



CENTRALBIDDING
FROM CENTRAL AUCTION HOUSE

New Church and Hall Christ the King Catholic Church (Diocese of Lake Charles)

Diocese of Lake Charles

Project documents obtained from www.CentralBidding.com

05-Aug-2025 12:49:31 AM

Project Manual and Specifications

For

**New Church and Hall
Christ the King Catholic Church**

7661 Gulf Highway
Lake Charles, Louisiana 70607

Diocese of Lake Charles

1201 Ryan Street
Lake Charles, Louisiana 70601

Prepared by:

Hoffpauir Studio, LLC
1669 Lobdell Avenue, Suite H1
Baton Rouge, Louisiana 70806

HS Project # 23.033
DOLC Project # 20.0028.37

June 20, 2025

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ADVERTISEMENT FOR BIDS

FROM:

1.1 THE OWNER (HEREINAFTER REFERRED TO AS OWNER):

- A. Diocese of Lake Charles
- B. Stephanie Rodrigue, Director of Temporal Goods
- C. Address:
1201 Ryan Street
Lake Charles, LA, 70601

1.2 AND THE ARCHITECT (HEREINAFTER REFERRED TO AS ARCHITECT):

- A. Hoffpauir Studio, LLC
- B. Address:
1669 Lobdell Avenue, Suite H1
Baton Rouge, LA

1.3 PRE-BID DATE: AUGUST 12, 2025 ON SITE AT 10:30AM

1.4 TO: POTENTIAL BIDDERS

- A. Electronic sealed bids will be received by The Diocese of Lake Charles through Central Bidding. The deadline for receipt of bids is **2:00 PM on August 28, 2025**, at which time bids will be authenticated online and a bid tab will be posted.
- B. Complete Bid Documents for this project are available in electronic form on behalf of the Owner by Central Bidding. They may be obtained without charge and without deposit from the Public Plan Room at www.centralauctionhouse.com. Printed copies are not available from the Designer, but arrangements can be made to obtain them through most reprographic firms. Plan holders are responsible for their own reproduction costs. Questions about this procedure shall be directed to the Architect.
- C. All bids shall be accompanied by bid security in an amount of five percent (5.0%) of the sum of the base bid and all alternates. The form of this security shall be as stated in the Instructions to Bidders included in the Bid Documents for this project.
- D. The successful Bidder shall be required to furnish a Performance and Payment Bond written as described in the Instructions to Bidders included in the Bid Documents for this project.
- E. Refer to other bidding requirements described in Document 00 21 13 - Instructions to Bidders.

END OF SECTION

SECTION 00 21 13
INSTRUCTIONS TO BIDDERS

PART 1 GENERAL

1.1 INSTRUCTIONS TO BIDDERS

- A. See included Diocese of Lake Charles Lump Sum Construction Services Request for Bids.

END OF SECTION



Diocese of Lake Charles

Lump Sum
Construction Services

Request for Bids
For

New Church and Hall
Christ the King Catholic Church
7661 Gulf Highway
Lake Charles, LA 70607

DOLC Project #20.0028.37.002
HS Project #23.033

June 20, 2025

Hoffpauir Studio, LLC
1669 Lobdell Avenue
Suite H1
Baton Rouge, LA 70806
(225) 926-7406

HFFPAUIRSTUDIO
ARCHITECTURE



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Section 2 – Introduction

- The Diocese of Lake Charles was established on January 29th, 1980 to serve the needs of the Catholic community in southwest Louisiana. Headquartered at 1201 Ryan Street, Lake Charles, LA 70601, the DOLC continues its mission of serving the community through 39 church parishes, as well as schools and various service entities in 5 Louisiana civil parishes. Hoffpauir Studio, LLC has been selected as the Architect for various projects for the Diocese of Lake Charles and is assisting in the reconstruction efforts of their expansive portfolio of assets. The Diocese sustained significant damage across their entire portfolio of ~70 sites and over 300 individual buildings and structures. It is the intent of this solicitation to select a highly qualified firm to complete the specified scope of work in the attached REQUEST FOR BIDS. The DOLC reserves the right to review the bid and reject any firm based on poor past performance or unqualified submissions.
- The proposed projects will be funded primarily through the Federal Emergency Management Agency (FEMA) Public Assistance Program, but may also include funding from Insurance, and other sources as may be necessary.

Section 3 – Project Objective

- The intended purpose of this REQUEST FOR BIDS is to provide a new church and hall building as described in the contract documents.

Section 4 – Bid Instructions

- **A Lump Sum Bid** will be received via submission through the Central Auction House website on the bid date noted. The bid shall be based on and address all information contained in and all documents attached to this REQUEST FOR BIDS and shall include the following.
 - List of subcontractors proposed for the project (if applicable)
 - CPM schedule
 - Pricing and detailed scope of work broken out by CSI division
 - Fee and mark-up structure for base bid and Change Order Request.
 - Under no circumstances can overhead and fee exceed 15%
- Contractor is to include any allowances and clearly identify the allowance and value. All allowances are to be Not to Exceed and are inclusive of mark-ups.
- Site walk will be performed as follows:

August 12, 2025 at 10:30 am
(Project Site): 7661 Gulf Highway
Lake Charles, LA 70607
Project #20.0028.37.002
A New Church and Hall
Christ the King Catholic Church
Lake Charles, LA 70607

Sign-in and initial briefing will be conducted on site at the time identified above. All interested parties are asked to email the Architect with the intent to attend the site-walk. The purpose of the site walk is to allow contractors to verify all elements which are to be included in the



bid. It is the contractors' responsibility to familiarize themselves to the site and all damages that are to be rectified. The scope of work narrative is intended to provide as much information as possible, but is not to be deemed an all-inclusive narrative. All measurements and quantities are approximations, and it is Contractors' responsibility to verify.

- All RFIs are to be submitted electronically to jason@hoffpauirstudio.com. RFI's will be accepted and answered up to 72 hours prior to bid date.
- Should a bidder find discrepancies or omissions in the REQUEST FOR BIDS or be in doubt as to meanings, they should notify Hoffpauir Studio, LLC at once. All changes or clarifications to documents will be made in the form of an addendum issued by Hoffpauir Studio. Where discrepancies occur between any documents the more expensive option shall be included.
- The following is the anticipated schedule.

Advertisements for Bids
Site Walk(s)
Bid Due Date

July 29, 2025
August 12, 2025
August 28, 2025

- Contractor is to provide a CPM schedule as noted above. Time is of the essence in completing this project and the overall project duration will be an important piece in selecting the contractor.

Section 5 – Bid Documents

The following constitutes a full REQUEST FOR BIDS document set:

- REQUEST FOR BIDS along with Drawings and/or Specifications
- Exhibit A – Insurance Requirements
- Exhibit B – Compliance with Federal Regulations
- Exhibit C – Non collusion Affidavit

Section 6 – Site Utilization

- Since this is an active property, contractor will always maintain a clean and safe site. Regular cleaning inside and outside of the construction limits is mandatory. Contractor is to take measures to protect all existing elements and systems in place from damage of any sort during construction.
- Work forces are not allowed to take breaks in owner occupied areas of any respective facility. Temp facilities are to be provided by contractor or approval must be given by owners' representative for use of other areas.
- Contractor shall furnish trailers or storage containers as needed for construction materials. Approvals are required by owner's representative for storage or use of any areas outside of active construction zones.
- All work relating to the disruption of existing services shall be coordinated with the Owner and at such time as scheduled by the Architect.

Section 7 – General Information

- A mutually agreed to AIA contract based upon the documents included in this REQUEST FOR BIDS, and any subsequent revision/addendum or clarifications is to be fully executed within **60** calendar days from date of selection. Owner reserves the right to terminate the original selection if an agreement cannot be executed within this period.
- Bids Received will be compiled into a Bid Tabulation and will be posted on Central



Auction House site by Hoffpauir Studio, LLC and DOLC.

- Contractors should be prepared to discuss all specifics of their bid at the interview including, but not limited to subcontractor selection criteria, procurement management, cost and schedule control processes and procedures, and overall construction project management philosophy.
- Any and all information and instructions contained in this REQUEST FOR BIDS including all attachments shall be considered and complied with in completing the response to this REQUEST FOR BIDS.
- Where discrepancies occur between any documents the more expensive option shall be included
- The bid shall be submitted with the complete understanding that the contractor has carefully examined all information contained in and documents attached with this Request for Bid, has visited the site at which the work will take place, and has fully informed himself or herself as to all existing conditions and limitations.
- Any addenda issued shall be covered and included in the bid and will become a part thereof.
- M/W/DBE and Louisiana Businesses:
 - It is the intent of the Diocese of Lake Charles, and each of its component institutions, subsidiaries and/or sister companies to promote and encourage contracting and subcontracting opportunities for Minority and Women Business Enterprises as well as Locally Owned and Operated Businesses in the state of Louisiana
- The parties acknowledge their intent to fully comply with all FEMA requirements, including, without limitation, those contained on Exhibit "B" attached hereto and made a part hereof. To the extent the provisions of FEMA are inconsistent with any provisions of this REQUEST FOR BIDS, the provisions of FEMA will control.

Section 8 - Evaluation and Selection Process

- The DOLC reserves the right to reject any bid which it feels does not comply with the requirements of this REQUEST FOR BIDS.
- The DOLC reserves the right to interview and reject responding firms after the initial evaluation

Section 9 – Compliance

- Exhibit B – Compliance with Federal Regulations
- Exhibit C – Non collusion Affidavit

Section 10 – Bond, Insurance, Licensing, and Tax Requirements

- Bonding is required.
- The proposed Bonding Company and Bond Form of the General Contractor must be acceptable by the Owner.
- Builders risk insurance is to be provided by contractor.
- Insurance as required in Exhibit A.
- Contractor is required to maintain all applicable Louisiana Contractor's licenses as required.
- Contractor is to include all applicable federal, state, parish, and local taxes for all labor, material, and equipment as required.
- Contractor shall pay sales, consumer, use, and similar taxes for the work or portions



thereof provided by the contractor which are legally enacted when the bids are received, whether or not yet effective or scheduled to go into effect.

Section 11 – Scope of Work

The following scope of work services shall be assumed and **INCLUDED** in the bid. All materials and labor shall be included to complete the scope of work.

All permits, fees, taxes, inspections, mobilizations, layout, cleaning, trash removal, hoisting and lifting equipment, scaffolding, staging, unloading, and traffic control responsibilities are included.

Contractor shall comply with all OSHA Safety Regulations and all local codes. A full-time supervisor employed directly with the contractor must be on site at all times during the installation of the work.

Contractor shall be responsible for the protection of the existing facility. The Contractor will be responsible for any damages caused during the construction process

Contractor shall be responsible for the necessary cleaning and repairing of damage to adjacent streets resulting from his operations. Contractor to be responsible for all necessary traffic control.

The Contractor shall provide and maintain adequate chemical toilet facilities in a clean and sanitary condition for the use of its Subcontractors/Labor Force. Utilization of the owner's facilities will not be allowed unless specifically agreed to in advance.

Project Specific Alternates

- See Specifications

Clarifications

- It is the responsibility of the bidding contractors to visit the site(s) and familiarize themselves with all aspects of the work in order to provide complete and accurate pricing.
- All quantities and measurements provided are approximations only. It is the bidding contractor's responsibility to site measure and quantity all scope of work items.
- Pricing is to be broken out by CSI division based on Area and project number designated above. Pay-applications will be required to be broken out in the same fashion.
- Contractor is to provide complete close-out packages with material listings, warranties, as-builts, and all other items customarily included.
- The Contractor shall hold their price for 60 days after bids are received.



Exhibit A- Insurance Requirements

Contractor shall obtain all insurance coverages scheduled below with limits and insurance carriers acceptable to the Contractor and file with the Owner, before the commencement of work, the required insurance coverages on ACORD Form Certificate of Liability Insurance. Nothing contained herein will be construed as an obligation of the Owner to review or accept or reject any certificate of insurance filed with the Owner by the Contractor.

Commercial General Liability Insurance

The policy will have the standard coverages of a Commercial General Liability Policy including: Premises and Operations coverage, independent Contractors' coverage, Products and Completed Operations with no specific exclusions, Broad Form Property Damage coverage including Completed Operations and Explosion and Underground Property coverage.

The Owner and their respective subsidiary or affiliated companies, agents, employees, and servants shall be named as Additional Insureds in accordance with the provisions above in this Article. Insurance coverages shall have a cross liability clause (severability of interest) and coverage shall be Primary and Non-Contributory as regards Additional Insureds, additionally the coverage will provide defense of the additional insureds after the Project has been put to its intended use.

Waiver of Subrogation in favor of the Owner and their respective subsidiary or affiliated companies, agents, employees, and servants.

For a project involving roofing work, the Contractor's General Liability coverage must include a pollution liability coverage extension that affords coverage for claims resulting from jobsite fumes and vapors. In the event the roofing work is to be performed by a Contractor or their Subcontractors, the Owner requires the Contractor or its Subcontractors to provide a Certificate of Insurance for General Liability coverage with a pollution liability coverage extension that affords coverage for claims resulting from jobsite fumes and vapors. In such case, the Contractor shall have the Owner and the Owner's Lessor (if any) named as an additional insured and the Certificate of Insurance shall comply with the other requirements set forth.

AMOUNT OF INSURANCE REQUIRED:

Type of Construction	Projects between \$1.00-\$500,000	Projects between \$500,000 and \$999,999	Projects over \$1,000,000
Each Occurrence (Minimum Limit)	\$1,000,000 Per Project	\$2,000,000 Per Project	\$3,000,000 Per Project
Aggregate	\$2,000,000	\$4,000,000	\$6,000,000

The above aggregate limits may be achieved through any combination of Primary and Umbrella/Excess policies.

Note: The Products and Completed Operations shall be maintained for two (2) years after the date of recordation of the Certificate of Substantial Completion.



Worker's Compensation

Statutory Limits as required by the State of operation

Employers' Liability Insurance Limits	\$1,000,000 each accident
Each Employee - Disease	\$1,000,000
Policy Limit - Disease	\$1,000,000

This policy shall include a waiver of subrogation in favor of Contractor, Architect, Owner and their subsidiary or affiliated companies, their agents, employees, or servants.

This policy shall have an Alternate Employer endorsement covering the Owner, and Contractor as an Alternate employer.

Business Automobile Liability Insurance AMOUNT OF INSURANCE REQUIRED:

Type of Construction	Projects between \$1.00-\$1,000,000	Projects over \$1,000,000
Each Occurrence (Minimum Limit)	\$500,000	\$1,000,000
Aggregate	\$500,000	\$1,000,000

The Owner and their respective subsidiary or affiliated companies, agents, employees, and servants shall be named as Additional Insureds in accordance with the provisions above in this Article.

Waiver of Subrogation in favor of the Owner and their respective subsidiary or affiliated companies, agents, employees, and servants.

Coverage to include Owned, Non-Owned and Hired Autos.

Worker's Compensation

Statutory Limits as required by the State of operation

Employers' Liability Insurance Limits	\$1,000,000 each accident

Each Employee – Disease \$1,000,000

Policy Limit – Disease \$1,000,000 This policy shall include a waiver of subrogation in favor of Architect, Owner and their subsidiary or affiliated companies, their agents, employees, or servants.

This policy shall have an Alternate Employer endorsement covering the Owner and Contractor as an Alternate employer.



Professional Liability if applicable

Contractor/Service Provider shall procure and maintain professional liability insurance (E&O) for claims arising out of the performance of any design or engineering services performed in connection with the Work caused by any wrongful or allegedly wrongful act, error or omission for which Contractor/Service Provider may become legally liable. If Contractor/Service Provider delegates any design responsibility to a design professional, said design professional must adhere to this section and provide professional liability insurance which will cover the design professional's design services. The design professional shall also furnish Contractor an insurance certificate evidencing said coverage in compliance with the below provisions.

Such professional liability insurance shall provide for coverage as follows:

- A. Limit of Liability \$ 1,000,000
- B. Deductible Amount \$ 5,000
- C. Coverage shall be maintained through the statute of repose (5 years) following completion and acceptance of the Project.
- D. If insurance is on a Claims Made policy form, prior Acts Coverage which covers any such acts, errors or omissions which occurred prior to the effective date of such policy for work under said subcontract.
- E. Thirty (30) days prior written notice to Contractor of cancellation of such insurance or any material change with respect thereto.

Such professional liability insurance shall be in a form acceptable to Contractor and shall be issued prior to the commencement of the Work.

The policy shall contain contractual coverage with a Waiver of Subrogation in favor of the Owner and their subsidiary or affiliated companies, their agents, employees, and servants.



Exhibit B- Compliance with Federal Regulations

OWNER: **DIOCESE OF LAKE CHARLES OR ITS RELATED CORPORATIONS**

THE BIDDER WILL COMPLY WITH THE FOLLOWING STATUTES, REGULATIONS and EXECUTIVE ORDERS:

- Executive Order 11246 entitled "Equal Employment Opportunity" as amended by Executive Order 11375.
- Copeland "Anti-Kickback" Act (18 U.S.C. 874) as supplemented in the Department of Labor regulations (29 CFR Part 3).
- Debarment and Suspension.
- Byrd Anti-lobbying Amendment
- Procurement of Recovered Materials
- Contract Work Hours Safety Standards Act (40 U.S.C. 327-330) Sections 103 and 107 as supplemented by Department of Labor regulations (29 CFR Part 5).
- Clean Air Act (42 U.S.C. 1857/(h)) Section 306
- Clean Water Act (33 U.S.C. 1368) Section 508
- Executive Order 11738 and Environmental Protection Agency (40 CFR Part 15)
- Energy Policy and Conservation Act (Pub. L. 94-163, 89 Stat. 871)
- All FEMA published compliance requirements, including but not limited to FEMA EM-3538-LA and DR-4559-LA
- FEMA access to any books, documents, papers, and records of the contractor which are directly pertinent to this specific contract for the purpose of making audit, examination, excerpts, and transcriptions.
- FEMA requirement for retention of all records for three years after receipt of final payment and all other matters are closed.
- Cooperate with and allow full access to all FEMA representatives regarding this site.
- Ensure that all subconsultants are aware of the requirements imposed upon them by Federal statute and regulation and include language in the contracts that requires the subconsultants to abide by all of the terms and conditions of the contract.

Signature and Title of Bidder's Representative / Date

Printed or Typed Name and Title of Bidder's Representative / Date



Exhibit C- Non-Collusion Affidavit

OWNER **DIOCESE OF LAKE CHARLES OR ITS RELATED CORPORATIONS**

BIDDER _____

PROJECT **New Church and Hall Christ the King Catholic Church**

Affiant, _____, states that:

Affiant is (enter title) _____ of _____, "the Bidder". Affiant has personal knowledge of the matters set forth in this Affidavit and is competent to testify about them.

The Bidder has submitted to the Diocese of Lake Charles or its related corporations, ("The Owner"), a "Proposal and/or Bid, for construction and related services, also referred to in this Affidavit as "The Work"

This Affidavit is executed by Affiant for inclusion with the submission to the Owner of the Bid and may be relied upon by the Owner in considering the Bid.

Affiant is fully informed about the preparation and contents of the Bid and of all pertinent circumstances surrounding the Bid, and has not entered into any contract; combination, conspiracy or other act prohibited by Law and the Proposal or Bid is genuine and is not collusive and sham.

Neither the Bid nor any of the Bidder's owners, officers, partners, directors, agents, representatives, principals, employees or parties in interest, including this Affiant, have in any way entered or proposed to enter into any combination to prevent the making of any Bid, or to fix any prices (including overhead, profit or other costs) for the Bid; or have made any agreement, or given or promised any consideration to induce any other person not to bid for the Work, or to bid at a specified price; or have secured, proposed or intended to secure through any agreement an unlawful advantage against the Owner or any other person interested in the Work. The Bid is not intended to secure an unfair advantage or benefit from the Owner or in favor of any person interested in the Work.

Affiant employed no person, either directly or indirectly, to secure the Contract(s) "The Work", other than persons regularly employed by the Affiant whose services in connection with the Work or in securing the Contract(s) were in the regular course of their duties for the Bidder.

No part of the Contract Price(s) was paid, or if Affiant is awarded the Contract(s) will be paid, to any person for soliciting the Contract(s) other than the payment of their normal compensation to persons regularly employed by the Affiant whose services in connection with the Work or in securing the Contract(s) were in the regular course of their duties for Affiant.



NON-COLLUSION AFFIDAVIT

The prices 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 other of the Bidder's owners, officers, partners, directors, agents, representatives, employees or parties in interest, including this Affiant; and neither the Bidder nor any of its owners, officers, partners, directors, agents, representatives, employees or parties in interest, including this Affiant, have divulged any information regarding the Bidder or any data about the Bidder to any other person.

By (signature) _____ Title _____

Printed or Typed Name _____ Date _____, 2025.

STATE OF LOUISIANA

PARISH OF _____

Before me, a Notary commissioned, qualified and acting, personally appeared (enter name of the person signing this Affidavit) _____

To me well known to be the person described is and who signed this Affidavit, who being by me first duly sworn upon oath, says that he/she has been authorized by (enter Bidder's name) _____ to execute this Affidavit on behalf of the named Bidder in favor of the Owner for the uses and purposes mentioned.

Subscribed and sworn to before me this _____ day of _____, 2025.

Notary

BID FORM

TO: Diocese of Lake Charles
1201 Ryan Street
Lake Charles, LA 70601

BID FOR: New Church and Hall for
Christ the King Catholic Church
7661 Gulf Highway
Lake Charles, LA 70601
DOLC Project #20.0028.37.002

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: **Hoffpauir Studio, LLC** and dated: **June 20, 2025**

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

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

_____ Dollars (\$ _____)

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

Alternate No. 1 (East and West Parking Areas) for the lump sum of:

_____ Dollars (\$ _____)

Alternate No. 2 (Exterior Wall Finish) for the lump sum of:

_____ Dollars (\$ _____)

Alternate No. 3 (Flooring and Walls) for the lump sum of:

_____ Dollars (\$ _____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

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

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

BID BOND

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That _____ of _____, as Principal, and _____, as Surety, are held and firmly bound unto the Diocese of Lake Charles (Obligee), in the full and just sum of five (5%) percent of the total amount of this proposal, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater that the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

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

**A New Church and Hall for Christ the King Catholic Church
DOLC Project #: 20.0028.37.002**

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

PRINCIPAL (BIDDER)

SURETY

BY: _____
AUTHORIZED OFFICER-OWNER-PARTNER

BY: _____
AGENT OR ATTORNEY-IN-FACT(SEAL)

SECTION 00 52 00
AGREEMENT FORM

PART 1 GENERAL

- 1.1 FORM OF AGREEMENT
- 1.2 THE AGREEMENT TO BE EXECUTED IS ATTACHED FOLLOWING THIS PAGE.
- 1.3 RELATED REQUIREMENTS
 - A. Section 00 72 00 - General Conditions.
 - B. Section 00 73 00 - Supplementary Conditions.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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 Twenty-ninth day of August in the year Two Thousand Twenty-Five

(In words, indicate day, month and year.)

BETWEEN the Owner:

(Name, legal status, address and other information)

Diocese of Lake Charles
1201 Ryan Street
Lake Charles, LA 70601
(337) 439-7400

and the Contractor:

(Name, legal status, address and other information)

for the following Project:

(Name, location and detailed description)

New Church and Hall Christ the King Catholic Church
7661 Gulf Highway
Lake Charles, LA 70607
D.O.L.C. PTO #20.0028.37
HS Project #23.033

The Architect:

(Name, legal status, address and other information)

Hoffpauir Studio, LLC
1669 Lobdell Avenue, Suite H1
Baton Rouge, LA 70806
(225) 926-7406

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 Three Hundred Sixty-Five (365) 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.)

\$500.00/per calendar day

§ 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 25th day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the 60 days thereafter. ~~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 Sixty-five (65) 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.)

10%

§ 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.)*

10.00 % per annum

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)

Mrs. Stephanie D. Rodrigue
1201 Ryan Street
Lake Charles, LA 70601
(337) 439-7400
stephanied.rodrigue@gmail.com

§ 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

☒ Supplementary and other Conditions of the Contract: See Specifications

Document	Title	Date	Pages

- .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)*

BY: Stephanie D. Rodrigue, Director of Temporal
Goods on behalf of the Diocese of Lake Charles

(Printed name and title)

CONTRACTOR *(Signature)*

(Printed name and title)

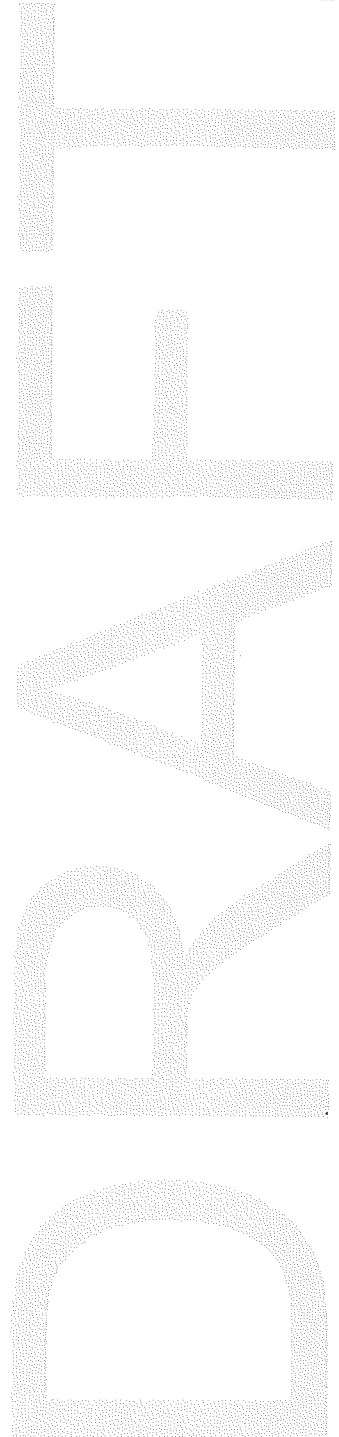


**EXHIBIT A TO STANDARD FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR WHERE THE BASIS OF PAYMENT IS A
STIPULATED SUM, AIA DOCUMENT A101-2017**

**FEDERAL CONTRACT PROVISIONS/TERMS REQUIRED FOR CLIENT
REIMBURSEMENT BY FEMA**

1. NO GOVERNMENT OBLIGATION TO THIRD PARTIES.

The Owner and Consultant/Contractor acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to the Owner, Consultant/Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract. It is further agreed that the clause shall not be modified, except to identify any subcontractor who will be subject to its provisions.

2. PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS AND RELATED ACTS.

Consultant/Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 et seq., "Administrative Remedies for False Claims and Statements," apply to its actions pertaining to this Project. Upon execution of the underlying contract, the Consultant/Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract for which this contract work is being performed. In addition to other penalties that may be applicable, the Consultant/Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Consultant/Contractor to the extent the Federal Government deems appropriate.

3. ACCESS TO RECORDS AND REPORTS.

The following access to records requirements apply to this contract:

- (1) The Consultant/Contractor agrees to provide the Owner, the State Emergency Management Agency (or Recipient), the FEMA Administrator, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Consultant/Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.
- (2) The Consultant/Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

(3) The Consultant/Contractor agrees to provide the FEMA Administrator or his authorized representative's access to construction or other work sites pertaining to the work being completed under the contract.

(4) The Consultant/Contractor agrees to retain all records for a period of not less than five years after the termination date of this contract

4. REMEDIES.

In instances where Consultant/Contractor violates or breaches the terms of this agreement, the Owner will be entitled to any administrative, contractual, legal or equitable remedies available to it under the applicable jurisprudence, laws and regulations.

5. EQUAL EMPLOYMENT OPPORTUNITY.

During the performance of this contract, Consultant/Contractor agrees as follows:

(1) The Consultant/Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The Consultant/Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Consultant/Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The Consultant/Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The Consultant/Contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the Consultant/Contractor's legal duty to furnish information.

SECTION 00 72 00
GENERAL CONDITIONS

FORM OF GENERAL CONDITIONS

- 1.1 THE GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT IS ATTACHED FOLLOWING THIS PAGE.

RELATED REQUIREMENTS

- 2.1 SECTION 00 73 00 - SUPPLEMENTARY CONDITIONS.

SUPPLEMENTARY CONDITIONS

- 3.1 REFER TO DOCUMENT 00 73 00 - SUPPLEMENTARY CONDITIONS FOR AMENDMENTS TO THESE GENERAL CONDITIONS.

END OF SECTION

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

New Church and Hall Christ the King Catholic Church
7661 Gulf Highway
Lake Charles, LA 70607

THE OWNER:

(Name, legal status and address)

Diocese of Lake Charles
1201 Ryan Street
Lake Charles, LA 70601

THE ARCHITECT:

(Name, legal status and address)

Hoffpauir Studio, LLC
1669 Loddell Avenue, Suite H1
Baton Rouge, LA 70806

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

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™–2017, Guide for Supplementary Conditions.

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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 millify 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

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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

§ 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.

SECTION 00 73 00
SUPPLEMENTARY CONDITIONS

PART 1 GENERAL

1.1 SUMMARY

- A. The following Supplementary Conditions amend and supplement the General Conditions defined in Document 00 72 00 - General Conditions and other provisions of Contract Documents as indicated below. Provisions that are not so amended or supplemented remain in full force and effect.
- B. The terms used in these Supplementary Conditions that are defined in the General Conditions have the meanings assigned to them in the General Conditions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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”.

1.8 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.

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

3.7.1 Delete Section 3.7.1.

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.

3.9 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.

3.11 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, including 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 be

computed for credits to the Owner and extras to the Contractor. The Owner shall receive full credit for the computed overhead and profit on credit change order items.

- 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 a Facility Planning and Control – 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 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 state 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

11.2 MINIMUM SCOPE AND LIMITS OF INSURANCE

11.2.1 Worker’s Compensation

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

****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.**

11.2.4 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

11.3.1.3 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 State of Louisiana self-insurance or commercial property policy through the Office of Risk Management (ORM), 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 ORM 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 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

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:

Diocese of Lake Charles
7680 Gulf Highway
Lake Charles, Louisiana, 70601
Attn: HS Project # 23.033 DOLC Project Number 20.00028.37.002

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 State of Louisiana, 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 State of Louisiana, 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 State of Louisiana, 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 State of Louisiana, all State 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 State of Louisiana, all State 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 State of Louisiana 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

11.4.2 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 Nineteenth Judicial Court in and for the Parish of East Baton Rouge, 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 Owner, and the Owner 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.

**ADDITIONAL TERMS AND CONDITIONS
FOR COMPLIANCE WITH 2 C.F.R. PART 200, APPENDIX II**

1. REMEDIES

The parties agree that the Owner reserves all rights and privileges under applicable laws and regulations with respect to this contract in the event of a breach of contract, including but not limited to the right to institute legal proceedings in a court of competent jurisdiction seeking monetary damages, court costs and litigation expenses, as applicable.

2. TERMINATION FOR CAUSE AND CONVENIENCE

The parties agree that the Owner reserves the right to terminate the contract immediately, with written notice to the Contractor, in the event of a breach or default of the Contractor, including but not limited to situations in which the Contractor fails, after a reasonable opportunity to cure, to: (1) meet schedules, deadlines, and/or delivery dates within the time specified in the procurement solicitation, contract, and/or a purchase order; (2) make any payments owed; or (3) otherwise perform in accordance with the contract and/or the procurement solicitation. The Owner also reserves the right to terminate the contract immediately, with written notice to the Contractor, for convenience, if the Owner believes that it is in the best interest of the Owner to do so. In the event of a termination for convenience of the Owner, the Contractor will be compensated only for work performed and goods provided by the Owner as of the termination date. The amount of compensation due the Contractor in the event of a termination for the convenience of the Owner shall be a reasonable amount, using as a guide factors such as the percentage of work or services performed by the Contractor and accepted by the Owner as of the date of termination, the contract price and any unit prices specified in the contract, as applicable.

3. EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this contract, the contractor agrees as follows:

- a. The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

- b. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

- c. The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.
- d. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- e. The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- f. The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- g. In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- h. The contractor will include the portion of the sentence immediately preceding paragraph (a) and the provisions of paragraphs (a) through (g) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: *Provided*, That if the applicant so participating is a State or local government, the

above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

4. COPELAND ANTI-KICKBACK ACT

- a. *Contractor.* The contractor shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this contract.
- b. *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clause above and such other clauses as FEMA may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these contract clauses.
- c. *Breach.* A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a contractor and subcontractor as provided in 29 C.F.R. §5.12.

5. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

- a. *Overtime requirements.* No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
- b. *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (a) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a) of this section, in the sum of \$27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a) of this section.
- c. *Withholding for unpaid wages and liquidated damages.* The Owner shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b) of this section.
- d. *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (a) through (d) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a) through (d) of this section.

6. RIGHTS TO INVENTIONS MADE UNDER A CONTRACT OR AGREEMENT

The parties agree to comply with the requirements of 37 CFR Part 401 (Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements), and any implementing regulations issued by FEMA.

7. CLEAN AIR ACT AND THE FEDERAL WATER POLLUTION CONTROL ACT

a. Clean Air Act

- 1. The contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq.

2. The contractor agrees to report each violation to the Owner and understands and agrees that the Owner will, in turn, report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.
 3. The contractor agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by FEMA.
- b. Federal Water Pollution Control Act
1. The contractor agrees to comply with all applicable standards, orders, or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.
 2. The contractor agrees to report each violation to the Owner and understands and agrees that the Owner will, in turn, report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.
 3. The contractor agrees to include these requirements in each subcontract exceeding \$150,000 financed in whole or in part with Federal assistance provided by FEMA.

8. DEBARMENT AND SUSPENSION

- a. This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such, the contractor is required to verify that none of the contractor's principals (defined at 2 C.F.R. § 180.995) or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).
- b. The contractor must comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.
- c. This certification is a material representation of fact relied upon by Owner. If it is later determined that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to Owner, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.
- d. The bidder or proposer agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

9. BYRD ANTI-LOBBYING AMENDMENT

Contractor must sign and submit to the Owner the following certification:

APPENDIX A. 44 C.F.R. PART 18- CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclose Form to Report Lobbying," in accordance with its instructions.
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The Contractor, _____ certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap. 38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

Signature of Contractor's Authorized Official

Name and Title of Contractor's Authorized Official

Date

11 PROCUREMENT OF RECOVERED MATERIALS

The Contractor agrees to comply with all applicable requirements of Section 6002 of the Solid Waste Disposal Act.

12 ACCESS TO RECORDS

The following access to records requirements apply to this contract:

- a. The Contractor agrees to provide Owner, the FEMA Administrator, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.
- b. The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.
- c. The Contractor agrees to provide the FEMA Administrator or his authorized representatives access to construction or other work sites pertaining to the work being completed under the contract.
- d. In compliance with the Disaster Recovery Act of 2018, the Owner and the Contractor acknowledge and agree that no language in this contract is intended to prohibit audits or internal reviews by the FEMA Administrator or the Comptroller General of the United States.

13. DRS SEAL, LOGO, AND FLAGS

The contractor shall not use the DHS seal(s), logos, crests, or reproductions of flags or likenesses of DHS agency officials without specific FEMA pre-approval.

14. COMPLIANCE WITH FEDERAL LAW, REGULATIONS, AND EXECUTIVE ORDERS

This is an acknowledgement that FEMA financial assistance will be used to fund all or a portion of the contract. The contractor will comply with all applicable Federal law, regulations, executive orders, FEMA policies, procedures, and directives.

15. NO OBLIGATION BY FEDERAL GOVERNMENT

The Federal Government is not a party to this contract and is not subject to any obligations or liabilities to the non-Federal entity, contractor, or any other party pertaining to any matter resulting from the contract.

16. PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS OR RELATED ACTS

The Contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the Contractor's actions pertaining to this contract.

Contractor

Diocese of Lake Charles

Signature of Contractor's authorized representative

Signature of Owner's authorized representative

Name Printed

Name Printed

Title

Title

Date

Date

Consolidated Resource Center (CRC)

Louisiana Specific EHP Completeness Checklist

The following checklist supports CRC EHP Specialists in identifying required SOW elements and documentation for a project to be considered complete and adequate for EHP Field review. Early and continual coordination between CRC EHP and EHP Field staff on projects will reduce and/or eliminate issues that cause delays, project re-works, and ineligible work. Please note that for work to be completed projects, EHP Field will acknowledge that some information cannot be provided in advance. In these situations, documentation can be provided before project close-out.

All Projects – Permanent Work

All permanent work projects should be reviewed for a complete and detailed damage description and SOW to include the following elements:

☐ Work Completed

- Work Completed may require after-the-fact consultation with the State Historic Preservation Officer (SHPO) and Tribes. To facilitate those consultations the following information must be included as an attachment to the project documentation:
 - Date(s) for when work was initiated and completed
 - Justification for completing work prior to FEMA review and approval.
 - For work on structures over 45 years old, photographs of the completed work and all sides of the facility or structure.

☐ FIRMettes

- All FIRMettes must be issued by the Region 6 Flood Mapping Mailbox
- FIRMettes are not required for:
 - Emergency actions under Category B (e.g. emergency protective measures, emergency response, temporary repairs, etc.)
 - In-kind repairs to electrical distribution systems that span multiple Parishes
 - In-kind repairs to park trails or roads only when the work does not include bridge(s), culvert(s), low water crossing(s), water-frontage trail(s), raised road elevation, or mitigation
 - Projects <\$5,000
 - This includes projects with multiple unique/independent site locations where the recovery costs for each location is <\$5,000
 - Permitted disposal facilities
 - Chop and drop activities that do not include staging

☐ Work in or Near Water or Wetlands

- *Work within intermittent or blue line stream and/or Major Rivers*
 - **No proof** of coordination with USACE required for a project when work has not begun, 0% complete.
 - **Written approval** or other coordination with USACE is **required** when the work is 100% complete.

☐ **H&H (Hydrologic and Hydrology) Study Requirements for Projects in Water**

Required for improvements or upsizing of culvert(s), major drainage improvements, bridge(s), or low water crossing(s) when they occur in the FEMA Regulatory or undesignated Floodways. A no-rise certification signed by a registered professional engineer and concurrence by the community floodplain administrator must also be included.

Debris Management (Cradle to Grave)

(Including debris associated with other categories of work)

In addition to “All Projects” requirements, debris projects should be reviewed for a complete and detailed damage description and SOW to include the following elements:

☐ **GPS Coordinates/Location/Scope of work**

- Collection location from public right of way (ROW) not required
- GPS coordinates and photographs must be included for root ball removal
- GPS coordinates for debris removal in water and method of removal must be included
- Any debris removal or stump removal already completed from a State Park must include documentation demonstrating coordination with the Louisiana State Historic Preservation Office, photographs and location information for removal and any staging.
- Rootball and/or stump removal from cemeteries must go through the standard Section 106 review process (consultation). If the applicant has contracted archaeological monitoring or other work for this removal, an archaeological report meeting the Louisiana Division of Archaeology’s standards will be required.

☐ **Debris Staging, Burning, and/or New Disposal Sites**

- Applicants are required to complete the “*Request for Approval of Temporary Debris Management Site*” form and submit to the Louisiana Department of Environmental Quality (LDEQ)
- Applicants are also required to complete the “Disposal Site Evaluation and Registry” form and submit to the State Historical Preservation Office (SHPO). SHPO will return the completed form to the Applicant. If the debris activity is on Tribal lands, the ‘Disposal Site Eval and Registry’ form goes to the Tribal Historic Preservation Officer or the designated preservation coordinator. Contact field EHP when in doubt. All debris activities must be indicated on the form. (SHPO forms are good for 5 years.)
 - Burning activities that do not require forms from LDEQ must follow the standard Section 106 review process (consultation).
- A copy of permit or correspondence from LDEQ, LDAF and/or the Parish related to any burning of debris and/or disposal including the spreading of ash or chips on site. Open air burning is governed by LDEQ’s Air Permit Division. Additionally, Louisiana burn bans are determined by the Louisiana Department of Agriculture and Forestry (not LDEQ) and is dependent upon weather conditions.
- LDEQ Burn Permit Exception: due to the rural area and/or proximity of corporate limits (i.e., 1,000 feet is considered the minimum distance a burn site should be located away from residences, businesses, schools, hospitals, clinics, and roads) to the burn location following activities are not subject to Control Outdoor Burning permits:

1. the burning of leaves, grass, twigs, branches, and vines by a private property owner on his own property for noncommercial purposes in parishes with a population of 300,000 or less, provided the property owner attends the burning of yard waste at all times. This exception shall not apply in the parish of East Baton Rouge.

2. The burning of trees, brush, grass, or other vegetable matter in any parish having a population of 90,000 or less, provided the location of the burning is not within the territorial limits of a city or town or adjacent to a city or town in such proximity that the ambient air of the city or town will be affected by smoke from the burning.

- Ash disposal of vegetative debris is permitted on Emergency Debris Sites (EDS) approved by LDEQ. **The scope of work must include the method of ash disposal.** Any ash disposal of vegetative debris must be properly land-applied (i.e., tilled into the soil) and may not be buried. Ash disposal that does not fit within these guidelines must be disposed at an approved landfill or may require a Best Management Practices (BMP) plan approved by LDAF and/or LDEQ (See BMP section below).
- LDEQ Exceptions: Trees/Stumps/Rootballs resulting from land and/or right-of-way clearing (includes staging) and are disposed of on site where generated are not subject to permitting requirements.

☐ **Debris to Landfill(s)**

- Scope of work must include the **operating name, address, latitude and longitude, and municipal solid waste permit number and/or AI number.**
- No LDEQ/SHPO approvals or permits need to be attached for any debris taken to a permitted landfill. If the project Scope of Work represents Parish-wide debris collection – curbside storage of debris is allowable as long as the PW indicates the final disposition of the debris.

☐ **Debris Removal from Water or Shoreline**

Will require a US Army Corps of Engineers (USACE) and/or a SHPO authorization.

Debris removal involving dredging, the discharge of dredge or fill material, or involves structures or work impacting the navigability, etc. of a waterway or drainage ditch requires USACE authorizations.

☐ **Utility poles**

- **For utility work, identify the final disposition of the damaged poles and transformers. Include the follow as it applies:**
 - If poles were disposed of at a permitted landfill, provide the location, operating name, and municipal solid waste permit number
 - If poles are being re-used by landowners, this must be indicated in the scope of work and the applicant must provide documentation of LDEQ approval for the reuse of the electrical poles by property owners
 - Provide GPS coordinates for all replaced poles regardless of whether they are going back into the existing holes (i.e., GPS start/stop and/or map showing the individual utility line locations are also acceptable).
 - If poles are being relocated, this must be indicated in the SOW along with GPS coordinates for the new location.
 - FIRMette(s) for new location(s) are required.
 - If poles or transformers contain hazardous materials, provide the name of materials and the manner in which it was managed/disposed of.

☐ **Invasive Species for Vegetative Debris in Quarantine Areas:**

• **Must provide the following if Invasive Species is triggered:**

- Origination location of the Vegetative debris, including GPS coordinates.
- Staging site and final disposal location of vegetative debris, GPS coordinates and permit number.
- LDAF permit if debris is moved from quarantined parish and temporary staging site/ final disposal site is outside of a quarantined parish

Species:

- **Citrus Greening** - Orleans, Washington, Jefferson, St. Bernard, Plaquemines
- **Citrus Canker** - Orleans, St. Bernard, Plaquemines, Jefferson, Lafourche, St. Charles, St. James, and St. John.
- **Roseau Can Scale** - Acadia; Ascension; Assumption; Beauregard; Calcasieu; Cameron; East Baton Rouge; Iberia; Iberville; Jefferson; Jefferson Davis; Lafayette; Lafourche; Livingston; Orleans; Plaquemines; St. Bernard; St. Charles; St. James; St. John; St. Martin; St. Mary; St. Tammany; Terrebonne; Vermillion; and West Baton Rouge AND portions of the following parishes that are south of Louisiana Highway 10: Allen; East Feliciana; Evangeline; Pointe Coupee; St. Landry; St. Helena; Tangipahoa; Vernon; Washington; and West Feliciana

☐ **Best Management Practices (BMPs) Approved by Louisiana Department of Agriculture (LDAF) Related to Staging, Burning, Disposal, or Recycling of Organic Solid Waste**

- Must have letter from LDAF approving BMP plan or site activity.
 - Project will be conditioned; sub-recipient /must submit LDAF approval to LDEQ, but no letter from LDEQ is required for project completeness.
- All actions taken at the disposal site must go through the standard Section 106 review process and may require consultation.

Emergency Protective Measures

☐ **Sandbags**

- **Identify the final disposition of the sandbags and include the following as applicable:**
 - Remained with residents.
 - If sandbags were disposed of at a permitted landfill provide the operating name, address, and municipal solid waste permit number
 - If uncontaminated sandbags are being removed to maintenance yard, municipality stockpile, or used for other purposes

☐ **Pumping**

- GPS Coordinates/Location of pump locations

☐ **Vector Control**

- Aerial/boundary maps of the targeted areas; areas where the chemical was applied
- Name and concentration of chemical to be used (must align with USFWS recommendations/guidance)
- Attach correspondence/coordination documentation from USFWS, CDC, DHH,

☐ **Temporary Levees**

- Attach correspondence/approval from USACE for emergency work.
- Disposal location of fill material to include permit information. Fill within a wetland or floodplain requires approval from USACE and the Floodplain Administrator.

☐ **Temporary Facilities**

- GPS coordinates and photographs
- Maps or aerial imagery of the project area with boundaries of proposed construction area; Photographs of the project site or facility.
- Narrative description of any ground-disturbing activities, including site preparation, laying new or expanding existing utilities, and expansion of existing footprints; Estimated maximum dimensions of any ground disturbance needed (depth, width).
- Temporary facilities funded under Section 403 are exempt from floodplain management review.

SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.1 PROJECT

- A. Project Name: New Church and Hall Christ the King Catholic Church.
- B. Owner's Name: Diocese of Lake Charles.
- C. Architect's Name: Hoffpauir Studio, LLC.
- D. The Project consists of the construction of a new church and hall building as indicated in Specifications and Drawings..

1.2 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on AIA Guarantee Maximum fixed lump sum as described in Document 00 52 00 - Agreement Form.

1.3 WORK BY OWNER

- A. Owner will supply the following for installation by Contractor:

1.4 OWNER OCCUPANCY

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.5 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
 - 1. Locate and conduct construction activities in ways that will limit disturbance to site.
- B. Arrange use of site and premises to allow:
 - 1. Work by Others.
 - 2. Work by Owner.
- C. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- D. Time Restrictions:
 - 1. Coordinate all working hours with Owner.
- E. Utility Outages and Shutdown:
 - 1. Prevent accidental disruption of utility services to other facilities.

1.6 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Owner and Architect.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Correlation of Contractor submittals based on changes.
- E. Procedures for preparation and submittal of application for final payment.

1.2 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703 Continuation Sheet for G702; edition stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section.
- F. Include in each line item, the amount of Allowances specified in this section.
- G. Include within each line item, a direct proportional amount of Contractor's overhead and profit.
- H. Revise schedule to list approved Change Orders with each Application For Payment.

1.3 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Owner to pay within 60 days after Architect approves pay app.
- B. Submit three copies of each application on Form AIA G702 - Application and Certificate for Payment and Form AIA G703 - Continuation Sheet for G702, edition stipulated in the Agreement.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.

5. Work in Place and Stored Materials under this Application.
 6. Authorized Change Orders.
 7. Total Completed to Date of Application.
 8. Balance to Finish.
 9. Retainage.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed.
- H. List each authorized Change Order as a separate line item including listing Change Order number and dollar amount as for an original item of work.
- I. Submit one electronic and three hard-copies of each Application for Payment.
- J. Include the following with the application:
1. Transmittal letter as specified for submittals in Section 01 30 00.
 2. Construction progress schedule.
- K. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date and line item by number and description.
- L. Do not include off-site stored materials in Application for Payment. Owner will not approve payment for off-site stored materials.

1.4 MODIFICATION PROCEDURES

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to Contract Documents.
- B. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- C. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change for subsequent inclusion in a Change Order.
1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 2. Promptly execute the change.
- D. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a estimated price quotation within 14 days.
- E. Contractor may propose a change by submitting a request for change to Architect describing the proposed change and its full effect on the work, with a statement describing the reason for the change and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 60 00.
- F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.

1. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.

G. Substantiation of Costs: Provide full information required for evaluation.

1. Provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Justification for any change in Contract Time.
 - d. Credit for deletions from Contract, similarly documented.

H. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

K. Promptly enter changes in Project Record Documents.

1.5 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:

1. All closeout procedures specified in Section 01 70 00.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 21 00

ALLOWANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cash allowances.
- B. Inspecting and testing allowances.
- C. Payment and modification procedures relating to allowances.

1.2 RELATED REQUIREMENTS

- A. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

1.3 CASH ALLOWANCES

- A. Costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, less applicable trade discounts, less cost of delivery to site, less applicable taxes .
- B. Architect Responsibilities:
 - 1. Consult with Contractor for consideration and selection of products, suppliers , and installers.
 - 2. Select products in consultation with Owner and transmit decision to Contractor.
 - 3. Prepare Change Order.
- C. Contractor Responsibilities:
 - 1. Assist Architect in selection of products, suppliers , and installers.
 - 2. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
 - 3. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - 4. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
- D. Differences in costs will be adjusted by Change Order.

1.4 INSPECTING AND TESTING ALLOWANCES

- A. Costs Included in Inspecting and Testing Allowances: Cost of engaging an inspecting or testing agency; execution of inspecting and tests; and reporting results.
- B. Costs Not Included in the Inspecting and Testing Allowances:
 - 1. Costs of incidental labor and facilities required to assist inspecting or testing agency.
 - 2. Costs of testing services used by Contractor separate from Contract Document requirements.
 - 3. Costs of retesting upon failure of previous tests as determined by Architect.
- C. Payment Procedures:
 - 1. Submit one copy of the inspecting or testing firm's invoice with next application for payment.

2. Pay invoice on approval by Architect.

D. Differences in cost will be adjusted by Change Order.

1.5 ALLOWANCES SCHEDULE

A. Sound System and Related Components: Include the stipulated sum of \$ \$50,000.00 for purchase, delivery, and installation.

B. Church Furnishings: Include the stipulated sum of \$275,000.00 for purchase and delivery of church furnishings.

C. Parish Hall Office Furnishings: Include the stipulated sum of \$30,000.00 for purchase and delivery of furnishings.

D. Door Hardware: Include the stipulated sum of \$35,000.00 for purchase and delivery of door hardware.

E. Unit Masonry: Include the stipulated sum of \$1,000.00/M for purchase and delivery of bricks.

F. Panel Signage: Include the stipulated sum of \$2,500.00 for purchase and delivery of signage.

G. Monument Sign: Include the stipulated sum of \$ 15,000.00 for purchase, delivery, and installation.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Description of Alternates.
- B. Procedures for pricing Alternates.
- C. Documentation of changes to Contract Price and Contract Time.
- D. Related Requirements
 - 1. Document 00 21 13 - Instructions to Bidders: Instructions for preparation of pricing for Alternates.
 - 2. Document 00 52 00 - Agreement Form: Incorporating monetary value of accepted Alternates.
- E. Acceptance of Alternates
 - 1. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- F. SCHEDULE OF ALTERNATES
 - 1. Alternate No. 1 - East and West Parking Areas:
 - a. Base Bid Item: Limestone parking lot east and west of building..
 - b. Alternate Item: Concrete paving on east and west of building.
 - 2. Alternate No. 2 - Exterior Wall Finish:
 - a. Base Bid Item: Metal wall panel for exterior at north, south, east walls. Brick water table and walls at west elevation. Brick columns at Covered Drop-Off and Covered Porch.
 - b. Alternate Item: Fiber cement siding with brick water table on exterior walls at north, south, east walls. Includes brick walls and pilasters at Covered Drop-Off and Covered Porch.
 - 3. Alternate No. 3 - Flooring and Walls:
 - a. Base Bid Item: Stained concrete all areas except Sanctuary. .
 - b. Alternate Item: Floor and Wall tile, LVT and other materials as shown on Finish Schedule.

