. The tests shall include:
 - 1. Off-line Testing: Impulse injection to verify the system tolerances as well as verification of proper facility neutral-to-ground bond. Compare field test results to factory benchmark test parameters supplied with each individual unit.
 - 2. On-line Testing: Verify that suppression and filtering paths are operating with 100% protection as well as verification of proper facility neutral-to-ground bond by measuring neutral-to-ground current and voltage and by visual inspection.
 - 3. Voltage measurements from Line-to-Ground (L-G), Line-to-Neutral (L-N), Line-to-Line (L-L), and Neutral-to-Ground (N-G), taken at the time of the testing procedure.

3.4 DOCUMENTATION AND REPORTING

- A. Record results of field testing and compare to factory benchmark test parameters supplied with each individual surge protective device. Indicate that the integrity of neutral-to-ground bonds were verified through testing and visual inspection, and that grounding bonds were observed to be in place.

- B. Submit to the Owner's representative and to the Architect/Engineer copies of the startup test results and the factory benchmark testing results for confirmation of proper suppression filter system function, as required by this section. Provide the number of copies as required by Division One and the Electrical General Provisions section; and three copies where not otherwise specified.

END OF SECTION 26 43 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.
- 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. 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.
- F. 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:

<u>Normal A/C Power</u>	<u>Switch Position</u>	<u>Operation of Lamps/LED's</u>
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 4000K. 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:

<u>Mounting Surface Material</u>	<u>Anchor type</u>
* 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

**DIVISION 27
COMMUNICATION**

27 05 00 TELE/DATA RACEWAY SYSTEM



SECTION 27 05 00 - TELE/DATA RACEWAY 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 Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding electrical work.

1.2 GENERAL

- A. Furnish and install a system of outlet boxes and empty conduit for a telephone raceway system as shown on the drawings and as specified herein.

PART 2 - PRODUCTS

2.1 OUTLET BOXES

- A. Outlet boxes shall be 4-11/16" square.
- B. Outlet boxes shall have raised covers with telephone outlet cover plate to match electrical device cover plate.

2.2 CONDUIT

- A. Conduit runs shall be run concealed in walls from outlet box up through ceiling to four inches (4") above top of wall partition, turn ninety degrees using long radius ninety, and stop. Provide and install a nylon bushing at ends of conduits.
- B. Leave a No. 14 fish wire in each conduit run.
- C. Conduit shall be 1" unless specified otherwise on the drawings.
- D. Install one (1) conduit from each outlet box to above ceiling.

PART 3 - EXECUTION

- 3.1 Provide and install system raceways in accordance with cable, jack, patch panel manufacturer's recommendations and requirements.

END OF SECTION 27 05 00

DIVISION 28

ELECTRONIC SAFETY AND SECURITY

(None in this project manual)

**DIVISION 31
EARTHWORK**

31 20 00	Earth Moving - Building Area Only (Structural)
31 31 16	Termite Control

SECTION 31 20 00

EARTH MOVING – BUILDING AREA ONLY

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Work included: Excavate, backfill, compact and grade the site to the elevations shown on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
 - 2. Soil Report and Soil Engineer. Contractor shall be familiar with geotechnical engineer's recommendations; discrepancies shall be immediately brought to the architect's attention.

1.2 QUALITY ASSURANCE

- A. 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 the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity and numbers to accomplish the work of this Section in a timely manner.
- C. In addition to complying with requirements of governmental agencies having jurisdiction, comply with the directions of the soils report.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

- A. Fill and backfill materials:
 - 1. Provide sand in accordance with ASTM C-33 or other non-expansive material in accordance with soils report.
 - 2. Vapor barrier: 12 mil polyethylene film.
 - 3. Provide soil materials free from organic matter and deleterious substances, containing no rocks or lumps over 3" in greatest dimensions.
 - 4. Fill material is subject to the approval of the soil engineer, and is that material removed from excavations or imported from off-site borrow areas, predominantly granular, non-expansive soils free from roots and other deleterious matter.
 - 5. Fill material under building slab to be an inactive fill material, such as silty-clayey sands, low plasticity sandy clays or sandy clay, having a maximum liquid limit of forty (40) and plasticity index between five (8) and twenty (20). All subject to approval of the soils engineer.
 - 6. Do not permit rocks having a dimension greater than 1" in the upper 12" of fill or embankment.
 - 7. Cohesionless material used for structural backfill: Provide sand free from organic material and other foreign matter, and as approved by the soil engineer.
 - 8. Where granular base is called for under building slabs, provide aggregate complying with requirements of Section 03 30 00 of these Specifications.