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.2 RELATED REQUIREMENTS

- A. Section 01 21 00 - Allowances, for cash allowances affecting this section.
- B. Section 01 30 00 - Administrative Requirements: Submittal procedures, coordination.
- C. Section 01 60 00 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.3 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - a. Unavailability.
 - b. Regulatory changes.
- B. Substitutions: See General Conditions for definition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.

1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
1. No specific form is required. Contractor's Substitution Request documentation must include the following:
 - a. Project Information:
 - 1) Official project name and number, and any additional required identifiers established in Contract Documents.
 - b. Substitution Request Information:
 - 1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
 - 2) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
 - 3) Description of Substitution.
 - 4) Reason why the specified item cannot be provided.
 - 5) Differences between proposed substitution and specified item.
 - 6) Description of how proposed substitution affects other parts of work.
 - c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
 - 1) Warranties.
 - 2) Include, as appropriate or requested, the following types of documentation:
 - (a) Product Data:
 - (b) Samples.
 - (c) Certificates, test, reports or similar qualification data.
 - (d) Drawings, when required to show impact on adjacent construction elements.
 - d. Impact of Substitution:
 - 1) Change to Contract Time due to accepting substitution.
- D. Limit each request to a single proposed substitution item.
1. Submit an electronic document, combining the request form with supporting data into single document.

3.2 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Submit request for Substitution for Convenience within 14 days of discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
 3. Bear the costs engendered by proposed substitution of:

- a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
- B. Substitutions will not be considered under one or more of the following circumstances:
 - 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 - 2. Without a separate written request.
 - 3. When acceptance will require revisions to Contract Documents.

3.3 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.
 - 1. Architect's decision following review of proposed substitution will be noted on the submitted form.

3.4 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.5 CLOSEOUT ACTIVITIES

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

END OF SECTION

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General administrative requirements.
- B. Web-based project software service.
- C. Electronic document submittal service.
- D. Preconstruction meeting.
- E. Site mobilization meeting.
- F. Progress meetings.
- G. Contractor's daily reports.
- H. Progress photographs.
- I. Coordination drawings.
- J. Submittals for review, information, and project closeout.
- K. Number of copies of submittals.
- L. Requests for Interpretation (RFI) procedures.
- M. Submittal procedures.

1.2 RELATED REQUIREMENTS

- A. Section 00 72 00 - General Conditions: Dates for applications for payment.
- B. Section 01 60 00 - Product Requirements: General product requirements.
- C. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.
- D. Section 01 78 00 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.3 REFERENCE STANDARDS

- A. AIA G716 - Request for Information; 2004.
- B. AIA G810 - Transmittal Letter; 2001.
- C. CSI/CSC Form 12.1A - Submittal Transmittal; Current Edition.
- D. CSI/CSC Form 13.2A - Request for Information; Current Edition.

1.4 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 70 00 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:

1. Requests for Interpretation (RFI).
2. Requests for substitution.
3. Shop drawings, product data, and samples.
4. Test and inspection reports.
5. Design data.
6. Manufacturer's instructions and field reports.
7. Applications for payment and change order requests.
8. Progress schedules.
9. Coordination drawings.
10. Correction Punch List and Final Correction Punch List for Substantial Completion.
11. Closeout submittals.

1.5 PROJECT COORDINATOR

- A. Project Coordinator: Construction Manager.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
 1. Requests for Interpretation.
 2. Requests for substitution.
 3. Shop drawings, product data, and samples.
 4. Test and inspection reports.
 5. Design data.
 6. Manufacturer's instructions and field reports.
 7. Applications for payment and change order requests.
 8. Progress schedules.
 9. Coordination drawings.
 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 WEB-BASED PROJECT SOFTWARE SERVICE

- A. Web-Based Project Software Service: Provide, administer, and use web-based project software to host and manage project communication and documentation.
1. Include, at minimum, the following features:
 - a. Project directory, including Owner, Contractor, subcontractors, Architect, Architect's consultants, and other entities involved in the project. Include names of contact persons and contact information for each entity.
 - b. Access control for each entity and for each workflow process to determine each entity's digital rights to create, modify, view, and print documents.
 - c. Workflow planning, allowing customization of workflow for each project entity.
 - d. Creation, logging, tracking, and notification for project communications.
 - e. Tracking of project communication statuses in real time, including timestamped response log.
 - f. Procedures for viewing PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
 - g. Processing and tracking of payment applications.
 - h. Processing and tracking of contract modifications.
 - i. Creation and distribution of meeting minutes.
 - j. Document management for drawings, specifications, and coordination drawings, including revision control.
 - k. Management of construction progress photographs.
 - l. Mobile device compatibility.
 - m. Creation of data analytics reports.
 - n. Creation and export of editable logs for software functions. Provide Owner, Architect, and Architect's consultants with rights and ability to download logs when requested.
 2. Cost: Pay cost of service. Include the cost of the service in the contract sum.
 3. Provide user licenses for use by Owner, Architect, Architect's consultants, and other entities involved in the project.
 4. Comply with the software service's current published licensing agreements.
 5. Training: Provide one-hour, web-based training session for users of software service. Further training is the responsibility of the user.
 - a. Representatives of Owner are scheduled and included in this training.
 6. Project Closeout: Architect determines when to terminate the software service for the project and is responsible for obtaining archive copies of files for Owner.
 7. Web-Based Project Software Services: The selected service is:

3.2 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.

1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
 2. Contractor and Architect are required to use this service.
 3. It is Contractor's responsibility to submit documents in allowable format.
 4. Subcontractors, suppliers, and Architect's consultants are to be permitted to use the service at no extra charge.
 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Cost: The cost of the service is to be paid by Contractor; include the cost of the service in the Contract Sum.
- C. Submittal Service: The selected service is:
- D. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.
1. Representatives of Owner are scheduled and included in this training.
- E. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.3 PRECONSTRUCTION MEETING

- A. Attendance Required:
1. Owner.
 2. Architect.
 3. Contractor.
 4. Major Subcontractors.
- B. Agenda:
1. Execution of Owner-Contractor Agreement.
 2. Submission of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 5. Submission of initial Submittal schedule.
 6. Designation of personnel representing the parties to Contract and Architect.

7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 8. Scheduling.
 9. Scheduling activities of a Geotechnical Engineer.
- C. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 SITE MOBILIZATION MEETING

A. Attendance Required:

1. Contractor.
2. Owner.
3. Architect.
4. Special consultants.
5. Contractor's superintendent.
6. Major contractors, major subcontractors, and engineers .

B. Agenda:

1. Use of premises by Owner and Contractor.
2. Owner's requirements.
3. Construction facilities and controls provided by Owner.
4. Temporary utilities provided by Owner.
5. Survey and building layout.
6. Security and housekeeping procedures.
7. Schedules.
8. Application for payment procedures.
9. Procedures for testing.
10. Procedures for maintaining record documents.
11. Requirements for start-up of equipment.
12. Inspection and acceptance of equipment put into service during construction period.

- C. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.5 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the work at maximum monthly intervals.

B. Attendance Required:

1. Contractor.
2. Owner.

3. Architect.
4. Special consultants.
5. Contractor's superintendent.
6. Major subcontractors.
7. Suppliers.

C. Agenda:

1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to work.

- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.6 DAILY CONSTRUCTION REPORTS

- A. Include only factual information. Do not include personal remarks or opinions regarding operations and/or personnel.
- B. In addition to transmitting electronically a copy to Owner and Architect, submit two printed copies at weekly intervals.
1. Submit in format acceptable to Owner.
 2. Submit using required form, a sample of which is appended to this section.
- C. Prepare a daily construction report recording the following information concerning events at Project site and project progress:
1. Date.
 2. High and low temperatures, and general weather conditions.
 3. List of subcontractors at Project site.
 4. List of separate contractors at Project site.
 5. Approximate count of personnel at Project site.

- a. Include a breakdown for supervisors, laborers, journeymen, equipment operators, and helpers.
6. Major equipment at Project site.
7. Material deliveries.
8. Safety, environmental, or industrial relations incidents.
9. Meetings and significant decisions.
10. Unusual events (submit a separate special report).
11. Stoppages, delays, shortages, and losses. Include comparison between scheduled work activities (in Contractor's most recently updated and published schedule) and actual activities. Explain differences, if any. Note days or periods when no work was in progress and explain the reasons why.
12. Meter readings and similar recordings.
13. Emergency procedures.
14. Directives and requests of Authority(s) Having Jurisdiction (AHJ).
15. Change Orders received and implemented.
16. Testing and/or inspections performed.
17. List of verbal instruction given by Owner and/or Architect.
18. Signature of Contractor's authorized representative.

3.7 PROGRESS PHOTOGRAPHS

- A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.
- B. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.
- C. Photography Type: Digital; electronic files.
- D. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect.
- E. In addition to periodic, recurring views, take photographs of each of the following events:
 1. Completion of site clearing.
 2. Excavations in progress.
 3. Foundations in progress and upon completion.
 4. Structural framing in progress and upon completion.
 5. Enclosure of building, upon completion.
 6. Final completion, minimum of ten (10) photos.
- F. Views:
 1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.

2. Consult with Architect for instructions on views required.
 3. Provide factual presentation.
 4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
 5. Point of View Sketch: Provide sketch identifying point of view of each photograph.
- G. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
1. Delivery Medium: Via email.
 2. File Naming: Include project identification, date and time of view, and view identification.
 3. Point of View Sketch: Include digital copy of point of view sketch with each electronic submittal; include point of view identification in each photo file name.
 4. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
 5. Photo CD(s): Provide 1 copy including all photos cumulative to date and PDF file(s), with files organized in separate folders by submittal date.
 6. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.

3.8 COORDINATION DRAWINGS

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.

3.9 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare in a format and with content acceptable to Owner.
 - a. Use AIA G716 - Request for Information .
 3. Prepare using software provided by the Electronic Document Submittal Service.

4. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
 - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 2. Owner's, Architect's, and Contractor's names.
 3. Discrete and consecutive RFI number, and descriptive subject/title.
 4. Issue date, and requested reply date.
 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 2. Note dates of when each request is made, and when a response is received.

3. Highlight items requiring priority or expedited response.
 4. Highlight items for which a timely response has not been received to date.
 5. Identify and include improper or frivolous RFIs.
- H. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
1. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 2. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 3. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.10 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
1. Coordinate with Contractor's construction schedule and schedule of values.
 2. Format schedule to allow tracking of status of submittals throughout duration of construction.
 3. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
 4. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
 - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.11 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
1. Product data.
 - 1) Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.

- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

3.12 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 1) Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.
 - b. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.
 - c. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - d. Certificates may be recent or previous test results on material or product but must be acceptable to Architect/Engineer.
 - 3. Test reports.
 - a. Informational Submittal: Submit reports for Architect/Engineer's knowledge as Contract administrator or for Owner.
 - b. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - a. Informational Submittal: Submit manufacturer's installation instructions for Architect/Engineer's knowledge as Contract administrator or for Owner.
 - b. Submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, to Architect/Engineer in quantities specified for Product Data.
 - c. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
 - 6. Manufacturer's field reports.
 - a. Informational Submittal: Submit reports for Architect/Engineer's knowledge as Contract administrator or for Owner.
 - b. Submit report within 5 days of observation to Architect/Engineer for information.
 - c. Submit reports for information for assessing conformance with information given and design concept expressed in Contract Documents.
 - 7. Erection Drawings.
 - a. Informational Submittal: Submit Drawings for Architect/Engineer's knowledge as Contract administrator or for Owner.

- b. Submit Drawings for information assessing conformance with information given and design concept expressed in Contract Documents.
 - c. Data indicating inappropriate or unacceptable Work may be subject to action by Architect/Engineer or Owner.
- 8. Contractor Review.
 - a. Review for compliance with Contract Documents and approve submittals before transmitting to Architect.
 - b. Contractor: Responsible for:
 - 1) Determination and verification of materials including manufacturer's catalog numbers.
 - 2) Determination and verification of field measurements and field construction criteria.
 - 3) Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
 - 4) Determination of accuracy and completeness of dimensions and quantities.
 - 5) Confirmation and coordination of dimensions and field conditions at Site.
 - 6) Construction means, techniques, sequences, and procedures.
 - 7) Safety precautions.
 - 8) Coordination and performance of Work of all trades.
 - c. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.
 - d. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Architect/Engineer.
- 9. Field engineering daily reports.
- 10. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.
- C. SUBMITTALS FOR PROJECT CLOSEOUT
 - 1. Submit Correction Punch List for Substantial Completion.
 - 2. Submit Final Correction Punch List for Substantial Completion.
 - 3. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 78 00 - Closeout Submittals:
 - a. Project record documents.
 - b. Operation and maintenance data.
 - c. Warranties.
 - d. Bonds.
 - e. Other types as indicated.
 - 4. Final Property Survey.
 - 5. Submit for Owner's benefit during and after project completion.
- D. NUMBER OF COPIES OF SUBMITTALS
 - 1. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

2. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - a. After review, produce duplicates.
 - b. Retained samples will not be returned to Contractor unless specifically so stated.

3.13 SUBMITTAL PROCEDURES

A. General Requirements:

1. Use a single transmittal for related items.
2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
3. Transmit using approved form.
 - a. Use Form AIA G810.
4. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
7. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Upload submittals in electronic form to Electronic Document Submittal Service website.
8. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
 - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
9. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
10. Provide space for Contractor and Architect review stamps.
11. When revised for resubmission, identify all changes made since previous submission.
12. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
13. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
14. Submittals not requested will not be recognized or processed.

B. Product Data Procedures:

1. Submit only information required by individual specification sections.
2. Collect required information into a single submittal.
3. Submit concurrently with related shop drawing submittal.
4. Do not submit (Material) Safety Data Sheets for materials or products.

C. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
2. Do not reproduce Contract Documents to create shop drawings.
3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:

1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.

E. SUBMITTAL REVIEW

1. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
2. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
3. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
 - a. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
4. Architect's and consultants' actions on items submitted for review:
 - a. Authorizing purchasing, fabrication, delivery, and installation:
 - 1) "Approved", or language with same legal meaning.
 - 2) "Approved as Noted, Resubmission not required", or language with same legal meaning.
 - (a) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
 - 3) "Approved as Noted, Resubmit for Record", or language with same legal meaning.
 - (a) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of project record documents.
 - (b) Non-responsive resubmittals may be rejected.
 - b. Not Authorizing fabrication, delivery, and installation:
 - 1) "Revise and Resubmit".

- (a) Resubmit revised item, with review notations acknowledged and incorporated.
 - (b) Non-responsive resubmittals may be rejected.
- 2) "Rejected".
 - (a) Submit item complying with requirements of Contract Documents.
- 5. Architect's and consultants' actions on items submitted for information:
 - a. Items for which no action was taken:
 - 1) "Received" - to notify the Contractor that the submittal has been received for record only.
 - b. Items for which action was taken:
 - 1) "Reviewed" - no further action is required from Contractor.

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, with network analysis diagrams and reports.

1.2 REFERENCE STANDARDS

- A. AGC (CPSM) - Construction Planning and Scheduling Manual; 2004.
- B. M-H (CPM) - CPM in Construction Management - Project Management with CPM; 2016, with Addendum (2021).

1.3 SUBMITTALS

- A. Within 14 days after date established in Notice to Proceed, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.
- F. Submit in PDF format.
- G. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect/Engineer.
- H. Submit under transmittal letter form specified in Section 01 30 00 - Administrative Requirements.

1.4 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.
- B. Contractor's Administrative Personnel: documented experience in using and monitoring CPM schedules on comparable projects.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.2 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- D. Coordinate content with schedule of values specified in Section 01 20 00 - Price and Payment Procedures.
- E. Provide legend for symbols and abbreviations used.

3.3 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.4 NETWORK ANALYSIS

- A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.
- B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.
 - 2. Activity description.
 - 3. Estimated duration of activity, in maximum 15 day intervals.
 - 4. Earliest start date.
 - 5. Earliest finish date.
 - 6. Actual start date.
 - 7. Actual finish date.
 - 8. Latest start date.
 - 9. Latest finish date.
 - 10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
 - 11. Monetary value of activity, keyed to Schedule of Values.
 - 12. Percentage of activity completed.
 - 13. Responsibility.
- D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.

- E. Required Reports: List activities in sorts or groups:
 - 1. By preceding work item or event number from lowest to highest.
 - 2. By amount of float, then in order of early start.

3.5 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.6 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision with projected completion date of each activity: overall percent complete, projected, and actual.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. Provide narrative progress report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect including the effects of changes on schedules of separate contractors.

3.7 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

SUBMITTAL PROCEDURES

PART 1 GENERAL

2.1 SECTION INCLUDES

- A. Definitions.
- B. Submittal procedures.
- C. Proposed product list.
- D. Product data.
- E. Shop Drawings.
- F. Samples.
- G. Other submittals.
- H. Design data.
- I. Architect/Engineer review.

2.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action.
- B. Informational Submittals: Written and graphic information and physical Samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

2.3 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Architect/Engineer-accepted form.
- B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.
- C. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.
- D. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite Project, and deliver to Architect at business address. Coordinate submission of related items.
- F. For each submittal for review, allow 21 days excluding delivery time to and from Contractor.
- G. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.
- H. Allow space on submittals for Contractor and Architect/Engineer review stamps.

- I. When revised for resubmission, identify changes made since previous submission.
- J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- K. Submittals not requested will not be recognized nor processed.
- L. Incomplete Submittals: Architect/Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Architect/Engineer.

2.4 PROPOSED PRODUCT LIST

- A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

2.5 PRODUCT DATA

- A. Product Data: Action Submittal: Submit to Architect/Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Submit number of copies Contractor requires, plus two copies Architect will retain.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

2.6 SHOP DRAWINGS

- A. Shop Drawings: Action Submittal: Submit to Architect/Engineer for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.
 - 1. Include signed and sealed calculations to support design.
 - 2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
 - 3. Make revisions and provide additional information when required by authorities having jurisdiction.
- D. Submit in form of one reproducible transparency and one opaque reproduction.
- E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

2.7 SAMPLES

- A. Samples: Action Submittal: Submit to Architect for assessing conformance with information given and design concept expressed in Contract Documents.

- B. Samples for Selection as Specified in Product Sections:
 - 1. Submit to Architect for aesthetic, color, and finish selection.
 - 2. Submit Samples of finishes, textures, and patterns for Architect/Engineer selection.
- C. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.
- D. Include identification on each Sample, with full Project information.
- E. Submit number of Samples specified in individual Specification Sections; Architect will retain one Sample.
- F. Reviewed Samples that may be used in the Work are indicated in individual Specification Sections.
- G. Samples will not be used for testing purposes unless specifically stated in Specification Section.
- H. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

2.8 OTHER SUBMITTALS

- A. Closeout Submittals: Comply with Section 01 70 00 - Execution and Closeout Requirements.
- B. Informational Submittal: Submit data for Architect/Engineer's knowledge as Contract administrator or for Owner.
- C. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.

2.9 ARCHITECT/ENGINEER REVIEW

- A. Do not make "mass submittals" to Architect/Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 15 or more submittals or items in one week. If "mass submittals" are received, Architect/Engineer's review time stated above will be extended as necessary to perform proper review. Architect/Engineer will review "mass submittals" based on priority determined by Architect/Engineer after consultation with Owner and Contractor.
- B. Informational submittals and other similar data are for Architect/Engineer's information, do not require Architect/Engineer's responsive action, and will not be reviewed or returned with comment.
- C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.
- D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order.
- E. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Control of installation.
- F. Mock-ups.
- G. Tolerances.
- H. Manufacturers' field services.
- I. Defect assessment.

1.2 RELATED REQUIREMENTS

- A. Document 00 72 00 - General Conditions: Inspections and approvals required by public authorities.
- B. Section 01 21 00 - Allowances: Allowance for payment of testing services.
- C. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- D. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.3 REFERENCE STANDARDS

- A. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2023.
- B. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2021.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
- C. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.

- e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.
2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
- D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
- 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- F. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
- 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
- G. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
- 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications:

- 1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
- 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
- 3. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.

B. Mockups -- Build mock-ups to do the following:

- 1. Verify selections made under Sample submittals.
- 2. Demonstrate aesthetic effects.
- 3. Demonstrate the qualities of products and workmanship.
- 4. Demonstrate acceptable coordination between components and systems.
- 5. Perform preconstruction testing, such as window air- and water-leakage testing.

- C. Fabrication: Before fabricating or installing portions of the Work requiring mock-ups, build mock-ups for each form of construction and finish required. Use materials and installation methods as required for the Work.
 - 1. Build mock-ups of size indicated.
 - 2. Build mock-ups in location indicated or, if not indicated, as directed by Architect or Construction Manager.
 - 3. Employ supervisory personnel who will oversee mock-up construction. Employ workers who will be employed to perform same tasks during the construction at Project.
 - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 5. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Demolish and remove mock-ups when directed unless otherwise indicated.
- D. Notifications:
 - 1. Notify Architect and Construction Manager seven days in advance of the dates and times when mock-ups will be constructed.
 - 2. Notify Architect and Construction Manager 14 days in advance of the dates and times when mock-ups will be tested.
 - 3. Allow seven days for initial review and each re-review of each mock-up.
- E. Approval: Obtain Architect's and Construction Manager's approval of mock-ups before starting fabrication or construction of corresponding Work.
 - 1. Unless otherwise indicated, approved mock-ups establish the standard by which the Work will be judged.
 - 2. Approval of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.7 LABELING

- A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.
- C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.8 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Owner will employ and pay for services of an independent testing agency to perform other specified testing and inspection.
- B. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- C. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- D. Contractor Employed Agency:
- E. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by **Architect**.
 - 1. Laboratory: Authorized to operate in Louisiana.
 - 2. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
 - 3. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS

2.1 INTEGRATED EXTERIOR MOCK-UPS

- A. Construct integrated exterior mock-ups according to approved mock-up Shop Drawings. Construct mock-ups to demonstrate constructability, coordination of trades, and sequencing of Work, and to ensure materials, components, subassemblies, assemblies, and interfaces integrate into a system complying with indicated performance and aesthetic requirements.
- B. Design and construct foundation and superstructure to support free-standing integrated exterior mock-ups.
- C. Build integrated exterior mock-ups using installers and construction methods that will be used in completed construction.
- D. Use specified products that have been approved by Architect. Coordinate installation of materials and products specified in individual Specification Sections that include Work included in integrated exterior mock-ups.
- E. The Work of integrated exterior mock-ups includes but is not limited to the following:

- F. Cold-formed metal framing and sheathing.
- G. Air and weather barriers.
- H. Thermal insulation.
- I. Through-wall flashing.
- J. Flashing and sheet metal trim.
- K. Joint sealants.
- L. Aluminum clad windows.
- M. Photographic Documentation: Document construction of integrated exterior mock-ups. Provide photographs showing details of interface of different materials and assemblies.
- N. Document testing procedures including water leakage and other deficiencies. Photograph modifications to component interfaces intended to correct deficiencies.
- O. Provide and document modifications to construction details and interfaces between components and systems required to properly sequence the Work or to pass performance testing requirements. Obtain Architect's approval for modifications.

PART 3 EXECUTION

3.1 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.
 - 1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
 - 2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
 - 3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Architect/Engineer for final decision.

3.2 MOCK-UPS

- A. Coordinate schedule for construction of mock-ups, so construction, testing, and review of mock-ups do not impact Project schedule.

- B. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- C. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.
- D. Integrated Exterior Mock-ups: Construct integrated exterior mock-up as indicated on drawings. Coordinate installation of exterior envelope materials and products as required in individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.
 - 1. Include plans, elevations, sections, and mounting attachment and support details.
 - 2. Indicate manufacturer and model number of individual components, subassemblies, and assemblies.
 - 3. Include site location drawing indicating orientation of mock-up.
 - 4. Revise and resubmit Shop Drawings to reflect approved modifications in details and component interfaces resulting from changes made during testing procedures.
- E. Preinstallation Conference: Conduct conference at Project site .
 - 1. Meet with Owner, Construction Manager, Architect, testing and inspecting agency representative, and installers of major systems whose Work is included in integrated exterior mock-ups.
 - 2. Review locations and extent of mock-ups.
 - 3. Review testing procedures to be performed on mock-ups.
 - 4. Review and finalize schedule for mock-ups, and verify availability of materials, personnel, equipment, and facilities needed to complete mock-ups and testing, and maintain schedule for the Work.
- F. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- G. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- H. Architect will use accepted mock-ups as a comparison standard for the remaining Work.
- I. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.4 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:

1. Test samples of mixes submitted by Contractor.
 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 3. Perform specified sampling and testing of products in accordance with specified standards.
 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 6. Perform additional tests and inspections required by Architect.
 7. Attend preconstruction meetings and progress meetings.
 8. Submit reports of all tests/inspections specified by independent firm to Architect, Contractor, and authorities having jurisdiction, in duplicate, indicating observations and results of tests and compliance or noncompliance with Contract Documents.
 9. After each test, promptly submit two copies of report to Architect, Contractor, and authorities having jurisdiction. When requested by Architect, provide interpretation of test results. Include the following:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and Specification Section.
 - f. Location in Project.
 - g. Type of inspection or test.
 - h. Date of test.
 - i. Results of tests.
 - j. Conformance with Contract Documents.
 - k. Submit final report indicating correction of Work previously reported as noncompliant.
- C. Limits on Testing/Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the Work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
1. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 2. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 3. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 4. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.5 MANUFACTURERS' FIELD SERVICES

- 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 equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Architect 30 days in advance of required observations.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.6 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If in the opinion of Architect it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.
- C. The defective/non-conforming Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Architect and Owner.
- D. Defective/non-conforming work will be partially repaired to instructions of Architect and Owner, and unit sum/price will be adjusted to new sum/price at discretion of Architect and Owner.
- E. Individual specification sections may modify these options or may identify specific formula or percentage sum/price reduction
- F. Authority of Architect and Owner to assess defects and identify payment adjustments is final.
- G. Non-Payment For Rejected Products: Payment will not be made for rejected products for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from transporting vehicle.
 - 4. Products placed beyond lines and levels of required Work.
 - 5. Products remaining on hand after completion of the Work.
 - 6. Loading, hauling, and disposing of rejected products.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary telecommunications services.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers, enclosures, and fencing.
- D. Fire Prevention Facilities.
- E. On-site personnel.
- F. Water infiltration.
- G. Security requirements.
- H. Vehicular access and parking.
- I. Waste removal facilities and services.
- J. Project identification.
- K. Field offices.

1.2 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.
- B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

1.3 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Internet Service: Provide, maintain, and pay for broadband or faster Internet service to field office at time of Project mobilization. Provide desktop computer with Microsoft operating system and appropriate office function software, modem, and printer.

1.4 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

1.5 TEMPORARY CONTROLS

- A. BARRIERS
 - 1. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.

2. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
3. Provide protection for plants designated to remain. Replace damaged plants.
4. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

B. FENCING

1. Construction: Commercial grade chain link fence.
2. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

C. EXTERIOR ENCLOSURES

1. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.6 FIRE PREVENTION FACILITIES

- A. Prohibit smoking within buildings under construction. Designate area on Site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
- B. Establish fire watch for cutting, welding, and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.
- C. Standpipes are required during construction for buildings more than three stories high.
- D. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.
- E. Provide one fire extinguisher at each stairway on each floor of buildings under construction.
- F. Provide minimum of one fire extinguisher in every construction trailer and storage shed.
- G. Provide minimum of one fire extinguisher on roof during roofing operations using heat-producing equipment

1.7 ON-SITE PERSONNEL

- A. Contractor shall provide a full-time on-site Project Superintendent to perform the duties of a project superintendent for the duration of the project. Project Superintendent shall have experience in constructing projects of similar scope and nature.

1.8 WATER INFILTRATION

- A. Contractor shall maintain a strict policy for the control of water infiltration and moisture build-up during the course of the project and shall comply with the following protocol for dealing with mold and mildew. The Contractor shall require each Subcontractor to expressly acknowledge and agree that the following guidelines and protocol are incorporated as material terms and conditions of each Subcontract. The Contractor and all Subcontractors hereby are obligated as follows:
 1. Water Infiltration: Any person who observes water infiltration (unintended) into a completed building or an ongoing construction site must immediately report the condition to the Contractor who shall be principally responsible for immediate mitigation. The Contractor shall immediately take steps to investigate the source of the water infiltration, identify the responsible party (person who performed work that resulted in water infiltration) and, on an emergency basis, take all temporary steps to stop the water infiltration into the building. Within 24 hours of initial

observation, the Contractor shall report the condition to the Owner/Architect and initiate permanent repairs.

2. Handling of Water-Damaged Building Materials and Construction: Closely inspect all building materials delivered to the site for pre-existing water damage as well as existing mold growth prior to installation. No building materials with pre-existing water damage or mold growth may be installed.
 3. If in-place construction becomes wet, the Contractor shall notify the Owner/Architect and the Contractor shall determine whether or not the work must be removed and replaced or if the material can be permitted to dry.
 4. The Contractor shall immediately provide written notice to the responsible Subcontractor or Vender together with a demand that their insurance carrier be notified of a potential claim. Similar notice must be immediately given to any other subcontractor responsible for the work which permitted the moisture to infiltrate the project and damage the material. Under no circumstances may new or additional construction be placed over or otherwise enclose wet building materials.
- B. Visible Mold/Mildew: Any person who observes any substance that appears to be mold or other fungal growth and/or an unidentified substance within a completed building or an ongoing construction site shall immediately suspend construction operations in the area and report the condition to the Contractor who shall immediately report the condition to the Owner/Architect. No person shall be allowed back into the affected area without the permission of the Contractor.
- C. The Contractor shall remediate all materials, equipment, etc., that has evidence of mold and mildew in accordance with applicable code requirements.

1.9 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.10 VEHICULAR ACCESS AND PARKING

- A. Coordinate access and haul routes with governing authorities and Owner.
- B. Provide and maintain access to fire hydrants free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
- E. Existing parking areas may not be used for construction parking.
- F. Do not allow vehicle parking on existing pavement.

1.11 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces before enclosing spaces.
- C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and rubbish from Site periodically, and dispose of off-Site.

- E. Provide containers with lids. Remove trash from site periodically.
- F. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- G. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.12 PROJECT IDENTIFICATION

- A. Provide 8' x 8' full color project identification sign of design and construction.
- B. Erect on site at location established by Architect.
- C. No other signs are allowed without Owner permission except those required by law.

1.13 FIELD OFFICES

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- C. Locate offices a minimum distance of 30 feet from existing and new structures.
- D. Storage Areas and Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and inspection of products to suit requirements in Section 01 60 00 - Product Requirements.

1.14 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.
- E. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.
- E. Procedures for Owner-supplied products.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 RELATED REQUIREMENTS

- A. Section 01 25 00 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- B. Section 01 40 00 - Quality Requirements: Product quality monitoring.

1.3 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 30 days after date of Agreement.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project, indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.1 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.

- B. See Section 01 40 00 - Quality Requirements for additional source quality control requirements.
- C. Use of products having any of the following characteristics is not permitted:
 - 1. Containing lead, cadmium, or asbestos.

2.2 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
- C. Products Specified as Basis-of-Design: Submit substitution requests for unnamed products to Architect for evaluation.
- D. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.

2.3 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

- A. See Section 01 25 00 - Substitution Procedures.

3.2 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.3 STORAGE AND PROTECTION

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.

- B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- C. Store and protect products in accordance with manufacturers' instructions.
- D. Store with seals and labels intact and legible.
- E. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities, amounts, and unit counts.
- F. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- G. For exterior storage of fabricated products, place on sloped supports above ground.
- H. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- I. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- J. Comply with manufacturer's warranty conditions, if any.
- K. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- L. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- M. Prevent contact with material that may cause corrosion, discoloration, or staining.
- N. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- O. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Pre-installation meetings.
- C. Cutting and patching.
- D. Surveying for laying out the work.
- E. Cleaning and protection.
- F. Starting of systems and equipment.
- G. Demonstration and instruction of Owner personnel.
- H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- I. General requirements for maintenance service.
- J. Closeout Meeting.

1.2 RELATED REQUIREMENTS

- A. Section 01 10 00 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.
- C. Section 01 50 00 - Temporary Facilities and Controls: Temporary exterior enclosures.
- D. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.

1.3 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.

1.5 QUALIFICATIONS

- A. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in Louisiana. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.

1.6 PROJECT CONDITIONS

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills and from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 1. Comply with sediment and erosion control plan indicated on Drawings.
 - 2. Minimize amount of bare soil exposed at one time.
 - 3. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
 - 4. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
 - 5. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- G. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.7 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new 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.

- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
 - 1. Coordination drawings: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination during fabrication or installation to fit in space provided or to function as intended. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.
- E. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and subcontractors to ensure coordination of work.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate sections.
- H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents in order to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.1 PATCHING MATERIALS

- A. New Materials: As specified in product sections, match existing products and work for patching and extending work.
- B. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.

- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting or affected by work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation, and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after the meeting to the participants with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Control datum for survey is that indicated on drawings.
- D. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- E. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- G. Utilize recognized engineering survey practices.
- H. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations.
- I. Periodically verify layouts by same means.
- J. Maintain a complete and accurate log of control and survey work as it progresses.
- K. On completion of foundation walls and major site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.

3.5 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions unless otherwise indicated.
- E. Make neat transitions between different surfaces maintaining texture and appearance.

3.6 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
 - 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- C. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- D. Refinish existing surfaces as indicated:
 - 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
 - 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- E. Clean existing systems and equipment.
- F. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- G. Comply with all other applicable requirements of this section.

3.7 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.

6. Repair new work damaged by subsequent work.
 7. Remove samples of installed work for testing when requested.
 8. Remove and replace defective and non-complying work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
 - E. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements and sight exposed surfaces.
 - F. Cut rigid materials using masonry saw or core drill. Pneumatic tools are not allowed without prior approval.
 - G. Restore work with new products in accordance with requirements of Contract Documents.
 - H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
 - I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material , to full thickness of the penetrated element.
 - J. Patching:
 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 2. Match color, texture, and appearance.
 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.8 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.9 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

- G. Prohibit traffic from landscaped areas.

3.10 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.11 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time at equipment location.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.
- E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data that becomes apparent during instruction.
- G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

3.12 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Testing, adjusting, and balancing HVAC systems: See Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.

3.13 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment by experienced personnel.
- B. Use cleaning materials that are nonhazardous.

- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Clean filters of operating equipment.
- G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- H. Clean site; sweep paved areas; rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in a legal manner; do not burn or bury.

3.14 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to Architect and Owner.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and is ready for Architect's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.15 CLOSEOUT MEETING

- A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.
- B. Attendance Required: Contractor, Contractor, Subcontractors, Architect, Engineer, Owner, and others appropriate to agenda.
- C. Notify Architect four days in advance of meeting date.
- D. Minimum Agenda:
 - 1. Start-up of facilities and systems.
 - 2. Operations and maintenance manuals.

3. Testing, adjusting, and balancing.
4. System demonstration and observation.
5. Operation and maintenance instructions for Owner's personnel.
6. Contractor's inspection of Work.
7. Contractor's preparation of an initial "punch list".
8. Procedure to request Architect/Engineer inspection to determine date of Completion time for correcting deficiencies.
9. Inspections by authorities having jurisdiction.
10. Certificate of Occupancy and transfer of insurance responsibilities.
11. Partial release of retainage.
12. Final cleaning.
13. Preparation for final inspection.
14. Closeout Submittals:
 - a. Project record documents.
 - b. Operating and maintenance documents.
 - c. Operating and maintenance materials.
 - d. Affidavits.
15. Final Application of Payment.
16. Contractor's demobilization of Site.
17. Maintenance.
18. Record minutes and distribute copies to participants within two days after meeting.

3.16 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or if not indicated not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project record documents.
- B. Operation and maintenance data.
- C. Materials transparency manual.
- D. Warranties and bonds.

1.2 RELATED REQUIREMENTS

- A. Section 00 72 00 - General Conditions and 00 73 00 - Supplementary Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

- A. Make final change-over of locks eliminating construction master-key system and transmit keys directly to Owner. Advise Owner's personnel of change-over in security provisions.
- B. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- C. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit in PDF composite electronic indexed file of final manual two sets of revised final documents in final form within 10 days after final inspection.
- D. Materials Transparency Manual:
 - 1. Compile and submit a digital and a printed version of information disclosing materials content for interior finishes, furnishings (including workstations), built-in furniture. Meet IWBI (BS) requirements for format and content.
- E. Warranties and Bonds:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
2. Make other submittals within 10 days after Date of Substantial Completion and prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 1. Drawings.
 2. Specifications.
 3. Addenda.
 4. Change Orders and other modifications to the Contract.
 5. Reviewed shop drawings, product data, and samples.
 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section a description of actual products installed including the following:
 1. Manufacturer's name and product model and number.
 2. Product substitutions or alternates utilized.
 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 1. Measured depths of foundations in relation to finish first floor datum.
 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 4. Field changes of dimension and detail.
 5. Details not on original Contract drawings.

3.2 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers including local source of supplies and replacement parts.

- B. Product Data: Mark each sheet to clearly identify specific products and component parts and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.

- I. Include sequence of operation by controls manufacturer.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- L. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- M. Include test and balancing reports.
- N. Additional Requirements: As specified in individual product specification sections.

3.5 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use with data arranged in the same sequence as and identified by the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider using the same identification as on the divider tab. Where multiple volumes are required, include all volumes Tables of Contents in each volume with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents of all volumes and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system then by product category.
 - a. Source data.
 - b. Operation and maintenance data.
 - c. Original warranties and bonds.
 - 4. Design Data: To allow for addition of design data furnished by Architect or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.

3.6 WARRANTIES AND BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Include originals of each in operation and maintenance manuals indexed separately on Table of Contents.

END OF SECTION

SECTION 03 10 00 - CONCRETE FORMWORK AND FORM ACCESSORIES

PART 1 - GENERAL

1.01 DESCRIPTION

This section covers design, construction, and treatment of formwork to confine and shape concrete to the required dimensions.

1.02 REFERENCE STANDARDS

A. ACI STANDARDS

ACI 117

ACI 301

ACI 318

B. ASTM STANDARDS

A 185-02

A 615-04b

C31 – 03a

C39 – 03

D994 – 98

D1751 – 99

FS

FS-SS-S-00210

1.03 SUBMITTALS

- A. Formwork Release Agent: Submit data on the Formwork release agent proposed for use with each form surface to be used for acceptance unless otherwise specified in the Contract Documents.
- B. Shop Drawings: When required by Contract Documents, submit shop drawings for Formwork.
- C. Re-shoring: When re-shoring is permitted or required, submit for acceptance the plan of re-shoring procedures and operations in advance.
- D. Control Joints for slabs on grade: If control joints are not shown in slabs on grade on the structural plans, the Contractor is to submit a drawing showing the proposed joint locations to the Architect for approval. Unless otherwise noted on the plans, control joints shall be spaced at 13' - 0" on center each way and shall be no closer than 5' - 0" from grade beam centerlines. Controls can be formed cold joints or saw joints. If saw joints are used the depth shall be as shown on the plans or 25% of the total slab depth. Saw joints shall be installed as soon as the concrete has cured enough such that the saw will not leave an impression on the concrete.

- E. Control Joint Filler: Submit data on control joint filler to be used for acceptance.
- F. Construction Joints: If construction joints other than those indicated in the contract documents are desired, submit a request for acceptance.
- G. Vapor Barrier: Submit data on under-slab vapor barrier for acceptance.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Form-facing material shall be plywood, tempered concrete-form-grade hardboard, metal, plastic, paper or other acceptable material capable of producing the desired finish. Form-facing material shall produce a smooth, uniform texture on the concrete. Do not use form-facing material with raised grain, torn surfaces, worn edges, patches, dents, or other defects that will impair the texture of concrete surfaces.
- B. Formwork Accessories: Use commercially manufactured accessories for formwork accessories that are partially or wholly embedded in concrete, including ties and hangers. Do not use non-fabricated wire form ties. Where indicated in the Contract Documents, use form ties with integral water barrier plates in walls.
- C. Formwork Release Agents: Use commercially manufactured form release agents that will prevent formwork absorption of moisture, prevent bond with concrete, and not stain the concrete surfaces.
- D. Expansion Joint Filler: Pre-molded expansion joint filler shall conform to ASTM D994, ASTM D1751, or ASTM D1752.
- E. Control Joint Filler: Joint filler is to be either Euco Qwik Joint 200 manufactured by the Euclid Chemical Co., Joint Tite 750 manufactured by L & M Construction Chemicals, Inc., or Sikadur 51 SL manufactured by the Sika Corporation
- F. Other Embedded Items: Sleeves, inserts, anchors, and other embedded items shall be of the material and design indicated in the Contract Documents.
- G. Water Stops: Water stop materials shall be a single component, self-sealing adhesive compound, SF302 Synko-Flex water stop or an approved equal meeting the requirements of FS-SSS-210 and shall have a cross sectional area (as extruded) 1" x 1". Cross section (as installed) 5/8" x 1-1/2".
- H. Foam Board: Lightweight inert compressible materials with a minimum density of 0.70 pounds per cubic foot and a minimum compressive resistance at 1% minimum deformation of 320 pounds per square foot. Foam board shall cover the full width of the member above.
- I. Cardboard Form Boxes: Form boxes are double wall corrugated fiber boards, laminated with water resistant adhesives and impregnated with waterproofing agents. Assembled units shall be capable of safely supporting a sustained 350#/sq. ft. for a minimum of thirty-six (36) hours after concrete has been placed. Provide all accessories to prevent concrete intrusion into the form boxes. Assemble per manufacturer's recommendations.
- J. Unless otherwise specified, provide minimum 15 mil vapor barrier under building slabs similar to WR Meadows Sealtight Perminator or Stego Wrap Vapor Barrier. Seal vapor barrier joints with tape as required by manufacturer.

2.02 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Design and engineering of formwork shall be the responsibility of the Contractor. When required by the Contract Documents, design of formwork and preparation of formwork drawings shall be under the supervision of a professional engineer registered in the state where the work will be done.
- B. Design formwork for construction loads, lateral pressure, and requirements of the applicable building code. Design formwork to withstand the pressure resulting from placement and vibration of concrete and to maintain specified tolerances.
- C. Do not use earth cuts as forms for vertical or sloping surfaces unless required or permitted by the Contract Documents.
- D. Maximum deflection of facing materials reflected on concrete surfaces exposed to view shall be $1/240$ of the span between structural members of the formwork except for architectural concrete.
- E. Locate and detail formed joints to the following requirements:

Locate and form construction joints that least impair strength of the structure, and submit information for acceptance of proposed location and treatment of construction joints that are not indicated on the project drawings. In general, locate construction joints near the middle of the spans of slabs, beams, and girders. When a beam intersects a girder at this joint, the joint in the girder shall be offset a distance equal to or greater than twice the width of the beam. Located joints in walls and columns at the underside of floors, slabs, beams, or girders and at the tops of footings or floor slabs. Make joints perpendicular to the main reinforcement.

- F. Provide saw cut control joints in slabs on grade spaced at 12' - 6" maximum centers in both directions unless they are shown otherwise on the plans. Sawing is to begin as soon as the surface is firm enough so that it will not be torn or damaged by the blade.
- G. For smooth form finish, arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to a practical minimum. Support facing material with studs or other backing capable of preventing excessive deflection within the tolerances specified.

2.03 FABRICATION AND MANUFACTURE

- A. Formwork shall be tight to prevent loss of mortar from concrete. Provide watertight formwork when architectural concrete is specified.
- B. Place $3/4$ " minimum chamfer strips in the corners of formwork to produce beveled edges on permanently exposed surfaces unless otherwise specified. Do not bevel re-entrant corners of edges of formed joints of concrete unless specified in the Contract Documents.
- C. Provide temporary openings at the base of column and wall formwork and at other points where necessary to facilitate cleaning and inspection. Clean and inspect immediately before concrete is placed.
- D. Fabricate form ties so ends or end fasteners can be removed, terminate the embedded portion of ties not less than (2) diameters, or twice the minimum cross-section dimension of the ties, from the formed concrete surface. In no case shall this distance be less than $3/4$ ".
- E. Locate water stops in joints where indicated on the Contract Documents. Use pieces of pre-molded water stop with a maximum practicable length to hold the number of end joints to a minimum. Make joints in water stops in accordance with the manufacturer's recommendations. Ensure that joints develop effective water tightness equal to the continuous water stop material, permanently develop

not less than 50% of the mechanical strength of the parent section, and permanently retain flexibility.

PART 3 - EXECUTION

3.01 CONSTRUCTION AND ERECTION OF FORMWORK

- A. At construction joints, lap contact surface of the form sheathing for flush surfaces exposed to view over the hardened concrete in the previous placement by not more than 1". Ensure formwork is held firmly against hardened concrete to prevent offsets or loss of mortar at construction joints and to maintain a true surface.
- B. Unless specified in the Contract Documents, construct formwork so concrete surfaces conform to tolerance limits of ACI 117. The class of surface for offset between adjacent pieces of formwork facing material shall be Class C in accordance with ACI 117, unless otherwise specified.
- C. Provide positive means of adjustment (wedges or jacks) of shores and struts. Do not make adjustments in the formwork after concrete has taken its initial set. Brace formwork securely against lateral deflection and lateral instability.
- D. To maintain specified tolerances, camber formwork to compensate for anticipated deflections in formwork prior to hardening of concrete. Set formwork and intermediate screed strips for slabs accurately to produce designated elevations and contours of the finished surface prior to removal of formwork. Ensure that edge forms and screed strips are sufficiently strong to support vibrating screeds or roller pipe screeds when the finish specified requires the use of such equipment.
- E. When formwork is cambered, set screeds to a like camber to maintain required concrete thickness.
- F. Fasten form wedges in place after final adjustment of forms and prior to concrete placement.
- G. Anchor formwork to shores, supporting surfaces, or members to prevent upward or lateral movement of the formwork system during concrete placement.
- H. Construct formwork for wall openings to facilitate removal and to counteract swelling of wood formwork.
- I. Provide runways for moving equipment and support runways directly on the formwork or structural member without resting on the reinforcing steel.
- J. Place sleeves, inserts, anchors, and embedded items required for adjoining work or for support of adjoining work prior to concrete placement.
- K. Position and support expansion joint material, water stops, and other embedded items to prevent displacement. Fill voids in sleeves, inserts, and anchor slots temporarily with readily removable material to prevent entry of concrete into voids.
- L. Clean surfaces of formwork and embedded materials of mortar, grout, and foreign material before concrete is placed.
- M. Cover surfaces of formwork with acceptable formwork release agent. Apply form release agent before placing reinforcing steel and concrete. A field-applied formwork release agent or sealer of an acceptable type or an acceptable factory-applied non-absorptive liner may be used. Do not allow formwork release agent to puddle in the forms. Do not allow formwork release agents to contact reinforcing steel or hardened concrete against which fresh concrete is to be placed.

3.02 REMOVAL FOR FORMWORK

- A. When finishing is required, remove forms as soon as removal operations will not damage concrete.
- B. Remove top forms on sloping surfaces of concrete as soon as removal will not allow concrete to sag. Perform needed repairs or treatment required at once and follow immediately with specified curing.
- C. Loosen wood formwork for wall openings when this can be accomplished without causing damage to concrete.
- D. Do not allow removal of formwork for columns, walls, sides of beams, and other parts not supporting the weight of the concrete to damage the concrete. Perform needed repair and treatment required on vertical surfaces at once and follow immediately with specified curing.
- E. Unless otherwise specified, leave formwork and shoring in place to support the weight of concrete in beams, slabs, and in place structural members until concrete has reached the specified compressive strength, f_c , or for no less than fourteen (14) days. If a lower compressive strength is proposed for removal for formwork and shoring, submit detail plans for review and acceptance, unless otherwise specified. When shores and other vertical supports are arranged to allow the form facing material to be removed without loosening or disturbing the shores and supports, the facing material may be removed after cumulative curing at not less than 50° F for twenty-four (24) hours after placing concrete, provided the concrete is sufficiently hard to not be damaged by form removal, and provided curing operations are maintained.
- F. Construct formwork to permit easy removal.

3.03 RESHORING

- A. When re-shoring is permitted or required, submit for acceptance a plan of re-shoring procedures and operations prior to their use.
- B. While re-shoring is under way, do not permit any construction load on new construction.
- C. During re-shoring, do not allow concrete in beam, slab, column, or any structural member to be loaded with combined dead and construction loads in excess of the loads permitted by the Architect/Engineer for the concrete compressive strength at the time of re-shoring.
- D. Place re-shores in sequence with stripping operation.
- E. Tighten re-shores to carry the required loads without over-stressing the concrete members. Leave re-shores in place until tests indicate that the concrete compressive strength has attained the minimum value specified.
- F. For floors supporting shores under newly placed concrete, leave in place the original supporting shores or re-shore. The shoring or re-shoring system and the supporting slabs shall have capabilities sufficient to resist the anticipated loads. Re-shores shall be located directly under a shore position.
- G. In multi-story buildings, extend re-shoring over a sufficient number of stories, two (2) stories minimum to distribute the weight of newly placed concrete, forms, and construction live loads.

3.04 STRENGTH OF CONCRETE REQUIRED FOR REMOVAL OF FORMWORK

When removal of formwork or re-shoring is based on concrete reaching a specified compressive strength, concrete will be presumed to have reached this strength when test cylinders, field cured along with the

concrete they represent, have reached the compressive strength specified for removal of formwork or re-shoring. Mold cylinders in accordance with ASTM C 31, and cure them under the same conditions for moisture and temperatures as used for the concrete they represent. Test cylinders in accordance with ASTM C 39.

3.05 FIELD QUALITY CONTROL

- A. Establish and maintain controls and bench marks in an undisturbed condition until final completion and acceptance of the project.
- B. Variations from plumb and designated building lines shall not exceed the tolerances specified in ACI 117.

END OF SECTION

SECTION 03 20 00 - CONCRETE REINFORCEMENT AND REINFORCEMENT SUPPORTS

PART 1 - DESCRIPTION

1.01 DESCRIPTION

This section covers materials, fabrication, placement and tolerances of reinforcement and reinforcement accessories.

1.02 REFERENCE STANDARDS

A. ACI STANDARDS

ACI 117

ACI 301

ACI 318

B. ASTM STANDARDS

A 185-02

A 615-04b

1.03 SUBMITTALS, DATA AND DRAWINGS

Unless otherwise required by Contract Documents, submit the following data and drawings for review and acceptance before fabrication and execution in accordance with the General Requirements of this project.

- A. Placing Drawings: Submit placing drawings showing fabrication dimensions and locations for placement of reinforcement and reinforcement supports.
- B. Splices: Submit a list and request to use splices not indicated in Contract Documents.
- C. Mechanical Connections: Submit request for the use of mechanical connections not shown on the Project Drawings.
- D. Field Bending: Submit requests and procedure to field bend or straighten reinforcement partially embedded in concrete.

1.04 MATERIALS DELIVERY, STORAGE, AND HANDLING

Prevent bending, coating with earth, oil, or other material, or otherwise damaging the reinforcement.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Reinforcing Bars: Bars used as reinforcement shall be deformed except spirals and welded wire fabric, which may be plain. Reinforcement shall be ASTM A 615 Grade 60. Provide weldable Grade 60 reinforcement where bars are called for or required to be welded.

- B. Welded Wire Fabric: ASTM A 185, with welded intersections spaced not farther apart than twelve (12) inches in the direction of principal reinforcement.
- C. Wire Reinforcement Supports: Unless otherwise specified or permitted, use wire reinforcement supports complying with Class 1, maximum protection, or Class 2, moderate protection as indicated in Chapter 3 - Bar Supports of the CRSI Manual of Standard Practice.
- D. Unless otherwise noted, provide corner bars at all bar intersections. Corner bars shall be the same size as the larger of the intersecting bars and each leg shall be forty-four (44) bar diameters in length.

2.02 FABRICATION

Bend all reinforcement cold unless heating is permitted. Fabricate reinforcement in accordance with fabricating tolerances of ACI 117.

PART 3 - EXECUTION

3.01 PREPARATION

When concrete is placed, all reinforcement shall be free of materials deleterious to bond. Reinforcement with rust, mill scale, or a combination of both will be considered satisfactory provided the minimum nominal dimensions, nominal weight, and the minimum average height of deformations of a hand-wire-brushed test specimen are not less than the applicable ASTM specification requirements.

3.02 PLACEMENT

- A. Tolerances: Place, support, and fasten reinforcement as shown on the Project Drawings. Do not exceed the placing tolerances specified in ACI 117 before concrete is placed. Placing tolerances shall not reduce cover requirements except as specified in ACI 117.
- B. Reinforcement Relocation: When necessary to move reinforcement beyond the specified placing tolerances to avoid interference with other reinforcement, conduits, or embedded items, submit the resulting arrangement of reinforcement for acceptance.
- C. Concrete Cover: Minimum concrete cover for reinforcement shall be in accordance with the latest edition of ACI 318 - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE.

Tolerances on minimum concrete cover shall meet the requirements of ACI 117.

- D. Reinforcement supports: Unless otherwise permitted:
 - 1. Place reinforcement supported from the ground or mud mat on precast concrete reinforcement supports.
 - 2. Place reinforcement supported from formwork on reinforcement supports made of concrete, metal, or plastic.
- E. Welded wire fabric: For slabs on grade, extend welded wire fabric to within two (2) inches of the concrete edge. Lap edges and ends of fabric sheets a minimum of one (1) mesh spacing. Welded wire fabric may extend through contraction joints only where permitted. Support welded wire fabric during placing of concrete to assure required positioning in the slab. Do not place welded wire fabric on grade and subsequently raise into position in concrete.

- F. Column dowels: Furnish and use templates for placement of column dowels unless otherwise permitted.
- G. Make splices as indicated on the Project Drawings unless otherwise permitted. Mechanical connections for reinforcement not shown on the Project Drawings may be used when accepted.
- H. Field bending or straightening: When permitted, bend or straighten reinforcement partially embedded in concrete in accordance with the following procedures.

Reinforcing bar sizes No. 3 through No. 5 may be bent cold the first time provided reinforcing bar temperature is above 32° F.

- I. Minimum inside bend diameters shall be six (6) bar diameters for No. 3 through No. 8 bars, eight (8) bar diameters for No. 9 through No. 11 bars, and ten (10) bar diameters for No. 14 and No. 18 bars. In addition, beginning of the bend shall not be closer to the concrete surface than the minimum diameter of bend.
- J. Field cutting of reinforcement: Reinforcement shall not be cut in the field except when specifically permitted.
- K. Reinforcement through expansion joint: Do not continue reinforcement or other embedded metal items bonded to concrete through expansion joints. Dowels bonded on only one (1) side of a joint and water stops may extend through the joint.

END OF SECTION

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

PART 1 – GENERAL REQUIREMENTS

1.01 DESCRIPTION – STRUCTURAL CAST-IN-PLACE CONCRETE

1.02 REFERENCE STANDARDS AND CITED PUBLICATIONS

A. American Concrete Institute (ACI) standards:

ACI 301-05 Standard Specification for Structural Concrete

ACI 117-06 Specifications for Tolerances for Concrete Construction and Materials

B. American Society for Testing & Materials (ASTM) standards:

A 185-02 Specification for Steel Welded Wire Fabric, Plain for Concrete Reinforcement

A 615-04b Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

C 31-03a Method of Making and Curing Concrete Test Specimens in the Field

C 33-03 Specification for Concrete Aggregates

C 39-03 Test Method of Compressive Strength of Cylindrical Concrete Specimens

C 42-04 Methods of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

C 94-04 Specification for Ready-Mixed Concrete

C 138-01 Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete

C 143-03 Test Method for Slump of Portland Cement Concrete

C 150-04a Specification for Portland Cement Concrete

C 171-03 Specification for Sheet Materials for Curing Concrete

C 172-04 Method of Sampling Freshly Mixed Concrete

C 173-01 Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

C 192-02 Method of Making and Curing Concrete Test Specimens in the Laboratory

C 231-04 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

C 260-01 Specification for Air-Entraining Admixtures for Concrete

C 309-03 Specification for Liquid Membrane-Forming Compounds for Curing Concrete

C 494-04 Specification for Chemical Admixtures for Concrete

C 595-03 Specification for Blending Hydraulic Cements

C 597-02 Test Method for Pulse Velocity through Concrete

(1991)	
C 618-03	Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as Mineral Admixture in Portland Cement Concrete
C 805-02	Test Method for Rebound Number of Hardened Concrete
C 989-04	Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
C 1017-03	Specification for Chemical Admixtures for Use in Producing Flowing Concrete
C 1064-04	Test Methods for Temperature of Freshly Mixed Portland Cement Concrete
C 1077-02	Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation

1.03 SUBMITTALS

- A. General – Submittals required in this specification shall be submitted for review and acceptance.
- B. Product Data – Submit (5) sets of manufacturer's product data with application and installation instructions for proprietary materials and items, admixtures, patching compounds, curing compounds, and others as requested by the Architect.
- C. Testing and Inspection Reports – Testing agencies shall report results of concrete and concrete materials tests and inspections performed during the course of the work to the Owner, Architect/Engineer, Contractor, and the Concrete Supplier. Strength test reports shall include location in the work where the batch represented by test was deposited and the batch ticket number. Final reports shall be provided within (7) days of test completion.

1.04 QUALITY ASSURANCE

- A. General – Concrete materials and operations may be tested and inspected by the Testing Agency as work progresses. Failure to detect defective work or material will not prevent rejection later when a defect is discovered, nor shall it obligate Architect/Engineer for final acceptance.
- B. Testing Agencies – Agencies that perform testing services on concrete materials shall meet the requirements of ASTM C 1077. Testing agencies performing the test shall be acceptable to Architect/Engineer prior to performing any work. Field tests of concrete shall be made by an ACI Concrete Field testing Technician Grade 1 in accordance with ACI CP1 or equivalent. Equivalent certification programs shall include requirements for written and performance examinations as stipulated in ACI Publication CP1.
- C. Testing Responsibilities of Contractor:
 - 1. Submit data on qualifications of proposed testing agency for acceptance. Use of testing services will not relieve the Contractor of the responsibility to furnish materials and construction in full compliance with the Contract Documents.
 - 2. Duties and Responsibilities: Unless otherwise specified in the Contract Documents, the Contractor shall assume the following duties and responsibilities:
 - a. Qualify proposed materials and establish mixture proportions.
 - b. Furnish any necessary labor to assist the testing agency in obtaining and handling samples at the project site or at the source of the materials.

- c. Advise the testing agency at least (24) hours in advance of operations to allow for completion of quality tests and for assignment of personnel.
 - d. Provide and maintain for the sole use of the testing agency adequate facilities for safe storage and proper curing of concrete test specimens on the job site for initial curing as required by ASTM C 31.
 - e. Submit data and test documentation on materials and mixture proportions.
 - f. Submit quality control program of the concrete supplier and provide copies of all test reports.
- D. Testing Services – The testing agency shall perform the following testing services:
- 1. Obtain composite samples in accordance with ASTM C 172. Each sample shall be obtained from a different batch of concrete on a random basis, avoiding any selection of the test batch other than by a number selected at random before commencement of concrete placement. Obtain at least (1) composite sample for each 50 yd³, or fraction thereof, of each design mixture of concrete placed in any (1) day. When the total quantity of concrete with a given design mixture is less than 25 yd³, the strength tests may be waived by the Architect/Engineer, if in his judgment, adequate evidence of satisfactory strength is provided.
 - 2. Conduct strength tests of concrete during construction in accordance with the following procedures:
 - a. Mold and cure (4) cylinders from each sample in accordance with ASTM C 31. Record any deviations from the ASTM requirements in the test report.
 - b. Test cylinders in accordance with ASTM C 39. Test (1) specimen at (7) days for information, (2) specimens at (28) days for acceptance, and hold (1) specimen to be tested as directed by the Architect/Engineer. The compressive strength test results for acceptance shall be the average of the compressive strengths from the (2) specimens tested at (28) days.
 - 3. Determine slump of each composite sample and whenever consistency of concrete appears to vary, using ASTM C 143. In addition, the testing laboratory shall also estimate the slump of every truck by visual inspection and include the slump estimates in their report. Additional actual slump tests shall also be taken as directed by the Architect or Engineer.
 - 4. Determine temperature of each composite sample in accordance with ASTM C 1064.
 - 5. Air content tests will be made on samples from the first (3) batches in the placement and until (3) consecutive batches have air contents within the range specified at which time (1) test will be performed for each (100) cubic yards or fraction thereof of each design mixture of concrete placed in any (1) day. This test frequency will be maintained until a batch is not within the range specified, at which time testing of each batch will be resumed until (3) consecutive batches have air contents within the range specified. Additional tests may be performed as necessary for control. These air content tests may be taken on composite samples or on samples from the batch at any time after discharge of (2) cubic feet of concrete.
 - 6. When it appears that material furnished or work performed by the Contractor fails to conform to the Contract Documents, testing agency will immediately report such deficiency to the Architect/Engineer, Contractor, and concrete supplier.
 - 7. Testing agency and its representatives are not authorized to revoke, alter, relax, enlarge, or release any requirement of the Contract Documents, nor to accept any portion of the work.

8. The testing agency will report all test and inspection results to the Architect/Engineer, Contractor and concrete supplier within (7) days after tests and inspections are performed.

E. Additional Testing and Inspection Services

1. The testing agency shall perform the following testing services when necessary, at the Contractor's expense.
 - a. Additional testing and inspection required because of changes in materials or mixture proportions requested by the Contractor.
 - b. Additional testing of materials or concrete occasioned by failure to meet specification requirements.
2. When material furnished or work performed by the Contractor fails to conform to the Contract Documents the testing agency will perform the following testing services when required by the Architect/Engineer at the Contractor's expense:
 - a. Inspect concrete batching, mixing, and delivery operations.
 - b. Other testing or inspection services as required by the Architect/Engineer.

F. Tests on Hardened Concrete in Place

1. General: Tests on hardened concrete will be performed by the testing agency when such tests are needed. Testing shall be at the Contractor's expense when tests are performed to verify the strength of the structure when required by this specification. Owner will pay costs if tests are at his request and not required by this specification.
2. Non-destructive Tests: Use of the rebound hammer in accordance with ASTM C 805, pulse velocity methods in accordance with ASTM C 597, or other non-destructive devices may be permitted by the Architect/Engineer in evaluating the uniformity and relative concrete strength in place, or for selecting areas to be cored.
3. Core Tests
 - a. When required by the Architect/Engineer, cores shall be obtained and tested in accordance with ASTM C 42.
 - b. At least (3) representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores is to be determined by the Architect/Engineer. If, before testing, cores show evidence of having been damaged subsequent to or during removal from the structure, replacement cores shall be taken.
 - c. Fill core holes with low slump concrete or grout of a strength equal to or greater than the original concrete.

G. Evaluation of Concrete Strength Tests

1. Standard molded and cured strength specimens: Test results from standard molded and cured test cylinders shall be evaluated separately for each specified concrete design mixture. Evaluation will be valid only if tests have been conducted in accordance with procedures specified. For evaluation, each specified design mixture shall be represented by at least (5) tests.

2. Non-destructive Tests: Test results will be evaluated by the Architect/Engineer and will be valid only if tests have been conducted by properly calibrated equipment in accordance with recognized standard procedures.
3. Core Tests: Core tests will be evaluated by the Architect/Engineer and will be valid only if tests have been conducted in accordance with specified procedures.

H. Acceptance of Concrete Strength

1. Standard molded and cured strength specimens: The strength level of concrete will be considered satisfactory when the averages of all sets of (3) consecutive compressive strength test results equal or exceed the specified compressive strength f_c' and no individual strength test result falls below the specified compressive strength f_c' by more than (500) psi.
2. Non-destructive tests: Non-destructive tests shall not be used as the sole basis for accepting or rejecting concrete, but may be used when permitted to evaluate concrete where standard molded and cured cylinders have yielded results not meeting the criteria in Paragraph 1.
3. Core Tests: Strength level of concrete in the area represented by core tests will be considered adequate when the average compressive strength of the cores are equal to at least 85 percent of specified compressive strength f_c' , and if not single core is less than 75 percent of the specified compressive strength, f_c' .

I. Field Acceptance of Concrete

1. Air content: Concrete not within the limits of the air-entrainment specified shall not be used in the work.
2. Slump: Concrete not within the slump limits specified at the point of placement shall not be used in the work.
3. Temperature: Concrete not within temperature limits specified shall not be used in the work.

1.05 ACCEPTANCE OF STRUCTURE

A. General – Completed concrete work shall conform to applicable requirements of this Specification.

1. Concrete work that fails to meet (1) or more requirements of the Contract Documents but subsequently is repaired to bring the concrete into compliance may be accepted.
2. Concrete work that fails to meet (1) or more requirements of the Contract Documents and cannot be brought into compliance will be rejected.
3. Repair rejected concrete work by removing and replacing or by reinforcing with additional construction required by the Architect/Engineer.
4. Submit for acceptance the proposed repair methods, materials, and modifications needed to assure that concrete work will meet requirements of the Contract Documents.
5. Document repair work to bring concrete work into compliance with the Contract Documents and submit the documentation to the Architect/Engineer for acceptance.
6. The Contractor shall pay all costs to bring concrete work into compliance with requirements of this Specification.
7. Concrete members cast in the wrong location will be rejected.

B. Dimensional Tolerances

1. Formed surfaces resulting in concrete outlines smaller than permitted by the tolerances of ACI 117, may be considered deficient in strength and subject to the provisions of Paragraph D, Strength of Structure.
2. Formed surfaces resulting in concrete outlines large than permitted by ACI 117 may be rejected. Excess materials will be subject to removal when required by the Architect/Engineer.
3. Inaccurately formed concrete surfaces that exceed ACI 117 tolerances may be rejected.
4. Concrete with tolerances and defects exceeding the specified limitations may be rejected.

C. Appearance

1. Concrete exposed to view with defects that adversely affect the appearance of the specified finish will be rejected.
2. Concrete not exposed to view may be rejected for non-conforming appearance.

D. Strength of Structure

1. Criteria for determining potential strength deficiency: Strength will be considered deficient and concrete work will be rejected when the work fails to comply with requirements which control the strength of the structure including, but not limited to, the following conditions:
 - a. Concrete strength failing to comply with requirements of the Contract Documents.
 - b. Reinforcing steel size, quantity, strength, position, or arrangement at variance with the requirements of the Contract Documents.
 - c. Concrete elements which differ from the required dimensions or location.
 - d. Curing not in accordance with Contract Documents.
 - e. Inadequate protection of concrete from extreme temperature and other environmental conditions during early stages of hardening and strength development.
 - f. Mechanical injury, construction fires, accidents, or premature removal of formwork resulting in deficient strength.
2. Action required when strength is potentially deficient: When strength of the structure is considered potentially deficient, corrective actions may be required by the Architect/Engineer.

E. Durability

1. Criteria for determining potential durability deficiency: Durability of concrete work will be considered deficient and the concrete work will be rejected when it fails to comply with the requirements which control durability of the structure including, but not limited to, the following conditions:
 - a. Strength failing to comply with that specified.
 - b. Materials for concrete not conforming with the specifications for Cements, Aggregated, Water, and Admixtures, including air entrainment.

- c. Concrete not conforming with the air-entrainment requirements in the Contract Documents.
 - d. Curing not in accordance with the Contract Documents.
 - e. Inadequate protection of concrete from temperature and other environmental conditions during early stages of hardening and strength development.
2. Action required when durability is potentially deficient: When durability of the structure is considered to be deficient, the following actions will be taken by the Architect/Engineer:
- a. Require that samples of the ingredient materials used in the concrete be obtained and tested.
 - b. Require that samples of hardened concrete be obtained from the structure by coring, sawing, or other acceptable means.
 - c. Require a laboratory evaluation of concrete and concrete materials to assess the ability of concrete to resist weathering action, chemical attack, abrasion, or other deterioration.
 - d. Concrete rejected for lack of durability shall be repaired or replaced as directed by the Architect/Engineer.

1.06 PROTECTION OF IN-PLACE CONCRETE

- A. Loading and support of concrete – Do not allow construction loads to exceed the superimposed load which the structural member, with necessary supplemental support, is capable of carrying safely and without damage.
- B. Protection from mechanical injury – during the curing period, protect concrete from damaging mechanical disturbances including load stresses, shock and harmful vibration. Protect concrete surfaces from damage by construction traffic, equipment, materials, rain or running water, and other adverse weather conditions.

PART 2 – CONCRETE MIXTURES

2.01 DESCRIPTION

Requirements for materials, proportioning, production, and delivery of concrete.

2.02 SUBMITTALS

- A. Mixture proportions – Submit concrete mixture proportions by weight.
- B. Concrete materials – Submit the following information for concrete materials:
 - 1. For cementitious material: types, classes.
 - 2. For aggregates: types, pit or quarry locations, producers' names, gradations, specific gravities.
 - 3. For admixtures: types, brand names, producers.
 - 4. For water and ice: source of supply.
- C. Mixture proportion adjustments – Submit any adjustments to mixture proportions or changes in materials, along with supporting documentation, made during the course of the work.

- D. Time of discharge – When it is desired to exceed time for discharge of concrete required by ASTM C 94, submit a request along with a description of the precautions to be taken.

2.03 PRODUCTS

A. Materials

1. Cementitious material – Cementitious material shall consist of Portland Cement conforming to ASTM C 150, or blended hydraulic cement conforming to ASTM C 595, or Portland Cement conforming to ASTM C 618, or a Portland Cement conforming to ASTM C 150 and a blast furnace slag cement conforming to ASTM C 989. Unless otherwise specified, cementitious material shall conform to ASTM C 150 Type I or Type II without the addition of cementitious or pozzolanic mineral admixtures. Cementitious material used in concrete shall be of the same brand and type, and from the same plant of manufacture as the cementitious material used in the concrete represented by the submitted field test data or used in the trial mixtures. If fly ash is used, it shall be Type C. Type F fly ash is not allowed.
2. Aggregates – Aggregates shall conform to ASTM C 33 unless otherwise specified. When a single size or a combination of (2) or more sizes of coarse aggregates are used, the final gradation shall conform to the grading requirements of ASTM C 33 unless otherwise specified or permitted.
3. Water and ice – Mixing water for concrete and water used to make ice shall meet the requirements of ASTM C 94.
4. Admixtures – When required or permitted, admixtures shall meet the requirements of the following:
 - a. Air entraining admixtures – ASTM C 260.
 - b. Chemical admixtures – ASTM C 494.
 - c. Chemical admixtures for use in producing flowing concrete – ASTM C 1017.
5. Change of materials – When brand, type, size, or source of cementitious materials, aggregates, water, ice, or admixtures are proposed to be changed, new data or evidence which indicates that the change will not adversely affect the relevant properties of the concrete shall be submitted for acceptance prior to use in concrete.

B. Performance and Design Requirements

1. Cementitious material content – The cementitious material content shall be adequate for concrete to satisfy the specified requirements for strength, water-cementitious material ratio and finishing ability.
2. Slump – Slump shall not exceed the specified slump. Concrete shall have, at the point of delivery, a slump of:
 - a. Ramps and sloping surfaces – 3" maximum
 - b. Reinforced foundations – 1" minimum to 3" maximum
 - c. Other concrete – 2" minimum to 4" maximum
 - d. Determine the slump by ASTM C 143. Slump tolerances shall meet the requirements of ACI 117. When use of a plasticizing admixture conforming to ASTM C 1017 or when a Type F or G high range water reducing admixture conforming to ASTM C 494 is permitted to increase the slump of concrete, concrete shall have a slump of 2 to 4 inches before the admixture is added

and a maximum slump of 6 inches at the point of delivery after the admixture is added, unless otherwise specified.

- e. Under no circumstances shall the slump exceed 8-1/2"
3. Size of coarse aggregate – Except when otherwise specified or permitted, nominal maximum size of coarse aggregate shall not exceed three-fourths of the minimum clear spacing between reinforcing bars, one-fifth of the narrowest dimensions between sides of forms, or one-third of the thickness of slabs or toppings.
 4. Air content – See plans for air-entrainment requirements. Unless otherwise specified, air content for exterior exposed concrete at the point of delivery shall conform to the requirements of ACI 301, Table 4.2.2.4 for mild exposure. For specified compressive strengths above 5,000 psi, the total air contents indicated in Table 4.2.2.4 may be reduced by one percent.
 5. Chloride ion concentration – Unless otherwise specified, maximum water soluble chloride ion concentrations in hardened concrete at ages from (28) to (42) days contributed from the ingredients including water, aggregates, cementitious materials, and admixtures shall not exceed .30 % by weight of cement. When testing is performed to determine water soluble chloride ion content, test procedures shall conform to AASHTO T 260.
 6. Concrete temperature – When the average of the highest and lowest temperature during the period from midnight to midnight is expected to drop below 40° F for more than (3) successive days, concrete shall be delivered to meet the following minimum temperature immediately after placement:
 - 55° F for sections less than 12 in. in the least dimension,
 - 50° F for sections 12 in. to 36 in. in the least dimension,
 - 45° F for sections 36 in. to 72 in. in the least dimension,
 - 40° F for sections greater than 72 in. in the least dimension.
- The temperature of concrete as placed shall not exceed these values by more than 20° F. These minimum requirements may be terminated when temperatures above 50° F occur during more than half of any (24) hour duration. Unless otherwise specified or permitted, the temperature of concrete as delivered shall not exceed 90° F.
7. Strength – The compressive strength is to be as specified on the drawings. Unless otherwise specified, strength requirements shall be based on the 28-day compressive strength determined on a 6 x 12 inch cylindrical specimens made and tested in accordance with ASTM C 31 and C 39 respectively.
 8. Water-cementitious material ratio – The water-cement or water-cementitious material ratio of the concrete for each portion of the work shall not exceed .50 for 3,000 psi concrete and .48 for higher strength concrete.
 - a. If cementitious or pozzolanic mineral admixtures conforming to ASTM C 989 or ASTM C 618 are used, the cement portion of the water-cement ratio shall be the total weight of cementitious materials.
 - b. The combined weight of fly ash and pozzolan conforming to ASTM C 618 shall not exceed 20 percent of the total weight of cementitious material. The fly ash and pozzolan present in a ASTM Type IP or IPM blended cement conforming to ASTM C 595 shall be included in the calculated percentage.
 9. Proportioning – Proportion concrete to conform with Paragraph C – Performance and Design Requirements, to provide workability and consistency so concrete can be worked readily into forms

and around reinforcement without segregation or bleeding, and to provide the compressive strength specified.

2.04 EXECUTION

- A. Measuring, batching, and mixing – Production facilities shall produce concrete of the specified quality and conforming to the requirements of this Specification. Unless otherwise specified, measure, batch and mix concrete materials and concrete in conformance with ASTM C 94.
- B. Delivery – Deliver concrete which will possess the specified characteristics in the freshly mixed state at the point of placing. Transport and deliver concrete in equipment conforming to the requirements of ASTM C 94.
 - 1. Slump adjustment – When concrete arrives at the point of delivery with a slump below that which will result in the specified slump at the point of placement and is unsuitable for placing at that slump, the slump may be adjusted to the required value by adding water up to the amount allowed in the accepted mixture proportions unless otherwise specified by the Architect/Engineer. Addition of water shall be in accordance with ASTM C 94. Do not exceed the specified water-cementitious material ratio or slump. Do not add water to concrete delivered in equipment not acceptable for mixing. After plasticizing or high-range water-reducing admixtures are added to the concrete at the site to achieve flowable concrete, do not add water to the concrete. Measure slump and air content of air-entrained concrete, after slump adjustment, to verify compliance with specified requirements.
 - 2. Time of discharge – Time for completion of discharge shall be as specified by ASTM C 94, unless otherwise permitted. When discharge is permitted after more than 90 minutes have elapsed since batching or after the drum has revolved 300 revolutions, verify that air content of air-entrained concrete, slump, and temperature of concrete are as specified.

PART 3 – HANDLING, PLACING, AND CONSTRUCTING

3.01 EXECUTION

- A. Preparation
 - 1. Do not place concrete until data on materials and mixture proportions are accepted.
 - 2. Before placing concrete in forms, complete the following:
 - a. Comply with formwork requirements specified.
 - b. Remove dirt, water, and other foreign material from surfaces, including reinforcement and embedded items, against which concrete will be placed.
 - c. Comply with reinforcing steel placement requirement specified.
 - d. Position and secure in place expansion joint material, anchors, and other embedded items.
 - e. Obtain acceptance of finished preparation.
 - 3. Before placing a concrete slab on grade, clean foreign material from the Subgrade and complete the following:
 - a. In-place density of Subgrade soils shall be uniform throughout the area and at least the minimum required by the Contract Documents.

- b. Subgrade shall be free from frost or ice.
 - c. Subgrade shall be moist with no free water and no muddy or soft spots.
4. When high ambient temperatures necessitate protection of concrete immediately after placing or finishing, make provisions in advance of concrete placement for windbreaks, shading, fogging, sprinkling, ponding, or wet covering.
 5. During ambient temperature conditions described in Section 2.03, Paragraph B, Subparagraph 6 – Concrete Temperature, make provisions in advance of concrete placement to maintain the temperature of the concrete as specified. Use heating, covering, or other means adequate to maintain required temperature without overheating or drying of concrete due to concentration of heat. Do not use combustion heaters unless precautions are taken to prevent exposure of the concrete to exhaust gases containing carbon dioxide.

B. Placement of Concrete

1. Wet weather – Do not begin to place concrete while rain, sleet, or snow is falling. Do not allow rain water to increase mixing water or to damage the surface of the concrete.
2. Cold weather – Concrete temperatures and ambient temperatures shall meet minimum temperature requirements of Section 2.03, Paragraph B, Sub Paragraph 6 – Concrete Temperature.
3. Hot weather – The temperature of concrete as placed shall not exceed 90° F unless otherwise permitted. Loss of slump, flash set, or cold joints due to temperature of concrete as placed will not be acceptable. When temperature of concrete exceeds 90° F, obtain acceptance, when required, of proposed precautionary measures. When temperature of steel reinforcement, embedments, or forms is greater than 120° F, fog steel reinforcement, embedments, and forms with water immediately prior to placing concrete.
4. Conveying – Convey concrete from mixer to the place of final deposit rapidly by methods which prevent segregation or loss of ingredients and will assure the required quality of concrete. Do not use aluminum pipes or chutes.
5. Depositing – Deposit concrete continuously in (1) layer or in layers to have fresh concrete deposited on in-place concrete that is still plastic. Do not deposit fresh concrete on concrete that has hardened sufficiently to cause formation of seams or planes of weakness within the section, unless construction joint requirements are met. Do not use concrete that has surface dried, partially hardened, or contains foreign material. Do not subject concrete to any procedure that will cause segregation. Deposit concrete as near as practicable to the final position to avoid segregation.
6. Consolidating – Consolidate concrete by vibration. Concrete shall be thoroughly worked around reinforcement and embedded items and into corners of forms, eliminating all air or stone pockets which may cause honey-combing, pitting, or planes of weakness. Use internal vibrators of the largest size and power that can properly be used in the work as described in ACI – 301, Table 5.3.2.5. Workers shall be experienced in use of the vibrators. Do not use vibrators to move concrete within the forms.
7. Construction joints and other bonded joints – Locate construction joints as indicated on the Project Drawings or as accepted by the Architect/Engineer.

- C. Finishing formed surfaces** – After removal of forms, give each formed surface (1) or more of the finishes as specified by the Architect/Engineer. Finishes are to be in accordance with ACI-301, Section 5.3.3.

- D. Finishing unformed surfaces – Place concrete at a rate that allows spreading, straight edging, and darbying or bull floating before bleed water appears. Strike smooth the top of walls, buttresses, horizontal offsets, and other similar unformed surfaces and float them to a texture consistent with finish of adjacent formed surface. Finish slab surfaces as specified by the Architect/Engineer. Finishes are to be in accordance with ACI-301. Flatness shall be $F_F = 20$ and Levelness shall be $F_L = 15$ unless noted otherwise in the Construction Documents and shall meet the requirements of ACI-117.
- E. Sawed control joints – Where saw cut joints are required or permitted, start cutting as soon as concrete has hardened sufficiently to prevent dislodgement of aggregates. Saw a continuous slot to a depth of one-fourth the thickness of the slab but not less than one inch. Complete sawing within (12) hours after placement.
- F. Curing and protection
1. General – Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. Protect concrete during the curing period such that the concrete temperature does not fall below the requirements of Section 2.03, Paragraph B, Sub Paragraph 6 – Concrete Temperature. Cure concrete in accordance with ACI-301, 5.3.6.2 or 5.3.6.3 for (7) days after placement.
 2. Formed concrete surfaces – Keep absorbent wood forms wet until they are removed. After form removal, cure concrete by (1) on the methods in Sub Paragraph 3 – Unformed Concrete Surfaces.
 3. Unformed concrete surfaces – After placing and finishing, use (1) or more of the following methods to preserve moisture in concrete:
 - a. Ponding, continuous fogging or continuous sprinkling.
 - b. Application of mats or fabric kept continuously wet.
 - c. Continuous application of steam (under 150° F).
 - d. Application of sheet materials conforming to ASTM C 171.
 - e. Application of a curing compound conforming to ASTM C 309. Apply the compound in accordance with manufacturer's recommendation after water sheen has disappeared from the concrete surface and after finishing operations. The rate of application shall not exceed 200 ft²/gal. For rough surfaces, apply in (2) applications at right angles to each other, not to exceed 200 ft²/gal. for each coat. Do not use curing compound on any surface where concrete or other material will be bonded unless the curing compound will not prevent bond or unless measures are to be taken to completely remove the curing compound from areas to receive bonded applications.
 - f. When the ambient temperature exceeds 90° F, either ponding, continuous fogging, continuous sprinkling or application of mats or fabric kept continuously wet are required for curing. Other methods of curing are not allowed.
- G. Repair of surface defects
- General – Repair tie holes and surface defects immediately after form removal. Where the concrete surface will be textured by sandblasting or bush-hammering, repair surface defects before texturing. Repairs are to meet the requirement of ACI-301, Section 5.3.7.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete block masonry units
- B. Clay facing brick.
- C. Mortar and grout.
- D. Reinforcement and anchorage.
- E. Flashings.
- F. Lintels.
- G. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Installation of dovetail slots for masonry anchors.
- B. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.

1.3 PRICE AND PAYMENT PROCEDURES

- A. See Section 01 21 00 - Allowances, for cash allowances affecting this section.
- B. This allowance includes purchase and delivery of modular bricks. Installation is not included in the allowance but is specified in this section and is part of the Contract Sum/Price.

1.4 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2024.
- C. ASTM C90 - Standard Specification for Dry-Cast Loadbearing Concrete Masonry Units; 2024a.
- D. ASTM C91/C91M - Standard Specification for Masonry Cement; 2025.
- E. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2024a.
- F. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2024.
- G. ASTM C150/C150M - Standard Specification for Portland Cement; 2024.
- H. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2024.
- I. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale); 2024.
- J. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2025.

- K. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2024.
- L. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2025.
- M. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017 (Reapproved 2023).
- N. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.
- O. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

1.6 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.
 - 1. Include calculations or selections from the manufacturer's prescriptive design tables that indicate compliance with the applicable building code and project conditions.
 - 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. Control and Expansion Joints: layout exact locations of control and expansion joints on a scaled building plan.
 - 4. Include the design engineer's stamp or seal on each sheet of shop drawings.
- D. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.
- E. Samples for Initial Selection:
 - 1. Weep holes/vents.
 - 2. Samples for Verification: For each type and color of the following:
 - 3. Accessories embedded in masonry.
- F. 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.
- G. Qualification Data: For testing agency.
- H. Material Certificates: For each type and size of the following:

1. Masonry units.
 2. Include material test reports substantiating compliance with requirements.
 - a. For masonry units, include data and calculations establishing average net-area compressive strength of units.
 3. Cementitious materials. Include brand, type, and name of manufacturer.
 4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 5. Grout mixes. Include description of type and proportions of ingredients.
 6. Reinforcing bars.
 7. Joint reinforcement.
 8. Anchors, ties, and metal accessories.
- I. 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.
- J. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
- K. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.
- L. Test Reports: Concrete masonry manufacturer's test reports for units with integral water repellent admixture.

1.7 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. 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.
- C. 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.
- D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
- F. Preconstruction Testing.

1. 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.
2. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C 140 for compressive strength.
3. Mortar Test (Property Specification): For each mix required, according to ASTM C 109/C 109M for compressive strength.
4. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.

1.8 MOCK-UPS

- A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.
- B. Locate where directed.
- C. Mock-up may remain as part of work.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.1 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. Concrete Block: Comply with referenced standards and as follows:
 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depth of 8 inches.
 2. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - a. Provide square-edged units for outside corners unless otherwise indicated.
 3. Load-Bearing Units: ASTM C90, normal weight.
 - a. Hollow block, as indicated.
 - b. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2000 psi.
 - c. Density Classification: Light weight less than 105 pcf
 - d. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
 - e. Exposed Faces: Manufacturer's standard color and texture where indicated.

2.3 BRICK UNITS

A. Manufacturers:

1. Belden Brick: www.beldenbrick.com/#sle.
2. Endicott Clay Products Co; Face Brick - FBX: www.endicott.com/#sle.
3. Substitutions: Under provisions of Section 01 60 00 - Product Requirements.

B. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.

1. Color and texture to match Architect's sample.
2. Nominal size: As indicated on drawings.
3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

2.4 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I. PColor as required to produce approved color sample.

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

C. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
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.

D. Aggregate for Grout: ASTM C 404.

E. 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, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Euclid Chemical Company (The); Accelguard 80.
 - b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.
 - c. Sonneborn Products, BASF; Trimix-NCA.
 - d. Substitutions: Under provisions of Section 01 60 00 - Product Requirements.

F. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs, containing integral water repellent by same manufacturer.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ACM Chemistries, Inc.; RainBloc for Mortar.
 - b. BASF; Rheopel Mortar Admixture.
 - c. Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.
 - d. Substitutions: Under provisions of Section 01 60 00 - Product Requirements.

G. Masonry Cement: ASTM C91/C91M, Type N.

- H. Portland Cement: ASTM C150/C150M, Type I.
- I. Hydrated Lime: ASTM C207, Type S.
- J. Mortar Aggregate: ASTM C144.
- K. Grout Aggregate: ASTM C404.
- L. Water: Clean and potable.

2.5 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 - 1. FERO Corporation; FERO FAST Soffit Concealer: www.ferocorp.com/#sle.
 - 2. Hohmann & Barnard, Inc; X-Seal Anchor: www.h-b.com/#sle.
 - 3. TruFast Walls, a division of Altenloh, Brinck & Co. US, Inc; Thermal-Grip MVA: www.trufastwalls.com/#sle.
 - 4. WIRE-BOND: www.wirebond.com/#sle.
 - 5. Substitutions: Under provisions of Section 01 60 00 - Product Requirements.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi), deformed billet bars; galvanized.
- C. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.
- D. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
 - 1. Interior Walls: Hot-dip galvanized, carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized, carbon steel.
 - 3. Wire Size for Side Rods: 0.187-inch diameter.
 - 4. Wire Size for Cross Rods: 0.187-inch diameter.
 - 5. Wire Size for Veneer Ties: 0.187-inch diameter.
- E. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.

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.
- B. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
- C. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
- D. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- E. Stainless-Steel Bars: ASTM A 276 or ASTM A 666, Type 304.
- F. Partition Top anchors: 0.105-inch- thick metal plate with 3/8-inch- diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- G. Rigid Anchors: Fabricate from steel bars bent to configuration indicated.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

2.7 MISCELLANEOUS ANCHORS

- A. 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.
- B. Postinstalled Anchors: Torque-controlled expansion anchors.
 1. Load Capacity: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 unless otherwise indicated.
 3. Also see requirements on structural drawings.
- C. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
 1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
 3. Vertical adjustment: Not less than 3-1/2 inches.

2.8 FLASHINGS

- A. Metal Flashing Materials:
 1. Prefabricated Metal Flashing: Smooth fabricated 12 oz/sq ft stainless steel (type 304) flashing for surface mounted conditions.

2.9 ACCESSORIES

- A. Preformed Control Joints: Neoprene material. Provide with corner and tee accessories, fused joints.
 1. Manufacturers:
 - a. Blok-Lok Limited: www.blok-lok.com/#sle.
 - b. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - c. WIRE-BOND: www.wirebond.com/#sle.
 - d. Substitutions: Under provisions of Section 01 60 00 - Product Requirements.
- B. 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.
- C. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- D. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

- 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, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Manufacturers:
 - a. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
 - b. WIRE-BOND; O-Ring or Double O-Ring Rebar Positioner.: www.wirebond.com/#sle.
 - c. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817..
 - d. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
 - e. Substitutions: Under provisions of Section 01 60 00 - Product Requirements.
- F. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
 - 1. Full-Height Airspace Maintenance and Drainage Material: Mesh panels fitted between masonry ties.
 - a. Drainage Material Thickness: 3/8 inch.
 - b. Manufacturers:
 - 1) Advanced Building Products, Inc; Mortairvent-CW:
www.advancedbuildingproducts.com/#sle.
 - 2) CavClear, a Division of Archovations Inc; CavClear Masonry Mat:
www.cavclear.com/#sle.
 - 3) Substitutions: Under provisions of Section 01 60 00 - Product Requirements.
- G. Building Paper: ASTM D226/D226M, Type I ("No.15") asphalt felt.
- H. Nailing Strips: Softwood lumber, preservative treated for moisture resistance, dovetail shape, sized to masonry joints.
- I. Weeps:
 - 1. Type: Polyester mesh.
 - 2. Color(s): As selected by Architect from manufacturer's full range.
 - 3. Manufacturers:
 - a. Masonry Technology, Inc; Cavity Weep: www.mtidry.com/#sle.
 - b. Mortar Net Solutions; WeepVent: www.mortarnet.com/#sle.
 - c. Substitutions: Under provisions of Section 01 60 00 - Product Requirements.
- J. Cavity Vents:
 - 1. Type: Preformed aluminum vents with sloping louvers.
- K. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.10 LINTELS

- A. Masonry Lintels: Built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Temporarily support built-in-place lintels until cured. See structural plans for lintel sizes, reinforcement requirements and grout requirements.

2.11 MORTAR AND GROUT MIXING

2.12 WATER: POTABLE.

- 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 mortar unless otherwise indicated.
 - 3. For exterior masonry, use portland cement-lime mortar.
 - 4. For reinforced masonry, use portland cement-lime 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 or needed to provide required compressive strength of masonry.
 - 1. For masonry below grade or in contact with earth, use Type S.
 - 2. For reinforced masonry, use Type S.
 - 3. For mortar parge coats, use Type N.
 - 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 S.
 - 5. For interior non-load-bearing partitions, Type O may be used instead of Type N or Type S.

2.13 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 requirements on drawings.
 - 3. Provide grout with a slump as indicated on drawings, as measured according to ASTM C 143/C 143M.
- B. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
 - 1. Masonry below grade and in contact with earth: Type S.
 - 2. Exterior, loadbearing masonry: Type N.
 - 3. Exterior, non-loadbearing masonry: Type N.
 - 4. Interior, loadbearing masonry: Type N.
 - 5. Interior, non-loadbearing masonry: Type O.

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. Verify that related items provided under other sections are properly sized and located.
- D. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.
- B. 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 7 days after completing cleaning.
- C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

3.4 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.5 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Flush.

D. Brick Units:

1. Bond: Running.
2. Coursing: Three units and three mortar joints to equal 8 inches.
3. Mortar Joints: Concave.

3.6 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- E. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- F. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

3.7 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.
- B. Install cavity vents in veneer and cavity walls at 32 inches on center horizontally below shelf angles and lintels and near top of walls.

3.8 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

3.9 REINFORCEMENT AND ANCHORAGE - GENERAL AND SINGLE WYTHER MASONRY

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 36 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.11 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.

3.12 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at nonmasonry construction.
- B. Terminate flashing up 8 inches minimum on vertical surface of backing:
- C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.
- D. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.

3.13 LINTELS

- A. Install loose steel lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
 - 1. Openings to 42 inches: Place two, No. 3 reinforcing bars 1 inch from bottom web.
 - 2. Openings from 42 inches to 78 inches: Place two, No. 5 reinforcing bars 1 inch from bottom web.
 - 3. Openings over 78 inches: Reinforce openings as detailed.
 - 4. Do not splice reinforcing bars.
 - 5. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
 - 6. Place and consolidate grout fill without displacing reinforcing.

3.14 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.15 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.
- B. Do not build into masonry construction organic materials that are subject to deterioration.

3.16 TOLERANCES

- A. Install masonry within the site tolerances found in TMS 402/602.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

3.17 CUTTING AND FITTING

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.18 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.
- C. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.19 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.

3.20 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.
- B. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.
- C. 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.
- D. 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.
- E. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
- F. Protect sills, ledges, and projections from mortar droppings.
- G. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop fabricated steel and aluminum items.
- B. Loose steel lintels.
- C. Ladders.
- D. Attic access ladder.
- E. Structural supports for miscellaneous attachments.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.

1.3 REFERENCE STANDARDS

- A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2024.
- B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- D. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2025.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.
- G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- H. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- I. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2025a.
- J. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- K. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- L. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

- M. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- N. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing; 2021.
- O. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- P. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- Q. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2023.
- R. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2019a.
- S. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- T. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- U. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2025.
- V. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- W. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021, with Errata (2023).
- X. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025.
- Y. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).
- Z. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.
- AA. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- BB. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.
- CC. SSPC-SP 2 - Hand Tool Cleaning; 2024.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.
- C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

- D. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.5 QUALITY ASSURANCE

- A. Design _____ under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Louisiana.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40.
- E. Stainless Steel, General: ASTM A666, Type 304.
- F. Slotted Channel Fittings: ASTM A1011/A1011M.
- G. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- H. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- I. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- J. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- K. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.
- D. Bolts, Nuts, and Washers: Stainless steel.
- E. Bolts, Nuts, and Washers for Equipment and Piping:
 - 1. Carbon Steel:
 - a. Structural Connections: ASTM A307, Grade A or B, hot-dip galvanized.
 - b. Anchor Bolts: ASTM A307, Grade A ASTM A36, hot-dip galvanized.
 - c. Pipe and Equipment Flange Bolts: ASTM A193, Grade B-7.
- F. Stainless Steel: Type 316 stainless steel, class 2; ASTM A193 for bolts; ASTM A194 for nuts.
- G. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.3 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.

- C. Continuously seal joined members by intermittent welds and plastic filler.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.4 FABRICATED ITEMS

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking and masonry; galvanized finish.
- C. Lintels: As detailed; prime paint finish.
 - 1. Steel sections, size and configuration as indicated on Drawings, length to allow 8 in minimum bearing on both sides of opening.
 - a. Exterior Locations: Galvanized, painted to match adjacent masonry.
 - b. Interior Locations: Prime paint, one coat.
- D. Ladder: ANSI A14.3, steel-welded construction.
 - 1. Side Rails: 3/8 x 2 in side rails spaced at 20 in.
 - 2. Rungs: 1 in diameter solid rod, spaced 12 in o.c.
 - 3. Mounting: Space rungs 7 in from wall surface; with steel mounting brackets and attachments.
 - 4. Finish: Galvanized, painted; color as selected.
- E. Attic Access Ladder: Rainbow F Series steel with 500 lb rating

2.5 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat except where galvanizing is specified.
- E. Galvanizing of Structural Steel Members: Hot-dip galvanize after fabrication to ASTM A123/A123M requirements.
- F. Fasteners, Connectors, and Anchors:
 - 1. Hot-Dip Galvanizing: ASTM A153.
 - 2. Mechanical Galvanizing: ASTM B695; Class 50 minimum.
- G. Stainless Steel:
- H. 1. Welds and finish to meet the requirements of Section 05 12 50 AESS Steel.

- I. Touch-Up Primer: Match shop primer.
- J. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic.

2.6 FINISHES - ALUMINUM

- A. Exterior Aluminum Surfaces: Clear anodized.
- B. Pigmented Organic Coating System: AAMA 2603 polyester or acrylic baked enamel finish; color as indicated.

2.7 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Field Measurements: Verify field measurements prior to fabrication. Indicate field measurements on Shop Drawings.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed , except surfaces to be in contact with concrete.
- G. Back grout all stainless steel bases.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch for every 12 ft in height, whichever is greater, non-cumulative.
- B. Maximum Variation from Level: 1/16 inch in 3 ft and 1/4 inch in 10 ft.

- C. Maximum Offset From True Alignment: 1/4 inch.
- D. Maximum Out-of-Position: 1/4 inch.

3.5 FIELD QUALITY CONTROL

- A. Welding: Inspect welds according to AWS D1.1.
- B. Replace damaged or improperly functioning hardware.
- C. After erection, touch up welds, abrasions, and damaged finishes with prime paint or galvanizing repair paint to match shop finishes.
- D. Touch up factory-applied finishes according to manufacturer-recommended procedures.

3.6 ADJUSTING

- A. Adjust operating hardware and lubricate as necessary for smooth operation.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural dimension lumber framing.
- B. Nonstructural dimension lumber framing.
- C. Rough opening framing for doors, windows, and roof openings.
- D. Sheathing.
- E. Underlayment.
- F. Preservative treated wood materials.
- G. Fire retardant treated wood materials.
- H. Miscellaneous framing and sheathing.
- I. Communications and electrical room mounting boards.
- J. Concealed wood blocking, nailers, and supports.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Setting anchors in concrete.
- B. Section 07 25 00 - Weather Barriers: Water-resistive barrier over sheathing.
- C. Section 07 62 00 - Sheet Metal Flashing and Trim: Sill flashings.
- D. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.
- E. Section 31 31 16 - Termite Control: Field-applied termiticide and mildewcide for wood materials.

1.3 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- C. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2017).
- D. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2024).
- E. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing; 2019a.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.
- G. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

- H. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2024, with Errata.
- I. AWPA U1 - Use Category System: User Specification for Treated Wood; 2025.
- J. ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers; 2016, with Editorial Revision (2021).
- K. ICC-ES AC380 - Acceptance Criteria for Termite Physical Barrier Systems; 2021, with Editorial Revision (2022).
- L. NELMA (SGR) - Standard Grading Rules for Northeastern Lumber; 2024.
- M. PS 1 - Structural Plywood; 2023.
- N. PS 2 - Performance Standard for Wood Structural Panels; 2018.
- O. PS 20 - American Softwood Lumber Standard; 2025.
- P. SPIB (GR) - Standard Grading Rules; 2021.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and application instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Cover wood products to protect against moisture. Store materials a minimum of 6 inc. above ground on framework or blocking. Support stacked products to prevent deformation and to allow air circulation.
- B. Immediately upon delivery to job site, place materials in area protected from weather and moisture.
- C. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 2-year manufacturer warranty for materials and workmanship commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Spruce-Pine-Fir (South), unless otherwise indicated.
 - 2. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
 - 3. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Framing Lumber:
 - 1. Light framing: plates, blocking, bracing, nailers and general utility purposes: No. 2 Southern Pine (Unless Otherwise Noted, UNO).

2. Studs: Load bearing and non-load bearing No. 2 Southern Pine (UNO).
3. Structural light framing: floor joists, rafters, ceiling joists, lintels and main framing: No. 2 Southern Pine (UNO).

2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Rough Hardware:
 1. Bolts: FS FF-B-575.
 2. Nuts: FS FF-N-836.
 3. Expansion shields: FS FF-B-561.
 4. Lag screws and bolts: FS FF-B-561.
 5. Toggle bolts: FS FF-B-588.
 6. Wood screws: FS FF-S-111.
 7. Nails and staples: FS FF-N-105.
 8. Metal nailing discs:
- B. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- C. Sizes: Nominal sizes as indicated on drawings, S4S.
- D. Moisture Content: S-dry or MC19.
 1. Actual dimension to conform to PS 20.
 - a. Flat caps, minimum 1 in. (25 mm) diameter.
- E. Stud Framing (2 by 2 through 2 by 6):
 1. Species: Southern Pine.
 2. Grade: No. 2.
- F. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):
 1. Species: Spruce-Pine-Fir (South).
 2. Grade: No. 1 and Better.
- G. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 1. Lumber: S4S, No. 2 or Standard Grade.
 2. Boards: Standard or No. 3.

2.3 TIMBERS FOR CONCEALED APPLICATIONS

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry (19 percent maximum).
- D. Beams and Posts 5 inches and over in thickness:
 1. Species: Allowed under referenced grading rules.
 2. Grade: Select Structural.

2.4 EXPOSED BOARDS

- A. Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.
- B. Moisture Content: Kiln-dry (15 percent maximum).
- C. Surfacing: S4S.
- D. Species: Douglas Fir.
- E. Grade: No. 2, 2 Common, or Construction.