2.2 WEED KILLER

- A. Provide a dry, free-flowing, dust-free chemical compound, soluble in water, capable of inhibiting growth of vegetation, and approved for use on this Work by governmental agencies having jurisdiction.

2.3 TOPSOIL

- A. Where and if shown on the Drawings or otherwise required, provide topsoil consisting of friable, fertile soil of loamy character, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life and reasonable free from subsoil, roots, heaving or still clay, stones larger than 2" in greatest dimension, noxious weeds, sticks, brush, litter and other deleterious matter.
- B. Obtain topsoil from sources within the project limits, or provide imported topsoil obtained from sources outside the project limits, or from both sources.

2.4 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 – EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PROCEDURES

A. Utilities:

1. Unless shown to be removed, protect active utility lines shown on the Drawings or otherwise made known to the Contractor prior to excavating. If damaged, repair or replace at no additional cost to the Owner.
2. If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.
4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Architect and secure his instructions.
5. Do not proceed with permanent relocation of utilities until written instructions are received from the Architect.

B. Protection of persons and property:

1. Barricade open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or with public access.
2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
3. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.

C. Dewatering:

1. Remove all water, including rain water, encountered during trench and sub-structure work to an approved location by pumps, drains and other approved methods.
2. Keep excavations and site construction area free from water.

D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

E. Maintain access to adjacent areas at all times.

3.4 EXCAVATING

A. Perform excavating of every type of material encountered within the limits of the Work of the lines, grades and elevations indicated and specified herein.

B. Satisfactory excavated materials:

1. Transport to, and place in, fill or embankment areas within the limits of the Work.

C. Unsatisfactory excavated materials:

1. Excavate to a distance below grade as directed by the soil engineer, and replace with satisfactory materials.
2. Include excavation of unsatisfactory materials and replacement by satisfactory materials, as parts of the work of this Section.

D. Surplus materials:

1. Dispose of unsatisfactory excavated material and surplus satisfactory excavated material, away from the site of disposal area arranged and paid for by the Contractor.

E. Excavation of rock:

1. Where rocks, boulders, granite or similar material is encountered, and where such material cannot be removed or excavated by conventional earth moving or ripping equipment, take required steps to proceed with the general grading operations of the Work, and remove or excavate such material by means which will neither cause additional cost to the Owner nor endanger buildings or structures whether on or off the site.
2. Do not use explosives without written permission from the Architect.

F. Excavate and backfill in a manner and sequence that will provide proper drainage at all times.

G. Borrow:

1. Obtain material required for fill or embankment in excess of that produced within the grading limits of the Work from borrow areas selected and paid for by the Contractor and approved by the soil engineer.

H. Ditches and gutters:

1. Cut accurately to the cross sections, grades and elevations shown.
2. Maintain excavations free from detrimental quantities of leaves, sticks, trash and other debris until completion of the Work.
3. Dispose of excavated materials as shown on the Drawings or directed by the soil engineer; except do not, in any case, deposit materials less than 3' -0" from the edge of a ditch.

I. Unauthorized excavation:

1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific instruction from the Architect or the soil engineer.
2. Under footings, foundations or retaining walls:
 - a. Fill unauthorized excavations by extending the indicated bottom elevation of the bottom or base to the excavation bottom, without altering the required top elevation.
 - b. When acceptable to the soil engineer, lean concrete fill may be used to bring the bottom elevation to proper position.
3. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations, unless otherwise directed by the soil engineer.

J. Stability of excavations:

1. Slope sides of excavations to 1:1 or flatter, unless otherwise directed by the soil engineer.
2. Shore and brace where sloping is not possible because of space restrictions or stability of the materials being excavated.
3. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

K. Shoring and bracing:

1. Provide materials for shoring and bracing as may be necessary for safety of personnel, protection of work and compliance with requirements of governmental agencies having jurisdiction.
2. Maintain shoring and bracing in excavations regardless of the time period excavations will be open.
3. Carry shoring and bracing down as excavation progresses.

L. Excavation for structures:

1. Conform to elevations and dimensions shown on contract documents within a tolerance of 0.10 ft., and extending a sufficient distance from footings and foundations to permit placing and removing concrete formwork, installation of services, other construction required and for inspection.

M. Cold weather protection:

1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.5 SUBGRADE INSPECTION

A. Notify Architect when excavations have reached required subgrade.

B. If Architect 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 with heavy pneumatic-tired equipment 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. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 20 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

3.6 FILLING AND BACKFILLING

A. General:

1. For each classification listed below, please acceptable soil material in layers to required subgrade elevations.
2. Use an inactive fill material such as clayey sand or sandy clay having a maximum liquid limit of forty (40) and plasticity index between eight (8) and twenty (20). See Structural.