2.5 CONSTRUCTION PANELS

- A. Subfloor/Underlayment Combination: PS 1 or PS 2 type, rated Single Floor.
 - 1. Panel Type: Plywood.
 - 2. Bond Classification: Exposure 1.
 - 3. Span Rating: 48.
 - 4. Performance Category: 1-1/8 PERF CAT.
 - 5. Edges: Tongue and groove.
- B. Subflooring: Oriented strand board wood structural panel; PS 2, rated Single Floor.
 - 1. Bond Classification: Exposure 1.
 - 2. Performance Category: 19/32 PERF CAT.
 - 3. Span Rating: 20.
 - 4. Edges: Square.
 - 5. Edges: Tongue and groove.
 - 6. Surface Finish: Fully sanded face.
 - 7. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 200 days.
 - 8. Products:
 - a. Georgia-Pacific LLC; DryGuard Enhanced OSB Sub-Floor: www.buildgp.com/#sle.
 - b. Louisiana-Pacific Corporation; TopNotch Sub-Flooring 350: www.lpcorp.com/#sle.
 - c. Weyerhaeuser Company: www.weyerhaeuser.com/#sle.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Subflooring: Structural cementitious subfloor panels.
 - 1. Size: 48 inches wide nominal, by 96 inches long, nominal.
 - 2. Thickness: 3/4 inch, nominal.
 - 3. Edges: Square along width; tongue and groove along length.
 - 4. Span: 24 inches, maximum.
 - 5. Products:
 - a. USG Corporation; Structural Panel Concrete Subfloor: www.usg.com/#sle.

- b. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Wall Sheathing: PS 2 type.

- 1. Bond Classification: Exterior.
- 2. Grade: Structural I Sheathing.
- 3. Span Rating: 24.
- 4. Performance Category: 5/8 PERF CAT.
- 5. Edge Profile: Square edge.

- E. Wall Sheathing: Plywood, PS 1, Grade C-D, Exposure I.

2.6 ACCESSORIES

- A. Fasteners and Anchors:

- 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
- 2. Anchors: Toggle bolt type for anchorage to hollow masonry.
- 3. Joist hangers: 18 ga. Zinc-coated steel.
- 4. Metal cross bridging, 16 ga. Zinc-coated steel:
- 5. Nailable type with two holes in each end.
- 6. Bar or strap anchors: ASTM A525, zinc-coated steel, 18 ga. minimum.
- 7. Plywood H-Clips – 18-20 gauge galvanized sheet metal.

- B. Sill Gasket on Top of Foundation Wall: 3/8 inch thick, closed-cell plastic foam.

- 1. Width: 3-1/2 inches.
- 2. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 30 days of weather exposure.

- C. Termite-Resistant Sill Plate Barrier: Self-adhesive, film-backed barrier with release sheet; adheres to concrete substrates and blocks termite access.

- 1. Thickness: 68 mil, 0.068 inch.
- 2. Termite Resistance: 100 percent when tested in accordance with ICC-ES AC380.
- 3. Water Vapor Permeance: 0.035 perm, maximum, when tested in accordance with ASTM E96/E96M.

- D. Subfloor Adhesives: Gap-filling construction adhesive for bonding wood structural panels to wood-based floor system framing; complying with ASTM D3498.

- 1. Products:
 - a. Adfast USA Inc; ADBOND EX 5690: www.adfastcorp.com/#sle.
 - b. Franklin International, Inc; Titebond Heavy Duty Construction Adhesive: www.titebond.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

- E. Water-Resistive Barrier: See Section 07 25 00.

2.7 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWP A U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWP A standards.
- B. Fire Retardant Treatment:
 - 1. Products:
 - a. T2EARTH, LLC; OnWood: www.t2earth.com/#sle.
 - b. UFP Industries; ProWood FR Lumber: www.ufpi.com/#sle.
 - c. Viance, LLC; D-Blaze: www.treatedwood.com/#sle.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Exterior Type: AWP A U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Do not use treated wood in direct contact with the ground.
- C. Preservative Treatment:
 - 1. Preservative Pressure Treatment of Lumber Above Grade: AWP A U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - 2. Preservative Pressure Treatment of Plywood Above Grade: AWP A U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
 - a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
 - 3. Preservative Pressure Treatment of Lumber in Contact with Soil: AWP A U1, Use Category UC4A, Commodity Specification A using waterborne preservative.
 - a. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.

PART 3 EXECUTION

3.1 PREPARATION

- A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.
- B. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.
- C. Coordinate installation of rough carpentry members specified in other sections.

3.2 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.3 FRAMING INSTALLATION

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength.
- B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.
- D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.
- E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.
- G. Miscellaneous Framing:

3.4 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
 - 1. Framing for mechanical and electrical work:
 - 2. Do not cut, notch, or bore framing members for passage of pipes or conduits without concurrence of Architect.
 - 3. Frame members for passage of pipes and ducts to avoid cutting structural members.
 - 4. Reinforce framing members where damaged by cutting.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to authorities having jurisdiction may be used in lieu of solid wood blocking.
- C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- E. Provide the following specific nonstructural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.

3. Handrails.
 4. Grab bars.
 5. Towel and bath accessories.
 6. Wall-mounted door stops.
 7. Chalkboards and marker boards.
- F. Provide single bottom plate and double top plates for load-bearing partitions, 2 in. thick by width of studs.
 - G. Toenail studs to bottom plate and end nail to lower top plate.
 - H. Provide single bottom plates and single top plates for non-load bearing partitions, 2 in. thick by width of studs.
 - I. Provide studs in continuous lengths without splices.
 - J. Anchor bottom plate of exterior partitions to concrete structure with ½" diameter x10" long anchor bolts with 3" x 3" x ¼" steel plate with slotted holes, including locking nut space a maximum of 24" o.c., 1'-0" from corners (inside and outside) and 8" from openings.
 - K. Space studs at 16" o.c. in load bearing partitions.
 - L. Double studs and headers at all framed openings.
 - M. Space studs in non-load bearing partitions at 16" o.c.
 - N. At corners and partition intersections for exterior walls, use 5 – 2"x6"s at 2"x6" walls and 4 – 2"x4" at 2"x4" walls.
 - O. Anchor studs abutting masonry or concrete with ½" anchor bolts spaced a maximum of 48" o.c.
 - P. Overlap double top plates minimum of 6 in. at corners and intersections.
 - Q. Face nail upper top plate to lower top plate.
 - R. Bottom plate of interior studs may be anchored with power driven studs spaced a maximum of 48" o.c.
 1. Wall paneling and trim.
 2. Joints of rigid wall coverings that occur between studs.

3.5 INSTALLATION OF CONSTRUCTION PANELS

- A. Subflooring/Underlayment Combination: Glue and Screw to framing; staples are not permitted.
- B. Subflooring: Glue and Screw to framing; staples are not permitted.
- C. Underlayment: Secure to subflooring with Glue and screws.
 1. Place building paper between floor underlayment and subflooring.
- D. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
 1. Nail panels to framing; staples are not permitted.
- E. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.

- F. Install a continuous horizontal row at mid-span of all floor framing unless noted otherwise (and) on the drawings.
- G. Install a continuous horizontal row at mid-height of all partitions unless noted otherwise (and) on the drawings.
- H. Install continuous blocking behind all horizontal joints in finish wall material.
- I. Wedge, align, and anchor blocking with countersunk bolts, washers and nuts, or nails.
- J. Locate blocking to facilitate installation of finishing materials, fixtures, specialty items, and trim.
 - 1. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.
- K. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 - 3. Install adjacent boards without gaps.
 - 4. Size and Location: As indicated on drawings.

3.6 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- B. Allow preservative to dry prior to erecting members.

3.7 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.8 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.

3.9 CLEANING

- A. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- B. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 17 53

SHOP-FABRICATED WOOD TRUSSES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop-fabricated wood trusses.
- B. Truss bridging.
- C. Preservative treatment of wood.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Installation requirements for miscellaneous framing.
- B. Section 06 10 00 - Rough Carpentry: Material requirements for blocking, bridging, plates, and miscellaneous framing.

1.3 REFERENCE STANDARDS

- A. ANSI/TPI 1 - National Design Standard for Metal-Plate-Connected Wood Truss Construction; 2014.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- C. SBCA (BCSI) - Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses; 2018 (Updated 2020).
- D. SPIB (GR) - Standard Grading Rules; 2021.
- E. TPI DSB-89 - Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses; 1989.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

1.5 QUALITY ASSURANCE

- A. Designer Qualifications: Perform design by or under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in Louisiana.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle trusses in accordance with SBCA (BCSI).
- B. Store trusses in vertical position resting on bearing ends.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Truss Plate Connectors:
 - 1. Alpine, an ITW Company; ____: www.alpineitw.com/#sle.
 - 2. MiTek Industries, Inc; ____: www.mii.com/#sle.

3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Truss Fabricators:

1. RedBuilt LLC; Open Web Trusses: www.redbuilt.com/#sle.
2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 TRUSSES

A. Wood Trusses: Design and fabricate trusses in accordance with ANSI/TPI 1 and to achieve specified design requirements indicated.

1. Design and fabricate temporary bracing in accordance with TPI DSB-89.
2. Species and Grade: Southern Pine, SPIB (GR) Grade No. 2 or better.
3. Connectors: Steel plate or plywood.
4. Structural Design: Comply with applicable code for structural loading criteria.
5. Floor Deflection: 1/360, maximum.
6. Roof Deflection: 1/240, maximum.
7. Fire Retardance: Comply with applicable codes; provide factory pressure-treated wood.

2.3 MATERIALS

A. Lumber:

1. Moisture Content: Between 7 and 9 percent.
2. Lumber fabricated from old growth timber is not permitted.

B. Plywood Connectors: Graded by APA; _____ species, ply core, _____ grade, waterproof glue; 19 percent maximum moisture content.

C. Steel Connectors: Hot-dipped galvanized steel sheet, ASTM A653/A653M Structural Steel (SS) Grade 33/230, with G90/Z275 coating; die stamped with integral teeth; thickness as indicated.

D. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

2.4 ACCESSORIES

A. Wood Blocking, Bridging, Plates, and Miscellaneous Framing: Softwood lumber, Spruce/Pine/Fir, construction grade, 19 percent maximum and 7 percent minimum moisture content.

B. Fasteners: Electrogalvanized steel, type to suit application.

2.5 WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated on shop drawings.
- B. Verify that supports and openings are ready to receive trusses.

3.2 PREPARATION

- A. Coordinate placement of bearing items.

3.3 ERECTION

- A. Install trusses in accordance with manufacturer's instructions, SBCA (BCSI); maintain a copy of applicable documents on site until installation is complete.
- B. Set members level and plumb, in correct position.
- C. Do not field-cut or alter structural members without approval of Architect.
- D. Install permanent bridging and bracing.
- E. Install headers and supports to frame openings required.
- F. Coordinate placement of decking with work of this section.

3.4 SITE-APPLIED WOOD TREATMENT

- A. Treat all site-sawn cuts of pressure-treated wood using same type of treatment (i.e. preservative or fire-retardant).

3.5 TOLERANCES

- A. Framing Members: 1/2 inch maximum, from true position.

END OF SECTION

SECTION 06 20 00
FINISH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finish carpentry items.
- B. Wood door frames, glazed frames.
- C. Wood casings and moldings.
- D. Hardware and attachment accessories.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 06 41 00 - Architectural Wood Casework: Shop fabricated custom cabinet work.
- C. Section 08 14 33 - Stile and Rail Wood Doors.
- D. Section 09 91 13 - Exterior Painting: Painting of finish carpentry items.
- E. Section 09 91 23 - Interior Painting: Painting of finish carpentry items.
- F. Section 09 93 00 - Staining and Transparent Finishing: Staining and transparent finishing of finish carpentry items.

1.3 REFERENCE STANDARDS

- A. AWI (QCP) - Quality Certification Program; Current Edition.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- D. BHMA A156.9 - Cabinet Hardware; 2020.
- E. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2024.
- F. PS 1 - Structural Plywood; 2023.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
 - 2. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

3. Include certification program label.

C. Samples: Submit two samples of wood trim 6 inch long.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.

B. Quality:

1. Perform work in accordance with AWI (QCP) woodwork association in accordance with requirements for work specified in this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-fabricated units to project site in original packages, containers or bundles bearing brand name and identification.

B. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.

C. Protect from moisture damage.

D. Handle materials and products to prevent damage to edges, ends, or surfaces.

PART 2 PRODUCTS

2.1 FINISH CARPENTRY ITEMS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Exterior Woodwork Items:

1. Window Casings and Moldings: Softwood; prepare for paint finish.

C. Interior Woodwork Items:

1. Moldings, Bases, Casings, and Miscellaneous Trim: Clear white pine; prepare for paint finish.
2. Door, Glazed Light, and Pocket Door Frames: Pop; prepare for paint finish.
3. Window Sills: Clear pine; prepare for transparent finish.
4. Loose Shelving: Birch plywood; prepare for paint finish.

D. Manufactured Attic Stairs:

1. Provide steel attic stair assembly with wood access cover, as indicated on Drawings.
 - a. Products:
 - 1) FAKRO America LLC; Attic Ladder LWF: www.fakrousa.com/#sle.
 - 2) Werner Company; AH2210/AH2510/AE2210 Series Aluminum Attic Ladder: <https://www.wernerco.com/us..>
 - 3) Substitutions: See Section 01 60 00 - Product Requirements.

2.2 LUMBER MATERIALS

- A. Softwood Lumber: Pine species, maximum moisture content of 6 percent; with vertical grain.
- B. Hardwood Lumber: Red Oak species, Rift sawn, maximum moisture content of 6 percent ; with vertical grain , of quality suitable for transparent finish.

2.3 SHEET MATERIALS

- A. Softwood Plywood, Not Exposed to View: Any face species, medium density fiberboard core; PS 1 Grade A-B, glue type as recommended for application.
- B. Softwood Plywood, Exposed to View: Face species as indicated, plain sawn, medium density fiberboard core; PS 1 Grade A-B, glue type as recommended for application.
- C. Hardwood Plywood: Face species Red Oak, plain sawn, book matched, medium density fiberboard core; HPVA HP-1 Front Face Grade AA, Back Face Grade 1, glue type as recommended for application.

2.4 FASTENINGS

- A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- B. Adhesive for factory-fabricated units: Manufacturer's recommended adhesive for application.
- C. Fasteners for Exterior Applications: Stainless steel; length required to penetrate wood substrate 1-1/2 inch minimum.

2.5 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Lumber for Shimming and Blocking: Softwood lumber of indicated species.

2.6 HARDWARE

- A. Hardware: Comply with BHMA A156.9.

2.7 WOOD TREATMENT

- A. Factory-Treated Lumber: Comply with requirements of AWPA U1 - Use Category System for pressure impregnated wood treatments determined by use categories, expected service conditions, and specific applications.

2.8 SITE FINISHING MATERIALS

- A. Stain, Shellac, Varnish, and Finishing Materials: Comply with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2.9 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.

- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 INSTALLATION

- A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.3 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 06 41 00
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Hardware.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 08 80 00 - Glazing: Glass for casework.
- C. Section 09 91 23 - Interior Painting: Field finishing of cabinet exterior and interior.
- D. Section 09 93 00 - Staining and Transparent Finishing: Field finishing of cabinet exterior and interior.
- E. Section 12 36 00 - Countertops.

1.3 REFERENCE STANDARDS

- A. ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).
- B. ANSI A208.1 - American National Standard for Particleboard; 2022.
- C. AWI (QCP) - Quality Certification Program; Current Edition.
- D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- E. BHMA A156.9 - Cabinet Hardware; 2020.
- F. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2024.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, elevations, assembly methods, fastening methods, jointing details, hardware location, schedule of finishes, accessories, and Certified Compliance Label on each ste.
- C. Samples:
 - 1. Submit two, 8 x 10 in samples, illustrating cabinet finish.
 - 2. Submit two, 8 x 10 in samples, illustrating counter top finish.
 - 3. Submit two samples of drawer pulls and hinges, illustrating hardware finish.
- D. Product Data: Provide data for hardware accessories.

- E. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet and shelf unit substrate and finish.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
 - 1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
 - 2. Single Source Responsibility: Provide and install this work from single fabricator.
- B. Quality:
 - 1. Perform work in accordance with AWI (QCP) woodwork association in accordance with requirements for work specified in this section.
 - 2. Provide designated labels on installed products as required by certification program.
 - 3. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.
 - 4. Replace, repair, or rework all work for which certification is refused.

1.7 MOCK-UPS

- A. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, finishes, and plumbing accessories.
- B. See Section 01 40 00 - Quality Requirements for additional requirements.
- C. Locate where directed by Architect.
- D. Mock-up may remain as part of the work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage.

1.9 FIELD CONDITIONS

- A. Section 01 50 00 - Temporary Facilities and Controls: Requirements for ambient conditions control facilities for product storage and installation.
- B. Maintain storage space relative humidity within ranges indicated in AWS Section 2
- C. Subsequent Conditions: Maintain same temperature and humidity conditions in building spaces as will occur after occupancy during and after installation of Work of this Section.
- D. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.1 CASEWORK MATERIALS

- A. Transparent Finish:
 - 1. Hardwood Lumber: Red Oak.
 - a. Cut: Plain Sawn.
 - b. NFPA Class "A" fire-rated.

- B. Hardwood Plywood: HPVA HP-1; veneer core.
 - 1. Species: Red Oak
 - 2. Veneer Slicing: Plain Sawn.
 - 3. Matching of Individual Leaves to Each Other: Book matching.
 - 4. Matching Across Panel Face: Center balanced matching.
 - 5. Matching or Relationship of Panels to Each Other: Sequence-matched, uniform-size sets matching
- C. Opaque Finish:
 - 1. Lumber: paint grade Birch
 - 2. Plywood: paint grade Birch
- D. Cabinet Planks (Sacristy):
 - 1. $\frac{3}{4}$ " thick Eastern Red Cedar.
- E. Medium-Density Fiberboard: ANSI A208.2, composed of wood fibers, medium density.
 - 1. Fire-Retardant Fiberboard: ASTM E84; 25 maximum flame-spread index and 450 maximum smoke-developed index, formaldehyde-free adhesive system. Fire rated where required.

2.2 PANEL CORE MATERIALS

- A. Particleboard: Composite panel composed of cellulosic particles, additives, and bonding system; comply with ANSI A208.1.
 - 1. Grade: M-2; moisture resistance: MR10.
 - 2. Panel Thickness: 1/2 inch.
- B. Basic Hardboard: Panel manufactured from inter-felted lignocellulosic fibers consolidated under heat and pressure; comply with ANSI A135.4.

2.3 HARDWOOD PLYWOOD PANELS

- A. Hardwood Plywood: Plywood manufactured for nonstructural decorative applications; consisting of faces and backs applied to a variety of core types; comply with HPVA HP-1.
 - 1. Woodwork Quality Standard: Panels complying with specified woodwork quality standard.

2.4 ACCESSORIES

- A. Fasteners and Anchors: Size and type to suit application.
 - 1. Fasteners: ASTM A153, hot-dip galvanized steel for high-humidity and treated wood locations, unfinished steel elsewhere.
 - 2. Nails and Staples: ASTM F1667.
- B. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- C. Concealed Joint Fasteners: Threaded steel.
- D. Concealed fasteners for finished carpentry items: "Z" clips.

- E. Veneer Edge Band: AWS; standard wood veneer edge banding matching face veneer.
- F. Safety Glass: Clear, fully tempered, 1/4" thick minimum.
- G. Adjustable Drawer Organization Systems: Drawer trays, dividers, and connectors.
- H. Grommets: Standard painted metal grommets for cut-outs, in color to match adjacent surface.
 - 1. Metal Grommets: 3-3/8" metal in polished chrome by Doug Mockett GRN2 or equal.

2.5 HARDWARE

- A. Cabinet Hardware: Comply with BHMA A156.9 for hardware types and grades indicated below:
 - 1. Hardware Types: As indicated on drawings.
 - 2. Product Grade: Grade 2.
- B. Shelf Standards and Rests: Formed steel channels and rests, cut for fitted rests spaced at 1 in centers; satin finish
- C. Shelf Brackets: Formed steel brackets, formed for attachment with lugs; satin finish.
- D. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards or multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments.
- E. Countertop Support Brackets: Fixed, L-shaped, face-of-stud mounting.
- F. Drawer and Door Pulls: "U" shaped wire pull, steel with satin finish, 4 inch centers.
- G. Keyed Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with satin finish.
- H. Cabinet Catches and Latches:
 - 1. Type: Magnetic catch.
 - 2. Manufacturers:
 - a. Knapé & Vogt Manufacturing Company: www.knapelandvogt.com/#sle.
 - b. Titus Cabinet Hardware; Push Latch: www.titusplus.com/us/en/#sle.
 - c. Titus Cabinet Hardware; Push Locks: www.titusplus.com/us/en/#sle.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- I. Drawer Slides: Self-closing, galvanized steel construction, ball bearings separating tracks, rail mounted full extension type with load capacity of 500 lbs.
 - 1. Type: Full extension.
 - 2. Static Load Capacity: Heavy Duty grade.
 - 3. Mounting: Side mounted.
 - 4. Stops: Integral type.
 - 5. Features: Provide self closing/stay closed type.
 - 6. Manufacturers:
 - a. Knapé & Vogt Manufacturing Company; Medium-Duty Drawer Slides: www.knapelandvogt.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

- J. Soft-Close, Door and Drawer Adjustable Dampers:
 - 1. Manufacturers:
 - a. Titus Cabinet Hardware; Titusoft Dampers for Drawers: www.titusplus.com/us/en/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- K. Hinges: European style concealed self-closing type, steel with satin finish.
 - 1. Manufacturers:
 - a. Blum, Inc: www.blum.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- L. Utility Hooks: Surface-mounted; stainless steel, satin finish.
 - 1. Manufacturers:
 - a. Rockwood; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - b. Sugatsune America, Inc: www.sugatsune.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.6 SITE FINISHING MATERIALS

- A. Stain, Shellac, Varnish, and Finishing Materials: In compliance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2.7 FABRICATION

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
 - 1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
 - 2. Door and Drawer Fronts: 3/4 in thick. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- E. Shop glaze glass materials using Interior Dry method; see Section 08 80 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation
- B. Verify adequacy of backing and support framing.
- C. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.

- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- F. Secure cabinets to floor using appropriate angles and anchorages.
- G. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.3 ADJUSTING

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.4 CLEANING

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 06 83 16

FIBERGLASS REINFORCED PANELING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fiberglass reinforced plastic panels.
- B. Trim.

1.2 REFERENCE STANDARDS

- A. ASTM D5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels; 2022.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.
 - 1. Do not store panels in contact with the floor or against an outside wall.
 - 2. Maintain optimum storage conditions of 60-75 degrees F (16-24 degrees C) at 35 -55% relative humidity. Avoid extremes in temperature and humidity.
- C. Do not remove protective film from panel surface until after installation (if applicable).
- D. Lead Time: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fiberglass Reinforced Plastic Panels:
 - 1. Nudo Products, Inc; FiberLite FRP: www.nudo.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.2 PANEL SYSTEMS

- A. Wall Panels:

1. Panel Size: 4 by 8 feet.
2. Panel Thickness: 0.10 inch.
3. Surface Design: Smooth.
4. Color: White.
5. Attachment Method: Adhesive only, sealant joints, no trim.

2.3 MATERIALS

- A. Panels: Fiberglass reinforced plastic (FRP), complying with ASTM D5319.
 1. Surface Burning Characteristics: Maximum flame spread index of 25 and smoke developed index of 450; when system tested in accordance with ASTM E84.
- B. Trim: Vinyl; color coordinating with panel.
- C. Fasteners: provide fasteners and accessories as required by manufacturer to properly complete installation .
- D. Adhesive: Type recommended by panel manufacturer.
- E. Sealant: Type recommended by panel manufacturer; white.
- F. Color: Color selected by Architect from full range of color options.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions and substrate flatness before starting work.
- B. Verify that substrate conditions are ready to receive the work of this section, free from dirt, dust, grease and other contaminants.
- C. Inspect panels for any defects immediately. Do not install panels of unacceptable quality. Field cutting of all wall systems should be accomplished using a circular saw with fine tooth carbide blade.

3.2 INSTALLATION - WALLS

- A. Install panels in accordance with manufacturer's instructions.
- B. Cut and drill panels with carbide tipped saw blades, drill bits, or snips.
- C. Pre-drill fastener holes in panels, 1/8 inch greater in diameter than fastener, spaced as indicated by panel manufacturer.
- D. Follow adhesive manufacturer's recommendations for appropriate height of adhesive bead left by trowel and do not allow adhesive to skin over. When interior paneling is on an exterior wall or wet area, provide a barrier sheet and/or follow the adhesive manufacturer's installation recommendations for a secure bond.
 1. Apply adhesive to the back side of the panel using trowel as recommended by adhesive manufacturer.
- E. Start in the corner. Mark plumb line 48 1/8 inches from corner.
- F. Begin in top corner nearest molding with laminate roller, rolling down and out toward the edge without molding.

- G. Continue rolling down and out working across panel away from previously installed panel or initial molding. Remove all trapped air.
- H. Install one-piece division bar and caps or next molding by sliding onto panel.
- I. Repeat process, working in one direction around room.
- J. Immediately remove all adhesive residue. To remove, clean with nonabrasive cotton cloth and warm water. If necessary, use a mild nonabrasive detergent. For cleanup with solvent based adhesives, use mineral spirits or acetone to remove residue.
- K. Apply panels to wall with seams plumb and pattern aligned with adjoining panels.
- L. Install panels with manufacturer's recommended gap for panel field and corner joints.
- M. Drive fasteners to provide snug fit, and do not over-tighten.
- N. Place trim on panel before fastening edges, as required.
- O. Fill channels in trim with sealant before attaching to panel.
- P. Slide panel into molding and withdraw 1/16 inch for aluminum moldings to provide appropriate gap. Align with plumb line.
- Q. Install trim with adhesive and screws or nails, as required.
- R. Seal gaps at floor, ceiling, and between panels with applicable sealant to prevent moisture intrusion.
- S. Remove excess sealant after paneling is installed and prior to curing.
- T. Clean panel surfaces in compliance with manufacturer's recommendations.
 - 1. Apply adhesive directly to entire back of composite wall panel using correct trowel with 100% adhesive coverage using crosshatch pattern. Apply adhesive to within 1/2 inch of all edges of panel.
 - 2. Use a clean, damp, nonabrasive cotton cloth and a mild liquid detergent or household cleaner.
 - 3. Rinse with clean water using a clean, nonabrasive cotton cloth.
 - 4. Dry panels with a soft, clean nonabrasive cotton cloth.

END OF SECTION

SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Batt insulation in exterior wall and roof construction.
- B. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.2 REFERENCE STANDARDS

- A. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2024.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.
- C. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C; 2024c.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

1.4 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.1 APPLICATIONS

- A. Insulation Above Lay-In Acoustical Ceilings: Batt insulation with no vapor retarder.

2.2 MINERAL FIBER BLANKET INSULATION MATERIALS

- A. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
 - 1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
 - 4. Formaldehyde Content: Zero.
 - 5. Thermal Resistance: R-value of 19 @ exterior walls and R-value of 30 above all ceilings.
 - 6. Thickness: 6 inch.
 - 7. Products:

- a. CertainTeed Corporation: www.certainteed.com/#sle.
- b. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation: www.owenscorning.com/en-us/#sle.
- c. Substitutions: See Section 01 60 00 - Product Requirements.

2.3 ACCESSORIES

- A. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.2 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.

3.4 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 25 00
WEATHER BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Water-resistive barriers.

1.2 RELATED REQUIREMENTS

- A. Section 07 21 00 - Thermal Insulation: Weather barrier installed in conjunction with batt insulation.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.

1.3 DEFINITIONS

- A. Weather Barriers: Materials or assemblies forming water-resistive barriers, air barriers, vapor retarders, or combination of one or more assemblies.
- B. Water-Resistive Barriers: Materials or assemblies installed behind exterior wall coverings; designed to prevent liquid water from further penetration into exterior wall assembly.

1.4 REFERENCE STANDARDS

- A. AATCC Test Method 127 - Test Method for Water Resistance: Hydrostatic Pressure; 2018, with Editorial Revision (2019).
- B. ASTM D779 - Standard Test Method for Determining the Water Vapor Resistance of Sheet Materials in Contact with Liquid Water by the Dry Indicator Method; 2016.
- C. ASTM D3330/D3330M - Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape; 2004 (Reapproved 2018).
- D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- E. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers; 2016, with Editorial Revision (2021).
- G. ICC-ES AC148 - Acceptance Criteria for Flexible Flashing Materials; 2017, with Editorial Revision (2021).
- H. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2025.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

1.6 MOCK-UPS

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Construct weather barrier mock-up.
- C. Locate where directed.

1.7 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.1 WATER-RESISTIVE BARRIERS

- A. Description: Materials installed behind exterior wall coverings; designed to prevent liquid water from further penetration into exterior wall assembly. Primary materials include mechanically applied sheets; accessory materials include flashings and seam tapes.
- B. Regulatory Requirements: For use in ICC (IBC) construction Types I, II, III, and IV buildings greater than 40 feet in height.
 - 1. Comply with NFPA 285 wall assembly requirements in accordance with local building code and authorities having jurisdiction (AHJ).
- C. Water-Resistive Barrier Building Wrap: Mechanically fastened building wrap.
 - 1. Hydrostatic Pressure Resistance: Greater than 200 inches when tested in accordance with AATCC Test Method 127.
 - 2. Water Resistance: Exceeds 1 hour when tested in accordance with ASTM D779.
 - 3. Water Vapor Permeance: 9 to 15 perms when tested in accordance with ASTM E96/E96M, Procedure A.
- D. Water-Resistive, Self-Adhering, Drainable Barrier Membrane: Nonwoven, polypropylene membrane with acrylic adhesive and release film.
 - 1. Thickness: 40 mil (1.02 mm).
 - 2. Water Vapor Permeance: tested in accordance with ASTM E96/E96M, Procedure A.
 - 3. Peel Adhesion to Plywood Substrates: Greater than 3.0 lbs/in. width (525 N/m), when tested in accordance with ASTM D3330/D3330M.
 - 4. Tensile strength, membrane 250 psi (1720 kN/m²).
 - 5. Elongation, membrane 250%
 - 6. Products:
 - a. Grace; Ice & Water Shield: <https://gcpat.com/>.
 - b. GAF; WeatherWatch: www.gaf.com..
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 ACCESSORIES

- A. Seal and Perimeter Tapes: As recommended by water-resistive barrier manufacturer.
- B. Flashings and Sealants: As recommended by water-resistive barrier manufacturer for application.

- C. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and weather barrier materials.

- 1. Application: Apply at 30 to 40 mil, 0.030 to 0.040 inch nominal thickness.
- 2. Color: Green.

2.3 FASTENERS

- A. Fasteners for Attaching Water-Resistive Barriers to Substrates: As indicated on drawings.
- B. Self-Sealing Washers: Solid plastic, 2 inch diameter washers; seals building-wrap air barriers against air penetration.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and conditions comply with requirements of this section.

3.2 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install materials in accordance with manufacturer's installation instructions.
- B. Install continuous water-resistive barriers where indicated on drawings, with sheets lapped to shed water.
- C. Apply sealants within recommended temperature range in accordance with manufacturer's installation instructions.
- D. Mechanically Fastened Sheets:
 - 1. Install sheets in shingle fashion to shed water; align horizontally.
 - 2. Overlap seams as recommended by manufacturer, 6 inches, minimum.
 - 3. Overlap at outside and inside corners as recommended by manufacturer, 12 inches, minimum.
 - 4. Install water-resistive barrier over jamb flashings.
 - 5. Install head flashings under water-resistive barrier.
 - 6. At framed openings with frames having nailing flanges, extend sheet into opening and over flanges; at head of opening, seal sheet over flange and flashing.
- E. Self-Adhered Sheets:
 - 1. Prepare substrate in accordance with sheet manufacturer's installation instructions; fill and tape joints in substrate and between dissimilar materials.
 - 2. Lap sheets shingle-fashion to shed water and seal laps airtight.
 - 3. Upon placement of sheets, firmly press onto substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.

4. Use same material, or other material approved by sheet manufacturer, to seal sheets to adjacent substrates, and as flashing.
5. At expansion joints, provide transition to joint assemblies approved by sheet manufacturer.

F. Fluid-Applied Assemblies:

1. Prepare substrate in accordance with coating manufacturer's installation instructions; treat joints in substrate and between dissimilar materials as indicated.
2. Where exterior masonry veneer is being applied, install masonry anchors prior to placement of water-resistive barrier over masonry substrate; seal airtight around anchors.
3. Apply bead or trowel coat of mastic sealant with minimum thickness of 1/4 inch along coating seams, rough cuts, and as recommended by manufacturer.
4. Apply flashing to seal with adjacent construction and to bridge joints in coating substrate.

G. Openings and Penetrations in Exterior Water-Resistive Barriers:

1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches onto water-resistive barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
2. At openings filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
3. At openings filled with nonflanged frames, seal water-resistive barrier to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
4. At head of openings, install flashing under water-resistive barrier extending at least 2 inches beyond face of jambs; seal water-resistive barrier to flashing.
5. At interior face of openings, seal gaps between window and door frames and rough framing using appropriate joint sealant over backer rod.
6. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of water-resistive barrier.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Owner's Inspection and Testing: Cooperate with Owner's testing agency.
 1. Allow access to work areas and staging.
 2. Notify Owner's testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection.
 3. Do not cover work of this section until testing and inspection is accepted.

3.5 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 46 46
FIBER-CEMENT SIDING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fiber-cement siding.
- B. Fiber-cement soffit.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Siding substrate.
- B. Section 09 91 13 - Exterior Painting: Field painting.

1.3 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- B. ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets; 2022, with Editorial Revision (2023).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
 - 1. Manufacturer's requirements for related materials to be installed by others.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods, including nail patterns.
- C. Test Report: Applicable model code authority evaluation report (e.g. ICC-ES).
- D. Manufacturer's qualification statement.
- E. Maintenance Instructions: Periodic inspection recommendations and maintenance procedures.
- F. Warranty: Submit copy of manufacturer's warranty, made out in Owner's name, showing that it has been registered with manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store materials in manufacturer's unopened packaging, with labels intact, until ready for installation.
- B. Store materials under dry and waterproof cover, well ventilated, and elevated above grade on a flat surface.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

- B. Manufacturer Warranty: Provide manufacturer warranty for years as indicated under Fiber-Cement Siding article sub-headings for "Warranty". Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 FIBER-CEMENT SIDING

- A. Lap Siding: Individual horizontal boards made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
 - 1. Style: Standard lap style.
 - 2. Texture: Smooth.
 - 3. Length: 12 feet, nominal.
 - 4. Width (Height): 5-1/4 inches.
 - 5. Thickness: 5/16 inch, nominal.
 - 6. Finish: Factory applied primer.
 - 7. Color: See Finish Schedule.
 - 8. Warranty: 25 year limited; transferable.
 - 9. Products:
 - a. James Hardie Building Products, Inc: www.jameshardie.com/#sle.
 - b. Nichiha
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Soffit Panels: Smooth panels of same material and finish.
- C. Soffit Panels: Panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
 - 1. Texture: Smooth.
 - 2. Length: 96 inches, nominal.
 - 3. Width: 48 inches.
 - 4. Thickness: 5/16 inch, nominal.
 - 5. Finish: Factory applied primer.
 - 6. Manufacturer: Same as siding.
- D. Ventilation: Provide perforated soffit unless otherwise indicated

2.2 ACCESSORIES

- A. Trim: Same material and texture as siding.
- B. Fasteners: Galvanized or corrosion resistant; length as required to penetrate, 1-1/4 inches, minimum.
- C. Exterior Soffit Vents: One piece, perforated, ASTM A653/A653M galvanized steel with G90 coating, with edge suitable for direct application to gypsum board and manufactured especially for soffit application, and provide continuous vent.

- D. Sealant: Elastomeric, polyurethane or silyl-terminated polyether/polyurethane, and capable of being painted.
- E. Finish Paint: Latex house paint acceptable to siding manufacturer; primer recommended by paint manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.
- B. Do not begin until unacceptable conditions have been corrected.
- C. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Protect surrounding areas and adjacent surfaces during execution of this work.
- B. Install Sheet Metal Flashing:
 - 1. Above door and window trim and casings.
 - 2. Above horizontal trim in field of siding.

3.3 INSTALLATION

- A. Install siding in accordance with manufacturer's instructions and recommendations.
 - 1. Read warranty and comply with terms necessary to maintain warranty coverage.
 - 2. Install in accordance with conditions stated in model code evaluation report applicable to location of project.
 - a. Do not install damaged components.
 - b. Install fasteners no more than 24 inches on center.
 - 3. Use trim details as indicated on drawings.
 - 4. Touch up field cut edges before installing.
 - 5. Pre-drill nail holes if necessary to prevent breakage.
- B. Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses.
- C. Do not install siding less than 6 inches from ground surface, or closer than 1 inch to roofs, patios, porches, and other surfaces where water may collect.
- D. Exterior Soffit Vents: Install in accordance with manufacturer's written instructions and at locations indicated on drawings; provide vent area as indicated on drawings.
- E. After installation, seal joints except lap joints of lap siding; seal around penetrations, and paint exposed cut edges.
- F. Finish Painting: Within one week after installation, paint siding and trim with one coat primer and two coats finish paint.

3.4 CLEANING

- A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
- B. Clean faced panels in accordance with manufacturer's maintenance instructions, using cleaning materials and methods acceptable to manufacturer.

3.5 PROTECTION

- A. Protect installed products until Date of Substantial Completion.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, sheet metal roofing, exterior penetrations, and other items indicated in Schedule.
- B. Sealants for joints within sheet metal fabrications.
- C. Precast concrete splash pads.

1.2 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- C. ASTM B32 - Standard Specification for Solder Metal; 2020.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).
- E. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017 (Reapproved 2023).
- F. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2024).
- G. CDA A4050 - Copper in Architecture - Handbook; current edition.
- H. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.1 MANUFACTURERS

2.2 SHEET MATERIALS

- A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch thick base metal.
- B. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 28 gauge, 0.0156 inch thick; smooth No. 4 - Brushed finish.

2.3 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.
- F. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.4 GUTTERS AND DOWNSPOUTS

- A. Gutters: SMACNA (ASMM) Rectangular profile.
- B. Downspouts: Round profile.
- C. Accessories: Profiled to suit gutters and downspouts.
 - 1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
 - 2. Gutter Supports: Brackets.
 - 3. Downspout Supports: Brackets.
- D. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3,000 psi at 28 days, with minimum 5 percent air entrainment.
- E. Seal metal joints.

2.5 ACCESSORIES

- A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers.
- B. Underlayment: ASTM D226/D226M, organic roofing felt, Type II, No. 30.
- C. Primer Type: Zinc chromate.
- D. Protective Backing Paint: Zinc molybdate alkyd.
- E. Concealed Sealants: Non-curing butyl sealant.
- F. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- G. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.
- H. Solder: ASTM B32, Alloy Grade - Sn50 (50/50).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

3.3 INSTALLATION

- A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- D. Solder metal joints for full metal surface contact, and after soldering wash metal clean with neutralizing solution and rinse with water.
- E. Secure gutters and downspouts in place with concealed fasteners.
- F. Set splash pads under downspouts, and set in place with gravel/sand.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Joint backings and accessories.

1.2 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).
- B. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2018 (Reapproved 2022).
- C. ASTM C834 - Standard Specification for Latex Sealants; 2017 (Reapproved 2023).
- D. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2024.
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).
- F. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2023.
- G. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.
- H. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.
- I. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2023.
- J. ASTM C1382 - Standard Test Method for Determining Tensile Adhesion Properties of Sealants when Used in Exterior Insulation and Finishing Systems (EIFS) Joints; 2016 (Reapproved 2023).
- K. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2019 (Reapproved 2020).
- L. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).
- M. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).
- N. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2023.
- O. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2024.
- P. UL 263 - Standard for Fire Tests of Building Construction and Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

- B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Backing material recommended by sealant manufacturer.
 - 4. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 5. Substrates the product should not be used on.
 - 6. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
- C. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
- D. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.
- E. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.
- F. Warranty: Include coverage for installed sealants and accessories failing to achieve watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.
- C. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
 - 1. Adhesion Testing: In accordance with ASTM C794.
 - 2. Compatibility Testing: In accordance with ASTM C1087.
 - 3. Allow sufficient time for testing to avoid delaying the work.
 - 4. Deliver sufficient samples to manufacturer for testing.
 - 5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
- D. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
 - 1. Identification of testing agency.
 - 2. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
 - a. Test date.
 - b. Copy of test method documents.
 - c. Age of sealant upon date of testing.

- d. Test results, modeled after the sample form in the test method document.
 - e. Indicate use of photographic record of test.
- E. Field Adhesion Test Procedures:
 - 1. Allow sealants to fully cure as recommended by manufacturer before testing.
 - 2. Have a copy of the test method document available during tests.
 - 3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
 - 4. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
 - 5. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
 - 6. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
- F. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
 - 1. Sample: At least 18 inches long.
 - 2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch by that percentage; if adhesion failure occurs before the 1-inch mark is that distance from the substrate, the test has failed.
 - 3. If either adhesive or cohesive failure occurs before minimum elongation, take necessary measures to correct conditions and retest; record each modification to products or installation procedures.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Joint Sealers:
 - 1. Dow: www.dow.com/#sle.
 - 2. Pecora Corporation: www.pecora.com/#sle.
 - 3. Sika Corporation: usa.sika.com/#sle.
 - 4. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Exterior Joints:
 - a. Seal open joints except open joints indicated on drawings as not sealed.
 - 2. Interior Joints:
 - a. Do not seal interior joints indicated on drawings as not sealed.
 - b. Do not seal gaps and openings in gypsum board and suspended ceilings

- c. Seal open joints except specific open joints indicated on drawings as not sealed.
- 3. Do Not Seal:
 - a. Intentional weep holes in masonry.
 - b. Joints indicated to be covered with expansion joint cover assemblies.
 - c. Joints where sealant is specified to be furnished and installed by manufacturer of product to be sealed.
 - d. Joints where sealant installation is specified in other sections.
 - e. Joints between suspended ceilings and walls.
- B. Interior Wet Areas: Bathrooms, restrooms, kitchens, food service areas, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.
- C. Sound-Rated Assemblies: Walls and ceilings identified as STC-rated, sound-rated, or acoustical.

2.3 JOINT SEALANTS - GENERAL

- A. Colors: As selected by Architect.

2.4 NONSAG JOINT SEALANTS

- A. Nonstaining Silicone Sealant: ASTM C920, Grade NS, Uses M, A, and G; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 100 percent, minimum.
 - 2. Nonstaining to Porous Stone: Nonstaining to light-colored natural stone when tested in accordance with ASTM C1248.
 - 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
 - 4. Color: To be selected by Architect from manufacturer's standard range.
 - 5. Products:
 - a. Dow; DOWSIL 790 Silicone Building Sealant: www.dow.com/#sle.
 - b. Pecora Corporation; Pecora 890 NST (Non-Staining Technology): www.pecora.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Silicone Sealant: ASTM C920, Grade NS, Use T; single component, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
 - 1. Movement Capability: Plus 100 percent and minus 50 percent, minimum.
 - 2. Color: To be selected by Architect from manufacturer's standard range.
- C. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
 - 1. Color: As indicated on Drawings..
- D. Polymer Sealant: ASTM C920; single component, cured sealant is paintable and mold/mildew resistant, low odor and VOC, and ultraviolet (UV) resistant.
 - 1. Adheres to wet surfaces.
 - 2. Products:
 - a. Adfast USA Inc; ADSEAL DWSP 1940 Series: www.adfastcorp.com/#sle.

- b. DAP Products Inc; DYNAFLEX 800 Sealant: www.dapspecline.com/#sle.
 - c. SIGA Cover Inc; SIGA-Meltell: www.siga.swiss/global_en/#sle.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Hybrid Elastomeric Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 50 percent, minimum.
 - 2. Hardness Range: 15 to 25, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: Match adjacent finished surfaces.
 - 4. Service Temperature Range: Minus 75 to 300 degrees F.
 - 5. Products:
 - a. Dow; DOWSIL Contractors Paintable Sealant - CPS: www.dow.com/#sle.
 - b. Franklin International Inc; Titebond WeatherMaster Metal Roof Sealant: www.titebond.com/#sle.
 - c. Franklin International Inc; Titebond WeatherMaster Sealant: www.titebond.com/#sle.
 - d. Sika Corporation; Sikaflex HY 150: usa.sika.com/#sle.
 - e. Tremco Commercial Sealants and Waterproofing; Dymonic FC: www.tremcosealants.com/#sle.
 - f. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Nonsag Traffic-Grade Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion and traffic without the necessity to recess sealant below traffic surface.
 - 1. Movement Capability: Plus and minus 50 percent, minimum.
 - 2. Hardness Range: 20 to 30, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: To be selected by Architect from manufacturer's standard range.
 - 4. Products:
 - a. Sika Corporation; Sikaflex NP 1: usa.sika.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- G. Epoxy Sealant: ASTM C881/C881M, Type I and III, Grade 3, Class B and C; two-component.
 - 1. Hardness Range: 65 to 75, Shore D, when tested in accordance with ASTM C661.
 - 2. Compressive Strength: 11,000 psi, when tested in accordance with ASTM D695.
 - 3. Color: Match adjacent finished surfaces.
- H. Polysulfide Sealant for Continuous Water Immersion: Polysulfide; ASTM C920, Grade NS, Uses M and A; single component; explicitly approved by manufacturer for continuous water immersion; not expected to withstand traffic.
 - 1. Movement Capability: Plus and minus 25 percent, minimum.
 - 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: Match adjacent finished surfaces.
 - 4. Products:
 - a. Pecora Corporation; Synthacalk GC2+: www.pecora.com/#sle.

- b. W. R. Meadows, Inc; Deck-O-Seal Gun Grade: www.wrmeadows.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- I. Acrylic-Urethane Sealant: ASTM C920, Grade NS, Uses M and A; single component; paintable; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 12-1/2 percent, minimum.
 - 2. Hardness Range: 15 to 40, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: White.
 - 4. Service Temperature Range: Minus 40 to 180 degrees F.
 - 5. Products:
 - a. DAP Products Inc; DYNAFLEX 920 Sealant: www.dapspecline.com/#sle.
 - b. Everkem Diversified Products, Inc; AcuraSeal: www.everkemproducts.com/#sle.
 - c. Florida Paints and Coatings, LLC; SunTech EP Urethane Acrylic Sealant FP00600: www.floridapaints.com/#sle.
 - d. Franklin International, Inc; Titebond UA 920 Sealant: www.titebond.com/#sle.
 - e. Sherwin-Williams Company; Shermax Urethanized Elastomeric Sealant: www.sherwin-williams.com/#sle.
 - f. Top Gun, a brand of PPG Architectural Coatings; Top Gun 400: www.pittsburghpaintsco.com/#sle.
 - g. Tower Sealants, Inc; AU-1 Commercial Construction Sealant: www.towersealants.com/#sle.
 - h. Substitutions: See Section 01 60 00 - Product Requirements.
- J. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, nonstaining, nonbleeding, nonsagging; not intended for exterior use.
 - 1. Color: Standard colors matching finished surfaces, Type OP (opaque).
 - 2. Products:
 - a. Pecora Corporation; AC-20 +Silicone: www.pecora.com/#sle.
 - b. Sherwin-Williams Company; White Lightning 3006 Siliconized Acrylic Latex Caulk: www.sherwin-williams.com/#sle.
 - c. Sherwin-Williams Company; 850A Acrylic Latex Caulk: www.sherwin-williams.com/#sle.
 - d. Top Gun, a brand of PPG Architectural Coatings; Top Gun 200: www.pittsburghpaintsco.com/#sle.
 - e. Tremco Commercial Sealants & Waterproofing; Tremflex 834: www.tremcosealants.com/#sle.
 - f. Substitutions: See Section 01 60 00 - Product Requirements.
- K. Acrylic Latex Sealant: ASTM C834; for use as acoustical sealant and in firestopping systems for expansion joints and through penetrations.
 - 1. Color: Standard colors matching finished surfaces.
 - 2. Fire Rated System: Complies with UL 263 and ASTM E119 with UL fire resistance classifications.

2.5 ACCESSORIES

- A. Sealant Backing Materials, General: Materials placed in joint before applying sealants; assists sealant performance and service life by developing optimum sealant profile and preventing three-sided

adhesion; type and size recommended by sealant manufacturer for compatibility with sealant, substrate, and application.

B. Sealant Backing Rod, Open-Cell Type:

1. Cylindrical flexible sealant backings complying with ASTM C1330 Type O.
2. Size: 25 to 50 percent larger in diameter than joint width.
3. Products:
 - a. Substitutions: See Section 01 60 00 - Product Requirements.

C. Overlay Extrusion for Glazing System Joint Protection: Rubber profiled extrusions placed over joints in glazing system and provided with watertight seal.

1. Profile: As required to match existing metal glazing cap requirements.
2. Color: As required to match existing conditions.
3. Durometer Hardness, Type A: 65, minimum, when tested in accordance with ASTM D2240.
4. Tensile Strength: 1,139 psi, in accordance with ASTM D412.
5. Products:
 - a. Tremco Commercial Sealants & Waterproofing; Spectrem Restoration Overlay:
www.tremcosealants.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
 2. Notify Architect of date and time that tests will be performed, at least seven days in advance.
 3. Record each test on Preinstallation Adhesion Test Log as indicated.
 4. If any sample fails, review products and installation procedures, consult manufacturer, or take other measures that are necessary to ensure adhesion; retest in a different location; if unable to obtain satisfactory adhesion, report to Architect.
 5. After completion of tests, remove remaining sample material and prepare joints for new sealant installation.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in an inconspicuous area to verify that it does not stain or discolor slab.

3.3 INSTALLATION

- A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Provide joint sealant installations complying with ASTM C1193.
- C. Install acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker backing tape where backer rod cannot be used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- I. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- C. Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet, notify Architect immediately.
- D. Destructive Adhesion Testing: If there are any failures in first 1,000 linear feet, notify Architect immediately.
- E. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.
- F. Repair destructive test location damage immediately after evaluation and recording of results.

3.5 POST-OCCUPANCY

- A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width, i.e., at low temperature in thermal cycle. Report failures immediately and repair them.

END OF SECTION

SECTION 08 14 33
STILE AND RAIL WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Custom wood doors, stile and rail design; non-fire rated.
- B. Panels of wood and glass.

1.2 RELATED REQUIREMENTS

- A. Section 06 20 00 - Finish Carpentry: Wood door frames.
- B. Section 08 71 00 - Door Hardware.
- C. Section 08 80 00 - Glazing.
- D. Section 09 91 23 - Interior Painting: Field finishing.

1.3 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2025.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- E. WDMA I.S. 6A - Interior Architectural Wood Stile and Rail Doors; 2021, with Errata (2022).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate stile and rail core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, and cutouts for glazing.
- D. Samples: Submit two samples of door construction, 12 by 12 inches in size cut from top corner of door.
- E. Samples: Submit two samples of door veneer, 12 by 12 inches in size illustrating wood grain, stain color, and sheen.
- F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- G. Manufacturer's Installation Instructions: Indicate special installation instructions.
- H. Manufacturer's qualification statement.
- I. Installer's qualification statement.
- J. Warranty, executed in Owner's name.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
 - 1. Accredited participant in specified certification program prior to commencement of fabrication and throughout duration of project.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- C. Quality Certification:
 - 1. Provide labels or certificates indicating that installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
 - 2. Provide designated labels on shop drawings as required by certification program.
 - 3. Provide designated labels on installed products as required by certification program.
 - 4. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver, and store doors in accordance with quality standard specified.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.7 WARRANTY

- A. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.1 DOORS

- A. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with WDMA I.S. 6A.
- B. Exterior Doors: 2-1/4 inches thick unless otherwise indicated; solid lumber construction; mortise and tenon joints; water repellent treated. Transparent or opaque finish as indicated on drawings.
- C. Interior Doors: 1-3/4 inches thick unless otherwise indicated; solid lumber construction; mortise and tenon joints. Transparent or opaque finish as indicated on drawings.
- D. Wood veneer facing for field transparent finish as indicated on drawings.

2.2 DOOR AND PANEL FACINGS

- A. Exterior: Veneer Facing for Transparent Finish: Honduras Mahogany, veneer grade in accordance with quality standard indicated, quarter cut, with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
 - 1. Pairs: Pair match each pair; set match pairs within 10 feet of each other when doors are closed.
- B. Interior: Veneer Facing for Transparent Finish: Alder, veneer grade in accordance with quality standard indicated, quarter cut, with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face. Transom Panels: Continuous match to door. Pairs:

Pair match each pair; set match pairs within 10 feet of each other when doors are closed. Materials for Opaque Finishes: Hardboard faces. Adhesive: Type I - Waterproof.

C. Adhesive: Type I - Waterproof.

2.3 DOOR CONSTRUCTION

- A. Astragals for Double Doors: Wood, overlapping and recessed at face edge, specifically for double doors.
- B. Vertical Exposed Edge of Stiles: Of same species as veneer facing.
- C. Vertical Exposed Edge of Stiles: Medium Density Overlay (MDO) to match door facing.
- D. Fit door edge trim to edge of stiles after applying veneer facing.
- E. Bond edge banding to cores.
- F. Panels: Raised, solid wood.
- G. At exterior doors, provide aluminum flashing at the top and bottom rail for full thickness and width of door.
- H. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- I. Cut and configure exterior door edge to receive recessed weatherstripping devices. Provide edge clearances in accordance with referenced quality standards.

2.4 FINISHES

- A. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Transparent:
 - a. System - 1, Lacquer, Nitrocellulose.
 - b. Stain: As selected by Architect.
 - 2. Opaque:
 - a. Color: As selected by Architect.
 - b. Sheen: Satin.
- B. Field finish doors in accordance with approved sample.
- C. Seal door top edge with color sealer to match door facing.

2.5 ACCESSORIES

- A. Wood Door Frames: See Section 06 20 00.
- B. Glazed Openings:
 - 1. Heat-Strengthened and Fully Tempered Glass: ASTM C1048.
 - 2. Glazing: Single vision units, 1/4 inch thick panes of glass.
 - 3. Coating: Low-E type, on No. 2 surface.
- C. Panel or Glass Retention Molding: Wood of same species as door facing, flat bead stop, with mitered corners; prepared for countersink style screws.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out of tolerance for size or alignment.

3.2 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standards.
- B. Field-Finished Doors: Trimming to fit is acceptable.
 - 1. Adjust width of non-rated doors by cutting equally on both jamb edges.
 - 2. Trim door height by cutting bottom edges to a maximum of 3/4 inch.
 - 3. Trim fire-rated doors in strict compliance with fire rating limitations.
- C. Machine cut for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

3.3 TOLERANCES

- A. Comply with specified quality standard for fit, clearance, and joinery tolerances.
- B. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 by 84 inch surface area.

3.4 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

3.5 SCHEDULE

- A. See Door and Frame Schedule in Drawings.

END OF SECTION

SECTION 08 43 13

ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Infill panels of metal and glass.
- C. Weatherstripping.

1.2 RELATED REQUIREMENTS

- A. Section 07 25 00 - Weather Barriers: Sealing framing to water-resistive barrier installed on adjacent construction.
- B. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.
- C. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.
- D. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.3 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2025.
- C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum; 2025.
- D. AAMA 611 - Specification for Anodized Architectural Aluminum; 2024.
- E. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- H. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- I. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).
- J. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).
- K. FLA (PAD) - Florida Building Code Online - Product Approval Directory; Current Edition.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.

- B. Preinstallation Meeting: Conduct a preinstallation meeting before starting work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
- D. Samples: Submit for each type of exposed finish required. samples 12 x 12 inches in size illustrating finished aluminum surface, glass, infill panels, glazing materials.
- E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- F. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
- G. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- H. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- I. Specimen warranty.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
 - 1. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.
 - a. North American Contractor Certification (NACC) for glazing contractors.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.8 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.9 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. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

- D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Aluminum-Framed Storefronts:

1. Kawneer North America; Versaglaze Trifab 451 T: www.kawneer.com/#sle.
2. Oldcastle Building Envelope: www.oldcastlebe.com/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

A. Center-Set Style, Wind-Borne-Debris Resistance Tested:

1. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.

2.3 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.

1. Finish: Class I natural anodized, Class I natural anodized, Class II natural anodized Class II natural anodized.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.
2. Finish Color: As selected by Architect from manufacturer's standard line.
3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

B. Performance Requirements

1. System Design: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners.
 - a. As calculated in accordance with applicable code, as tested in accordance with ASTM E330.

2. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M.
 - a. Design Wind Loads: Comply with requirements of ASCE 7.
 - b. Member Deflection: Limit member deflection to 1/175 for spans under 13'-6" and 1/240 plus 1/4 inch for spans over 13'-6" flexure limit of glass 3/4 inch of span; in any direction, with full recovery of glazing materials.
3. System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads, deflection of structural support framing.
4. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection, having Florida Building Code FLA (PAD) approval for Large and Small Missile impact and pressure cycling at design wind pressure.
5. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 2.86 lbf/sq ft and maximum of 12.00 lbf/sq ft.
6. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.
7. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
8. Thermal and Solar Heat Transmittance of Assembly (U Value and SHGC): Comply with ICC IECC for climate zone in which project is located.
9. Exterior system to be thermally broken.
10. 100 percent of exterior system will be tested. See Quality Control.

2.4 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 1. Glazing Stops: Flush.
 2. Glazing System: Retained mechanically with gaskets on four sides.
 3. Fabrication Method: Field-fabricated stick system.
 4. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 5. Steel Reinforcement: As required by manufacturer.
 6. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
 7. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
 8. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Glazing: See Section 08 80 00.

2.5 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).

- B. Fasteners: Stainless steel.
- C. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- D. Shop and Touch-Up Primer for Steel Components: Zinc oxide, alkyd, linseed oil primer appropriate for use over hand cleaned steel.

2.6 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- B. Color: As selected by Architect from manufacturer's standard range.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.7 HARDWARE

- A. Other Door Hardware: See Section 08 71 00.
- B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- C. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.2 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.

- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 FIELD QUALITY CONTROL

- A. Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.
- B. See Section 01 40 00 - Quality Requirements for general testing and inspection requirements.
- C. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
 - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
- D. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.5 ADJUSTING

- A. Adjust operating hardware and sash for smooth operation.

3.6 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.7 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hardware for wood, aluminum, and hollow metal doors.
- B. Hardware for fire-rated doors.
- C. Thresholds.
- D. Weatherstripping and gasketing.

1.2 RELATED REQUIREMENTS

- A. Section 06 20 00 - Finish Carpentry: Wood door frames.
- B. Section 07 92 00 - Joint Sealants: Sealants for setting exterior door thresholds.
- C. Section 08 14 33 - Stile and Rail Wood Doors.
- D. Section 08 43 13 - Aluminum-Framed Storefronts: Door hardware, except as noted in section.

1.3 PRICE AND PAYMENT PROCEDURES

- A. Allowances: See Section 01 21 00 - Allowances, for cash allowances affecting this section.

1.4 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. BHMA A156.1 - Standard for Butts and Hinges; 2021.
- C. BHMA A156.3 - Exit Devices; 2025.
- D. BHMA A156.4 - Door Closers and Pivots; 2024.
- E. BHMA A156.13 - Mortise Locks & Latches Series 1000; 2022.
- F. BHMA A156.16 - Standard for Auxiliary Hardware; 2023.
- G. BHMA A156.18 - Standard for Materials and Finishes; 2020.
- H. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.
- I. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.
- J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- K. ITS (DIR) - Directory of Listed Products; Current Edition.
- L. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025.
- M. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- N. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- O. UL (DIR) - Online Certifications Directory; Current Edition.

- P. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- C. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; attendance is required by affected installers and the following:
 - 1. Architect.
 - 2. Installer's Architectural Hardware Consultant (AHC).
 - 3. Hardware Installer.
 - 4. Owner's Security Consultant.
- D. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- E. Keying Requirements Meeting:
 - 1. Attendance Required:
 - a. Contractor.
 - b. Owner.
 - c. Architect.
 - 2. Agenda:
 - a. Establish keying requirements.
 - b. Verify locksets and locking hardware are functionally correct for project requirements.
 - c. Verify that keying and programming complies with project requirements.
 - 3. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
 - 4. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.
 - 5. Deliver established keying requirements to manufacturers.

1.6 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- C. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
 - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
 - 2. Provide complete description for each door listed.

3. Provide manufacturer name, product names, and catalog numbers; include functions, types, styles, sizes and finishes of each item.
- D. Samples for Verification:
1. Submit minimum size of 2 by 4 inch for sheet samples, and minimum length of 4 inch for other products.
 2. Submit one (1) sample of hinge, latchset, lockset, and closer illustrating style, color, and finish.
 3. Return full-size samples to Contractor.
 4. Submit product description with samples.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- F. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
1. Submit manufacturer's parts lists and templates.
- G. Keying Schedule:
1. Submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.
- H. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
- I. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.7 QUALITY ASSURANCE

- A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least three years of documented experience.
- D. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC) to assist in work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

1.9 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer's Warranty: Provide warranty against defects in material and workmanship for period indicated. Complete forms in Owner's name and register with manufacturer.
 1. Closers: Five years, minimum.
 2. Exit Devices: Three years, minimum.

3. Locksets and Cylinders: Three years, minimum.
4. Other Hardware: Two years, minimum.

PART 2 PRODUCTS

2.1 DESIGN AND PERFORMANCE CRITERIA

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Provide door hardware products that comply with the following requirements:
 1. Applicable provisions of federal, state, and local codes.
 2. Accessibility: ADA Standards and ICC A117.1.
 3. Applicable provisions of NFPA 101.
 4. Fire-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
 5. Hardware on Fire-Rated Doors: Listed and classified by UL (DIR), ITS (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for application indicated.
 6. Auxiliary Hardware: BHMA A156.16.
 7. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
 8. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.
- D. Lock Function: Provide lock and latch function numbers and descriptions of manufacturer's series. See shop drawing submittal of Door Hardware Schedule.
- E. Fasteners:
 1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
 - a. Aluminum fasteners are not permitted.
 - b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
 2. Fire-Rated Applications: Comply with NFPA 80.
 - a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
 - b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

3.2 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.

- B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.
- C. Use templates provided by hardware item manufacturer.
- D. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list, unless noted otherwise on drawings.
 - 1. Mounting heights in compliance with ADA Standards:
 - a. Locksets: 40-5/16 inch.
 - b. Push Plates/Pull Bars: 42 inch.
 - c. Deadlocks (Deadbolts): 48 inch.
 - d. Exit Devices: 40-5/16 inch.
- E. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.3 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Section 01 40 00 - Quality Requirements.

3.4 ADJUSTING

- A. Adjust work under provisions of Section 01 70 00 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.5 CLEANING

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.6 PROTECTION

- A. Protect finished Work under provisions of Section 01 70 00 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing units.
- C. Glazing compounds.

1.2 RELATED REQUIREMENTS

- A. Section 07 25 00 - Weather Barriers.
- B. Section 07 92 00 - Joint Sealants: Sealants for other than glazing purposes.
- C. Section 08 14 33 - Stile and Rail Wood Doors: Glazed lites in doors.
- D. Section 08 43 13 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.
- E. Section 10 28 00 - Toilet, Bath, and Laundry Accessories: Mirrors.

1.3 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).
- F. ASTM C1036 - Standard Specification for Flat Glass; 2025.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2025.
- H. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2024.
- I. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.
- J. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.
- K. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2024.
- L. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.
- M. BS EN 14179-1 - Glass in Building - Heat Soaked Thermally Toughened Soda Lime Silicate Safety Glass - Part 1: Definition and Description; 2016.
- N. GANA (GM) - GANA Glazing Manual; 2022.

- O. GANA (SM) - GANA Sealant Manual; 2008.
- P. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (Reaffirmed 2016).
- Q. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2023.
- R. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2023.
- S. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2023.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Certificate: Certify that products of this section meet or exceed specified requirements.
- E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM), GANA (SM), and GANA (LGRM) for glazing installation methods. Maintain one copy on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.
- D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.
- E. Tempered Glass:
 - 1. Heat soak according to DIN 18516-4.
 - 2. Select heat soak method. Full heat soaking does not completely eliminate possibility of glass breakage.
 - 3. Statistical Heat Soaking: Heat soak statistical sampling of each type of tempered glass to ensure 95 percent probability of maximum 0.1 percent glass breakage caused by nickel-sulfide inclusions.
 - 4. Full Heat Soaking: Heat soak each tempered glass lite before final fabrication.
- F. Certificate of Compliance:

1. If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.
2. Specified shop tests are not required for Work performed by approved manufacturer.

1.7 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
- C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.
- D. Heat Soaked Tempered Glass: Provide a five (5) year manufacturer warranty to include coverage for spontaneous breakage of fully tempered glass caused by nickel sulfide (NiS) inclusions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Float Glass Manufacturers:
 1. Cardinal Glass Industries: www.cardinalcorp.com/#sle.
 2. Guardian Glass, LLC: www.guardianglass.com/#sle.
 3. Pilkington North America Inc: www.pilkington.com/na/#sle.
 4. Saint Gobain North America: www.saint-gobain.com/#sle.
 5. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
 6. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 1. Design Pressure: Calculated in accordance with ASCE 7.
 2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
 4. Glass thicknesses listed are minimum.
- B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
 1. In conjunction with weather barrier related materials described in other sections, as follows:

- a. Water-Resistive Barriers: See Section 07 25 00.
- 2. To utilize inner pane of multiple pane insulating glass units for continuity of vapor retarder and/or air barrier seal.
- 3. To maintain a continuous vapor retarder and/or air barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
 - 1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 7 computer program.
 - 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 7 computer program.
 - 3. Solar Optical Properties: Comply with NFRC 300 test method.

2.3 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
 - 1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
 - 2. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
 - 3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
 - 4. Heat-Soak Testing (HST): Provide HST of fully tempered glass used on canopy, point-supported, spider wall, high-risk, sloping overhead, horizontal overhead, free-standing glass protective barrier, or other demanding applications of project, to reduce risks of spontaneous breakage due to nickel sulfide (NiS) induced fractures in accordance with BS EN 14179-1.
 - 5. Impact Resistant Safety Glass: Complies with ANSI Z97.1 - Class B, or 16 CFR 1201 - Category I criteria.
 - 6. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design, 1/4 clear tempered glass.
- B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
 - 1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.

2.4 INSULATING GLASS UNITS

- A. Manufacturers:
 - 1. Glass: Any of the manufacturers specified for float glass.
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Insulating Glass Units: Types as indicated.
 - 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 - 2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.

3. Spacer Color: Black.
 4. Edge Seal:
 - a. Color: Black.
 5. Purge interpane space with dry air, hermetically sealed.
- C. Type IG-1 - Insulating Glass Units: Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated.
 2. Space between lites filled with air.
 3. Outboard Lite: Laminated, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - b. Coating: Low-E (passive type), on #2 surface.
 4. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 5. Total Thickness: 1 inch.
 6. Visible Light Transmittance (VLT): 70 percent, nominal.
 7. Solar Heat Gain Coefficient (SHGC): .39, nominal.

2.5 GLAZING UNITS

- A. Type G-2 - Monolithic Interior Vision Glazing:
1. Applications: Interior glazing unless otherwise indicated.
 2. Glass Type: Fully tempered float glass.
 3. Tint: Clear.
 4. Thickness: 1/4 inch, nominal.

2.6 GLAZING COMPOUNDS

- A. Type GC-5 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.
- B. Manufacturers:
1. Dow; DOWSIL 982 Silicone Insulating Glass Sealant Base and Catalyst: www.dow.com/#sle.
 2. Tremco Commercial Sealants & Waterproofing; Proglaze: www.tremcosealants.com/#sle.
 3. Substitutions: See Section 01 60 00 - Product Requirements.

2.7 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.

- C. Glazing Clips: Manufacturer's standard type.

2.8 SOURCE QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Provide shop inspection and testing for insulating glass.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- D. Verify that sealing between joints of glass framing members has been completed effectively.
- E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.3 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, and paint.

3.4 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- E. Place glazing tape on free perimeter of glazing in same manner described above.
- F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- G. Carefully trim protruding tape with knife.

3.5 INSTALLATION - WET GLAZING METHOD (COMPOUND AND COMPOUND)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.
- C. Locate and secure glazing pane using glazers' clips.
- D. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

3.6 INSTALLATION - WET/DRY GLAZING METHOD (TAPE AND SEALANT)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- E. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.
- F. Fill gaps between pane and applied stop with sealant to depth equal to bite on glazing, to uniform and level line.
- G. Carefully trim protruding tape with knife.

3.7 FIELD QUALITY CONTROL

- A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- B. Monitor and report installation procedures and unacceptable conditions.
- C. Manufacturer Services: Furnish services of manufacturer's representative experienced in installation of products furnished under this Section for not less than 7 days on Site for installation, inspection, field testing, and instructing Owner's personnel in operation and maintenance of equipment.
- D. Equipment Acceptance:
 - 1. Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.
 - 2. Make final adjustments to equipment under direction of manufacturer's representative.

3.8 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.9 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Gypsum sheathing.
- C. Gypsum wallboard.
- D. Joint treatment and accessories.
- E. Textured finish system.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Building framing and sheathing.
- B. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
- C. Section 07 21 00 - Thermal Insulation: Acoustic insulation.
- D. Section 07 25 00 - Weather Barriers: Water-resistive barrier over sheathing.
- E. Section 07 92 00 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
- F. Section 09 30 00 - Tiling: Tile backing board.

1.3 REFERENCE STANDARDS

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).
- B. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2020).
- C. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2017).
- D. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2024.
- E. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
- F. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2024.
- G. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019 (Reapproved 2024).
- H. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- I. GA-216 - Application and Finishing of Gypsum Panel Products; 2024.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the installation of gypsum board assemblies with size, location, and installation of service utilities.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Provide data on gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.
- C. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.
- D. Samples: Submit two samples of predecorated gypsum board, 12 by 12 inches in size, indicating finish color and texture.
- E. Samples: Submit two samples of gypsum board finished with proposed texture application, 12 by 12 inches in size, indicating finish color and texture.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store gypsum products and accessories indoors and keep above freezing. Elevate boards above floor, on nonwicking supports, in accordance with manufacturer's recommendations.
- B. Store metal products to prevent corrosion.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
 - 1. See PART 3 for finishing requirements.

2.2 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 - 1. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
 - 2. USG Corporation: www.usg.com/#sle.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
 - b. Mold resistant board is required whenever board is being installed before the building is enclosed and conditioned..

3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 4. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - b. Ceilings: 5/8 inch.
 - c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
 5. Paper-Faced Products:
 - a. Georgia-Pacific Gypsum; ToughRock Fireguard C: www.gpgypsum.com/#sle.
 - b. USG Corporation; Sheetrock Brand Firecode X Panels 5/8 in. (15.9 mm): www.usg.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 6. Mold-Resistant, Paper-Faced Products:
 - a. Georgia-Pacific Gypsum; ToughRock Mold-Guard: www.gpgypsum.com/#sle.
 - b. USG Corporation; Sheetrock Brand Mold Tough Firecode SCX Panels 5/8 in. (15.9 mm): www.usg.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 7. Glass Mat Faced Products:
 - a. Georgia-Pacific Gypsum; DensArmor Plus: www.gpgypsum.com/#sle.
 - b. USG Corporation; Sheetrock Brand Glass-Mat Panels Mold Tough Regular 1/2 in. (12.7 mm): www.usg.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Abuse Resistant Wallboard:
1. Application: High-traffic areas indicated.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. Paper-Faced Type: Gypsum wallboard, as defined in ASTM C1396/C1396M.
 4. Glass Mat-Faced Type: Gypsum wallboard, as defined in ASTM C1658/C1658M.
 5. Type: Fire-resistance-rated Type X, UL or WH listed.
 6. Thickness: 5/8 inch.
 7. Edges: Tapered.
 8. Paper-Faced Products:
 - a. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold Guard Abuse-Resistant: www.gpgypsum.com/#sle.
 - b. USG Corporation; Fiberock Brand Aqua-Tough AR Interior Panels Regular 1/2 in. (12.7 mm): www.usg.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 9. Glass Mat Faced Products:
 - a. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Interior Extreme AR Gypsum Panel: www.goldbondbuilding.com/#sle.
 - b. USG Corporation; Sheetrock Brand Glass-Mat Panels Mold Tough AR Firecode X 5/8 in. (15.9 mm): www.usg.com/#sle.

- c. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Impact Resistant Wallboard:
 - 1. Application: High-traffic areas indicated.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. Type: Fire-resistance-rated Type X, UL or WH listed.
 - 4. Thickness: 5/8 inch.
 - 5. Edges: Tapered.
 - 6. Paper-Faced Products:
 - a. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond XP Hi-Impact Gypsum Board: www.goldbondbuilding.com/#sle.
 - b. USG Corporation; Sheetrock Brand Mold Tough VHI Firecode X Panels 5/8 in. (15.9 mm): www.usg.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 - 7. Glass Mat Faced Products: Noncombustible, moisture-resistant gypsum core encased in a fiberglass face and back that shed water. Provide minimum 20-gauge (0.0296 inch) (0.752 mm) steel studs, as defined by the Steel Stud Manufacturers Association (SSMA). Non intended for exterior applications or constant exposure to water. Protect from immersion in water and the eroding effects of cascading water. Product is not suitable for use as a substrate for tile in wet areas such as tubs, showers, gang shower and other areas subject to direct water exposure. Refer to Gypsum Association's GA-216 reference guide, or ASTM C840 reference standard for additional installation requirements.
 - a. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Interior Extreme IR Gypsum Panel: www.goldbondbuilding.com/#sle.
 - b. USG Corporation; Sheetrock Brand Glass-Mat Panels Mold Tough VHI Firecode X 5/8 in. (15.9 mm): www.usg.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.3 GYPSUM BOARD ACCESSORIES

- A. Acoustic Insulation: See Section 07 21 00.
- B. Water-Resistive Barrier: See Section 07 25 00.
- C. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
 - 1. Corner Beads: Low profile, for 90 degree outside corners.
 - a. Products:
 - 1) CertainTeed Corporation; No-Coat Drywall Corner: www.certainteed.com/#sle.
 - 2) ClarkDietrich; Strait-Flex OS-300: www.clarkdietrich.com/#sle.
 - 3) Substitutions: See Section 01 60 00 - Product Requirements.
- D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
- E. Finishing Compound: Surface coat and primer, takes the place of skim coating.
- F. Nails for Attachment to Wood Members: ASTM C514.

- G. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.
- H. Adhesive for Attachment to Wood, ASTM C557 and Metal:
 - 1. Products:
 - a. Franklin International, Inc; Titebond Drywall Construction Adhesive: www.titebond.com/#sle.
 - b. Liquid Nails, a brand of PPG Architectural Coatings: www.liquidnails.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.2 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.3 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- E. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For nonrated assemblies, install as follows:
 - 1. Single-Layer Applications: Adhesive application.

3.4 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
 - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.

3.5 JOINT TREATMENT

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 2. Level 3: Walls to receive textured wall finish.
 3. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch.
 2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
- E. Spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.6 TEXTURE FINISH

- A. Apply light orange peel finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.

3.7 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.8 CLEANING

- A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

3.9 PROTECTION

- A. Protect installed gypsum board assemblies from subsequent construction operations.

END OF SECTION

SECTION 09 30 00

TILING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Cementitious backer board as tile substrate.
- D. Ceramic trim.
- E. Non-ceramic trim.
- F. Edge-protection and transition profiles for floors
- G. Underlayment.

1.2 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.
- B. Section 09 21 16 - Gypsum Board Assemblies: Tile backer board.

1.3 REFERENCE STANDARDS

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2024.
- B. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2023.
- C. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar; 2020.
- D. ANSI A108.20 - American National Standard Specifications for Exterior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs; 2020.
- E. ANSI A118.1 - American National Standard Specifications for Dry-Set Cement Mortar; 2023.
- F. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2021.
- G. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2023.
- H. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation; 2019.
- I. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2019.
- J. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2023.

- K. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2023.
- L. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2014 (Reaffirmed 2024).
- M. ANSI A118.13 - American National Standard Specification for Bonded Sound Reduction Membranes for Thin-Set Ceramic Tile Installation; 2014 (Reaffirmed 2024).
- N. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2022.
- O. ANSI A326.3 - American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials; 2021.
- P. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products; 2018 (Reapproved 2023).
- Q. ASTM D4068 - Standard Specification for Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane; 2017 (Reapproved 2022).
- R. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- S. ASTM E492 - Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine; 2022.
- T. ASTM E2179 - Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors; 2021.
- U. ICC-ES AC308 - Acceptance Criteria for Termite Physical Barrier Systems; 2021, with Editorial Revision (2022).
- V. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2025.
- W. TCNA (HB-GP) - Handbook for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs Installation; 2023.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, perimeter conditions, junctions with dissimilar materials, control and expansion joints, ceramic accessories, and setting details.
- D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.
- E. Certificate: Certify products of this section meet or exceed specified requirements.
- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Tile: 10 sq ft of each size, color, and surface finish combination.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with documented experience.
- B. Installer Qualifications:
 1. Company specializing in performing tile installation, with documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.8 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Tile: Refer to Drawings
 1. Substitutions: See Section 01 60 00 - Product Requirements.
 2. Source Limitations: Furnish products produced by single manufacturer and obtained from single supplier.
- B. Setting Materials:
 1. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
 2. Bostik Inc: www.bostik.com/#sle.
 3. LATICRETE International, Inc: www.laticrete.com/#sle.
 4. Mapei Corporation: www.mapei.com/#sle.
 5. Substitutions: See Section 01 60 00 - Product Requirements.
 6. Source Limitations: Furnish products produced by single manufacturer and obtained from single supplier.
- C. Grout:
 1. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
 2. Bostik Inc: www.bostik.com/#sle.
 3. LATICRETE International, Inc: www.laticrete.com/#sle.
 4. Mapei Corporation: www.mapei.com/#sle.
 5. Substitutions: See Section 01 60 00 - Product Requirements.
 6. Source Limitations: Furnish products produced by single manufacturer and obtained from single supplier.

2.2 PERFORMANCE REQUIREMENTS

- A. Floor Tile: Provide tile for flooring applications with minimum wet Dynamic Coefficient of Friction (DCOF) of 0.42 when tested in accordance with ANSI A326.3.

2.3 TILE

A. Wall Tile:

1. Moisture Absorption: $\leq 0.1\%$ as tested in accordance with ASTM C373.
2. Size: As indicated.
3. Thickness: 3/8 inch.
4. Surface Finish: Matte glazed.
5. Color(s): As indicated on Finish Schedule.
6. Pattern: As indicated on drawings..
7. Trim Units: Matching bullnose, cove base, and cove shapes in sizes coordinated with field tile.
8. Products: As indicated on Drawings.

B. Floor Tile:

1. Moisture Absorption: $\leq 0.1\%$ as tested in accordance with ASTM C373.
2. Size: As indicated.
3. Color(s): As indicated on Finish Schedule.
4. Pattern: As indicated on Drawings
5. Trim Units: Matching bullnose, cove base, and cove shapes in sizes coordinated with field tile.
6. Products: As indicated on Drawings.

2.4 TRIM AND ACCESSORIES

- A. Ceramic Trim: Matching bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.

1. Manufacturers: Same as for tile.

- B. Non-Ceramic Trim: Satin brass anodized extruded aluminum, style and dimensions to suit application, set with tile mortar or adhesive.

1. Applications:
 - a. Transition between floor finishes of different heights.
 - b. Thresholds at door openings.

2.5 SETTING MATERIALS

- A. Provide setting and grout materials from same manufacturer.

- B. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.

1. Applications: Use where large and heavy tile mortar is indicated on drawings.
2. Products:
 - a. ARDEX Engineered Cements; ARDEX X 5: www.ardexamericas.com/#sle.

- b. Custom Building Products; ProLite Premium Rapid Setting Large Format Tile Mortar, with Multi-Surface Bonding Primer: www.custombuildingproducts.com/#sle.
- c. LATICRETE International, Inc; TRI-LITE: www.laticrete.com/#sle.
- d. Sika Corp; SikaTile 300 Set: www.sika.com/#sle.
- e. Substitutions: See Section 01 60 00 - Product Requirements.

2.6 GROUTS

- A. Provide setting and grout materials from same manufacturer.
- B. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
 - 1. Applications: Use this type of grout where indicated .
 - 2. Wall: Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
 - 3. Wall:
 - a. Grout Joint: 1/16" (1/8" when rectangular size is installed in a staggered brick-joint pattern; overlap 33%).)should not exceed
 - 4. Color: As indicated on drawings.
 - 5. Products:
 - a. LATICRETE International, Inc; LATICRETE PERMACOLOR Select NS Grout Base: www.laticrete.com/#sle.
 - b. Mapei Corporation; Ultracolor Plus FA: www.mapei.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Standard Grout: ANSI A118.6 standard cement grout.
 - 1. Applications: Use where indicated on drawings and where no other type of grout is indicated.
 - 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
- D. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
 - 1. Applications: Use where indicated on drawings.

2.7 MAINTENANCE MATERIALS

- A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
 - 1. Applications: Between tile and plumbing fixtures.
 - 2. Color: As indicated on drawings.
 - 3. Products:
 - a. LATICRETE International, Inc; LATICRETE LATASIL: www.laticrete.com/#sle.
 - b. Mapei Corporation; Mapesil T Plus: www.mapei.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
 - 1. Composition: Water-based colorless silicone.
 - 2. Products:

- a. STONETECH, a Division of LATICRETE International, Inc; STONETECH Heavy Duty Grout Sealer: www.laticrete.com/#sle.
 - b. Merkrete, by Parex USA, Inc; Merkrete Revive: www.merkrete.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Tile Sealer: Stain protection for ceramic tile and natural stone tile.
 - 1. Products:
 - a. Custom Building Products; Aqua Mix Enrich 'N' Seal: www.custombuildingproducts.com/#sle.
 - b. STONETECH, a Division of LATICRETE International, Inc; STONETECH BulletProof Stone Sealer: www.laticrete.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.8 ACCESSORY MATERIALS

- A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
 - 1. Crack Resistance: No failure at 1/8 inch gap, minimum.
 - 2. Bonded Sheet Membrane Type:
 - a. Material: Polyethylene sheet membrane with polyester fleece laminated to underside, 20 mils thick.
 - b. Description: 1/8" (3 mm) thick, orange, high-density polyethylene membrane with a grid structure of 1/2" x 1/2" (12 mm x 12 mm) square cavities, each cut back in a dovetail configuration, and a polypropylene anchoring fleece laminated to its underside.
 - c. Products:
 - 1) Schluter-Systems; DITRA: www.schluter.com/#sle.
 - 2) Substitutions: See Section 01 60 00 - Product Requirements.
 - 3. Waterproofing seaming membrane:
 - a. 0.004" (4 mil) thick, orange polyethylene membrane, with polypropylene fleece laminated on both sides.
 - b. Products:
 - 1) Schluter®; KERDI-BAND Seams and Corners material: www.schluter.com.
- B. Tile Underlayment: Specifically designed for bonding to thin-set setting mortar; not primarily waterproofing material and having the following characteristics:
 - 1. Sound Reduction: Comply with ANSI A118.13, ASTM E492, and ASTM E2179.
 - 2. Crack Resistance: No failure at 1/16-inch gap, minimum; comply with ANSI A118.12.
 - 3. Water Resistance: Comply with ANSI A118.10, bonded waterproofing.
 - 4. Termite Resistance: 100 percent when tested in accordance with ICC-ES AC380.
 - 5. Uncoupling Function: Allow for separation between membrane and mortar adhering tile to membrane when subjected to excessive substrate movement.
 - 6. Suitable for installation over green concrete.
 - 7. Type: Fluid or trowel applied.

- a. Products:
- C. Reinforcing Underlayment: Specifically designed for bonding to thin-set setting mortar; not primarily waterproofing material and having the following characteristics:
 - 1. Thickness: 1/8 inch.
 - 2. Suitable for installation over green concrete.
- D. Sound Control Underlayment at Floors: Flexible, self-bonding, fabric reinforced, loadbearing type, fully-adhered.
 - 1. Sound Reduction: Comply with ASTM E492.
 - 2. Thickness: 90 mils, 0.090 in, nominal.
 - 3. Products:
 - a. Sika Corp; SikaTile 700 Sound Shield PNS90: www.sika.com/#sle.
 - b. Substitutions: Section 01 60 00 - Product Requirements.
- E. Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.
- F. Mesh Tape: 2 inch wide self-adhesive fiberglass mesh tape.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive tile.
- B. Verify wall surfaces are smooth and flat within tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.
- D. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Vacuum clean surfaces and damp clean.
- B. Seal substrate surface cracks with filler.
- C. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to feather edge.
- D. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.3 INSTALLATION - GENERAL

- A. Lay tile to pattern indicated on drawings. Do not interrupt tile pattern through openings.
- B. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align wall joints.
- C. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

- D. Form internal angles coved and external angles bullnosed.
- E. Install non-ceramic trim in accordance with manufacturer's instructions.
- F. Sound tile after setting. Replace hollow sounding units.
- G. Keep control and expansion joints free of mortar, grout, and adhesive.
- H. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- I. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.4 INSTALLATION - FLOORS - THIN-SET METHODS

- A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, on ground, with standard grout, unless otherwise indicated on drawings.
 - 1. Where cementitious underlayment is indicated on drawings, install in accordance with TCNA (HB) Method F205, on ground.
- B. Over wood substrates, install in accordance with TCNA (HB) Method F142, with standard grout, unless otherwise indicated on drawings.
- C. Over wood substrates with backer board underlayment, install in accordance with TCNA (HB) Method F144, for cementitious backer boards, with standard grout.
- D. Install tile-to-tile floor movement joints in accordance with TCNA (HB) Method EJ171F.

3.5 INSTALLATION - WALL TILE

- A. Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244C, using membrane at toilet rooms, kitchens, and locker rooms.

3.6 CLEANING

- A. Clean tile and grout surfaces.

3.7 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 09 51 00

ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.2 RELATED REQUIREMENTS

- A. Section 07 21 00 - Thermal Insulation: Acoustical insulation.

1.3 REFERENCE STANDARDS

- A. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.
- C. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2024.
- D. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2024a.
- E. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning.
- C. Product Data: Provide data on suspension system components and acoustical units.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.6 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acoustic Tiles/Panels:

**New Church and Hall
Christ the King Catholic Church
HS #23.033**

**ACOUSTICAL CEILINGS
09 51 00 - 1**

1. Armstrong World Industries, Inc: www.armstrongceilings.com/#sle.
2. USG Corporation: www.usg.com/ceilings/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Suspension Systems:

1. Armstrong World Industries, Inc: www.armstrongceilings.com/#sle.
2. USG Corporation: www.usg.com/ceilings/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Rating: Determined in accordance with test procedures in ASTM E119.

2.3 ACOUSTICAL UNITS

- A. Acoustical Panels ACT: Glass fiber with membrane-faced overlay, attached to suspended ceiling grid with baffle clips, with the following characteristics:

1. Classification: ASTM E1264 Type XII.
2. Size: 24 by 24 inches.
3. Thickness: 1 inch.
4. Light Reflectance: 88, determined in accordance with ASTM E1264.
5. NRC Range: 95, determined in accordance with ASTM E1264.
6. Articulation Class (AC): 190, determined in accordance with ASTM E1264.
7. Panel Edge: Tegal.
8. Color: White.
9. Suspension System: Exposed.
10. Products:
 - a. Armstrong World Industries, Inc; Optima Tegal Item No. 3251: www.armstrongceilings.com/#sle.
 - b. USG Corporation; Halcyon Acoustical Panels: www.usg.com/ceilings/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.4 SUSPENSION SYSTEM(S)

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
- B. Concealed Suspension System: Hot-dip galvanized steel grid and cap.
1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
 2. Profile: Tee; 9/16 inch face width.
 3. Finish: Baked enamel.
 4. Color: White.

5. Products:
 - a. Armstrong World Industries, Inc; Suprafine XL 9/16" Exposed Tee:
www.armstrongceilings.com/#sle.
 - b. USG Corporation: www.usg.com/ceilings/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.5 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. Hold-Down Clips: Manufacturer's standard clips to suit application.
- D. Perimeter Moldings: Same metal and finish as grid.
 1. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
 2. Acoustical Sealant For Perimeter Moldings: Non-hardening, non-skinning, for use in conjunction with suspended ceiling system.
- E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.2 PREPARATION

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

3.3 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 1. Install in bed of acoustical sealant.
 2. Use longest practical lengths.
 3. Overlap and rivet corners.
- E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.

3.4 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Make field cut edges of same profile as factory edges.
 - 3. Double cut and field paint exposed reveal edges.
- F. Where round obstructions occur, provide preformed closures to match perimeter molding.
- G. Lay acoustical insulation for a distance of 48 inches either side of acoustical partitions as indicated.
- H. Install hold-down clips on panels within 20 ft of an exterior door.

3.5 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.6 CLEANING

- A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
- B. Clean surfaces.
- C. Replace damaged or abraded components.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Installation accessories.

1.2 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.

1.3 REFERENCE STANDARDS

- A. ASTM D6329 - Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers; 1998 (Reapproved 2023).
- B. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2023.
- C. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile in Modular Format such as Tile(s) or Plank(s); 2024.
- D. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2025.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate seaming plans, floor patterns, and seaming plan, custom patterns and inlay designs.
- D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- E. Verification Samples: Submit two samples illustrating color and pattern for each resilient flooring product specified.
- F. Manufacturer's Qualification Statement.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Flooring Material: 100 square feet of each type and color.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.

1.7 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.1 TILE FLOORING

- A. Vinyl Tile: Printed film type, with transparent or translucent wear layer; acoustic interlayer or backing.
 - 1. Manufacturers:
 - a. Shaw Contract; Terrain II: <https://www.shawcontract.com/en-us/collection/details/kr..>
 - b. Mannington Commercial; Onward 12: <https://www.manningtoncommercial.com/>
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 - 2. Minimum Requirements: Comply with ASTM F1700, Class III.
 - 3. Mold and Microbial Resistance: Highly resistant when tested in accordance with ASTM D6329.
 - 4. Plank Tile Size: 6 by 48 inch.
 - 5. Total Thickness: 0.098 in (2.5 mm)
 - 6. Tile Edge: Interlocking shape.
 - 7. Pattern: As indicated on Drawings.
 - 8. Color: To be selected by Architect from manufacturer's full range.

2.2 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
- C. Underlayment: Type recommended by manufacturer.
- D. Moldings, Transition and Edge Strips: Same material as flooring.

2.3 PART 3 EXECUTION

2.4 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

2.5 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Clean substrate.
- E. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

2.6 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Loose-Laid Installation: Set flooring in place in accordance with manufacturer's instructions.
- D. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Resilient Strips: Attach to substrate using adhesive.
- E. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- F. Install flooring in recessed floor access covers, maintaining floor pattern.

2.7 INSTALLATION - LVT FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Install plank tile with a random offset of at least 6 inches from adjacent rows.

2.8 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

2.9 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

2.10 SCHEDULE

- A. See Finish Schedule for Location.

END OF SECTION

SECTION 09 91 13
EXTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Exposed surfaces of steel lintels and ledge angles.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Marble, granite, slate, and other natural stones.
 - 6. Floors, unless specifically indicated.
 - 7. Ceramic and other types of tiles.
 - 8. Brick, glass unit masonry, architectural concrete, cast stone, integrally colored plaster and stucco.
 - 9. Glass.
 - 10. Concealed pipes, ducts, and conduits.

1.2 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.3 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2024.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.
- D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

- E. SSPC V2 (PM2) - Systems and Specifications: Steel Structures Painting Manual Volume 2; 2021.
- F. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- G. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.
 - 5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

1.6 MOCK-UPS

- A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
- B. Locate where directed by Architect.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.8 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

- C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Base Manufacturer: Sherwin Williams Compan;<https://www.sherwin-williams.com/>.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 - 3. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.
 - 5. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- B. Volatile Organic Compound (VOC) Content:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Colors: As indicated in Color Schedule. See Finish Schedule.
 - 1. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.

2.3 PAINT SYSTEMS - EXTERIOR

- A. Concrete: Cementitious siding.

1. Supply each coating material in quantity required to complete entire project's work from a single production run.
 2. Latex Systems:
 - a. Semi-Gloss Finish:
 - 1) 1st Coat: Sherwin-Williams Loxon Concrete and Masonry Primer Sealer LX02W50:
www.sherwin-williams.com/#sle.
 - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Acrylic Semi-Gloss, B66-650 Series:
www.sherwin-williams.com/#sle.
- B. Concrete/Asphalt: Traffic marking paint
1. Waterborne Systems:
 - a. Flat finish: 1 coat: Sherwin-Williams Pro-Park Waterborne Traffic Marking Paint, B97 Series.
 - 1) 1 coat: Sherwin-Williams Pro-Park Waterborne Traffic Marking Paint, B97 Series.
 2. Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete masonry units, brick, fiber cement siding, primed wood, and primed metal.
 - a. Two top coats and one coat primer.
 - b. Top Coat(s): Exterior Latex.
 - 1) Products:
 - (a) Sherwin-Williams Loxon XP Exterior. (MPI #10)
 - (b) Substitutions: See Section 01 60 00 - Product Requirements
 - c. Paint E-TR-C - Transparent Finish on Concrete Floors:
 - 1) 2 coats sealer over 2 coats stain.
 - 2) Stain: Semi-Transparent Stain for Concrete Floors; MPI #58.
 - (a) Products:
 - (1) Behr Premium Semi-Transparent Concrete Stain [No.850]. (MPI #58)
 - (2) Substitutions: See Section 01 60 00 - Product Requirements

2.4 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
 1. Latex Primer for Exterior Wood; MPI #6.
 2. Bonding Primer, Water Based; MPI #17.

2.5 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Fiber Cement Siding: 12 percent.
 - 2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
 - 3. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
 - 4. Concrete Floors and Traffic Surfaces: 8 percent.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Concrete:
 - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 - 2. Clean surfaces with pressurized water. Use pressure range of 1,500 to 4,000 psi at 6 to 12 inches. Allow to dry.
- G. Masonry:
- H. Fiber Cement Siding: Remove dirt, dust and other foreign matter with a stiff fiber brush. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
- I. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- J. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- K. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.

2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. Protect from corrosion until coated.
- L. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.
- M. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with tinted primer.

3.3 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.
- C. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.
- G. Sand wood and metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

3.5 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

3.7 SCHEDULE - PAINT SYSTEMS

- A. Steel Fabrications: Finish surfaces exposed to view and concealed surfaces where required to conform to performance requirements and resist corrosion.
- B. Shop-Primed Metal Items: Finish surfaces exposed to view.
 - 1. Finish the following items:
 - a. Exposed surfaces of lintels.

END OF SECTION

SECTION 09 91 23
INTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints, stains, varnishes .
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Exposed surfaces of steel lintels and ledge angles.
 - 3. Surfaces inside cabinets.
 - 4. Prime surfaces to receive wall coverings.
 - 5. Mechanical and Electrical:
 - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
 - c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Marble, granite, slate, and other natural stones.
 - 6. Floors, unless specifically indicated.
 - 7. Ceramic and other tiles.
 - 8. Brick, architectural concrete, cast stone, integrally colored plaster, and stucco.
 - 9. Glass.
 - 10. Acoustical materials, unless specifically indicated.
 - 11. Concealed pipes, ducts, and conduits.

1.2 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Shop-primed items.

1.3 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.4 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2024.
- C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2023.
- D. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.
- E. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
- F. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- G. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- H. SSPC-SP 2 - Hand Tool Cleaning; 2024.
- I. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
 - 2. MPI product number (e.g., MPI #47).
 - 3. Cross-reference to specified paint system products to be used in project; include description of each system.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
- D. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gal of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

1.7 MOCK-UP

- A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
- B. Locate where directed by Architect.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.9 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point, or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 45 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 fc measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide all paints and finishes from the same manufacturer to the greatest extent possible.
 - 1. If a single manufacturer cannot provide specified products; minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
- B. Paints:
 - 1. Base Manufacturer: Sherwin Williams Company.
 - 2. Benjamin Moore & Co: www.benjaminmoore.com.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Transparent Finishes:
 - 1. Base Manufacturer: Minwax Water Based Stain
 - 2. Benjamin Moore & Co: www.benjaminmoore.com
- E. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
 - 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 - 2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 3. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- D. Colors: To be selected from manufacturer's full range of available colors.
 - 1. Selection to be made by Architect after award of contract.
 - 2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
 - 3. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.

2.3 PAINT SYSTEMS - INTERIOR

- A. Wood - Millwork, Doors and Trim:
 - 1. 1st Coat: Sherwin Williams ProMar 200 Zero VOC Latex Primer, B28W2600
 - 2. 2nd Coat: Sherwin Williams ProMar 200 Int Waterbased Acrylic-Alkyd S/G B34-8250
 - 3. 3rd Coat: Sherwin Williams ProMar 200 Int Waterbased Acrylic-Alkyd S/G B34-8250
 - 4. Sand between coats.
 - 5. Paint and finish to match Architect provided sample.
- B. Wood - Transparent:
 - 1. Stain: Minwax Wood 250 Stain
 - 2. 2nd Coat: Minwax® Water Based Polyurethane Varnish, Satin
 - 3. 3rd Coat: Minwax® Water Based Polyurethane Varnish, Satin
 - 4. Sand between coats.

5. Stain and finish to match Architect provided sample.
- C. Gypsum Board Walls and Ceilings (Matte):
 1. 1st Coat: ProMar 200 Zero VOC Latex Primer, B28W2600
 2. 2nd Coat: Sherwin-Williams ProMar 200 Zero VOC Latex Flat, B30-2600 Series
 3. 3rd Coat: Sherwin-Williams ProMar 200 Zero VOC Latex Flat, B30-2600 Series
- D. Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board.
 1. Two top coats and one coat primer.
 2. Top Coat(s): Institutional Low Odor/VOC Interior Latex.
 - a. Products:
 - 1) Sherwin-Williams ProMar 200 HP Series, Eg-Shel. (MPI #145)
- E. Paint I-TR-C - Transparent Finish on Concrete Floors.
 1. 2 coats sealer over 2 coats stain.
 2. Stain: Semi-Transparent Stain for Concrete Floors; MPI #58.
 3. Sealer: Water Based Sealer for Concrete Floors; MPI #99.
 4. Sealer Sheen:
 - a. Eggshell: MPI gloss level 3; use this sheen at all locations.

2.4 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.

2.5 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been adequately prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 1. Gypsum Wallboard: 12 percent.
 2. Plaster and Stucco: 12 percent.

3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
5. Concrete Floors and Traffic Surfaces: 8 percent.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Concrete:
 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 2. Clean surfaces with pressurized water. Use pressure range of 1,500 to 4,000 psi at 6 to 12 inches. Allow to dry.
 3. Clean concrete according to ASTM D4258. Allow to dry.
- G. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- H. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- I. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- J. Galvanized Surfaces:
 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 2. Prepare surface according to SSPC-SP 2.
- K. Ferrous Metal:
 1. Solvent clean according to SSPC-SP 1.
 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. Protect from corrosion until coated.
- L. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- M. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with tinted primer.

N. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- F. Sand wood and metal surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

3.5 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 10 14 23

PANEL SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Panel signage.

1.2 PRICE AND PAYMENT PROCEDURES

- A. Allowances:

1. See Section 01 21 00 - Allowances for cash allowances affecting this section.
2. Include cash allowance for purchase and delivery but not installation.

1.3 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's product literature for each type of panel sign, indicating styles, font, foreground and background colors, locations, and overall dimensions of each sign.
- C. Shop Drawings:
 1. Include dimensions, locations, elevations, materials, text and graphic layout, attachment details, and schedules.
 2. Show locations of electrical service connections.
 3. Schedule: Provide information sufficient to completely define each panel sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 - a. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
 - b. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
 - c. Submit for approval by Owner through Architect prior to fabrication.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, indicating sign style, font, and method of attachment.
- E. Selection Samples: Where colors, materials, and finishes are not specified, submit two sets of color selection charts or chips.
- F. Verification Samples: Submit samples showing colors, materials, and finishes specified.
- G. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

H. Manufacturer's qualification statement.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled by floor or building.

1.7 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain minimum ambient temperature during and after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Panel Signage:

1. FASTSIGNS International, Inc: www.fastsigns.com/#sle.
2. Inpro Corporation: www.inprocorp.com/#sle.
3. Takeform: www.takeform.net/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 REGULATORY REQUIREMENTS

A. Accessibility Requirements: Comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most restrictive requirements.

2.3 PANEL SIGNAGE

A. Panel Signage Type A:

1. Application: Room and door signs.
2. Description: Flat signs with engraved panel media, tactile characters.
3. Sign Size: 4 inches by 6 inches.
4. Total Thickness: 1/8 inch.
5. Sign Edges: Squared.
6. Corners: Squared.
7. Color and Font, unless otherwise indicated:
 - a. Character Font: Helvetica, Arial, or other sans serif font.
 - b. Character Case: Upper and lower case (title case).
 - c. Background Color: As scheduled.
 - d. Character Color: Contrasting color.
8. Material: Laminated colored plastic engraved through face to expose core as background color.

9. Profile: Flat panel in aluminum frame.
 - a. Frame Finish: Black anodized.
10. Tactile Letters: Raised 1/32 inch minimum.
11. Braille: Grade II, ADA-compliant.

2.4 SIGNAGE APPLICATIONS

A. Room and Door Signs:

1. Office Doors: Identify with room names and numbers to be determined later, not those indicated on drawings; provide "window" section for replaceable occupant name.
2. Conference and Meeting Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings; provide "window" section with sliding "In Use/Vacant" indicator.
3. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
4. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", room numbers to be determined later, and braille.

B. Emergency Evacuation Map Panel Signs:

1. Map content to be provided by Owner.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install with horizontal edges level.
- C. Locate panel signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

END OF SECTION

SECTION 10 21 13.17
PHENOLIC TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Phenolic toilet compartments.
- B. Urinal screens.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Blocking and supports.
- B. Section 10 28 00 - Toilet, Bath, and Laundry Accessories.

1.3 REFERENCE STANDARDS

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- D. Samples: Submit two samples of partition panels illustrating panel finish, color, and sheen.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Phenolic Toilet Compartments:
 - 1. All American Metal Corp - AAMCO: www.allamericanmetal.com/#sle.
 - 2. ASI Accurate Partitions: www.asi-accuratepartitions.com/#sle.
 - 3. Partition Systems International of South Carolina; Phenolic Toilet Partitions: www.psisc.com/#sle.
 - 4. Substitutions: Section 01 60 00 - Product Requirements.