B. Backfill excavations as promptly as progress of the Work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, damp proofing and waterproofing.
2. Inspecting, testing, approving and recording locations of underground utilities.
3. Removing concrete formwork.
4. Removing shoring and bracing and backfilling of voids with satisfactory materials.
5. Removing trash and debris.
6. Placement of horizontal bracing or horizontally supported walls.

C. Ground surface preparation:

1. Remove vegetation, debris, unsatisfactory soil materials, obstructions and deleterious matter from ground surface prior to placement of fills.
2. Plow, strip or break-up sloped surfaces steeper than one vertical to four horizontal so that fill material will bond with existing surface.
3. When existing ground surface has a density less than that specified under "compacting" for the particular area, break-up the ground surface, pulverize, moisture-condition to the optimum moisture content and compact to required depth and percentage of maximum density.

D. Placing and compacting:

1. Place backfill and fill materials in layers not more than 8" in loose depth.
2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content.
3. Compact each layer to required percentage of maximum density for area.
4. Do not place backfill or fill material on surfaces that are muddy, frozen or containing frost or ice.
5. Place backfill and fill materials evenly adjacent to structures, to required elevations.
6. Take care to prevent wedging action or backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.

3.7 GRADING

A. General:

1. Uniformly grade the area within limits of grading under this Section, including adjacent transition areas.
2. Smooth the finished surfaces within specified tolerance.
3. Compact with uniform levels or slopes between points where elevation are shown on the Drawings, or between such points and existing grades.
4. Where a change of slope is indicated on the Drawings, construct a rolled transition section having a minimum radius of approximately 8'0", unless adjacent construction will not permit such a transition, or if such a transition defeats positive control of drainage.

B. Grading outside building lines:

1. Grade areas adjacent to buildings to achieve drainage away from the structure, and to prevent ponding.
2. Finish the surfaces to be free from irregular surface changes, and:
 - a. Shape the surface of areas scheduled to be under walks to line, grade and cross-section, with finished surface not more than 0.10 feet above or below the required subgrade elevation.
 - b. Shape the surface of areas scheduled to be under pavement to line, grade and cross-section, with finished surface not more than 0.05 feet above or below the required subgrade elevation.

3.8 COMPACTING

- A. Control soil compaction during construction to provide the minimum percentage of density specified for each area as determined according to ASTM D 698.
- B. Provide not less than the following maximum density of soil material compacted at optimum moisture content for the actual density of each layer of soil material in place and as approved by the soil engineer.
 1. Structures:
 - a. Compact the top 8" of subgrade and each layer of fill material or backfill material to a minimum of ninety-five (95) percent Standard Proctor (ASTM D-698).
- C. Moisture control:
 1. Where subgrade or layer of soil material must be moisture-conditioned before compacting, uniformly apply water to surface of subgrade or layer of soil material to prevent free water appearing on surface during or subsequent to compacting operation.
 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density.
 3. Soil material that has been removed because it is too wet to permit compacting may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value as determined by moisture-density relation tests approved by the soil engineer.

3.9 FIELD QUALITY CONTROL

- A. Secure the soil engineer's inspection and approval of subgrades and fill layers before subsequent construction is permitted thereon.
- B. Provide at least the following tests to the approval of the soil engineer:
 1. At building slab areas, at least one field density test for every 2,500 square feet of paved area, but not less than four tests.

3.10 MAINTENANCE

- A. Protection of newly graded areas:
 1. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds;
 2. Repair and reestablish grades in settled, eroded and rutted areas to the specified tolerances.
- B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape and compact to the required density prior to further construction.

3.11 CERTIFICATION

- A. Upon completion of this portion of the Work, and as a condition of its acceptance, deliver to the Architect a written report from the soil engineer certifying that the compaction requirements have been obtained. State in the report the area of fill or embankment, the compaction density obtained and the type or classification of fill material placed.

END OF SECTION 31 20 00

**SECTION 31 31 16
TERMITE CONTROL**

PART 1 GENERAL

1.1 DESCRIPTION

- A. Work included: Provide soil poisoning to control subterranean termites as specified herein and needed for a complete and proper treatment.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. 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 the methods needed for proper performance of the work of this Section.
- B. Qualifications of Subcontractor:
 - 1. Properly licensed to provide such services by governmental agencies having jurisdiction.
 - 2. Not less than five (5) years successful experience in soil treatment for subterranean termites.