2.2 PHENOLIC TOILET COMPARTMENTS

- A. Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid phenolic core panels with integral melamine finish, floor-mounted unbraced.

1. Color: Single color as selected.
- B. Doors:
 1. Thickness: 3/4 inch.
 2. Width: 24 inch.
 3. Width for Handicapped Use: 36 inch, out-swinging.
 4. Height: 58 inch.
- C. Panels:
 1. Thickness: 1/2 inch.
 2. Height: 58 inch.
- D. Pilasters:
 1. Thickness: 3/4 inch.
 2. Width: As required to fit space; minimum 3 inch.
- E. Screens: Without doors; to match compartments; mounted to wall with two panel brackets with vertical support/bracing same as compartments.

2.3 ACCESSORIES

- A. Pilaster Shoes: Formed ASTM A666 Type 304 stainless steel with No. 4 finish, 3 inch high, concealing floor fastenings.
 1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Wall and Pilaster Brackets: Polished stainless steel; manufacturer's standard type for conditions indicated on drawings.
- C. Attachments, Screws, and Bolts: Stainless steel , tamper proof type.
- D. Hardware: Satin stainless steel:
 1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
 2. Door Latch: Slide type with exterior emergency access feature.
 3. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
 4. Coat hook with rubber bumper; one per compartment, mounted on door.
 5. Provide door pull for outswinging doors.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify correct spacing of and between plumbing fixtures.

3.2 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.3 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

3.4 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Commercial toilet accessories.
- B. Under-lavatory pipe supply covers.
- C. Diaper changing stations.
- D. Utility room accessories.

1.2 RELATED REQUIREMENTS

- A. Section 09 30 00 - Tiling: Ceramic washroom accessories.

1.3 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2024.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- E. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2023.
- F. ASTM C1036 - Standard Specification for Flat Glass; 2025.
- G. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2024.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.
- I. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2022.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Samples: Submit two samples of each accessory, illustrating color and finish.

- D. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:

1. American Specialties, Inc: www.americanspecialties.com/#sle.
2. Bobrick: <https://www.bobrick.com>.
3. Bradley Corporation: www.bradleycorp.com/#sle.
4. Kimberly-Clark Corporation; Kimberly-Clark Professional ICON Collection: www.kcprofessional.com/#sle.
5. Substitutions: Section 01 60 00 - Product Requirements.

B. Under-Lavatory Pipe Supply Covers:

1. Exterior Surfaces: Smooth non-absorbent, non-abrasive surfaces.
2. Construction: 1/8 inch flexible PVC.
 - a. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84. b. Comply with ASTM C1822, type indicated.
3. Color: White.
4. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces.
5. Products:
6. Plumberex Specialty Products, Inc; Plumberex Handy-Shield Max: www.plumberex.com/#sle.
7. Truebro Lav Guard 2 Undersink Piping Covers.
8. Substitutions: Section 01 60 00 - Product Requirements.

C. Diaper Changing Stations (Listed as "E" on Accessory Schedule on Drawings):

1. Bradley Corporation: www.bradleycorp.com/#sle.
2. Koala Kare Products: www.koalabear.com/#sle.
3. Substitutions: 01 60 00 - Product Requirements.

D. Provide products of each category type by single manufacturer.

2.2 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
- B. Stainless Steel Sheet: ASTM A666, Type 304.
- C. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- D. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

- E. Zinc Alloy: Die cast, ASTM B86.
- F. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- G. Adhesive: Two component epoxy type, waterproof.
- H. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

2.3 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.

2.4 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser: Double roll, surface mounted, for cored or coreless type rolls.
 - 1. Products:
 - a. American Specialties, Inc: www.americanspecialties.com/#sle.
 - b. Kimberly-Clark Corporation; Kimberly-Clark Professional Scott Pro Toilet Paper Dispenser: www.kcprofessional.com/#sle.
 - c. Palmer Fixture; RD0057 – Premium Twin 9 inch Jumbo Tissue: www.palmerfixture.com/#sle.
 - d. Substitutions: Section 01 60 00 - Product Requirements.
- B. Paper Towel Dispenser: Folded paper type, thermoplastic polymer, surface-mounted, with viewing slots on sides as refill indicator and tumbler lock.
 - 1. Capacity: 500 multifold minimum.
 - 2. Products:
 - a. American Specialties, Inc: www.americanspecialties.com/#sle.
 - b. Palmer Fixture; TD0189 – Premium Multi/C-Fold Towel Dispenser: www.palmerfixture.com/#sle.
 - c. Substitutions: Section 01 60 00 - Product Requirements.
- C. Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036;
 - 1. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
 - 2. Size: As indicated on drawings.
 - 3. Products:
 - a. American Specialties, Inc; _____ : www.americanspecialties.com/#sle.
 - b. Ketcham Medicine Cabinets, a Division of Fred Silver and Company, Inc; Washroom Mirrors: www.ketchamcabinets.com/#sle.
 - c. Substitutions: Section 01 60 00 - Product Requirements.
- D. Grab Bars: Stainless steel, smooth surface.
 - 1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force, minimum.
 - b. Dimensions: 1-1/2 inch outside diameter, minimum 0.05 inch wall thickness, concealed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
 - c. Finish: Satin.

- d. Length and Configuration: As indicated on drawings.
- e. Products:
 - 1) American Specialties, Inc: www.americanspecialties.com/#sle.
 - 2) Bobrick.
 - 3) Substitutions: Section 01 60 00 - Product Requirements.

2.5 UNDER-LAVATORY PIPE AND SUPPLY COVERS

A. Under-Lavatory Pipe and Supply Covers:

- 1. Insulate exposed drainage piping, including hot, cold, and tempered water supplies under lavatories or sinks to comply with ADA Standards.
- 2. Exterior Surfaces: Smooth non-absorbent, non-abrasive surfaces.
- 3. Construction: 1/8 inch flexible PVC.
 - a. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- 4. Color: White.
- 5. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.
- D. Verify that field measurements are as indicated on drawings.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
 - 1. Grab Bars: As indicated on drawings.
 - 2. Mirrors: 40 inch, measured from floor to bottom of mirrored surface.
 - 3. Other Accessories: As indicated on drawings.

3.4 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 10 44 00
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.

1.3 REFERENCE STANDARDS

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2024.
- B. FM (AG) - FM Approval Guide; Current Edition.
- C. NFPA 10 - Standard for Portable Fire Extinguishers; 2022.
- D. UL (DIR) - Online Certifications Directory; Current Edition.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features.
- C. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

1.5 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Activar Construction Products Group, Inc. - JL Industries; Cosmic Extinguisher - Multipurpose Chemical: www.activarcpg.com/#sle.
 - 2. Ansul, a Tyco Business; Sentry: www.ansul.com/#sle.
 - 3. Oval Brand Fire Products; Oval Dry Chemical Fire Extinguisher - Multipurpose ABC: www.ovalfireproducts.com/#sle.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Fire Extinguisher Cabinets and Accessories:

1. Activar Construction Products Group, Inc. - JL Industries; Ambassador Series:
www.activarcpg.com/#sle.
2. Larsen's Manufacturing Co: www.larsensmfg.com/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
1. Class: A:B:C type.
 2. Size: 5 pound.
 3. Size and classification as scheduled.
 4. Finish: Baked polyester powder coat, color as selected.

2.3 FIRE EXTINGUISHER CABINETS

- A. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.
- B. Fire Rated Cabinet Construction: One-hour fire rated.
1. Steel; double wall or outer and inner boxes with 5/8 inch thick fire barrier material.
- C. Cabinet Configuration: Surface mounted type.
1. Size to accommodate accessories.
- D. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- E. Finish of Cabinet Exterior Trim and Door: No.4 - Brushed stainless steel.
- F. Finish of Cabinet Interior: White colored enamel.

2.4 ACCESSORIES

- A. Lettering: "FIRE EXTINGUISHER" decal, or vinyl self-adhering, prespaced black lettering in accordance with authorities having jurisdiction (AHJ).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level in wall openings.
- C. Place extinguishers in cabinets.

3.3 MAINTENANCE

- A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

3.4 MAINTENANCE - SELF-SERVICE FIRE EXTINGUISHERS

- A. Monthly Inspections: Inspect self-service fire extinguishers on monthly basis in accordance with manufacturer's instructions, and requirements of the authorities having jurisdiction (AHJ).
- B. Annual Inspections: Inspect self-service fire extinguishers on annual basis in accordance with manufacturer's instructions, and requirements of the authorities having jurisdiction (AHJ).
- C. Inspection Certification Tag: Provide new tag indicating acceptable condition of fire extinguisher, date of inspection, and name of self-service inspector for each inspection.

END OF SECTION

SECTION 11 40 00
FOODSERVICE EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Foodservice equipment.
- B. Connections to utilities.

1.2 REFERENCE STANDARDS

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- B. FM (AG) - FM Approval Guide; Current Edition.
- C. ITS (DIR) - Directory of Listed Products; Current Edition.
- D. UL (DIR) - Online Certifications Directory; Current Edition.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- C. Operation Data: Provide operating data for the specified equipment.
- D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products clear of floor in a manner to prevent damage.
- B. Coordinate size of access and route to place of installation.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Foodservice Equipment as indicated on Schedule on Drawings
 - 1. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 REGULATORY REQUIREMENTS

- A. Comply with applicable codes for utility requirements.

- B. Products Requiring Electrical Connection: Listed and classified by FM (AG), ITS (DIR), UL (DIR), or testing agency acceptable to local authorities having jurisdiction as suitable for the purpose specified and indicated.

2.3 EQUIPMENT

- A. Equipment Schedule: As indicated on Drawings.
 - 1. Equipment Eligible for Energy Star Rating: Provide Energy Star Rated equipment
 - 2. Cooler and Freezer Units: Listed by UL (DIR).
 - 3. Electrical Wiring and Components and Self-Contained Refrigeration Systems: Comply with UL (DIR) listed product standards.
- B. Installation Accessories: Provide rough-in hardware, supports and connections, attachment devices, closure trim, and accessories as required for complete installation.

2.4 MATERIALS

- A. Stainless Steel Sheet: ASTM A666 Type 304 commercial grade, No. 4 finish.
- B. Finish Hardware: Manufacturer's standard.
- C. Work Surfaces: Stainless steel.
- D. Fittings: Sink drains with crumb cup and waste fittings.

2.5 FABRICATION

- A. Install rubber button feet on bearing surface of any item positioned on a finished surface.

2.6 FINISHES

- A. Stainless Steel: No. 4 finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify ventilation outlets, service connections, and supports are correct and in required location.
- B. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install items in accordance with manufacturers' instructions.
- B. Insulate to prevent electrolysis between dissimilar metals.
- C. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved.
- D. Use anchoring devices appropriate for equipment and expected usage.

3.3 ADJUSTING

- A. Adjust equipment and apparatus to ensure proper working order and conditions.
- B. Remove and replace equipment creating excessive noise or vibration.

3.4 CLEANING

- A. Remove masking or protective covering from stainless steel and other finished surfaces.
- B. Wash and clean equipment.
- C. Polish glass, plastic, hardware, accessories, fixtures, and fittings.

3.5 CLOSEOUT ACTIVITIES

- A. At completion of work, provide qualified and trained personnel to demonstrate operation of each item of equipment and instruct Owner in operating procedures and maintenance.
 - 1. Test equipment prior to demonstration.
 - 2. Individual Performing Demonstration: Fully knowledgeable of all operating and service aspects of equipment.

3.6 PROTECTION

- A. Protect finished work from damage.

END OF SECTION

SECTION 12 36 00

COUNTERTOPS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Countertops for architectural cabinet work.
- B. Nosing and trim

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- C. ISFA 3-01 - Classification and Standards for Quartz Surfacing Material; 2013.
- D. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- E. NSI (DSDM) - Dimensional Stone Design Manual, Version VIII; 2016.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Specimen warranty.
- C. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Natural Stone Institute (NSI) Accredited Natural Stone Fabricator; www.naturalstoneinstitute.org/#sle.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 COUNTERTOPS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Natural Quartz and Resin Composite Countertops: Sheet or slab of natural quartz and plastic resin over continuous substrate.
 - 1. Flat Sheet Thickness: 1.18 inch, minimum.
 - 2. Natural Quartz and Resin Composite Sheets, Slabs and Castings: Complying with ISFA 3-01 and NEMA LD 3; orthophthalic polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard stone fabrication tools; no surface coating; color and pattern consistent throughout thickness.
 - a. Manufacturers:
 - 1) Corian: Quartz Blanco Dolomite 2 cm: <https://www.corianquartz.com>
 - 2) Wilsonart; Wilsonart® Quartz Madeira Beach Q4504, 2 cm: www.wilsonart.com/#sle.
 - 3) Substitutions: See Section 01 60 00 - Product Requirements.
 - b. Factory fabricate components to the greatest extent practical in sizes and shapes indicated; comply with NSI (DSDM).
 - c. Finish on Exposed Surfaces: Polished.
 - d. Color and Pattern: As selected by Architect from manufacturer's standard line.
 - 3. Other Components Thickness: 1.18 inch, minimum.
 - 4. Exposed Edge Treatment: Built up to minimum 1.18 inch thick; radiused edge.
 - 5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

2.2 MATERIALS

- A. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- B. Joint Sealant: Mildew-resistant silicone sealant, clear.

2.3 ACCESSORIES

- A. Fixed Top-Mounted Countertop Support Brackets:
 - 1. Material: Steel.
 - 2. Finish: Manufacturer's standard, factory-applied, textured powder coat.
 - 3. Products:
 - a. Centerline Brackets; Front Mounting Countertop Support: www.countertopbracket.com/#sle.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Stone Nosing and Trim: same material as Countertops.

2.4 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
 - 1. Join lengths of tops using best method recommended by manufacturer.

2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
 2. Height: 4 inches, unless otherwise indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Seal joint between back/end splashes and vertical surfaces.

3.4 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

3.5 CLEANING

- A. Clean countertops surfaces thoroughly.

3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 13 34 19
METAL BUILDING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Manufacturer-engineered, shop-fabricated structural steel building frame.
- B. Metal wall and roof panels including soffits.
- C. Exterior louvers.

1.2 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants: Sealing joints between accessory components and wall system.
- B. Section 08 43 13 Aluminum Framed Storefronts.

1.3 REFERENCE STANDARDS

- A. AISC 360 - Specification for Structural Steel Buildings; 2022, with Errata (2025).
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- E. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- H. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2019.
- I. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2023.
- J. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures; 2023.
- K. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.
- L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2024.
- M. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2025.
- N. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

- O. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025.
- P. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems; 2024.
- Q. MBMA (MBSM) - Metal Building Systems Manual; 2024.
- R. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.
- S. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on profiles, component dimensions, fasteners.
- C. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections; wall and roof system dimensions, panel layout, general construction details, anchors and methods of anchorage, and installation; framing anchor bolt settings, sizes, locations from datum, and foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature.
- D. Samples: Submit two samples of precoated metal panels for each color selected, 12 by 12 inch in size illustrating color and texture of finish.
- E. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.
- F. Designer's Qualification Statement.
- G. Manufacturer's Qualification Statement: Provide documentation showing metal building manufacturer is accredited under IAS AC472.
 - 1. Include statement that manufacturer designs and fabricates metal building system as integrated components and assemblies, including but not limited to primary structural members, secondary members, joints, roof, and wall cladding components specifically designed to support and transfer loads and properly assembled components form a complete or partial building shell.
- H. Project Record Documents: Record actual locations of concealed components and utilities.

1.6 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this type of work.
 - 1. Design Engineer Qualifications: Licensed in Louisiana.
 - 2. Comply with applicable code for submission of design calculations as required for acquiring permits.
- B. Perform work in accordance with AISC 360 and MBMA (MBSM).
- C. Erector Qualifications: Company specializing in performing the work of this section.
- D. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.

1.7 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. Provide five year manufacturer warranty.
 - 1. Include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading. Include coverage for weather tightness of building enclosure elements after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Metal Buildings Systems:
 - 1. Butler Manufacturing Company: www.buttermfg.com/#sle.
 - 2. Metallic Building Systems: www.metallic.com/#sle.
 - 3. Nucor Building Systems: www.nucorbuildingsystems.com/#sle.
 - 4. VP Buildings: www.vp.com/#sle.
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 ASSEMBLIES

- A. Single span rigid frame.
- B. Primary Framing: Rigid frame of rafter beams and columns, canopy beams, intermediate columns, braced end frames, and end wall columns, and wind bracing.
- C. Secondary Framing: Purlins, Girts, Eave struts, Flange bracing, Sill supports, and Clips, and other items detailed.
- D. Wall System: Preformed metal panels of vertical profile, with sub-girt framing/anchorage assembly and insulation, and accessory components.
- E. Roof System: Preformed metal panels oriented parallel to slope, with sub-girt framing/anchorage assembly and liner panels, and accessory components.

2.3 PERFORMANCE REQUIREMENTS

- A. Installed Thermal Resistance of Wall System: R-value of 19.
- B. Installed Thermal Resistance of Roof System: R-value of 30.
- C. Design structural members to withstand dead load, and design loads due to pressure and suction of wind calculated in accordance with applicable code.
- D. Design structural members to withstand Class 30 wind uplift in accordance with UL 580.
- E. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.
- F. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to extreme temperature range.
- G. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

2.4 MATERIALS - FRAMING

- A. Structural Steel Members: ASTM A36/A36M.
- B. Structural Tubing: ASTM A500/A500M Grade B cold-formed.
- C. Plate or Bar Stock: ASTM A529/A529M, Grade 50.
- D. Anchor Bolts: ASTM A307, Grade A, with hot dip type for protective coatings.
- E. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1; galvanized to ASTM A153/A153M.
- F. Welding Materials: Perform in accordance with AWS D1.1/D1.1M.
- G. Primer: SSPC-Paint 20 zinc rich.
- H. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
 - 2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
 - 3. Height Change, Plastic State: When tested in accordance with ASTM C827/C827M:
 - a. Maximum: Plus 4 percent.
 - b. Minimum: Plus 1 percent.

2.5 MATERIALS - WALLS AND ROOF

- A. Steel Sheet: ASTM A792/A792M aluminum-zinc alloy coated to AZ50/AZM150.
- B. Insulation: Roll glass fiber type, faced with reinforced white vinyl, ASTM E84 Class A, flame spread index of 25 or less where exposed, friction fit.
- C. Joint Seal Gaskets: Manufacturer's standard type.
- D. Fasteners: Manufacturer's standard type, galvanized to comply with requirements of ASTM A153/A153M, finish to match adjacent surfaces when exterior exposed.
- E. Sealant: Manufacturer's standard type.
- F. Trim, Closure Pieces, Caps, Flashings, Gutters, Downspouts, Fascias and Infills: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

2.6 COMPONENTS

- A. Wall Louvers: Z blade design, same finish as adjacent material, with steel mesh bird screen and frame, blank sheet metal at unused portions.

2.7 FABRICATION - FRAMING

- A. Fabricate members in accordance with AISC 360 for plate, bar, tube, or rolled structural shapes.
- B. Anchor Bolts: Formed with bent shank, assembled with template for casting into concrete.
- C. Provide wall opening framing for doors, windows, and other accessory components.

2.8 FABRICATION - WALL AND ROOF PANELS

- A. Siding: Minimum 26 ga metal thickness, R profile indicated, 1 1/2 inch deep, lapped edges fitted with continuous gaskets.
- B. Roofing: Minimum 24 ga metal thickness, PBR profile, lapped edges fitted with continuous gaskets.

- C. Soffit Panels: Minimum 26 ga metal thickness, flat profile indicated, unperforated.
- D. Inline Girts/Purlins: Rolled formed structural shape to receive siding, roofing and liner sheet.
- E. Internal and External Corners: Same material thickness and finish as adjacent material, profile brake formed to required angles. Back brace mitered internal corners with 24 inch thick sheet.
- F. Flashings, Closure Pieces, Fascia, Infills, and Caps: Same material and finish as adjacent material, profile to suit system.
- G. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive type.

2.9 FABRICATION - GUTTERS AND DOWNSPOUTS

- A. Fabricate of same material and finish as roofing metal.
- B. Form gutters and downspouts of profile and size indicated to collect and remove water. Fabricate with connection pieces.

2.10 FINISHES

- A. Framing Members: Clean, prepare, and shop prime. Do not prime surfaces to be field welded.
- B. Exterior Surfaces of Wall Components and Accessories: Precoated enamel on steel of modified silicone finish, color as selected from manufacturer's standard range.
- C. Interior Surfaces of Wall Components and Accessories: Precoated enamel on steel of modified silicone finish, color as selected from manufacturer's standard range.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position

3.2 ERECTION - FRAMING

- A. Erect framing in accordance with AISC 360.
- B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.
- C. Set column base plates with non-shrink grout to achieve full plate bearing.
- D. Do not field cut or alter structural members without approval.
- E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.3 ERECTION - WALL AND ROOF PANELS

- A. Install in accordance with manufacturer's instructions.
- B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.
- C. Fasten cladding system to structural supports, aligned level and plumb.
- D. Locate end laps over supports. End laps minimum 2 inches. Place side laps over bearing.
- E. Provide expansion joints where indicated.

F. Use concealed fasteners.

G. Install sealant and gaskets, providing weather tight installation.

3.4 ERECTION - GUTTERS AND DOWNSPOUTS

A. Rigidly support and secure components. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.

B. Install splash pans under each downspout.

3.5 INSTALLATION - ACCESSORY COMPONENTS IN WALL SYSTEM

A. Install door frames, doors, and windows and glass in accordance with manufacturer's instructions.

3.6 TOLERANCES

A. Framing Members: 1/4 inch from level; 1/8 inch from plumb.

B. Siding and Roofing: 1/8 inch from true position.

END OF SECTION

SECTION 21 00 00

FIRE PROTECTION SYSTEM

PART 1 GENERAL

1.1 WORK INCLUDED:

- A. The General Conditions of the Contract and Supplementary Conditions of the Contract shall govern the work under this Section of the Specifications. The Contractor is specifically directed to refer to said conditions.
- B. It is understood that these specifications, and the accompanying drawings, complement complete apparatus, fully erected and in successful operating condition. All work must be preformed in the best and most substantial manner.
- C. These specifications are intended to provide complete, and in proper operation, all sprinkler system piping, equipment, heads, valves, controls, air compressor, and accessories, all as specified herein or shown on the accompanying drawings, or reasonably implied in either. The building shall be provided with complete coverage sprinkler system for the spaces designated on the drawings classification as required. System shall consist of a calculated dry system unless indicated otherwise. Verify all pertinent criteria. The systems shall conform to layout shown and meet all requirements of agencies listed under "REGULATIONS AND STANDARDS" below. Refer to plans and specifications for additional information.
- D. Pipe, fittings, valves, and connections for fire protection and sprinkler systems shall be furnished by fire protection contractor.

1.2 RELATED WORK:

- A. Section 21 13 13 - Wet-pipe Sprinkler Systems.

1.3 SYSTEM LAYOUT:

- A. Where plans indicate layout of system components, the layout shall be verified to comply with "REGULATIONS AND STANDARDS" and shall be revised if required to comply. The location of the sprinkler system piping and components shall be coordinated with all other trades. Revisions to sprinkler system layout shall be at Sprinkler Contractor's expense. Any such revisions shall be verified with the Architect.

1.4 ELECTRICAL WORK:

- A. See "COORDINATION".

1.5 SPRINKLER SYSTEM CONTRACTOR:

- A. It is intended that the work under this section is to be preformed by a qualified Fire Protection Piping Systems Contractor regularly engaged in this type of work. The Contractor is to hold a current license to perform this work and be certified by the State Fire Marshall. All documents shall bear this certification.

1.6 REGULATIONS, STANDARDS AND REFERENCES:

- A. It is the intention of these specifications and the accompanying drawings, that all elements and features of the fire protection system shall be in accordance with the standards of the National Fire

Association (NFPA), the State Fire Marshall, all applicable building codes and Property Insurance Association of Louisiana whether so indicated or not. NFPA standards are on file in office of Engineer and may be examined at the Contractor's request.

- B. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 150.
- C. ANSI/ASME B16.3 - Malleable Iron Threaded Fittings, Class 150. Interior of building.
- D. Specifications for Qualification of Welding Procedures and Welders for Piping and Tubing.
- E. NFPA 13 - Installation of Sprinkler Systems.
- F. NFPA 14 - Standpipe and Hose Systems.

1.7 QUALITY ASSURANCE:

- A. Conform to NFPA 13 for sprinkler systems.
- B. Conform to NFPA 14 for standpipe hose systems.
- C. Welding Materials and Procedures: Conform to ASME Code.
- D. Employ certified welders in accordance with ANSI/ASME Section 9. AWS D10.9.
- E. Valves: Bear UL FM label or marking. Provide manufacturer's name and pressure rating marked on valve body.

1.8 SUBMITTALS:

- A. Submit product data under provisions of section 01 30 00 - Administrative Requirements
- B. Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals.
- C. Indicate valve data and ratings.

1.9 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver and store valves in shipping containers, with labeling in place, under provisions of Section 016000- Product Requirements.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures. Maintain in place until installation.

1.10 AREAS SUBJECT TO FREEZING:

- A. For areas requiring protection and not receiving direct heating during times of potential freezing, such as building overhangs, porches, canopies, attics, etc. provide a compressed air dry pipe system for these areas only, see drawings for locations. Coordinate electrical requirements with contractor.

1.11 MANUFACTURER'S OR TRADE NAMES:

- A. Where the plans or specifications mention the names of manufacturers or the products of specific manufacturers, it is intended that the Contractor shall furnish the item or items as specifies. Products of manufacturers that are not mentioned shall be subject to prior review by the Engineer and shall in any case mentioned shall be subject to prior review by the Engineer and shall in any case be in accordance with regulations and standards as state above.

1.12 SHOP DRAWINGS AND SUBMITTAL DATA:

- A. Within fifteen (15) days of award of the contract, the contractor shall submit six (6) copies of system piping shop drawings and six (6) copies of manufacturer's data and descriptive literature and drawings for all equipment and materials. Additionally, provide a reproducible (sepia) copy of the system piping shop drawings. All drawings, literature and data on all equipment shall be submitted at the same time; this material shall contain complete layout, capacity data, dimensions and other pertinent information necessary for the Architect to properly review and evaluate the item that necessary to meet the requirements for submittal to the State Fire Marshall.
- B. The contractor shall obtain approval of agencies listed under "REGULATIONS AND STANDARDS" before submitting to the Engineer, except that the date for State Fire Marshall's review shall be submitted to the Engineer prior submitting to the Fire Marshall. All required review fees and applicable requirements shall be by the contractor. No item of equipment or material shall be place on order until Final Review comments have been received from the Architect. See "DRAWINGS" below.

1.13 ORDINANCES, RULES AND REGULATIONS:

- A. All material and construction shall conform to the requirements of all building, plumbing and sanitary codes and laws in force in the locality in which the work is to be done. All materials and construction shall also conform to the rules and regulations listed above under "REGULATIONS AND STANDARDS".

1.14 DRAWINGS:

- A. The contractor shall submit detailed drawings for all sprinkler system showing exact locations and sizes of all elements in the system before fabrication is begun. Engineer shall have the prerogative of changing the position or configuration of these systems without changing the total scope of work involved to comply with "REGULATIONS AND STANDARDS".

1.15 GUARANTEE:

- A. The contractor shall guarantee all materials and workmanship under this contract for a period of one (1) year from date of final acceptance of his work and shall repair or replace any such defective materials and workmanship without cost to the Owner.
- B. The guarantee shall include complete service, including adjustment service and inspection, during the guarantee period as required by agencies listed under "REGULATIONS AND STANDARDS".

1.16 APPROVAL OF PRODUCT PRIOR TO BIDDING

- A. Refer to Instructions to Bidders

PART 2 PRODUCTS

2.1 PIPE AND TUBE:

- A. See Section – 21 13 13 Wet-pipe Sprinkler System
- B. Underground pipe shall be C900 to within 5' of building.

2.2 PIPE FITTINGS:

- A. Steel Fittings: ANSI/ASME B16.9, wrought steel, butt welded. ANSI/ASME B16.25, butt weld ends. ASTM A234, wrought carbon steel and alloy steel. ANSI/ASME B16.5, steel flanges and fittings. ANSI/ASME B16.11, forged steel socket welded and threaded.

- B. Cast Iron Fittings: ANSI/ASME B16.1, flanges and fittings. B16.4, screwed fittings.
- C. Malleable Iron Fittings: ANSI/ASME B16.3, screwed type. ANSI/ASTM A47.

2.3 JOINT MATERIALS:

- A. Solder: ANSI/ASTM B32, 95/5 alloy.
- B. Brazing: ANSI/AWS A5.8.
- C. Threaded Joint Compound.

2.4 UNIONS, FLANGES, AND COUPLINGS:

- A. Unions: 150 psi malleable iron for threaded ferrous piping.
- B. Flanges: 150 psi forged steel slip-on flanges for ferrous piping.

2.5 ACCEPTABLE MANUFACTURER - GATE VALVES:

- A. Nibco 637-31
- B. Central 722 U Series
- C. Substitutions: Under provisions of Instructions To Bidders.

2.6 GATE VALVES:

- A. Bronze, rising stem, inside screw, solid wedge.

2.7 ACCEPTABLE MANUFACTURERS - GLOBE OR ANGLE VALVES:

- A. Nibco GS-132-U
- B. Crane 143
- C. Substitutions: Under provisions of Instructions To Bidders.

2.8 GLOBE OR ANGLE VALVES:

- A. Bronze, rising stem, inside screw, renewable composition disc.

2.9 ACCEPTABLE MANUFACTURERS - CHECK VALVES:

- A. NIBCO CS-172
- B. Crane 147
- C. Substitutions: Under provisions of Instructions To Bidders.

2.10 CHECK VALVES:

- A. Iron body, bronze trim, swing disc, renewable disc and seat.

2.11 ACCEPTABLE MANUFACTURERS - BUTTERFLY VALVES:

- A. Nibco LD 3510-2 Series

- B. Central Fig. 570 or 580
- C. Substitutions: Under provisions of Instructions To Bidders.

2.12 BUTTERFLY VALVES:

- A. Iron body, bronze stainless steel disc and stem extended for insulated work, resilient replaceable liner seat.

2.13 ACCEPTABLE MANUFACTURERS - DRAIN VALVES:

- A. Nibco F-667-0 Series
- B. Central 722 U Series
- C. Substitutions: Under provisions of Instructions To Bidders.

2.14 DRAIN VALVES:

- A. Brass ball valve with cap and chain, 3/4 inch (19 mm) hose thread.

2.15 VALVE OPERATORS:

- A. Provide handwheels for gate, globe or angle, and drain valves.
- B. For butterfly valves provide gear operators for sizes 8 inches and larger. For smaller sizes provide level lock handle with toothed plate.

2.16 VALVE CONNECTIONS:

- A. Provide valve connections to match pipe joints. Use valves of pipe size.
- B. For copper tube, provide threaded solder adapters for connection to valve.
- C. Provide butterfly valve with tapped lug body when used for isolating service.

2.17 SIAMESE FIRE DEPARTMENT CONNECTIONS:

- A. Provide two-way standard siamese fire department connection with chrome plated finish, local fire department threads, dust caps and chains, 3/4" automatic drip, marked "SPRINKLER - FIRE DEPARTMENT CONNECTION.

2.18 ACCEPTABLE MANUFACTURERS - SPRINKLER HEADS:

- A. Reliable Automatic Sprinkler
- B. Viking Corp.
- C. Tyco-Fire
- D. Substitutions: Under provisions of Instruction To Bidders.

PART 3 INSTALLATION

3.1 GENERAL:

- A. Furnish and install in a neat workmanlike manner, all piping shown on drawings or that is specified or required to provide a complete, properly operating installation. All piping and accessories shall conform to standards as applicable.
- B. Run piping parallel with the lines of the building, unless specifically shown or noted otherwise. All pipe, fittings, valves, etc., shall have sufficient clearance from other work to finish at least 1/2 inch from other work or finished covering of other piping.
- C. Provide all necessary hangers, anchors, thrust blocks, etc., to properly support and protect piping system, as required by agencies listed under "REGULATIONS AND STANDARDS".
- D. 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 are to be approved by the Architect/Engineer. All supplement angle or channel iron required to support equipment of this Specification is to be furnished by the contractor and is to be independent of any other supports.

3.2 DESIGN:

- A. The sprinkler systems shall be designed as required for occupancies specified by experienced personnel have competency in the execution of such work. Sprinkler system design shall be performed only by licensed sprinkler contractors.
- B. Sprinkler piping shall be protected from freezing during the lay-a-way period.
- C. NFPA rules and regulations governing the design shall be scrupulously adhered to.
- D. Piping shall be installed in accordance with NFPA 13.

3.3 EXECUTION:

- A. Run piping concealed above furred ceiling and in joists to minimize obstructions. Expose only heads.
- B. Coordinate sprinkler piping routing and heads with all trades.
- C. Protect sprinkler heads against mechanical injury.
- D. Include all costs of shop drawings review and approval from authorities in price.
- E. Locate outside alarm on wall of building adjacent to Siamese department connections.
- F. Provide cabinet containing required number of spare heads as per NFPA 13, of each type, along with wrench suitable for each type of head.
- G. Provide flow switch on leaving side of main valve and monitoring switch on main valve. Flow switch shall sense flow and sound appropriate zone of fire alarm system monitoring switch on each main valve; when valve is started to its "closed" position shall indicate trouble on appropriate zone of fire alarm system and sound local audible alarm. Wiring between flow switches and monitoring switches and fire alarm system shall be provided under the Electrical Division.
- H. Furnish and install sprinkler zone valves and flow switches where indicated on the drawings for the zoning of the system. Each of these devices shall be connected into the fire alarm system as indicated for the main valve, including local alarming.
- I. Provide all test and drain valves as required per NFPA 13.
- J. Support sprinkler piping in accordance with NFPA 13.
- K. Provide new water service as shown on the drawings.

- L. Install air compressor on vibration isolators, as required.
- M. Screw joint steel piping up to and including 1-1/2 inch diameter. Screw or Roll Groove 2 inch diameter and larger. PER NFPA 13.
- N. Die cut screw joints with full cut standard taper pipe threads with red lead and linseed oil or other non-toxic joint compound applied to male threads only.
- O. Coat threaded ends with pipe lubricant compound.
- P. Steel piping, main sized saddle branch connections or direct connection of branch lines to mains is permitted if main is one pipe size larger than the branch for up to 6 inch mains and if main is two pipe sizes larger than branch for 8 inch and larger mains.
- Q. Solder Braze copper tubes.
- R. Install piping in accordance with NFPA 13 for sprinkler systems and NFPA 14 for standpipe and hose systems.
- S. Do not penetrate building structural members unless indicated.
- T. Provide sleeves when penetrating footings floors and walls.
- U. Seal pipe and sleeve penetration to achieve fire resistance equivalent to fire separation required.

3.4 INSTALLATION - VALVES:

- A. Install valves with stems upright or horizontal, not inverted.
- B. Provide gate valves for shut-off or isolating service.
- C. Where approved, butterfly valves may be used instead of gate valves.
- D. Provide drain valves at main shut-off valves, low points of piping and apparatus.

3.5 SLEEVES AND PLATES:

- A. Wherever pipes pass through concrete slabs, furnish and install sleeves, properly located for the work.
- B. Use sleeves of sufficient size to allow the specified pipe covering to pass through the sleeves and finish sleeves flush with walls and ceiling.
- C. Sleeves shall be galvanized steel not lighter than 24 gauge.
- D. Seal spaces between sleeve and pipe. Use packing device or material for UL rating to match rating of wall or floor/ceiling as rated under UL File R9658.

3.6 ESCUTCHEONS:

- A. Where pipes passing through floors, walls or ceiling exposed to view in finished areas, provide pressed steel split plates which cover the opening and fit snugly to pipe.

3.7 COORDINATION:

- A. All interlock and signal wiring runs to the annunciator panel will be furnished and installed and as part of the Electrical Work.

B. This contractor shall provide for all switches and interlocking devices on all valves as required.

3.8 UNDERGROUND PIPING:

- A. Underground fire protection system piping shall be installed in accordance with the requirements of NFPA 24, Private Fire Service Mains and Their Appurtenances. Provide concrete thrust blocking at each change of direction of the piping and at all tees, plugs, and caps in accordance with NFPA 24. Where thrust blocking is impractical, fittings with a mechanical joint retainer gland, approved for the piping material utilized, may be used in lieu of thrust blocking.

END OF SECTION

SECTION 21 13 13

WET-PIPE SPRINKLER SYSTEMS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Installation of new sprinkler and related piping systems in new construction.

1.2 WORK INSTALLED BUT SPECIFIED UNDER OTHER SECTIONS

- A. Section Fire Protection Piping: Piping and valves.

1.3 WORK FURNISHED BUT INSTALLED UNDER OTHER SECTIONS

- A. Furnish sleeves to General Contractor.

1.4 RELATED WORK

- A. Section 23 05 29 - Supports and Anchors.

1.5 REFERENCES:

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volt maximum).
- B. NFPA 13 - Installation of Sprinkler Systems.

1.6 SYSTEM DESCRIPTION:

- A. System to provide coverage for entire new building area.
- B. Interface system with building control system. Building fire and smoke alarm system.
- C. Provide system per NFPA 13 hazard requirement.

1.7 QUALITY ASSURANCE:

- A. Design and installation to conform to NFPA 13.
- B. Equipment and components: Bear UL FM label or marking.
- C. Specialist Firm: Company specializing and licensed in sprinkler systems.

1.8 REGULATORY REQUIREMENTS:

- A. Hydraulic Calculations, Product Data, Shop Drawings: Bear stamp of approval of Fire Marshal.
- B. Indicate hydraulic calculations, detailed pipe layout, hangers and supports, components and accessories.
- C. Submit shop drawings product data hydraulic calculations to Fire Marshal. Submit proof of approval to Architect. Include check for review fee with submittal to Fire Marshal's office.

1.9 PROJECT RECORD DOCUMENTS:

- A. Submit documents under provisions of Section 01 78 39.

1.10 OPERATION AND MAINTENANCE DATA:

- A. Submit manufacturer's operation and maintenance data under provisions of Section 01 78 23.
- B. Include written maintenance data on components of system, servicing requirements, and record drawings.
- C. Include maintenance, inspection data, replacement part numbers and availability, and location and numbers of service depot.

1.11 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver and store materials in shipping containers with labeling place under provisions of Section 01 60 00.
- B. Provide suitable wrenches for each head type.
- C. Maintain caps in place until installation.

1.12 EXTRA STOCK:

- A. Provide extra sprinkler heads under provisions of NFPA 13.
- B. Provide suitable wrenches for each head type.
- C. Provide storage cabinet, size and type as per NFPA-13

PART 2 PRODUCTS

2.1 PIPING MATERIALS:

- A. Above Ground Inside Building Piping: Pipe diameter smaller than and up to 2" shall be Steel Schedule 40 pipe, Pipe diameters 2-1/2" and larger shall be Steel Schedule 10 or Steel Schedule 40 pipe, As permitted by NFPA 13.

2.2 ACCEPTABLE MANUFACTURERS - SPRINKLER HEADS:

- A. Reliable Automatic Sprinkler
- B. Viking Corp.
- C. Tyco-Fire
- D. Substitutions: Under provisions of Instruction To Bidders.

2.3 SPRINKLER HEADS:

- A. Exposed Area Type: Standard upright type with brass finish.
- B. Sidewall Type: Brass Chrome plated finish with matching escutcheon.
- C. Fusible Link: Temperature rated for specific area hazard.
- D. Guards: finish to match sprinkler head.

- E. Finished ceilings: Pendent sprinklers - concealed type with white cover plates. Unless otherwise noted on plans.

PART 3 EXECUTION

3.1 PREPARATION:

- A. Place pipe runs to minimize obstruction to other work.

3.2 INSTALLATION:

- A. Run piping concealed above furred ceiling and in joists to minimize obstructions. Expose only heads.
- B. Coordinate sprinkler piping routing and heads with all trades.
- C. Protect sprinkler heads against mechanical injury.
- D. Include all costs of shop drawings review and approval from authorities in price.
- E. Locate outside alarm on wall of building adjacent to siamese fire department connections.
- F. Provide cabinet containing required number of spare heads as per NFPA 13, of each type, along with wrench suitable for each type of head.
- G. Provide flow switch on leaving side of main valve and monitoring switch on main valve. Flow switch shall sense flow and sound appropriate zone of fire alarm system monitoring switch on each main valve; when valve is started to its "closed" position shall indicate trouble on appropriate zone of fire alarm system and sound local audible alarm. Wiring between flow switches and monitoring switches and fire alarm system shall be provided under electrical division.
- H. Furnish and install sprinkler zone valves and flow switches where indicated on the drawings for the zoning of the system. Each of these devices shall be connected into the fire alarm system as indicated for the main valve, including local alarming.
- I. Provide all test and drain valves as required for system per NFPA 13.
- J. Support sprinkler piping in accordance with NFPA 13.
- K. Provide new water service as shown on the drawings.

3.3 CLEANING:

- A. Flush entire piping system of foreign matter.

3.4 SYSTEM TESTS:

- A. Hydrostatically test entire system.
- B. Test shall be witnessed by Fire Marshal and Architect.

END OF SECTION

SECTION 22 10 00

PLUMBING PIPING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Pipe and Pipe Fittings
- B. Valves
- C. Sanitary Sewer Piping System
- D. Domestic Water Piping system
- E. Service Connections
- F. Natural Gas Piping System

1.2 RELATED WORK

- A. Section 23 00 00 - General Provisions
- B. Section 23 05 16 - Expansion Compensation
- C. Section 23 05 23 - Supports and Anchors
- D. Section 23 07 00 - Piping Insulation
- E. Section 22 10 10 - Plumbing Specialties
- F. Section 22 40 00 - Plumbing Fixtures and Trim

1.3 REFERENCES:

- A. ANSI/ASME B16.3 - Malleable Iron Threaded Fittings Class 150 NS 300.
- B. ANSI/ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV.
- C. ANSI/ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.
- D. ANSI/ASME Sec. 9 - Welding and Brazing Qualifications.
- E. ANSI/ASTM B32 - Solder Metal.
- F. ANSI/ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
- G. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
- H. ASTM A74 - Cast Iron Soil Pipe and Fittings.
- I. ASTM A234 - Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.

- J. ASTM B88 - Seamless Copper Water Tube.
- K. ASTM B306 - Copper Drainage Tube (DWV).
- L. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- M. AWS A5.8 - Brazing Filler Metal.
- N. AWWA C601 - Standard Methods for the Examination of Water and Waste Water.
- O. CISPI 301 - Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Sanitary System.
- P. CISPI 310 – Standard for cast iron couplings
- Q. LSPC – The latest addition of the Louisiana State Plumbing Code.

1.4 QUALITY ASSURANCE:

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.
- C. Welders Certification: In accordance with ANSI/ASME Sec. 9. ANSI/AWS D 1.1.
- D. Cast iron pipe and fittings shall be marked with CISPI's collective trademark.

1.5 SUBMITTALS:

- A. Submit shop drawings and product data under provisions of Section 01 30 00.
- B. Include data on pipe material, pipe fittings, valves and accessories.

1.6 WATER PIPE AND FITTING MATERIALS STANDARD

- A. Plastic Water Pipe and Fittings
 - 1. ABS and PVC Plastic Tubular Fittings: ASTM F 409, ANSI/NSF 24, ANSI/NSF 14
 - 2. Joints for IPS PVC pipe using solvent cement: ASTM D 2672
 - 3. Chlorinated poly (vinyl chloride) (CPVC) plastic pipe, Schedule 80, 2" and under: ASTM F 441, listed
 - 4. Chlorinated poly (vinyl chloride) (CPVC) plastic pipe (SDR-PR): ASTM F 442
 - 5. CPVC Pipe and fittings: ASTM D 2846, Listed
 - 6. Cross-linked Polyethylene/Aluminum/Cross-linked Polyethylene (PEX-AL-PEX) pressure pipe and fittings: ASTM F 1281
 - 7. Cross-linked Polyethylene (PEX) plastic hot and cold water distribution system: ASTM F 877, Listed
 - 8. Cross-linked Polyethylene (PEX) tubing: ASTM F 876
 - 9. Cross-linked Polyethylene (PEX) tubing systems for pressure: CAN/CSA-B137.5M89, listed
 - 10. Flexible Elastomeric pressure joints: ASTM D 3139, See 308.8

11. Metal insert fittings for PB tubing: ASTM F 1380
 12. Polyethylene/Aluminum/Polyethylene (PE-AL-PE) pressure pipe and fittings: ASTM F 1282
 13. Polyethylene pipe and tubing (PE) Number 2305, 2306, 3306, 3406, 3408: ASTM D 2104, ASTM D 2239, ASTM D 2737, Listed, See 303.8.2
 14. Poly (vinyl chloride) (PVC) plastic pipe fittings, Schedule 40: ASTM D 2466
 15. Pressure rated ABS-fittings: ASTM D 2468, Listed
 16. Pressure rated ABS-pipe Number 1210, 2112, 1316: ASTM D 1527, ASTM D 2282, Listed, See 303.8.2
 17. PVC injection molded gasketed fittings for pressure applications: CAN/CSA-B137.2-M89, Listed
 18. PVC Pipe, Number 1120, 1220: ASTM D 1785, ASTM D 2241, listed, See 303.8.2
 19. PVC socket-type fittings, Schedule 80: ASTM D 2467, listed
 20. Socket-type chlorinated poly (vinyl chloride) (CPVC) plastic pipe fittings, Schedule 80, 2" and under: ASTM F 439, listed
 21. Threaded chlorinated poly (vinyl chloride) (CPVC) plastic pipe fittings, Schedule 80, 2" and under: ASTM F 437, listed
- B. Ferrous Water Pipe and Fittings
1. Cast Iron fittings (threaded): ASTM A 126
 2. Cast iron pipe (threaded): ANSI A40.5
 3. Cast iron water pipe: ASTM A377
 4. Ductile-iron water pipe: ANSI/AWWA C 151/A 21.51
 5. Ductile-iron water fittings: ANSI/AWWA C 110/A 21.10
 6. Malleable iron fittings (threaded): ASTM A 197
 7. Nipples pipe (threaded): FS WW-N-351a
 8. Stainless steel water pipe Grade H: ASTM A 268, See 303.8.4
 9. Steel couplings, threaded, black and galvanized: ASTM A 865
 10. Steel pipe black and galvanized: ASTM A 53
 11. Welded and seamless steel pipe: ASTM A 53
- C. NonFerrous Pipe and Fittings
1. Cast bronze fittings for flared copper tube: ANSI B16.26
 2. Cast bronze threaded fittings: ASME B16.15
 3. Cast bronze solder-joint pressure fittings: ANSI B16.18
 4. Cast copper alloy fittings for flared copper tubes: ASME B 16.26

5. Pipe flanges and flanged fittings: ANSI B16.5
6. Seamless brass tube: ASTM B 135
7. Seamless copper pipe: ASTM B 42
8. Seamless copper tube: ASTM B 75
9. Seamless copper water tube types K, L, & M: ASTM B 88
10. Seamless red brass pipe: ASTM B 43
11. Seamless and welded copper distribution tube (type D): ASTM B 641
12. Threadless copper pipe (TP): ASTM B 302
13. Welded brass tube: ASTM B 587
14. Welded copper tube: ASTM B 447
15. Welded copper alloy UNS # C21000 water tube: ASTM B 642
16. Wrought copper and copper-alloy solder-joint pressure fittings: ASME B 16.22 for copper water tube
17. Wrought seamless copper and rectangular copper-alloy pipe and tube: ASTM B 251, square and tubing not applicable
18. Valves-flanged threaded, and welding end: ANSI B 16.34

D. Backflow Prevention Devices Materials Standard

1. Air gap standards: ASME A112.1.2
2. Backflow preventers, double check valve assembly: ASSE 1015, ANSI/AWWA C510
3. Backflow preventers with intermediate atmospheric vent: ANSI/ASSE 1012
4. Backflow preventers, double check detector assembly: ANSI/ASSE 1048
5. Backflow preventers, hose connection: ANSI/ASSE 1052
6. Backflow preventers, reduced pressure detector assembly: ANSI/ASSE 1047
7. Backflow preventers, reduced pressure principle assembly: ANSI/AWWA C511, ASSE 1013
8. Dual check valve type backflow preventer: ASSE 1032, for carbonated beverage dispensers-post mix type
9. Field test procedures for backflow preventer assemblies: ASSE 5010
10. Manual for the selection, installation, maintenance, and field testing of backflow prevention devices: CAN/CSA B64.10
11. Vacuum breakers, Anti-Siphon, pressure type assembly (outdoor use): ASSE 1020
12. Vacuum breakers-atmospheric pipe applied: ANSI/ASSE 1001
13. Vacuum breakers, back siphonage, pressure type assembly (spill resistant): ANSI/ASSE 1056

14. Vacuum breakers, hose connections: ANSI/ASSE 1011
15. Vacuum breakers, laboratory faucet: ANSI/ASSE 1035
16. Vacuum breaker wall hydrants, fronts resistant automatic draining: ASSE 1019
17. Water closet flush tank fill valves (ballcocks): ASSE 1002

E. Valves Material Standards

1. Valves, bronze gate: MSS SP-80
2. Valves, cast iron gate: ASTM A 126
3. Valves, ball: MSS SP-72, MSS SP-110
4. Valves, resilient-seated gate: ANSI/AWWA C509

F. Temperature Control Device Standards

1. Individual shower control valves, anti-scald: ASSE 1016
2. Temperature actuated mixing valves for primary domestic use: ASSE 1017
3. Water supply valves, mixing valves and single control mixing valves: ASSE 1029

G. Potable Water Piping

1. All potable water pipes, pipe related products, and materials that join or seal pipes conform to ANSI/NSF 61.

1.7 DRAINAGE SYSTEM MATERIALS STANDARDS

A. NonMetallic Piping

1. Concrete drain tile: ASTM C 412
2. Concrete perforated: ASTM C 444
3. Concrete reinforced culverts: ASTM C 76, for storm drains only
4. Concrete reinforced sewer pipe: ASTM C 361, for storm drains only
5. Concrete sewer pipe: ASTM C 14, for storm drains only
6. Sewer manholes: ASTM C 478
7. Concrete (steel cylinder type): FS SS-P-381

B. Plastic Pipe and Fittings

1. Coextruded composite pipe: ASTM F 1488, See 303.8.3, 303.8.5, 704.1, 1101.5, 1103.2, 1103.4
2. Coextruded composite drain, waste, and vent pipe (DWV): ASTM F 1499, See 303.8.3, 303.8.5, 704.1, 1101.5, 1103.2, 1103.4
3. Coextruded PVC plastic pipe: ASTM F 891, See 303.8.3, 303.8.5, 704.1, 1101.5, 1103.2, 1103.4

4. Flexible elastomeric non-pressure joints: ASTM D 3212, See 303.8
5. Large diameter ribbed PVC sewer pipe and fittings: CAN/CSA-B182.4
6. Polyolefin laboratory drainage systems: CAN/CSA-B181.3
7. PVC-DWV pipe and fittings: ASTM D 2665, listed, See 303.8.3
8. Type PS 46 and type PS 115 sewer pipe (for outside building sewers, storm drains): ASTM F 789, See 704.1, 1101.4, 1103.2, 1103.4, ASTM D 2321, installation
9. Type PSM PVC sewer pipe and fittings (for outside building sewers, storm drains, and storm sewers): ASTM 3034, See 704.1, 1101.5, 1103.2, 1103.4, ASTM D 2321, installation
10. Type PSP PVC sewer pipe and fittings (for outside building sewers, storm drains, and storm sewers): ASTM D 2321, Installation
11. All plastic piping pipes, plastic plumbing piping components and related materials shall be listed as conforming with ANSI/NSF Standard 14.

C. Ferrous Pipe and Fittings

1. Cast iron soil pipe and fittings: ASTM A 74, CISPI HS
2. CI NO-HUB pipe and fittings: ASTM A 888, CISPI Std. 301
3. Ductile-iron gravity sewer pipe: ASTM A 746
4. Hubless cast iron sanitary system: CISPI Std. 310
5. Manhole top frames and covers: ASTM A 48

D. NonFerrous Pipe and Fittings

1. Cast copper alloy solder-joint drainage fittings: ASME B 16.23, for plumbing drainage waste and vents
2. Cast copper alloy solder-joint fittings for solvent drainage systems: ANSI B 16.32
3. Copper drainage tube DWV: ASTM B 306
4. Welded copper and copper alloy heat exchanger tube: ASTM B 543
5. Wrought copper and wrought copper alloy solder-joint drainage fittings for plumbing drainage waste and vents: ASME B 16.29
6. Wrought copper and wrought copper alloy solder-joint fittings for solvent drainage systems: ANSI B 16.43

E. Glass pipe

1. Borosilicate glass pipe and fittings for DWV applications: ASTM C 1053

PART 2 PRODUCTS

2.1 SANITARY SEWER PIPING - BURIED BEYOND 5 FEET OF BUILDING:

- A. Schedule 40 PVC/DWV

Fittings: Same as piping
Joints: Solvent welded

2.2 SANITARY SEWER PIPING - BURIED WITHIN 5 FEET OF BUILDING:

- A. Schedule 40 PVC/DWV
Fittings: Same as piping
Joints: Solvent welded

2.3 SANITARY SEWER PIPING, ABOVE GRADE:

- A. Schedule 40 PVC/DWV
Fittings: Same as piping
Joints: Solvent welded

2.4 WATER PIPING, ABOVE GRADE: EXTERIOR WATER PIPING BURIED BEYOND 5' OF BUILDING TO BE SAME AS ABOVE GRADE.

- A. Copper Tubing: ASTM B88, Type L, hard drawn.
Fittings: ANSI/ASME B16.18, cast bronze solder-joint pressure fittings, or ANSI/ASME B16.22, wrought copper.
- B. All potable water pipes, pipe related products and materials that join or seal pipes and pipe related products shall be evaluated and listed as conforming with a national consensus product or material standard and ANSI/NSF Standard 61.

2.5 WATER PIPING, TRAP PRIMERS: PIPING FOR TRAP PRIMER PIPING BELOW SLAB ONLY.

- A. Soft Copper Tube: ASTM B 88, Types K and L, water tube, annealed temper.

2.6 NATURAL GAS PIPING, BURIED BEYOND 5 FEET OF BUILDING:

- A. Polyethylene Pipe: ASTM D2513, SDR 11.5.
Fittings: ASTM D2683 to ASTM D2513, socket type.
Joints: Fusion welded.

2.7 NATURAL GAS PIPING, ABOVE GRADE:

- A. Steel Pipe: ASTM A53 or A120, Schedule 40, black.
Fittings: ANSI/ASME B16.3, malleable iron, or ASTM A234, forged steel welding type.
Joints: Screwed for pipe two (2) inches and under; ANSI/AWS D1.1 welded, for pipe over two (2) inches. All gas piping run in a concealed space shall be welded.

2.8 FLANGES, UNION, AND COUPLINGS:

- A. Pipe Size two (2) Inches and Under: 150 psig malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, solder joints.
- B. Pipe Size Over two (2) Inches: 150 psig forged steel slip-on flanges for ferrous piping; bronze flanges for copper piping; neoprene gaskets for gas service.
- C. Dielectric Connections: Unions with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.9 GATE VALVES

- A. Up to two (2) Inches: Bronze body, non-rising or rising stem and handwheel, inside screw, single double wedge or disc, solder or threaded ends. Nibco Model 113 Series, Crane Model 438 Series, Powell Model 2700, Hammond 2B 617 or approved equal.
- B. Over two (2) Inches: Iron body, bronze trim, non-rising or rising stem and handwheel, OS&Y, single wedge, flanged ends. Red and White 415/421, NIBCO F619/F617, Crane 461/465 1/2 or approved equal.

2.10 GLOBE VALVES:

- A. Up to 2 Inches: Bronze body, rising stem and handwheel inside screw, renewable composition disc, solder screwed ends, with backseating capacity. Nibco Model 211 Series, Crane Model 1 Series, Powell Model 150, Hammond 1.413, Red White 211/212 or approved equal.
- B. Over 2 Inches: Iron body, bronze trim, rising stem and handwheel, OS&Y, plug-type disc, flanged ends. Red and White Fig 400 or NIBCO F718-B, Crane 351 or approved equal.

2.11 BALL VALVES:

- A. Up to 2 Inches: Bronze or stainless steel body, stainless steel ball, teflon seats and stuffing box ring, lever handle and balancing stops, solder threaded ends with union. Nibco Model 580 Series, Crane Model 2330 Series, Red White 5092/5095 or approved equal.
- B. Over 2 inches: Cast steel body, chrome plated steel ball teflon seat and stuffing box seals, lever handle or gear drive handwheel for sizes 10 inches and over, flanged.

2.12 BUTTERFLY VALVES:

- A. Iron body, bronze disc, resilient replaceable seat for service to 180-degrees F, or lug end butterfly, 10 position over handle or infinite position lever handle with memory stop.

2.13 SWING CHECK VALVES:

- A. Up to 2 inches: Bronze 45 degree swing disc, solder or screwed ends. Nibco Model 413 Series, Crane Model 37 Series, Red White 236/237 or approved equal.
- B. Over 2 inches: Iron body, bronze trim, 45 degrees swing disc, renewable disc and seat, flanged ends. Red White 435, Nibco F918, Crane 373 or approved equal.

2.14 SPRING LOADED CHECK VALVES:

- A. Iron body, bronze trim, spring loaded, bronze disc, wafer.
- B. Red White 442, Nibco W920W, Stockham W6-970 or approved equal.

PART 3 EXECUTION

3.1 PREPARATION:

- A. Ream pipe and tube ends. Remove burrs. Bevel end Ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATIONS:

- A. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- B. Route piping in orderly manner and maintain gradient.
- C. Install piping to conserve building space and not interfere with use of space.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Provide clearance for installation of insulation and access to valves and fittings.
- G. Provide access where valves and fittings are not exposed.
- H. Slope water piping and arrange to drain at low points.
- I. Establish elevations of buried piping outside the building to insure not less than 3 feet of cover.
- J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- K. Prepare pipe, fittings, supports, and accessories not prefinished, ready for finish painting.
- L. Establish invert elevations, slope all drainage piping 4 inches and larger to 1/8 inch per foot minimum. All drainage piping 3 inches and smaller shall be sloped to 1/4 inch per foot minimum.
- M. Install bell and spigot pipe with bell end upstream.
- N. Install valves with stems upright or horizontal, not inverted.
- O. Provide one plug cock wrench for every ten plug cocks sized 2 inches and smaller, minimum of one. Provide one plug cock wrench for each plug cock sized 2-1/2 inches and larger.
- P. In pipe 3 – inch nominal diameter or less, cleanouts shall be located at not more than 50ft.intervals
- Q. In pipe 4 – inches nominal diameter through 6 inches nominal diameter, cleanouts shall be located at not more than 80ft. intervals
- R. Each building drain shall be provided with a cleanout within 6ft. of the junction of the building drain and building sewer.

3.3 APPLICATION:

- A. Grooved mechanical couplings and fasteners not allowed.
- B. Install unions downstream of valves and at equipment or apparatus connections.
- C. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe. All joints in potable lines to be lead free.
- D. Install gate, ball, butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- E. Install globe, ball, butterfly valves for throttling, bypass, or manual flow control services.
- F. Provide spring loaded check valves on discharge of water pumps.

3.4 TEST

- A. Upon completion of the domestic water piping system, it shall be tested and proved tight under a water pressure not less than 200 psi. The water used for testing shall be obtained from a potable source of supply. This pressure test shall be performed before the disinfection of the domestic water piping system is started. This test shall conform to the Louisiana State Plumbing Code
- B. Upon completion of the sanitary sewer piping system the contractor shall perform a water test to prove that the system is tight and without leaks. No section of the piping system shall be tested with less than 10 ft head of water. The pressure shall be kept on the system for a time no less than 1 hour. This test shall conform to the Louisiana State Plumbing Code.
- C. Upon completion of the sanitary vent piping system the contractor shall perform a pressure test to prove that the system is tight and is without leaks. This test shall conform to the Louisiana State Plumbing Code.
- D. All Gas piping shall be tested in accordance to NFPA 54.
- E. Prior to any test, the contractor shall notify the Architect in writing a minimum of 5 business days, the date and time the test will take place. No exceptions. After the completion of the test but before the building is substantially complete the contractor shall submit a written report with the following information for each test performed.
 - 1. Project Name
 - 2. Project Location
 - 3. Plumbing Contractor Name, Address and Contact Information
 - 4. Identification of test performed.
 - 5. Time and Date test was started
 - 6. Time and Date test was completed.

3.5 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM:

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. New or repaired potable water systems shall be purged of deleterious matter and disinfected prior to utilization. The method to be followed shall be that prescribed by the health authority or water purveyor having jurisdiction or, in the absence of a prescribed method, the procedure described in either AWWA C651 or AWWA C652, or as described in this section. This requirement shall apply to "onsite or in-plant" fabrication of a system or to a modular portion of a system.
 - 1. The pipe system shall be flushed with clean, potable water until dirty water does not appear at the points of outlet.
 - 2. The system or part thereof shall be filled with a water/chlorine solution containing not less than 50 parts per million (50 mg/L) of chlorine, and the system or part thereof shall be valved off and allowed to stand for 24 hours; or the system or part thereof shall be filled with a water/chlorine solution containing not less than 200 parts per million (200 mg/L) of chlorine and allowed to stand for 3 hours.
 - 3. Following the required standing time, the system shall be flushed with clean potable water until the chlorine is purged from the system.
 - 4. The procedure shall be repeated where shown by a bacteriological examination that contamination remains present in the system.

- C. Prior to the disinfection of the domestic water piping system the contractor shall inform the architect in writing the date and time the disinfection will take place. After the completion of the disinfection of the domestic water piping system but before the building is substantially completed the contractor shall submit a written report with the following information.

1. Project Name
2. Project Location
3. Plumbing Contractors Name, Address, and contact information
4. Chemicals used in the disinfection process.
5. Time and Date disinfection process was started
6. Time and Date disinfection process was completed

3.6 SERVICE CONNECTIONS:

- A. Provide new sanitary sewer services and tie into existing as shown on plans. Before commencing work check invert elevations required for sewer connections, confirm inverts and insure that these can be properly connected with slope for drainage and cover to avoid freezing. Contractor to tie in existing services as shown on drawings.
- B. Tie domestic water into existing services as shown on drawings. Provide sleeve in wall for service main and support at wall with reinforced concrete bridge. Caulk enlarged sleeve and make watertight with pliable material. Provide 18-gauge galvanized sheet metal sleeve around service main to 6 inches above floor and 6 feet minimum below grade. Size for minimum of 2 inches of loose batt insulation stuffing. Contractor shall utilize and tie in existing water lines as indicated on the drawings.
- C. Tie new gas service into existing onsite. Coordinate connection with gas service provider.

END OF SECTION

SECTION 22 10 10
PLUMBING SPECIALTIES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Floor drains
- B. Trap Primers
- C. Cleanouts
- D. Backflow preventors
- E. Water hammer arrestors
- F. Hose bibbs hydrants

1.2 RELATED WORK

- A. Section 23 05 29 - Supports and Anchors
- B. Section 22 10 00 - Plumbing Piping
- C. Section 22 40 00 - Plumbing Fixtures

1.3 REFERENCES

- A. ANSI/ASSE 1012 - Backflow Preventers with immediate Atmospheric Cent.
- B. ANSI/ASSE 1011 - Hose Connection Vacuum Breakers.
- C. ANSI/ASSE 1013 - Backflow Preventers, Reduced Pressure Principle.
- D. ANSI/ASSE 1019 - Wall Hydrants, Frost Proof Automatic Draining Anti-Backflow Types.
- E. ANSI A112.21.1 - Roof Drains
- F. ANSI A112.26.1 - Water Hammer Arrestors
- G. PDI WH-201 Water Hammer Arrestors

1.4 QUALITY ASSURANCE

- A. Manufacturer: For each product specified, provide components by same manufacturer throughout.

1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 30 00.
- B. Include component sizes, rough-in requirements, service sizes, and finishes.

PART 2 PRODUCTS

2.1 FLOOR DRAINS

- A. Floor Drain (FD): ANSI A112.21.1; lacquered cast iron two piece body with double drainage flange, weep holes, reversible clamping collar, square adjustable nickel- bronze strainer, and trap primer connection; Wade model 1100G, Zurn model Z415s or Smith model 2005.
- B. All floor drains installed shall have trap primers.

2.2 TRAP PRIMERS

- A. Trap primers shall be PPP, Inc. Prime-Rite 500 with AG-500 air gap fitting. Distribution unit may be used for multiple floor drains. Trap primers shall be installed as per manufacturer recommendations and in strict accordance with the Louisiana Plumbing Code. Elastomeric flexible type trap guards will not be allowed on this project.

2.3 FLOOR SINK

- A. Floor sink (FS): 12"x12" floor sink with square nickel bronze top, 8" deep, aluminum dome strainer. Zurn Z1901, Wade 9144, or Smith 300.

2.4 CLEANOUTS

- A. Exterior Surfaced Areas: As detailed on Plans.
- B. Interior Finished Floor Areas: Lacquered cast iron, two piece body with double drainage flange, weep holes, reversible clamping collar, and adjustable nickel- bronze strainer, square with scoriated cover in service areas and square with depressed cover to accept floor finish in finished floor areas; Model W-6000 manufactured by Wade or Model ZN-1400 manufactured by Zurn or 4000 Series manufactured by Smith.
- C. Interior Finished Wall Areas: Line type with lacquered cast iron body and round epoxy coated gasketted cover, and round stainless steel access cover secured with machine screw; Model W-8460-R manufactured by Wade or Model ZN-1445-1 manufactured by Zurn or Model 4532 manufactured by Smith.
- D. Interior Unfinished Accessible Areas: Caulked or threaded type, provide bolted stack cleanouts on vertical rainwater leaders.
- E. Acceptable Manufacturers
 - 1. Wade 6000
 - 2. Zurn 1400
 - 3. Substitutions: Under provisions of Instructions To Bidders.

2.5 BACKFLOW PREVENTERS

- A. Pressure Backflow Preventers: ANSI/ASSE 1013; bronze body with bronze and plastic internal parts and Stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve which opens under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with two gate valves, strainer, and four test cocks.
- B. Acceptable Manufacturers
 - 1. Watts Model 909

2. Wilkins Model 375
3. Substitutions: Under provisions of Instructions To Bidders.

2.6 WATER HAMMER ARRESTORS

- A. ANSI A112.26.1; sized in accordance with PDI WH-201, precharged suitable for operation in temperature range - 100 to 300 degrees F (-73 to 49 Degrees C) and maximum 250 psig (1700 kpa) working pressure.
- B. Acceptable Manufactures
 1. Wade Model W-5, W-10, W-20
 2. Zurn Model Z-1700-100, 200, 300
 3. Smith Model 5000
 4. Substitutions: Under provisions of Instructions To Bidders.

PART 3 EXECUTION

3.1 PREPARATION

- A. Coordinate cutting forming of roof floor construction to receive drains to required invert elevations.

3.2 INSTALLATION AND APPLICATION

- A. Install specialties in accordance with manufacturer's instructions to permit intended performance.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Insure clearance at cleanout for rodding of drainage system.
- C. Encase exterior cleanouts in concrete flush with grade.
- D. Install water hammer arrestors complete with accessible isolation valve.
- E. In pipe 3 – inch nominal diameter or less, cleanouts shall be located at not more than 50ft.intervals
- F. In pipe 4 – inches nominal diameter through 6 inches nominal diameter, cleanouts shall be located at not more than 80ft. intervals
- G. Each building drain shall be provided with a cleanout within 6ft. of the junction of the building drain and building sewer.

END OF SECTION

SECTION 22 40 00

PLUMBING FIXTURES AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Plumbing Fixtures and Trim

1.2 RELATED WORK

- A. Section 23 00 00 - General Mechanical
- B. Section 22 10 00 - Plumbing Piping
- C. Section 22 10 10 - Plumbing Specialties

1.3 SUBMITTALS

- A. Furnish and install plumbing fixtures as shown on the accompanying drawing and in accordance with the approved rough-in drawings. This will include service sinks, lavatories, water closets, urinals, etc., with all brass in connection with supply tubing, traps, escutcheons, stop and basin cocks, etc. All fixtures shall be new and must be delivered to the building properly crated and in perfect condition.
- B. All brass must be best quality. All brass pipe to be seamless brass tubing and all fixture traps shall be heavy with C.O. plugs. Nipples shall be extra heavy. Lightweight goods will not be accepted. All exposed metal on fixtures shall be C.P. or Chromard. All "P" traps shall be complete with cleanout plug.
- C. Contractor shall submit in his fixture brochure for approval, a rough-in sheet of each fixture and indicate any variation required for the fixtures. Fixtures are to be roughed-in in accordance with these approved rough-in sheets and anchored so that piping cannot be moved.

1.4 JOB CONDITIONS

- A. Check millwork shop drawings. Conform location and size of fixtures and openings before rough-in and installation.

PART 2 PRODUCTS – SEE PLANS

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install furnish and install all plumbing fixtures and accessories according to manufacturer's instruction and according to national, state and local codes governing the various systems. Carefully review the Architectural floor plans and millwork details to determine exact number of all fixtures, outlets, and accessories required. Coordinate all fixtures, outlets, drains, accessories, etc., prior to submitting shop drawings.
- B. Install each fixture in accordance with rough-in drawings as per manufacturers recommendations. At completion thoroughly clean plumbing fixtures and equipment. Anchor fixtures rigidly; anchor piping in walls so that piping cannot be moved.

- C. Provide chrome plated rigid or flexible supplies to fixtures with stops, reducers and escutcheons.
- D. Solidly attach floor water closets to floor with lag screws and finishing caps.
- E. Install each fixture with trap, easily removable for servicing and cleaning.
- F. All fixtures supplied with domestic water, hot or cold, shall be installed with integral stops on all supply lines.
- G. Mount fixtures to the following heights above finished floor:
 - 1. Water Closets:
 - a. Standard 15" to top of bowl rim
 - b. Handicapped 18" to top of seat
 - 2. Urinal:
 - a. Standard 22" to top of bowl rim
 - 3. Lavatories:
 - a. Handicapped 34" to top of basin rim
 - 4. Water Closet Flush Valves:
 - a. Standard 11" min. above bowl rim'
- H. Contractor shall caulk all joints at walls and floors with plumbing fixtures.
- I. Contractor shall provide approved ADA drain and water line insulation covers on all exposed services for lavatories and sinks. Truebro Lav Guard or approved equal.

3.2 FIXTURE ROUGH-IN SCHEDULE:

- A. Rough-in fixture piping and size connections shall be in accordance with the following table of minimum sizes for particular fixtures unless noted different on the drawing:

PLUMBING FIXTURE ROUGH-IN SCHEDULE				
DESCRIPTION	C.W.	H.W.	WASTE	VENT
WATER CLOSET (TANK)	1/2"	—	4"	3"
WATER CLOSET (FLUSH VALVE)	1"	--	4"	3"
URINAL (FLUSH VALVE)	3/4"	--	2"	1-1/2"
LAVATORY	1/2"	--	2"	1-1/2"
SERVICE SINK	1/2"	1/2"	3"	2"
ELECTRIC WATER COOLER	1/2"	--	2"	1-1/2"
SINK	1/2"	1/2"	2"	1-1/2"
HOSE BIBB	3/4"	--	--	--
2" FLOOR DRAIN	--	--	2"	1-1/2"

3" FLOOR DRAIN	--	--	3"	2"
3" HUB DRAIN	--	--	3"	2"

WATER PIPE SIZING TABLE

UNLESS SHOWN OTHERWISE, DOMESTIC WATER LINES SHALL RUN CONCEALED OVERHEAD AS DESIGNATED IN PLUMBING FIXTURE SCHEDULE AND BE SIZED ACCORDING TO TABLE BELOW.

PLANS AND RISER DIAGRAMS DO NOT NECESSARILY SHOW ALL PIPING RUNS. INSTALL A FACTORY SHOCK ABSORBER AT TOP OF EACH FIXTURE GROUP AND ALSO AT WATER HEATERS.

<u>NUMBER OF FIXTURES*</u>	<u>PIPE SIZE (IPS)</u>
2 OR LESS	1/2"
3 TO 5	3/4"
6 TO 10	1"
11 TO 15	1-1/4"
16 TO 28	1-1/2"

*FLUSH VALVE WATER CLOSET IS EQUIVALENT TO SIX (6) FIXTURES SIZES INDICATED ABOVE ARE MINIMUM SIZES TO BE USED UNLESS OTHERWISE STATED

END OF SECTION

SECTION 23 00 00

GENERAL MECHANICAL

PART 1 GENERAL CONDITIONS

1.1 WORK INCLUDED

- A. The general conditions of the general specifications are made a part of these specifications and apply the same as if attached hereto. The contractor should, before bidding, read and thoroughly understand all general conditions, priority and scheduling.

1.2 SCOPE OF WORK

- A. This section calls for the furnishing of labor, materials, equipment, and all the services, and of performing all operations required for the complete mechanical systems as hereinafter specified and/or shown on the accompanying drawings.

1.3 GENERAL REQUIREMENTS

- A. Contractor shall install his work to meet the existing conditions as found at buildings and property, and to accommodate work of other trades. This contractor shall be responsible for timely placing of sleeves in forms before concrete is poured. Cooperate with the general contractor and place pipes and ducts in floors, walls, furred spaces, etc., so there will be no delay. Sheet metal or iron pipe sleeves shall be provided for pipes passing through floors, wall or partitions.
- B. Contractor shall furnish and properly install materials, devices, equipment, insulation, controls, appurtenances, etc., mentioned in these specifications and/or shown on plans or required to make a complete and satisfactory installation in working order whether fully shown or not.
- C. Contractor should visit the site and acquaint himself thoroughly with conditions governing installation of his work.
- D. All other plans shall be checked in relation to these plans so that all conditions will be furnished and installed in this contract to provide complete and satisfactory systems.

1.4 LAWS, RULES, REGULATIONS, FEES, ETC.

- A. The entire mechanical work shall comply with rules and regulations of the local and state authorities having jurisdiction including the State Fire Marshal and the State Board of Health. All modifications required by the said authorities at any time shall be made by the mechanical contractor without additional charge. In cases where alterations to or deviations from this specification and accompanying plans are required by the authorities, contractor shall report same to the Architect and obtain his approval before work is started.

1.5 DRAWINGS

- A. Plans and detail sketches are submitted to limit, explain, and define structural conditions, specified requirements, pipe sizes, and manner of erecting work. Structural or other conditions may require certain deviations from manner of installation shown, and such deviations shall be made as required, but specified sizes and requirements necessary for satisfactory operation shall remain unchanged.
- B. It may be necessary to shift or to change routing of ducts and or piping and this shall be done, but such changes must be referred to Architect for approval before proceeding. Extra charges will not be allowed for these changes.

- C. Typical details are shown on plans, and in any cases where Contractor is not certain about the method of installation of this work, he shall ask for details, lack of details will not be an excuse for improper installation.
- D. Contractor bidding on this portion of the work must be fully experienced in installations of equal size, complexity and quality. In bidding, he acknowledges that he fully understands the scope of the work and design and has the ability, for the contract price to assemble and install the equipment, piping, and ductwork shown or specified, so as to mold same into a satisfactory workable system and arrangement, without responsibility for capacities and sizes set by these documents.
- E. Contractor shall recognize that the amount of information and detail that could be provided in Contract Documents is limitless and could extend into every minute detail, step, sequence, and operation to a point where only workmen would be required, without drawing on ability experience, and ingenuity of the Contractor.

1.6 MATERIALS

- A. Where directed by the Architect, Contractor shall submit sample for approval before proceeding.

1.7 STANDARDS

- A. In general, standards for products and workmanship shall be as described in each individual section.
- B. The standards referred to, except as modified in these specifications shall have full force and effect as though printed in these specifications. These standards are not furnished to bidders for the reason that the manufacturers and trades involved are assumed to be familiar with their requirements. The Architect will furnish, upon request, information as to how copies of the standards referred to may be obtained.
- C. Notwithstanding any reference in this section of the specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalogue number, such references shall be interpreted as establishing a standard of quality and shall not be construed limiting competition and the Contractor in such cases, may at his option, use any article, device, product, material, fixture, form or type of construction which in the judgment of the Architect, expressed in writing, is equal to that specified.

1.8 MATERIALS SPECIFIED OR SUBSTITUTED (PRIOR APPROVALS)

- A. Refer to Instructions to Bidders.

1.9 SHOP DRAWINGS

- A. Before proceeding with the work, contractor shall make complete shop and working drawings of such apparatus or connections as directed by the Architect and/or hereinafter specified. These drawings shall show construction details and dimensions of each piece of equipment so drawn.
- B. Architects approval of shop drawings shall not relieve the Contractor from responsibility of incorrectly figured dimensions or any other errors in these drawings or specified even though approved by the Architect, shall not relieve this Contractor from furnishing and erecting same.
- C. Ten (10) sets of prints of shop drawings shall be submitted to Architect for approval. These prints shall be supplied as part of this contract. Submit all shop drawings at the same time or as soon as practical after award of the contract. No separate items will be accepted.
- D. Where laws or local regulations provide that certain accessories such as gauges, thermometers, relief valves and parts be installed on equipment, it shall be understood that such accessories shall be furnished if no specific reference to them is made in the specifications.

1.10 CUTTING AND PATCHING

- A. All cutting necessary for this work will be done by this Contractor at his own expense, but all patching shall be done by the General Contractor. No beams or joists shall be cut without prior approval of Architect. After initial resurfacing has been done any further cutting, patching or painting shall be done at the expense of this Contractor.

1.11 INTERFERENCES

- A. The drawings are generally diagrammatic and this Contractor shall harmonize his work with that of the different trades so that interferences of the different equipment, piping, etc., shall be installed so as to function properly. In the case where interference develops, the Architect is to state which equipment, piping, etc., is to be relocated regardless of which item was first installed.

1.12 EXCAVATION AND BACKFILL

- A. This Contractor shall do all excavating required to lay the specified services and after same have been laid, he shall do all backfilling to the satisfaction of all parties concerned and shall cart away from the premises all unnecessary dirt, rubbish, etc., as directed. Backfill shall be well tamped. All backfill shall be done according to the "Compaction And Backfill" section of these specifications.

1.13 SPACE REQUIREMENTS

- A. Contractor shall check all plans pertaining to this job so as to be fully aware of the space limitations for all various items of equipment. Equipment is not to be bid on, submitted for preliminary approval nor placed on the job if it is so bulky and large that adequate access for proper maintenance and servicing cannot be achieved in the space provided.

1.14 FOUNDATIONS AND SUPPORTS

- A. This contractor shall furnish and install foundations and supports of concrete or steel shapes for equipment requiring same, unless specifically indicated otherwise or specified.
- B. All floor mounted mechanical equipment shall be mounted on 4" high concrete housekeeping pad unless specifically shown otherwise on plans. Refer to plans for special requirements for foundations and supports.

1.15 HANGERS, ESCUTCHEONS, ETC.

- A. See Section 23 05 29 – Supports and Anchors.
- B. Mechanical Contractor shall furnish and install all thimbles, inserts and other requirements necessary for the support of his equipment and piping. Assist and cooperate with other trades in locating and placing these items.

1.16 CEILING AND WALL ACCESS PANEL

- A. Factory made access doors and frames, prime coat finish, screw driver latch(s) of suitable size as required.
- B. Access panels in rated ceiling to have same rating as ceiling.
- C. Where valves, dampers, controls, fire dampers, smoke dampers, and detectors, reheat coils, etc. are concealed in walls or non-accessible ceilings, install factory made access doors and frames.

1.17 DUCTWORK ACCESS PANELS

- A. Access panels in ductwork to be double wall type with insulation sandwiched in between, same insulation value as adjacent ductwork.

1.18 SIPHON PREVENTERS

- A. Furnish and install approved type siphon preventors on all equipment and fixtures in such a manner as to prevent water being siphoned back into the water supply in the event the water supply is shut off.

1.19 FLAME SPREAD PROPERTIES OF MATERIALS

- A. All materials and adhesives used for acoustical linings, jackets and insulation shall comply with requirements of NFPA 90A and 90B and UL guide # 40V.8.15. Products exceeding a flame spread rating of 25, or a smoke developed rating of 50, as determined by ASTM Test Method E-84 are prohibited. Adhesives and sealers shall be fire retardant and fire resistant when dry. Flame proofing treatments which are subject to decomposition, deterioration, or the effects of moisture are prohibited.

1.20 DOMESTIC AND FIRE WATER TIE-IN

- A. Contractor shall provide any necessary meters and tap fees for domestic or fire water tie-ins to utility companies. All domestic and fire water taps shall have aboveground reduced pressure back flow preventors near the tie-in point. Coordinate with Engineer exact location.
- B. All backflow preventors shall be heat traced and insulated with 1-1/2" fiberglass insulation with water tight aluminum jacket.

1.21 PROTECTION OF EQUIPMENT

- A. See individual sections for protection of equipment.
- B. This Contractor shall at all times take such precautions as may be necessary to properly protect his equipment from damage. Failure on the part of the Contractor to comply with the above to the entire satisfaction of the Architect will be sufficient cause for the rejection of the particular piece of equipment in question.

1.22 TESTING

- A. All pressure lines, unless elsewhere specified, shall be tested under 150# hydrostatic pressure unless rated pressure is less for a minimum of 5 hours. Contractor shall provide valve at farthest point in line to bleed off air and for inspection.
- B. Notice shall be given the Architect before tests are made, the test is not to be drawn off pipes and pipes are not to be covered or insulated until filled pipes have been examined and testing approved by the Architect.
- C. In case of defects, they shall be made good to the satisfaction of the Architect and work retested. All such work shall be done by the Contractor with no additional expense to the Owner.
- D. Contractor shall make any other such tests as may be called for by the Architect, and all other tests so called for elsewhere in these specifications.

1.23 CLEANING AND ADJUSTING

- A. Before receiving final approval from the Architect, the Contractor shall clean out all lines; adjust all valves, control equipment and other equipment. Clean all pipe and equipment and leave the entire installation in good working order. All heaters, fans, grilles, controls, etc., shall be adjusted to perform

in correct and satisfactory manner, with sequences, etc., as called for in the specifications hereinafter specified and on plans.

1.24 PAINTING

- A. Refer to Section 09 90 00 – Painting and Coating and 230553 – Mechanical Identification for painting requirements.

1.25 MOTORS, MOTOR STARTERS AND ELECTRICAL WORK

- A. Refer to Section 23 05 13 - Motors.
- B. Motors shall be suitable for voltage indicated on the plans, plus or minus 10% and be designed for constant operation at 40 degrees C ambient, 65 degrees C rise for class A, 90 degrees C rise for Class B, etc. Electrical equipment furnished under this contract shall meet standards as set forth by NEMA and NEC requirements. All electrical equipment shall be UL labeled.

1.26 PARTS LIST AND INSTRUCTION MANUAL

- A. See individual sections for specific instructions.
- B. This Contractor shall deliver to the Architect three (3) copies of printed instructions relating to operating, proper maintenance and repair parts list indicating the various parts by name, number and diagram for each piece of equipment installed. Test and balance report shall also be included in parts list and instruction manual.
- C. The shop drawings, parts list, and maintenance and repair instructions shall be neatly bound in a canvas-covered notebook and turned over to the Architect before acceptance of the work.

1.27 BOILER TEST CERTIFICATES

- A. Each boiler, water heater (with a capacity equal to or greater than 50 gallons), and pressure vessels are to be inspected by a State of Louisiana certified inspector upon installation.
- B. Submit a copy of each report to the Architect and include one copy in each of the Close-out Manuals.

1.28 GUARANTEE

- A. Contractor shall guarantee materials, equipment and workmanship installed and performed under this contract for a period of one (1) year from date of the final completion and official acceptance of the contract.
- B. He shall furnish free of charge to the Owner all materials and labor necessary to comply with the above guarantee, which shall be based on defective materials and/or workmanship, and on such basis shall be responsible if a deficiency is found, for any adjustment, replacement, or correction which may be necessary to replace the project to first class condition. This guarantee shall include refrigerant charges, but shall not include the changing of filters.

1.29 RECORD DRAWINGS

- A. The Contractor shall maintain a set of record drawings on-site throughout the construction. The record drawings shall reflect accurate dimensional record of all underground, buried, above ceiling, or otherwise concealed work.
- B. The Contractor shall maintain these record documents and keep them up-to-date daily.

END OF SECTION

SECTION 23 05 00

BASIC MECHANICAL MATERIALS AND METHODS

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Sleeves.
5. Escutcheons.
6. Grout.
7. Mechanical demolition.
8. Equipment installation requirements common to equipment sections.
9. Concrete bases.
10. Supports and anchorages.

1.2 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.

1.3 SUBMITTALS

- A. Welding certificates.

1.4 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications." Comply with provisions in ASME B31 Series, "Code for Pressure Piping." Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

PART 2 PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 23 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS

- A. Refer to individual Division 23 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.
- C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Brazing Filler Metals: AWS A5.8, BCuP Series or BAg1, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12.
- G. Solvent Cements for Joining Plastic Piping:
 - 1. ABS Piping: ASTM D 2235.
 - 2. CPVC Piping: ASTM F 493.
 - 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 - 4. PVC to ABS Piping Transition: ASTM D 3138.

2.3 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig (1725-kPa) minimum working pressure at 180 deg F (82 deg C).
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig (1035- or 2070-kPa) minimum working pressure as required to suit system pressures.

- E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).
- F. 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 deg F (107 deg C).

2.4 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
- B. Sealing Elements: NBR interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- C. Pressure Plates: Carbon steel. Include two for each sealing element.
- D. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

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.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
Retain subparagraph below if required.
 - 1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.
- G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

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 and rough brass.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated and rough brass.

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.

PART 3 EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 23 Sections specifying piping systems.
- B. 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.
- 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 to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors.
- M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
- N. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 - 1. Install steel pipe for sleeves smaller than 6 inches (150 mm) in diameter.
 - 2. Install cast-iron "wall pipes" for sleeves 6 inches (150 mm) and larger in diameter.
 - 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals

and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

- O. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 - 1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- P. 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.
- Q. Verify final equipment locations for roughing-in.
- R. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.2 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 15 Sections 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. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 4. 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.
 5. PVC Nonpressure Piping: Join according to ASTM D 2855.
 6. 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 Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
1. Plain-End Pipe and Fittings: Use butt fusion.
 2. Plain-End Pipe and Socket Fittings: Use socket fusion.
- M. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.3 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. Edit dielectric connection types in two subparagraphs below for each fluid.
 4. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 5. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. 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.
- D. Install equipment to allow right of way for piping installed at required slope.

3.5 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 - 1. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit.
 - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of the base.
 - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 - 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 - 7. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete and reinforcement.

3.6 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.

3.7 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.

3.8 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.

END OF SECTION

SECTION 23 05 29
SUPPORTS AND ANCHORS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Pipe and equipment hangers, supports, and associated anchors.
- B. Equipment bases and supports.
- C. Sleeves and seals.
- D. Flashing and sealing equipment and pipe stacks.

1.2 RELATED WORK

- A. Section 23 07 00 - Piping and Equipment Insulation.
- B. Section 23 21 13 - Hydronic Piping.

1.3 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 30 00 – Administrative Requirements.
- B. Indicate hanger and support framing and attachment methods.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER'S

- A. Fee and Mason
- B. Grinnel

2.2 PIPE HANGERS AND SUPPORTS

- A. Hangers for pipe sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
- B. Hangers for pipe sizes 2 to 4 inches and cold pipe sizes 6 inches and over: Carbon steel, adjustable, clevis.
- C. Multiple or trapeze hangers: Steel channels with welded spacers and hanger rods; cast iron roll and stand for hot pipe sizes 6 inches and over.
- D. Vertical Support: Steel riser clamp.
- E. Floor support for pipe sizes 4 inches and over: Welded steel bracket and wrought steel clamp; adjustable steel yoke and cast iron roller for hot pipe 6 inches and over.
- F. Shields for insulated piping 2 inches and smaller: 18 gauge galvanized steel shield over insulation in 180 degree segments, minimum 12 inches long at pipe support.
- G. All hangers to be sized to include insulation.

2.3 HANGER RODS

- A. Steel Hanger Rods: Threaded both ends, threaded one end, or continuous threaded.

2.4 INSERTS

- A. Inserts: Malleable iron case or galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms, size inserts to suit threaded hanger rods.

2.5 FLASHING

- A. Metal Flashing: 26 gauge galvanized steel.
- B. Lead Flashing: 5 lb./sq. ft. sheet lead for waterproofing.
- C. Caps: Steel, 22 gauge minimum, 16 gauge at fire resistant elements.

2.6 SLEEVES

- A. Sleeves for pipes through non-fire rated floors: Form with 18 gauge galvanized steel.
- B. Sleeves for pipes through non-fire rated beams, walls, footings, and potentially wet floors: Form with steel pipe or 18 gauge galvanized steel.

2.7 FABRICATION

- A. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- B. Design hangers without disengagement of supported pipe.

2.8 FINISH

- A. Prime coat exposed steel hangers and supports.
- B. Protect against galvanic action with dielectric unions for dissimilar metals.

PART 3 EXECUTION

3.1 INSERTS

- A. Provide inserts to General Contractor for placement in concrete formwork.
- B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
- D. Where concrete slabs form finished ceiling, provide inserts to be flush with slab surface.
- E. Where inserts are omitted, drill through concrete slab from below and provide thru-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.2 PIPE HANGERS AND SUPPORTS

- A. Support horizontal piping as follows:

PIPE SIZE DIAMETER	MAX HANGER SPACING	MIN. HANGER
1-1/2 TO 2 INCH	10' - 0"	3/8"
2-1/2 TO 3 INCH	10' - 0"	1/2"
4 to 6 inch	10' - 0"	5/8"
8 to 12 inch	10' - 0"	7/8"
14 to 20 inch	15' - 0"	1"

- B. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
- C. Place a hanger within 12 inches of each horizontal elbow.
- D. Use hangers with 1-1/2 inch minimum vertical adjustment.
- E. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- F. Support riser piping independently of connected horizontal piping.

3.3 EQUIPMENT BASES AND SUPPORTS

- A. Provide equipment bases of reinforced concrete as detailed on plans.
- B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.
- C. Provide rigid anchors for pipes after vibration isolation components are installed.

3.4 FLASHING

- A. Provide flexible flashing and metal counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.

END OF SECTION

SECTION 23 05 48
VIBRATION ISOLATION

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Inertia Bases
- B. Vibration Isolation

1.2 RELATED WORK

- A. Fire Protection System
- B. Plumbing System
- C. HVAC System

1.3 REFERENCES

- A. ASHRAE - Guide to Average Noise Criteria Curves.

1.4 QUALITY ASSURANCE

- A. Maintain ASHRAE criteria for average noise criteria curves for all equipment at full load condition.

1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 30 00– Administrative Requirements.
- B. Indicate vibration isolator locations, with static and dynamic load on each, on shop drawings and described on product data.
- C. Submit manufacturer's installation instructions.

1.6 CERTIFICATES

- A. Submit manufacturer's certificate that isolators are properly installed and properly adjusted to meet or exceed specified requirements.

PART 2 PRODUCTS

2.1 INERTIA BASES

- A. Pumps: Reinforced 3,000 psi concrete base with chamfered edges, without channel frame.

2.2 VIBRATION ISOLATORS

- A. A.H. Units: Open spring mount with stiff springs. Horizontal stiffness equal to vertical stiffness. Minimum 1" deflection. No. and size of springs as per A.H. unit manufacturer's recommendations.
- B. Color code spring mounts.

- C. Select springs to operate at 2/3 maximum compression strain, with 1/4 inch (6 mm) ribbed neoprene pads.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install vibration isolators for motor driven equipment.
- B. Set steel bases for one inch clearance between housekeeping pad and base. Set concrete inertia bases for 2 inch (50 mm) clearance. Adjust equipment level.
- C. Provide spring isolators on piping connected to isolated equipment as follows: Up to 4 inch diameter, first three points of support; 5 to 8 inch diameter, first four points of support; 10 inch diameter and over, first six points of support. Static deflection of first point shall be twice deflection of isolated equipment.

END OF SECTION

SECTION 23 05 53

MECHANICAL IDENTIFICATION

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Identification of all mechanical products installed under this Division.

1.2 RELATED WORK

- A. Section 09 90 00 - Painting: Identification painting.

1.3 REFERENCES

- A. ANSI/ASME A13.1 - Scheme for the Identification of Piping Systems.

1.4 SUBMITTALS

- A. Submit product data under provisions of Section 01 30 00– Administrative Requirements.
- B. Mechanical and plumbing contractors shall coordinate color codes and marking procedures.

1.5 APPROVAL OF PRODUCT PRIOR TO BIDDING

- A. Refer to Instructions to Bidders, Page IB-3, Paragraph 4.3 Substitution.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Color: Unless specified otherwise, conform with ANSI/ASME A13.1.
- B. Plastic Nameplates: Laminated three-layer plastic with engraved black letters on light contrasting background color.
- C. Metal Tags: Brass with stamped letters, tag size minimum 1-1/2 inch (38 mm) diameter with smooth edges.
- D. Stencils: With clean cut symbols and letters of following size:

OUTSIDE DIAMETER OF INSULATION OF PIPE	LENGTH OF COLOR FIELD	SIZE OF LETTERS
3/4" - 1-1/4"	8"	1/2"
1-1/2" - 2"	8"	3/4"
2-1/2" - 6"	12"	1-1/4"
8" - 10"	24"	2 - 1/2"
Over 10"	32"	3 - 1/2"
Ductwork & Equipment	-----	2 - 1/2"

- E. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing printed markings.
- F. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape of not less than 6" wide by 4 mil thick manufactured for direct burial service.

PART 3 EXECUTION

3.1 PREPARATION AND INSTALLATION:

- A. Degrease and clean surfaces to receive adhesive for identification material.

3.2 INSTALLATION

- A. Plastic Nameplates: Install with corrosive-resistant mechanical fasteners, or adhesive.
- B. Plastic Pipe Markers: Install in accordance with manufacturer's instructions.
- C. Plastic type Pipe Markers: Install complete around pipe in accordance with manufacturer's instructions.
- D. Underground Plastic Pipe Markers: Install 6 to 8 inches (150 to 200 mm) below finished grade, directly above buried pipe.
- E. Equipment: Identify air handling units, pumps, heat transfer equipment, tanks and water treatment devices, and motor starters with plastic nameplates. Small devices, such as in-line pumps, may identified with plastic tags.
- F. Controls: Identify control panels and major control components outside panels with plastic nameplates.
- G. Valves: Identify valves in main and branch piping with tags.
- H. Piping: Identify piping, concealed or exposed, with plastic pipe markers. Tags may be used on small diameter piping. Identify service and flow direction. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and "T", at each side penetration of structure or enclosure, and at each obstruction.

3.3 PAINTING

- A. All surfaces requiring painting shall be left clean by the Mechanical Subcontractor. All painting shall be done by the General Contractor's painting Subcontractor. All exposed piping or insulation, convectors, grilles, or fans, in building or on roof will be painted. Paint pipe, equipment, hangers and accessories in Equipment Rooms including covering and foundations with two (2) coats of approved paint after thoroughly cleaning. Equipment having factory finish shall be touched up and given one (1) additional coat of machinery enamel color as selected. The above shall be done by the General Contractor. See Section 09 90 00.
- B. All piping in all equipment rooms shall be identified with pipe markers with directional arrows. The following color code shall be followed.

LEGEND	PIPING	DIRECTIONAL MARKER	BAND COLOR BACKGROUND
Domestic Water	Green	Green	White

NOTE: On any asphalt finished surfaces, prime with one (1) coat of aluminum paint before final color.

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. All division 23 specification sections, drawings, and general provisions of the contract apply to work of this section, as do other documents referred to in this section.

1.2 SCOPE OF WORK

- A. The Contractor shall obtain the services of an independent Test and Balance (TAB) Company which specializes in the testing and balancing of heating, ventilating and air conditioning (HVAC) systems to test, adjust and balance all HVAC systems in the building(s).
- B. The work included in this section consists of furnishing labor, instruments, and tools required in testing, adjusting and balancing the HVAC systems as described in these specifications or shown on accompanying drawings. Services shall include checking equipment performance, taking the specified measurements, and recording and reporting the results. The testing, adjusting and balancing agency shall act as a reporting agency; that is, list and report each piece of equipment as to identification number, manufacturer, model number, serial number, proper location, specified performance, and report actual performance of all equipment as found during testing. The report is intended to be used during the life of the building as a ready reference indicating original conditions, equipment components, etc.
- C. Representatives of the Test and Balance Company shall visit the job site during installation of the HVAC equipment, piping and ductwork as required.
- D. Upon completion of the HVAC system installation, the Test and Balance Company shall perform all required testing and balancing with the full cooperation of the Contractor and his Sub-contractors. The Contractor shall make changes and/or adjustments to the HVAC system components that are required by the Test and Balance Company to accomplish proper balancing. The TAB agency shall not supply or install any materials or balancing devices such as pulleys, drives, belts, etc. All of this work is by the Contractor and shall be performed at no additional cost to the Owner.
- E. The test and balance report complete with a summary page listing all deficiencies shall be submitted to the Architect for review by his Mechanical Engineer. If the Mechanical Engineer agrees with the report, he shall sign it and return it to the Architect. The test and balance report must be complete and must be accepted by the Mechanical Engineer prior to acceptance of the project. Any outstanding test and balance items shall be placed on the punch list and a monetary value shall be assigned to them.
- F. After all deficiencies have been corrected the Mechanical Engineer shall sign the testing and balancing report, and the Test and Balance Company shall supply four (4) copies of the final and complete report to the Architect for inclusion in the Operation and Maintenance Manuals.
- G. The items requiring testing, adjusting, and balancing include (but are not restricted to) the following:

AIR SYSTEMS

Supply Fans
Zone, Branch, & Main Ducts
Diffusers, registers, & grilles
Coils

1.3 DEFINITIONS, REFERENCES, STANDARDS

- A. All work shall be in accordance with the latest edition of the Associated Air Balance Council (AABC) National Standards or the latest standards of the National Environmental Balancing Bureau (NEBB). If these contract documents set forth more stringent requirements than the AABC National Standards or the NEBB Standards, these contract documents shall prevail.

1.4 QUALIFICATIONS

- A. Agency Qualifications: The TAB Agency shall be a current member of the AABC or the NEBB and must be in good standing with FP&C. A list of these firms shall be obtained from FP&C. Falsification of a TAB report shall be grounds for removal from the FP&C list and the firm's actions shall be reported to the appropriate certification agency. The contractor may use any FP&C approved TAB firm on a state project.

1.5 SUBMITTALS

- A. Procedures and Agenda: The TAB agency shall submit the TAB procedures and agenda proposed to be used.
- B. Sample Forms: The TAB agency shall submit sample forms, which shall include the minimum data required by the AABC National Standards or the NEBB Standards.

1.6 TAB PREPARATION AND COORDINATION

- A. Shop drawings, submittal data, up-to-date revisions, change orders, fan curves, pump curves and other data required for planning, preparation, and execution of the TAB work shall be provided when available and no later than 30 days after the Designer has returned the final approved submittal data to the Contractor.
- B. System installation and equipment startup shall be complete prior to the TAB agency's being notified to begin.
- C. The building control system (BCS) contractor shall provide and install the control system, including all temperature, pressure and humidity sensors. These shall be calibrated for accurate control. If applicable, the BCS contractor shall install all necessary computers and computer programs, and make these operational. Assistance shall be provided as required for reprogramming, coordination, and problem resolution.
- D. All test points, balancing devices, identification tags, etc., shall be accessible and clear of insulation and other obstructions that would impede TAB procedures.
- E. Qualified installation or startup personnel shall be readily available for the operation and adjustment of the systems. Assistance shall be provided as required for coordination and problem resolution.

1.7 REPORTS

- A. Final TAB Report - The TAB agency shall submit the final TAB report for review by the Architect. On plans provided, all outlets, devices, HVAC equipment, etc., shall be identified (including manufacturer, model number, serial number, motor manufacturer, HP, drive type, fan and motor sheaves and belt number), along with a numbering system corresponding to report unit identification. The TAB agency shall submit an AABC "National Project Performance Guaranty" (or similar NEBB Guaranty) assuring that the project systems were tested, adjusted and balanced in accordance with the project specifications and AABC National Standards (or similar NEBB Standards). The Designer shall certify his approval on the Performance Guaranty.

- B. Submit 4 copies of the Final TAB Report to the Architect for inclusion in the Operation and Maintenance Manuals.

PART 2 INSTRUMENTATION

- A. All instruments used for measurements shall be accurate and calibrated. Calibration and maintenance of all instruments shall be in accordance with the requirements of AABC National Standards (or similar NEBB Standards).

PART 3 EXECUTION

3.1 GENERAL

- A. The specified systems shall be reviewed and inspected for conformance to design documents. Testing, adjusting and balancing on each identified system shall be performed. The accuracy of measurements shall be in accordance with AABC National Standards (or similar NEBB Standards). Adjustment tolerances shall be + or - 10% unless otherwise stated.
- B. Equipment settings, including manual damper quadrant positions, valve indicators, fan speed control levers, and similar controls and devices shall be marked to show final settings.
- C. All information necessary to complete a proper TAB project and report shall be per AABC or NEBB standards unless otherwise noted. The descriptions of work required, as listed in this section, are a guide to the minimum information needed.
- D. TAB contractor shall cut insulation, ductwork and piping for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. Upon completion, patch insulation, ductwork and housings using materials identical to those removed. Seal insulation to reestablish integrity of the vapor barrier.
- E. TAB work shall include additional inspection and adjustment of components during the season following the initial balance to include re-balance of any items influenced by seasonal changes or as directed by the Owner.