1.3 WARRANTY

- A. Upon completion of the Work, and as a condition of its acceptance, deliver to the Architect two copies of a Warranty signed by an authorized representative of the installing Subcontractor and co-signed by the Contractor, agreeing:
 - 1. To make an inspection of the Work once each year for a total period of five (5) years following Date of Substantial Completion for the purpose of detecting termite infestation;
 - 2. If termite infestation is found during that five (5) year period, to retreat in accordance with prevailing practices of the trade and within ten (10) calendar days after such infestation is discovered;
 - 3. To repair damage to the Work caused by subterranean termites during that five (5) year period.
 - 4. To make such inspections, retreatment and repairs at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 MATERIALS

- A. The following materials are approved for use under this Section:
 - 1. The chemical to be used shall be one which is accepted by the Structural Pest Control Commission or the U.S. Department of Agriculture, Division of Insecticides and Fungicides as having prolonged effectiveness as a toxicant against subterranean termites. In no event shall the anticipated effective duration of the termite chemical be for less than two years. The chemical shall be applied at the dosage rate recommended by the manufacturer and acceptable to the Structural Pest Control Commission.
 - 2. Use termiticide carrying an EPA registration number, and approved by Louisiana governing authority.

3. There are certain Proprietary Materials which are being used as soil poisons for subterranean termite control. These are acceptable provided they contain one or more of the above approved chemicals in the concentrations specified, and providing, further that they possess acceptable compatibility materials that do not conform to these requirements will be evaluated on the basis of field performance according to standards approved by the Structural Pest Control Commission. Any other chemicals which in the future may be recommended by the Southern Forest Experiment Station's Forest Insect Laboratory at Gulfport, Mississippi, will be acceptable by the Structural Pest Control Commission.

C. APPLICATION

1. General

- a. The General Contractor shall remove all wood stakes, form boards, leveling pets and other wood or organic materials from the building area prior to treatment.
- b. Treatment shall not be made when the soil or fill is excessively wet or immediately after heavy rains, to avoid surface flow of the toxicant from application site.
- c. Unless the treated areas are to be immediately covered, precautions shall be taken to prevent disturbance of the treatment by human or animal contact with the treated soil.
- d. All openings around pipes that penetrate concrete floor slabs of filled foundations shall be sealed with a termite resistant mastic or cement grout. The mastic joint sealer shall be hot poured coat tar pitch, or a similar approved material that is equally resistant to penetration by termites. The joint sealer shall be applied in such a way as to provide a termite proof seal between the cement of the floor and the outer surface of the pipe or pipes.

2. Guarantee (Sample to be submitted as Shop Drawing.)

The cost of this work is to include the issuance of a \$100,000.00 termite control repair and guarantee for an initial period of two years with stipulated renewal rights at the sole option of the Owner for the life time of the building. This renewal, in the third year, shall not exceed 12% of the initial treatment price. Renewal insurance in the fourth year and each year thereafter for the life of the building shall be increased no more than the annual 10% per year or more than the annul rate of inflation (as measured by the consumer price index) whichever is greater. No failure on the part of the buyer to request reinspection shall, in any way, effect the buyer's rights under this contract. This contract cannot be canceled by any other way except the following:

- a. The Owner's written request.
- b. Failure of Owner to pay insurance premium within 6 months after renewal date. Written notice must be given to the Owner, once a month, within this 6 month period indicating that the premium is due or delinquent.

This blanket repair guarantee shall state the responsibility of the termite contractor to apply to the premises any necessary additional treatment and to make repairs or replacements to remedy damaged areas caused by subterranean termite reinfestation no extra cost to the Owner. If there is more than one building on a project, and these buildings do not connect, the issuance of a separate guarantee shall be provided, but in no event shall the accumulated totals of issuance premiums for the third year exceed 12% of the total price of the initial cost.

D. PRE-TREATMENT OF SLABS

1. Soil under open slab and appendages attached to building shall be pre-treated at the rate as recommended on manufacturer's label along a strip extending at least 3 ft. from wall of building.
2. After building has been completed and the yard filled and leveled so that the final grade has been reached along the outside of the foundation wall, this area shall be trenched and treated at the rate as recommended on manufacturer's label. Back fill as required.

PART 3 EXECUTION

- A. The above listed materials are to be applied exactly as indicated on the labels and labeling.
- B. Examine the areas and conditions under which work of this Section will be performed. Correct all conditions detrimental to timely and proper completion of the work. do not proceed until satisfactory conditions are provided.
- C. If soil is disturbed after treatment, retreat disturbed areas complete.

END OF SECTION

**DIVISION 32
EXTERIOR IMPROVEMENTS**

(None in this project manual)

DIVISION 33
UTILITIES

(None in this project manual)