3.2 AIR SYSTEMS

- A. The TAB agency shall verify that all ductwork, splitters, extractors, dampers, grilles, registers, and diffusers have been installed per design, are functional and set full open. Any leakage in the ductwork shall be repaired prior to the test. The TAB agency shall perform the following TAB procedures in accordance with the AABC National Standards or NEBB Standards:

For supply fans:

1. Fan speeds - Test and adjust fan RPM to achieve design CFM requirements.
2. Current and Voltage - Test and record motor voltage and amperage, and compare data with the nameplate limits to ensure fan motor is not in or above the service factor.
3. Pitot-Tube Traverse - Perform a Pitot-tube traverse of main supply and return ducts, as applicable to obtain total CFM. If a Pitot-tube traverse is not practical, an explanation of why a traverse was not made must appear on the appropriate data sheet.
4. Outside Air - Test and adjust the outside air on applicable equipment using a Pitot-tube traverse. If a traverse is not practical, an explanation of why a traverse was not made must appear on the appropriate data sheet. If a traverse is not practical use the mixed-air temperature method if the inside and outside temperature difference is at least 20 degrees Fahrenheit or use the difference between Pitot-tube traverses of the supply and return air ducts.

5. Static Pressure - Test and record system static pressure, including the static pressure profile of each supply fan.

For exhaust fans:

1. Fan speeds - test and adjust fan RPM to achieve design CFM requirements.
2. Current and Voltage - Test and record motor voltage and amperage, and compare data with the nameplate limits to ensure motor is not in or above the service factor.
3. Pitot-Tube Traverse - Perform a Pitot-tube traverse of main exhaust ducts to obtain total CFM. If a Pitot-tube traverse is not practical, an explanation of why a traverse was not made must appear on the appropriate data sheet.
4. Static Pressure - Test and record system static pressure, including the static pressure profile of each exhaust fan.

For zone, branch and main ducts:

1. Adjust ducts to within design CFM requirements. As applicable, at least one zone balancing damper shall be completely open. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.

For diffusers, registers and grilles:

1. Tolerances - Test, adjust, and balance each diffuser, grille, and register to within 10% of design requirements. Minimize drafts. Include required CFM, initial test CFM and final CFM.
2. Identification - Identify the type, location, and size of each grille, diffuser, and register. This information shall be recorded on air outlet data sheets.

For coils:

1. Air Temperature - Once air flows are set to acceptable limits, take wet bulb and dry bulb air temperatures on the entering and leaving side of each cooling coil. Dry-bulb temperature shall be taken on the entering and leaving side of each heating coil.

3.3 ADDITIONAL TAB SERVICES

- A. Job Site Inspections: During construction, the TAB agency shall inspect the installation of pipe systems, sheet metal work, temperature controls, and other component parts of the HVAC systems as required.
- B. Verification of HVAC Controls: The TAB agency shall be assisted by the building control systems Contractor in verifying the operation and calibration of all HVAC and temperature control systems. The following tests shall be conducted:
 1. Verify that all control components are installed in accordance with project requirements and are functional, including all electrical interlocks, damper sequences, air and water resets, fire and freeze stats, and other safety devices.
 2. Verify that all controlling instruments are calibrated and set for design operating conditions.
- C. Temperature Testing: To verify system control and operation, a series of three temperature tests shall be taken at approximately two hour intervals in each separately controlled zone. The resulting temperatures shall not vary more than two degrees Fahrenheit from the thermostat or control set point during the tests. Outside temperature and humidity shall also be recorded during the testing periods.

- D. TAB Report Verification: At the time of final inspection, the TAB agency may be required to recheck, in the presence of the owner's representative, specific and random selections of data, air quantities, and air motion recorded in the certified report. Points and areas for recheck shall be selected by the owner's representative. Measurements and test procedures shall be the same as approved for the initial work for the certified report. Selections for recheck, specific plus random, will not exceed 10% of the total number tabulated in the report.

END OF SECTION

SECTION 23 07 00

PIPING AND EQUIPMENT INSULATION

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Piping Insulation
- B. Jackets and Accessories
- C. Equipment Insulation
- D. Duct Insulation

1.2 RELATED WORK

- A. Section 23 31 00 - Ductwork

1.3 REFERENCES

- A. ANSI/ASTM C547 - Mineral Fiber Preformed Pipe Insulation
- B. ANSI/ASTM C552 - Cellular Glass Block and Pipe Thermal Insulation.
- C. ASTM B209 - Aluminum and Aluminum Alloy Sheet and Plate
- D. ASTM E845 - Surface Burning Characteristics of Building Materials.
- E. NFPA 255 - Surface Burning Characteristics of Building Materials.
- F. UL 723 - Surface Burning Characteristics of Building Materials.

1.4 QUALITY ASSURANCE

- A. Applicator: Company specializing in application of piping insulation.
- B. Materials: Flame spread/fuel contributed/smoke developed rating of 25/50/50 in accordance with ASTM E84, NFPA 255.0, UL 723.

1.5 SUBMITTALS

- A. Submit product data for each application as per Section 01 30 00– Administrative Requirements.
- B. Submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 INSULATION

- A. After all work has been tested and found to be leak free and tight, and accepted by the Architect, insulate as follows:
 - 1. All domestic hot and cold piping above ground shall be covered with 1" thick fiberglass, molded type sectional pipe covering complete with FRJ jacket. Sections of pipe covering shall be joined

together, the mastic to be buttered on only one of the two adjoining surfaces at both the Longitudinal and circumferential joints so that a complete seal at the joints is obtained. The piping insulation will be secured in place with copper wire spaced not more than 12 on center. All domestic water piping insulation shall be continuous. Contractor shall not cut insulation to fit around structural items. No exceptions.

2. Insulate the square to round connections on each air handling unit with 3" thick 3/4 lb. density insulation board using stick pins randomly spaced 18" apart. Insulation board shall have aluminum vapor barrier.
3. Fittings, flanges, valves, etc., shall be covered with molded or fabricate covers of same material as pipe covering and shall be finished with two (2) coats of white vapor barrier mastic reinforced with 20-20 mesh glass fabric.
4. Insulate all rectangular supply, return, exhaust, and fresh air ducts with 3" thick 3/4 lb. density fiberglass insulation with reinforced aluminum vapor barrier. Seal all joints with duct tape.
5. All round supply air ducts shall be wrapped with 3" thick, 3/4 lb. density fiberglass insulation with reinforced aluminum vapor barrier. Seal all joints with 2" duct tape.
6. Insulate cooling coil condensate drain lines from air handling units with 1/2" thick aerotube type insulation tied on and sealed over with tape.
7. Insulate back of all ceiling diffusers with 3" thick fiberglass with reinforced aluminum vapor barrier.
8. All outdoor mechanical piping shall be covered with aluminum jacket, water tight.
9. Insulate all PVC piping located in a return air plenum with 2" thick 3/4 lb. density fiberglass insulation with reinforced aluminum vapor barrier. Seal all joints with duct tape.

PART 3 EXECUTION

3.1 PREPARATION

- A. Install materials in accordance with manufacturer's instructions.

3.2 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Continue insulation with vapor barrier through penetrations.
- C. On insulated piping with vapor barrier, insulate fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.
- D. Neatly finish insulation at supports, protrusions, and interruptions.

END OF SECTION

SECTION 23 31 00

DUCTWORK

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Low pressure duct.
- B. Fire and Smoke Dampers

1.2 RELATED WORK

- A. Section 23 05 23 - Supports and Anchors
- B. Section 23 07 00 - Piping and Equipment Insulation
- C. Section 23 36 00 - Air Terminal Units
- D. Section 23 37 00 - Air Inlets and Outlets
- E. Section 23 05 93 - Testing and Balance

1.3 REFERENCES

- A. ASHRAE, 2009 Fundamentals, Chapter 21.
- B. ASHRAE, 2008 Equipment, Chapter 18.
- C. NFPA 90A, 90B.
- D. H.V.A.C. Duct Construction Standards - SMACNA 1995.

1.4 DEFINITIONS

- A. Duct sizes: Inside clear dimensions for wrapped ducts, maintain sizes inside lining. Metal to metal sizes for internally lined ductwork.
- B. Low Pressure: Three pressure classifications: 1/2" WG positive or negative static pressure and velocities less than 2,000 fpm, 1" WG positive or negative static pressure and velocities less than 2,500 fpm and 2" WG positive or
- C. Medium Pressure: Three pressure classifications: 3 inch WG positive or negative static pressure and velocities less than 4,000 fpm, 4" WG positive static pressure and velocities greater than 2,000 fpm. 6" WG positive static pressure and velocities greater than 2,000 fpm.

1.5 REGULATORY REQUIREMENTS

- A. Construct ductwork to NFPA 90A and NFPA 90B Standards.
- B. Store and protect products under provisions of Section 01 60 00.
- C. Construct ductwork to International Mechanical Code Standards

PART 2 PRODUCTS

2.1 LOW PRESSURE DUCTWORK

- A. Furnish and install all ducts for the air conditioning, heating and ventilating systems. Ductwork shall be complete with grilles, vanes splitters, flashings, hangers, flexible connections, manual dampers, fresh air inlet louvers, reinforcing angles, transitions to equipment, etc.
- B. All low pressure ductwork (mean velocity less than 2,000 FPM and static pressure in duct 2" of water or less) shall be constructed as per SMACNA Standards, 1995 Edition, Chapter 1, and shall be of the gauge metal and reinforced as per SMACNA Standards, 1995 Edition.
- C. Flashing shall be of the same material as specified under the roofing and flashing section of these specifications, or of 16-ounce sheet copper and shall be furnished and installed around all outside openings used for ducts or fans where required. Roof flashing shall extend at least 8" above roof. Cooperate with roofing contractor when installing flashing.
- D. All duct connections to equipment shall be made with fire and mildew resistant flexible connections of canvas or other acceptable materials. Connections shall have suitable metal collar frames at each end and shall not be less than 4" long with at least 1" of slack in the connection. Flexible connections shall be heat resistant to 500 degrees F continuously.
- E. Duct dimensions shown are metal sizes. All edges shall be straight and true.
- F. All flexible connections, duct liner and adhesives shall be U.L. listed as having a maximum flame spread of 50, fuel contribution of 25 and smoke contribution of 25.
- G. This Contractor shall furnish and install in ductwork all dampers, vanes splitters, etc.. as shown on the drawings or necessary to make the system complete. Where dampers or splitters can not be accessed through lay in ceiling, Contractor shall provide lockable 24" x 24" access door. Contractor shall coordinate location with Architect.
- H. Shafts shall be marked to show position of dampers, vanes, splitters, etc.
- I. Ductwork shall be supported in accordance with SMACNA Plate No. 17 and No. 18, up to and including band iron hangers attached to duct by means of screws or rivets per hanger.
- J. Access doors shall be provided in ductwork for all automatic dampers and each manual damper 3 square feet in area or larger, and shall be so located that damper can be completely serviced through the access door. Access door shall be provided with felt gaskets and suitable hinges and locks. Where access doors occur in insulated duct, double skin insulated doors shall be used.
- K. Where square ducts are shown, provide single vane elbows as per Plate 22, Figure A, SMACNA Standards, 1995 Edition. For all ductwork over 18" provide double vane square elbow as shown in Figure C of the Plate.
- L. All low pressure ductwork joints shall be sealed with hard cast "iron grip".
- M. Flexible air duct for connections between low pressure rectangular duct and ceiling diffusers shall be pre- insulated and listed by Underwriters Laboratories under U.L Standard 181 as a Class 1 flexible air duct and complying with NFPA Standards 90A and 90B.
- N. All flex duct 45 degree and 90 degree turns shall be metal hard duct.

2.2 INSULATED ACOUSTICAL LOW PRESSURE FLEXIBLE DUCT

- A. The duct shall be constructed of a CPE fabric supported by helical wound galvanized steel.
- B. Provide where indicated on drawings Flexmaster Type 8M UL181 Class I Air Duct.

- C. Fabric shall be mechanically locked to the steel helix without the use of adhesives or chemicals.
- D. The internal working pressure rating shall be at least 6" w.g. positive and 4" w.g. negative with a bursting pressure of at least 2½ time the working pressure.
- E. The duct shall be rated for a velocity of at least 4000 feet per minute.
- F. The duct must be suitable for continuous operation at a temperature range of -20° F to +250°
- G. Acoustical performance, when tested by an independent laboratory in accordance with the Air Diffusion Council's Flexible Air Duct Test Code FD 72-R1, Section 3.0, Sound Properties, shall be as follows:

The insertion loss (dB) of a 10 foot length of straight duct when tested in accordance with ASTM 477, at a velocity of 2500 feet per minute, shall be at least:

Octave Band	2	3	4	5	6	7
Hz.	125	250	500	1000	2000	4000
6" diameter	7	31	40	38	40	27
8" diameter	13	29	36	35	38	22
12" diameter	21	28	29	33	26	12

The radiated noise reduction (dB) of a 10 foot length of straight duct when tested in accordance with ASTM E477, at a velocity of 2500 feet per minute, shall be at least:

Octave Band	2	3	4	5	6	7
Hz.	125	250	500	1000	2000	4000
6" diameter	5	8	7	8	11	15
8" diameter	10	7	7	8	10	13
12" diameter	9	6	6	5	9	13

The self generated sound power levels (LW) dB re 10⁻¹² Watt of a 10 foot length of straight duct for an empty sheet metal duct when tested in accordance with ASTM E477, at a velocity of 1000 feet per minute, shall not exceed:

Octave Band	2	3	4	5	6	7
Hz.	125	250	500	1000	2000	4000
6" diameter	42	31	23	18	17	21
8" diameter	41	34	27	19	18	21
12" diameter	54	45	38	31	27	23

Factory insulate the flexible duct with fiberglass insulation. The R value shall be at least 5.0 at a mean temperature of 75° F. (R-4.2 is not acceptable)

- H. Cover the insulation with a fire retardant metalized vapor barrier jacket reinforced with crosshatched scrim having a permeance of not greater than 0.05 perms when tested in accordance with ASTM E96, Procedure A.
- I. Cover the insulation with a fire retardant metalized vapor barrier jacket reinforced with crosshatched scrim having a permeance of not greater than 0.05 perms when tested in accordance with ASTM E96, Procedure A.
- J. Maximum length to be 3'-0
ALL FLEX CONNECTIONS TO CEILING DIFFUSERS MUST BE FACTORY DESIGNED TO HAVE NO DIMENSIONAL CONTORTION WHEN CONNECTED TO THE DIFFUSER.

2.3 FIRE AND SMOKE DAMPERS

- A. Round and oval fire dampers shall be designed for high pressure duct systems.
- B. Rectangular fire dampers shall be designed for low pressure duct systems.
- C. All fire dampers must be NFPA 90A and UL approved.
- D. Furnish and install access doors in ductwork, walls, and ceilings where required to service all fire dampers, smoke dampers and detectors. All fire and smoke dampers shall be installed by the sheet metal contractor. All smoke detectors shall be furnished by the electrical Sub-contractor. Control of smoke dampers shall be coordinated with fire alarm system and building automation system.
- E. Rectangular Smoke Dampers - Louvers Dampers Inc. Model SD-400-UD or Ruskin FSD-35 tight seal parallel blade smoke dampers with low leakage and felted blades.
- F. Round and Oval Smoke Dampers - Shall be same as above but complete with welded round or oval collars. Units shall be capable of handling pressures up to 6" W.G.
- G. Smoke dampers shall be Class I rated as per UL 555.
- H. Sheet metal contractor shall provide and install all smoke dampers and actuators. Dampers shall be provided with end switches
- I. Approved Manufacturers: Pottorff, Ruskin, Price, Nailor Industries, Greenheck, or prior approved equal.

2.4 LOW LOSS TAP

- A. All round low pressure connections to rectangular ducts shall be made with a factory fabricated 45 degree low loss entry "shoe" tap with damper constructed of minimum 26 gage galvanized steel. The damper shall have a 2" raised handle with a high quality locking quadrant. A 3/8" continuous rod with "U" bolts connects the damper to the rod. Nylon end bearings are required where the rod penetrates the spin collar barrel.
- B. Provide Flexmaster #STOD-BO3, Dace # 26 ga STOD-C03, or prior approved equal.
- C. For medium pressure systems where used upstream of VAV terminals, the damper can be eliminated (use Flexmaster #STO or Dace 24 ga STO). Gauge shall be 24 gauge on medium pressure systems.

PART 3 EXECUTION

3.1 INSTALLATION

- A. See details of ductwork symbols and connections on drawing.

END OF SECTION

SECTION 23 37 00
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Diffuser boots.
- B. Registers/grilles.
- C. Louvers.

1.2 RELATED WORK

- A. See Mechanical Plans for wall louvers.

1.3 REFERENCES

- A. ADC 1062 - Certification, Rating and Test Manual.
- B. AMCA 500 - Test Method for Louvers, Dampers, and Shutters.
- C. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- D. ARI 650 - Air Outlets and Inlets.
- E. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.
- F. SMACNA - Low Pressure Duct Construction Standard.

1.4 QUALITY ASSURANCE

- A. Test and rate performance of air outlets and inlets in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.
- B. Test and rate performance of louvers in accordance with AMCA 500.

1.5 REGULATORY REQUIREMENTS

- A. Conform to ANSI/NFPA 90A.

1.6 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 30 00– Administrative Requirements.
- B. Provide product data for items required for this project.
- C. Submit schedule of outlets and inlets indicating type, size, application, and noise level.
- D. Review requirements of outlets and inlets as to size, finish, and type of mounting prior to submitting product data and schedules of outlets and inlets.
- E. Submit diffuser, grille and register color data to Architect for approval.

PART 2 PRODUCTS

2.1 GENERAL

- A. See mechanical schedules and drawings for diffuser types, sizes and configuration. See architectural plans - room finish schedules for type of ceiling and wall construction.
- B. Substitutions: Under provisions of Instructions To Bidders, Page IB-3, Paragraph 4.3.

2.2 ACCEPTABLE MANUFACTURERS - CEILING DIFFUSERS

- A. Titus TMSA Series, Krueger Series 1400 Adjustable
- B. All diffusers shall have opposed blade volume dampers and adjustable horizontal to vertical four way throw operable from face of grille. All diffusers must be aluminum.

2.3 ACCEPTABLE MANUFACTURERS - CEILING EXHAUST GRILLES

- A. Titus - Model 50F Code C 1/2" x 1/2" x 1" Cube Core, Krueger EGC-10, Nailor Industries Model 51EC
- B. All exhaust registers shall have opposed blade dampers.
- C. Grilles shall have baked enamel white finish.
- D. All dampers shall be operable from grille face.

2.4 ACCEPTABLE MANUFACTURERS - CEILING RETURN AIR GRILLES

- A. Titus - 50F Code C, Krueger EGC-10, Nailor Industries
- B. All return air shall have opposed blade dampers. See plans for filter backed grille requirements.

2.5 ACCEPTABLE MANUFACTURERS - WALL SUPPLY REGISTERS.

- A. Titus 1700 Series, Krueger ULTRA-FLO
- B. All registers shall have adjustable blade dampers on all registers.
- C. Furnish and install opposed blade damper on all registers.
- D. Finish to be approved by Architect.

2.6 ACCEPTABLE MANUFACTURERS - DOOR RETURN GRILLES

- A. Titus Model CT-700, Krueger Series 5600, Nailor Industries
- B. Substitutions: Under provisions of Instructions To Bidders, Page IB-3, Paragraph 4.3.
- C. All aluminum construction & design.
- D. Finish to be approved by Architect.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install items in accordance with manufacturer's instructions.

- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement. Refer to Section 09 90 00.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and register, regardless of whether dampers are specified as part of the diffuser, or grille and register assembly.
- E. Furnish and install necessary frames, bucks, sponge rubber gasketed, etc. to make a neat setting job.
- F. Diffusers shall be placed to insure that air does not blast against columns and lights.
- G. All diffusers, registers, etc. shall have external volume controls and deflecting grids.
- H. Ceilings in areas where plaster or gypsum board ceiling are used, shall be surface mounted.

END OF SECTION

SECTION 23 54 10

FORCED AIR FURNACE - ELECTRIC HEAT - DX

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Forced Air Furnace
- B. Refrigeration Cooling Coil
- C. Controls
- D. Electric Heater

1.2 RELATED WORK

- A. General Mechanical
- B. Supports and Anchors
- C. Piping Insulation
- D. Air Cooled Condensing Unit
- E. Ductwork

1.3 QUALITY ASSURANCE

- A. Conform to requirements of UL and applicable codes.
- B. Cooling system tested and rated to ARI Standard 210.

1.4 SUBMITTALS

- A. Submit manufacturer's installation instructions.
- B. Submit manufacturer's descriptive literature, operating instruction, and maintenance and repair data.

PART 2 PRODUCTS

2.1 TYPE

- A. Provide horizontal type with electric heating elements.
- B. Provide self contained packaged, factory assembled, pre-wired units, consisting of cabinets, supply fan, controls, air filter, refrigerant cooling coil.

2.2 PERFORMANCE

- A. Refer to Schedule of Drawings for performance and capacities.

2.3 CONSTRUCTION

- A. Cabinet: Galvanized steel with baked enamel finish, easily removed and secured access doors, glass fiber insulation.
- B. Fan: Direct or belt drive (as scheduled), rubber isolated mounted 1750 rpm motor.
- C. Air Filters: One (1) inch thick glass fiber, disposable type arranged for easy replacement.

2.4 ELECTRIC HEATER

- A. Finned tube metal sheath heating elements or open coil type (black heat) arranged in incremental stages as scheduled, accessible, with protection against no or low air flows, shorts or grounds, and failure of protection devices.

2.5 ELECTRIC HEATER CONTROLS

- A. Unit to be complete with low voltage transformer, terminal box with built-in factory wired magnetic contactors and high temperature thermal cutout protection with magnetic contactors rated for 100,000 cycle service: electric heating coils to be protected as per Article 424 of National Electric Code, UL approved and so labeled.

2.6 EVAPORATOR COIL

- A. Mount in furnace supply plenum, copper tube with mechanically bonded aluminum fins in a coil assembly, with galvanized drain pan, drain connection, and refrigerant piping connections.
- B. Provide factory installed thermostatic expansion valve.

2.7 CONTROLS

- A. Temperature control sequence of air conditioning equipment: "Automatic controls are placed into operation when system is energized. Provide room type thermostat to cycle condensing unit on the cooling cycle and the electric heater strip on the heating cycle as required to maintain space conditions. Air handling unit fan shall be wired for constant fan operation and shall be electrically interlocked such that the condensing unit may not run nor the electric heater strip be energized unless the evaporator fan is running. An air switch shall be installed which shall prevent electric heater operation until air flow is proven. If return air temperature rises above firestat setpoint then the firestat (located in the return air plenum) shall de-energize the air handling unit fan(s). If supply air contains smoke, a smoke detector (located in the supply air plenum) shall de-energize the air handling unit fan(s). If auxiliary drain pan fills with water, a float switch shall de-energize the condensing unit."
- B. Contractor shall provide clear locking cover for all thermostats.

2.8 ACCEPTABLE MANUFACTURERS

- A. TRANE COMPANY
- B. DAIKIN
- C. CARRIER

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in strict accordance with manufacturer's recommendations.
- B. Pipe condensate drain as shown on the drawings or to the nearest available plumbing vent.

END OF SECTION

SECTION 23 63 13

AIR COOLED CONDENSING UNIT

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Condensing Unit Package
- B. Internal Piping and Accessories
- C. Controls

1.2 RELATED WORK

- A. General Mechanical
- B. Supports and Anchors
- C. Air Handling Unit

1.3 QUALITY ASSURANCE

- A. Conform to requirements of UL and applicable codes.
- B. Test and rate cooling system to ARI Standard 210.

1.4 SUBMITTALS

- A. Submit shop drawings and product data.
- B. Submit with shop drawings, schematic layouts showing condensing units, cooling coils, refrigerant piping, size, and accessories required for complete system.
- C. Submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 TYPE AND PERFORMANCE

- A. Provide self-contained, package, factory assembled and pre-wired units suitable for outdoor use consisting of cabinet, compressor(s), condensing coil(s) and fan(s), integral sub-cooling coil, controls, liquid receiver, and screen(s).
- B. All Condensing Unit's to be supplied with coil guards.
- C. Refer to Schedule on Drawings for air cooled condensing unit(s) requirements.
- D. Acceptable Manufacturer: TRANE COMPANY, DAIKIN, CARRIER

2.2 MATERIALS

- A. Use corrosion resistant materials for parts in contact with refrigerant. Provide timer circuits to prevent rapid loading and unloading of compressor.

2.3 CABINET

- A. Galvanized steel with baked enamel finish, and removable access doors or panels with quick fasteners.

2.4 COMPRESSOR(S)

- A. Provide hermetically sealed, 1750 rpm resiliently mounted compressor with positive lubrication, crankcase heater, cylinder unloaders for capacity modulation (as scheduled), motor overload protection, service valves, filter driers (suction and liquid), and site glass.

2.5 CONDENSER

- A. Coil: Seamless copper tube with mechanically bonded aluminum fins.
- B. Fans: Vertical discharge, direct or belt drive axial fan(s), resiliently mounted with guard and motor.
- C. Motors: Permanently lubricated ball bearing motors with built-in current and overload protection.

2.6 CONTROLS

- A. Provide high and low pressure cutouts for compressor, oil pressure control, and reset relay.
- B. Provide controls to permit operation down to 50-degrees F. ambient temperature at minimum compressor load.

2.7 REFRIGERANT PIPING

- A. Refrigerant piping shall be run in Type "L" hard drawn copper tubing attached with wrought copper fittings, utilizing 1000-degree silver solder and a non-corrosive flux. Refrigerant piping shall be sized and installed in strict accordance with the air conditioning unit manufacturer's recommendations and directions and shall be submitted to the Engineer for prior approval before installation. Pressure drops shall not exceed the equivalent of 2-psi. Refrigerant piping system shall be evacuated, charged with refrigerant holding charge. The refrigerant lines to be tested with nitrogen to a test pressure of not less than 450 psi and proved before final charge of refrigerant. Compressor shall not be subject to the 450 psi pressure test.
- B. All refrigerant piping shall comply with the applicable requirements of the safety Code of Mechanical Refrigeration (ASA-89.1-1956) and the Code of Refrigerant Piping (ASA-831.5-1962), and all state ordinances, codes, and regulations.
- C. Refrigerant suction line shall be insulated with a cellular foam type insulation; "K" value of 0.28 at 75-degrees F. Manufacturers: Armstrong "Armaflex" or Rubatex R-180-FS.
- D. General - Refrigerant piping installations shall comply with the requirements of this section. The design of refrigerant piping shall be in accordance with ASME B31.5.
 - 1. Piping Location
 - a. Minimum Height
 - b. Exposed refrigerant piping installed in open spaces that afford passage shall be not less than 7 feet 3 inches (2210 mm) above the finished floor.
 - 2. Refrigerant Pipe Enclosure
 - a. Refrigerant piping shall be protected by locating it within the building elements or within

protective enclosures.

1. Exception: Piping protection within the building elements or protective enclosure shall not be required in any of the following locations
2. Where installed without ready access or located more than 7 feet 3 inches (2210 mm) above the finished floor.
3. Where located within 6 feet (1829 mm) of the refrigerant unit or appliance
4. Where located in a machinery room
5. Outside the building:
 - a. Where protected from damage from the weather, including but not limited to hail, ice and snow loads.
 - b. Where protected from damage within the expected foot or traffic path.
 - c. Where installed underground not less than 8 inches (200 mm) below finished grade and protected against corrosion.
6. Prohibited Locations
 - a. Refrigerant piping shall not be installed in any of the following locations:
 - b. Exposed within a fire-resistance-rated exit access corridor.
 - c. Exposed within an interior exit stairway.
 - d. Within an interior exit ramp.
 - e. Within an exit passageway.
 - f. Within an elevator, dumbwaiter or other shaft containing a moving object.
7. Protection against physical damage
 - a. Aluminum, copper and steel tube used for Group A2, A3, B2 and B3 refrigerants and located in concealed locations where tubing is installed in studs, joists, rafters or similar member spaces, and located less than 1 1/4 inches (32 mm) from the nearest edge of the member, shall be continuously protected by shield plates. Protective steel shield plates shall cover the area of the tube plus the area extending not less than 2 inches (51 mm) beyond both sides of the tube. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.46 mm) (No. 16 gage).

PART 3 EXECUTION

3.1 INSTALLATION

- A. Complete structural, mechanical and electrical connections in accordance with manufacturer's installation instructions.
- B. Mount unit on 4" concrete pad with minimum 6" clearance all around or as indicated on the drawings.
- C. Furnish charge of refrigerant and oil.

3.2 START-UP AND TESTING

- A. Dehydrate, charge system with refrigerant and test entire system for leaks after completion of installation. Repair leaks, put system into operation, and test equipment performance.

3.3 GUARANTEE

- A. Reciprocating refrigerant compressor shall have full five (5) year warranty.

END OF SECTION

SECTION 23 74 13

AIR HANDLING UNIT WITH COILS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Packaged Air Handler Units.

1.2 RELATED WORK

- A. Section 23 05 16 - Expansion Compensation.
- B. Section 22 07 00 - Piping Insulation.

1.3 REFERENCES

- A. ARI 430 - Standard for Central Station Air Handling Units.
- B. NFPA 90A - Installation of Air Conditioning and Ventilation Systems.
- C. ANSI/AFMBA 9 - Load Ratings and Fatigue Life for Ball Bearings.
- D. SMACNA - HVAC Duct Construction Standards.
- E. ARI 410 - Standard for Forced Circulation Air-Cooling and Air-Heating Coils.
- F. ANSI/UL 900 - Test Performance of Air Filter Units.
- G. AMCA 300 - Reverberant Method for Sound Testing of Fans.
- H. AMCA 301 - Method for Publishing Sound Ratings for Air Moving Devices.
- I. ASHRAE 68 - Laboratory Method of Testing In-Duct Sound Power Measurement Procedure for Fans.

1.4 QUALITY ASSURANCE

- A. Air Handling Units: Product of manufacturer regularly engaged in production of components who issues complete catalog data on total product offering.
- B. Variable Air Volume Air Handling Units with Variable Frequency Drives: Certify air volume, static pressure, fan speed, brake horsepower and selection procedures in accordance with ARI 430. Certify balance of fans between all points 10-100% of capacity. Any costs to adjust fans to meet scheduled capacities shall be the sole responsibility of the contractor.
- C. Air Coils: Certify capacities, pressure drops and selection procedures in accordance with ARI 410-87.

1.5 SUBMITTALS

- A. Submit unit performance including: capacity, nominal and operating performance.
- B. Submit Mechanical Specifications for unit and accessories describing construction, components and options.

- C. Submit shop drawings indicating overall dimensions as well as installation, operation and service clearances. Indicate lifting points and recommendations and center of gravity. Indicate unit shipping, installation and operating weights including dimensions.
- D. Submit data on electrical requirements and connection points. Include recommended wire and fuse sizes or MCA, sequence of operation, safety and start-up instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site fully assembled up to practical shipping and rigging limitations. Units not shipped fully assembled shall have tags and airflow arrows on each section to indicate location and orientation in direction of airflow. Each section shall have lifting lugs or shipping skid to allow for field rigging and final placement of section.
- B. Deliver units to site with fan motors, sheaves, and belts completely assembled and mounted in units. Mount motors as specified in Article 2.04 Paragraph F and Article 2.05 Paragraph A.
- C. Store and protect products.
- D. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

1.8 EXTRA STOCK

- A. Provide one (1) extra set of 30% efficient pleated disposable filters.

1.9 APPROVAL OF PRODUCT PRIOR TO BIDDING

- A. Refer to section 01 60 00, Material and Equipment, para.1.4, 1.4A & 1.4B for prior approval requirements.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. TRANE Company Model Modular Climate Changer
- B. DAIKIN
- C. CARRIER

2.2 GENERAL

- A. Manufacturer must clearly define any exceptions made to Plans and Specifications. Mechanical Contractor is responsible for expenses that occur due to exceptions made.
- B. Fabricate draw-thru type air handling units with horizontal or vertical coil and fan sections with horizontal discharge and filter mixing box with angle filter section.
- C. Factory fabricate air handling units of sizes, capacities, and configurations as scheduled on drawings.

- D. Provide factory installed 5"(minimum) base rail made of 12 gauge(minimum) galvanized steel for shipping and mounting purposes. Unit mounting legs are not acceptable, a continuous base rail must be provided. Contractor will be responsible for providing a housekeeping pad when unit mounting device is not of sufficient height to properly trap unit. Unit mounting devices not constructed of galvanized steel shall be chemically cleaned, coated with rust inhibiting primer, and finished with rust inhibiting enamel.

2.3 CASING

- A. Unit shall be constructed of a complete structural frame with removable panels. Removal of side panels shall not affect the structural integrity of the unit. Contractor shall be responsible to provide connection flanges and all other framework that is needed on unit to ensure that removal of unit's panels shall not affect structural integrity.
- B. Panels shall be fully removable to allow for a proper way to thoroughly clean panels of microbial growth and to access internal parts. If panels are not removable, then manufacturer shall provide access sections with doors between all internal components to ensure access and cleanability of the air handler.
- C. Construct casing sections located upstream of supply fan for operation at 4 inches water gage negative static pressure and casing sections located downstream of supply fan for operation at 6 inches water gage positive static pressure.
- D. All segments shall be double wall a minimum of 2" thick. The exterior casing shall be minimum 18 ga G90 galvanized sheet steel. The interior lining shall be minimum 20 ga G90 solid galvanized sheet metal. All panels shall be insulated with 2"-1.5# fiberglass insulation. Insulation must be a full 2" (uncompressed) throughout the entire unit. Units with less than 2" of insulation in any part of the walls, floor, roof or drain pan shall not be acceptable. Any portion of the unit, including the frame rails, that is not insulated (gaps) or has less than 2" uncompressed insulation shall be the responsibility of the manufacturer to modify. Insulation shall comply with NFPA 90A.
 - 1. Seal joints between exterior panels and structural frames with closed-cell neoprene foam gasketing a minimum of 1/4" thick and 3/4" wide for air seal and thermal and acoustical break.
- E. Double wall access doors shall be provided in the fan and filter segments on the coil header side of the unit. Access doors must also be provided in all segments where removal of sheet metal screws is required for unit access. Doors shall be of the same thickness and construction as the wall panels. Casing shall have removable full size access panels or doors as scheduled on drawings. Doors shall have the same construction as all other unit panels. Access doors shall have double wall style neoprene gasketing around the full perimeter of access doors/panels to prevent air leakage. Provide "ventlock" style non-corrosive alloy latches. If access doors open against unit operating pressure, provide safety latches that allow access doors to partially open after first handle movement and fully open after second handle movement.

2.4 DRAIN PAN CONSTRUCTION

- A. Provide sealed double wall drain pans constructed to meet ASHRAE Std 62 for IAQ with a stainless steel (Type 304) liner. Drain pans shall be insulated with a minimum of 2" 1.5 lb density uncompressed insulation encased between the interior and exterior casing. The drain pan shall be a minimum of 4" deep to provide positive head pressure and the liner shall be pitched in 2 directions to a single drain. Units with cooling coils shall have drain pans under complete cooling coil section with additional distance to ensure no moisture carry over to the fan. If no moisture carryover space is provided in the coil section, an auxiliary drain pan with the same type construction shall be installed in the next downstream segment.

2.5 FANS

- A. Provide supply fan sections with FC or AF, double width, double inlet centrifugal fan designed and suitable for class of service indicated on the unit schedule. Fan shaft shall be properly sized and protectively coated with lubricating oil. Fan shafts shall be solid and properly designed so that fan shaft does not pass through it's 1st critical speed as unit comes to rated RPM. Fans shall be statically and dynamically balanced and tested as a an assembly at the required RPM to meet design specifications. Key fan wheels to fan shaft to prevent slipping.
 - 1. Provide self-aligning, grease lubricated pillow-block ball bearings selected for L-50 (200,000 hour average life) per ANSI/AFBMA 9. Extend both grease lubrication lines fittings to the drive side with plastic tubing and terminate with zerk fittings.
- B. Internally mount fan and motor on the same isolation base with 1" spring isolators. Install flexible canvas ducts between fan and casings to ensure complete isolation. Flexible canvas ducts shall comply with NFPA 90A.
- C. Fan sections shall have full height, double wall, hinged, removable access doors on drive side for inspection and maintenance of internal components. Construct doors in accordance with Article 2.03 paragraph E.
- D. Weigh fan and motor assembly at manufacturer's factory for isolator selection. Statically and dynamically balance fan section assemblies. Fan section assemblies include fan wheels, shafts, bearings, drives, belts, isolation bases and isolators. Allow isolators to free float when performing fan balance.
- E. Fans with Variable frequency drives shall be balanced for inverter duty operation after installation in the air handler. The fan will be balanced over the entire range of fan operation (30% to 100% RPM). The filter-in measurements shall not exceed 5 mils in the horizontal, vertical and axial planes. Filter-out measurements shall not exceed 7.5 mils in the horizontal, vertical and axial planes.

2.6 MOTORS AND DRIVES

- A. Factory install all motors on slide base to permit adjustment of belt tension.
- B. Fan motors shall be heavy duty, high efficiency, open drip proof design operable at 460 volts, 60 Hz, 3 phase.
- C. V-belt drives shall be variable pitch for motors less than 20 hp and fixed for hp greater than 20. Drives shall be rated at 1.5 times the motor nameplates.

2.7 COILS

- A. Coils shall be manufactured by the same company as the supplier of the air handling unit. Install coils such that headers and return bends are enclosed by the unit casing. Coils shall be rated IAW ARI Std 410.
- B. Construct coils of 5/8" O.D. seamless copper tube with a minimum wall thickness of 0.020". Fins shall have collars drawn, belled and firmly bonded to the tubes by mechanically expanding the tubes. Fins shall be a aluminum and a minimum of 0.006" thick. Do not use soldering or tinning in bonding process.
- C. Construct coil casing of G90 galvanized steel aluminum 18 ga with formed end supports and top and bottom channels. Intermediate casing supports shall be supplied for finned lengths exceeding 60". Cooling coils in excess of 48" finned height shall be supplied with an intermediate drain pan with drop tubes to guide condensate to the main drain pan.
- D. Water cooling coils shall meet the following requirements:

1. Clearly label supply and return headers on outside of units such that direction of coil water flow is counter to direction of the unit air flow.
2. Coils shall be designed to operate at 250 psig working pressure and up to 300F and shall be tested to 325 psig compressed air under water.
3. Circuiting shall provide free and complete draining and venting when installed in the unit. All vent and drain connections shall be extended to the outside of the unit casing.
4. Coil grommets shall be provided on all coil and header penetrations through the unit casing.
5. Coil density shall not be greater than 10 fins per inch.

2.8 FILTERS AND DAMPERS

- A. Factory fabricate a combination filter and mixing box in one standard segment. Filter media shall be arranged in an angle configuration and shall provide 2" -30% efficient pleated filters. The segment shall have a hinged access door on the drive side of the unit. The dampers shall be located as indicated on the drawings and shall be low leak opposed blade type. Dampers shall have 16 ga. galvanized steel blades. The blades shall be provided with a PVC coated polyester fabric mechanically locked into the blade edge. The jamb to be a flexible metal compression type. Leakage will not exceed 7.20 CFM/ft.sq. @ 1" w.g. and 14.00 cfm/ft.sq. @ 4" w.g.

2.9 AIR HANDLING UNIT SCHEDULE: SEE PLANS

END OF SECTION

SECTION 26 01 00

BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 SCOPE

- A. The scope of work is as indicated on electrical drawings and includes but is not limited to the following:
- B. Site:
 - 1. Coordination with the local utility company and provide primary conduits with pull boxes to utility tie-in point, per utility co. specifications. Provide secondary conduit, metering equipment, service termination, and junction box with splicing hardware. Include all Utility Company fees for service connection in bid.
 - 2. Coordinate communication services with the local telecommunication company and provide service conduit with pull rope to locations stipulated by Utility Company.
 - 3. Alternate #1: Provide a natural gas emergency generator, automatic transfer switch, and associated emergency power feeders.
 - 4. Provide temporary construction power; coordinate with the local Utility Company.
 - 5. Provide in-ground pull boxes and conduit as requires to serve any/all electrical equipment located throughout the site.
 - 6. Provide concrete foundation for automatic transfer switch.
 - 7. Provide power and fire alarm connection to backflow preventer.
 - 8. Provide site lighting poles and associated branch circuits.
- C. Power:
 - 1. Provide panel, safety disconnect switches and associated feeder(s).
 - 2. Provide receptacles, special outlets, junction boxes, and their associated branch circuits.
 - 3. Provide branch circuits associated with all mechanical and plumbing system equipment, including all accessories such as motorized dampers, valves, fan interlocks, ionization, etc.
- D. Lighting:
 - 1. Provide interior light fixtures, wall switches, wall dimmers, and occupancy sensors and associated branch circuits.
 - 2. Install all lighting fixtures furnished by others and associated branch circuits.
 - 3. Provide all exterior building mounted fixture and associated branch circuits.
 - 4. Provide exit light fixtures and both interior and exterior emergency light fixtures.
- E. Telecommunications:

1. Provide junction boxes and conduit for phone and data outlets. Provide (2) CAT 6 cables to each data outlet shown unless otherwise indicated.
2. Provide floor mounted 4-post rack
3. Provide 3/4" plywood backboard. Paint with two coats of fire retardant paint on both sides.

F. Fire Alarm:

1. Provide fire alarm control panel, voice evacuation panel and remote booster panels.
2. Provide manual pull stations at all exterior exits.
3. Provide visual and audio notification throughout including voice evacuation.
4. Provide smoke detectors at all control panels, voice evacuation panels and booster panels.
5. Provide duct mounted smoke detectors for all air units with greater than 2000 cfm air flow.
6. Provide a monitor module for all sprinkler system tamper and flow switches.
7. Provide a monitor module for sprinkler system hotbox heater power and tamper switches.
8. Provide a monitor module for kitchen hood suppression system.

1.2 GENERAL CONDITIONS

- A. The General Conditions and Supplementary General Conditions are a part of this section of these Specifications. The Contractor is cautioned to read and be thoroughly familiar with all provisions of the General Conditions. These conditions shall be complied with in every aspect.

1.3 DEFINITIONS:

- A. The word "shall" where used, is to be understood, as mandatory and the word "should" as advisory. "May" is used in the permissive sense.
- B. Concealed: Concealed areas are those areas that cannot be seen by building occupants.
- C. Exposed: Exposed areas are all areas that are exposed to view by building occupants, including areas below counter tops, inside cabinets and closets, inside all equipment rooms, and areas outside the building exterior envelope.
- D. Feeder: Feeder consists of both conduit and wiring installed above or below grade
- E. Provide: Provide shall including furnishing, installing, and connecting the item or items referenced unless specifically indicated otherwise.

1.4 QUALITY ASSURANCE

A. General:

1. Every effort has been made by the Engineer to clearly indicate all devices/equipment requiring an electrical/data connection. It is the intent of the Engineer that all light fixtures be powered and controlled, that all devices and equipment be circuited to a panelboard of appropriate voltage and breaker of MOCP not exceeding manufacturer's specifications. That all communications, security, and fire alarm devices are installed, wiring, and functioning properly.

2. Where there is a conflict between the contract document and an applicable Code. The Code shall govern except where the requirements of the contract documents are more stringent. The most stringent requirement shall apply.
 3. All work shall be concealed unless specifically noted to be exposed.
 4. Coordinate the exact locations of electrical outlets and equipment with building features and equipment as indicated on architectural, structural, mechanical, plumbing, landscape, and food service drawings. Review any/all proposed changes in electrical device/equipment locations with Architect prior to rough-in. Architect may direct relocation of outlets before rough-in, up to ten (10) feet from the position indicated, without additional cost. Remove and relocate outlets placed in unsuitable locations when requested by the Architect, at no additional cost.
 5. Resolve, in writing, any code violation discovered in contract documents with the Engineer prior to bidding. After award of the contract, Contactor shall make any correction or addition necessary for compliance with applicable codes at no additional cost.
- B. An approved contractor for the work under this division shall be:
1. A licensed electrical contractor in the jurisdiction in which the work shall be performed.
 2. Able to furnish evidence of having contracted for and installed not less than three (3) systems of comparable size and type that have served their Owners satisfactorily for no less than three (3) years.
- C. All work, materials and equipment shall comply with the latest applicable codes, local ordinances, and UL requirements.
- D. Provide new products of manufacturers regularly engaged in production of such equipment. Provide the manufacturer's latest standard design for the type product specified. All new products shall be listed for the use shown on drawings.
- E. Equipment shall be delivered with a factory-applied finish so that no additional field painting is required.
- F. Equipment shall be selected to conform the building space limitations. Do not provide equipment that cannot meet the arrangement requirements shown on plans. Contractor shall submit room layouts with submitted items shown drawn to scale. Submittals will be rejected without floor plan Drawings showing submitted items.
- G. All equipment included in the service and distribution specifications shall be provided by the same manufacturer.
- H. Manufacturer names and model numbers are subject to change. Contractor shall verify them with manufacturer's representative prior to ordering any product or equipment.

1.5 GENERAL REQUIREMENTS

- A. The Contractor is referred to all of the Drawings for building construction as well as the electrical Drawings.
- B. The Contractor shall examine the site and shall verify to his own satisfaction the location of all utilities, and shall adequately inform himself as to their relation to his work before entering into a Contract and he shall base his bid on any conditions, which may be encountered during the progress of the work.
- C. The Contractor shall furnish and install properly all materials, devices, equipment, supports, controls, appurtenances, etc., mentioned or required to make complete or satisfactory installations in working order whether shown or not. All electrical equipment shall be connected in accordance with

manufacturer's instructions. All work shall be executed in a workmanlike manner and shall present a neat and mechanical appearance when completed.

- D. The Contractor shall provide finished to match approved samples; all exposed finishes shall be approved by the Architect. Submit color samples as required.

1.6 APPLICABLE GENERAL CODES AND REGULATIONS

- A. All electrical work and equipment, in whole or in part, shall conform to the applicable portions of the following specifications, codes and regulations in effect on that date of invitation for bids, and shall form a part of this specification.
- B. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition.
- C. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

- 1. NFPA 70, National Electrical Code

- 2. National Fire Codes:

- a. NFPA 70E, Electrical Safety Requirements for Employee Workplaces

- b. NFPA 72, National Fire Alarm Code

- c. NFPA 77, Static Electricity

- d. NFPA 101, Life Safety Code

- e. NFPA 110, Emergency and Standby Power Systems

- 3. Occupational Safety and Health Regulations (OSHA).

- 4. NFPA Standards in effect shall be as listed or adopted by the appropriate authority having jurisdiction.

- 5. American National Standards Institute (ANSI)

- 6. Institute of Electrical and Electronics Engineers (IEEE)

- 7. Local, City and State Codes and Ordinances

- 8. Regulations and standards of the Electric Utility Company

- 9. National Electrical Safety Code (NESC)

- 10. National Electrical Manufacturers Association (NEMA)

- 11. Insulated Power Cable Engineers Association (IPCEA)

- 12. International Building Codes (IBC)

- 13. International Energy Conservation Codes (IECC)

- B. Equipment that has been inspected and approved by the Underwriter's Laboratory shall bear its label or appear on its list of approved apparatus.

1.7 DRAWINGS

- A. Plans and detail sketches are submitted to limit, explain, and define conditions, specified requirements, conduit sizes, and manner of erecting work. The Contractor is cautioned to field check and verify all existing conditions before bidding, as no extra compensation will be allowed for conditions found different than represented in the construction drawings and/or specifications. Written approval of the Architect shall be obtained prior to any alterations or additions to specified work.
- B. Structural or other conditions may require certain modifications from the manner of installation shown, and such deviations are permissible and shall be made as required, but specified sizes and requirements necessary for satisfactory operations shall remain unchanged.
- C. The drawings and these specifications are complementary to each other and what is called for by one shall be binding as if called for by both.
- D. General arrangement of work is indicated on plans. Due to the small scale of the drawings, offsets, fittings, and boxes required are not all indicated; provide fittings, boxes, etc., as needed in accordance with codes and accepted practices.

1.8 SUPERVISION

- A. The Contractor shall personally or through an authorized and competent representative, constantly supervise the work from beginning to completion and final acceptance. So far as possible, he shall keep the same foreman and workmen throughout the project duration.
- B. During its progress, the work shall be subject to inspection by representatives of the Architect or Engineer, at which times the Contractor shall furnish required information.
- C. It is not the Architect's or Engineer's duty to direct or guarantee the work of the Contractor, but to assist the Owner in obtaining a complete building in accordance with plans, specifications and addenda and to furnish engineering services in accordance with recognized practices.

1.9 PRIOR APPROVALS

- A. The Contractor shall base his proposal on materials as specified herein. Any references to a specific manufacturer or trade name is made to establish a standard of quality and to define a type of product and in no way is intended to indicate a preference for a particular manufacturer. It is the intent of these specifications to allow all manufacturers of equipment, products, etc., judged equal to the specified product to bid on a competitive basis.

1.10 MEASUREMENTS

- A. The Contractor shall verify all measurements and shall be responsible for the correctness of same, before ordering any materials or doing any work. No extra charge or compensation will be allowed for any differences between the actual measurements and those indicated on the drawings.

1.11 LAWS, PERMITS AND FEES

- A. The entire electrical work shall comply with the rules and regulations of the City, Parish, and State, including the State Fire Marshal and State Board of Health, whether so shown on plans or not. The Contractor shall pay fees for permits, inspections, etc., and shall arrange with the inspecting authorities all required inspections.

1.12 SITE INSPECTION

- A. The Contractor shall visit the site and familiarize himself with difficulties attendant to the successful execution of the work before bidding. Failure to visit the site shall not relieve the Contractor of the extent or conditions of the work required of him.

1.13 TEMPORARY FACILITIES

- A. The Contractor shall provide all temporary power and lighting for construction purposes. Installation of temporary power shall be in accordance with NEC Article 527.
- B. Temporary facilities, wire, lights, and devices are the property of the contractor and shall be removed by the Contractor at the completion of the Contract.

PART 2 PRODUCTS

2.1 MATERIAL AND EQUIPMENT

- A. All materials, equipment, and accessories installed under this Contract, whether approved or not, shall be new and shall conform to all rules, codes, etc., as recommended or adopted by the National Association(s) governing the manufacture, rating and testing of such materials, equipment, and accessories.
- B. Product Substitutions
 - 1. If item of equipment or device offered as Substitution differs in dimension or configuration from that indicated in the Contract Documents, provide, as part of the substitution submittal, a drawing that shows that the equipment or devices proposed for Substitution can be installed in the space available without interfering with other trades or with access requirements for operations and maintenance in the completed project. Drawings shall be of appropriate scale but shall not be smaller than a scale of 1/4-inch equals one foot.
 - 2. Where substitute equipment or devices requires different arrangement or connections from that indicated in the Contract Documents, install the equipment or devices to operate properly and in accordance with the requirements of the Contract Documents. Make incidental changes necessary in piping, ductwork or wiring which results from the inclusion of the substitute equipment or device without any additional cost to the Owner. Pay all additional costs incurred by other trades in connection with changes required by the inclusion of the substituted equipment or device in the Work.

2.2 SHOP DRAWINGS & SUBMITTALS

- A. Shop drawings shall be taken to mean detailed drawings with dimensions, schedules, weights, capacities installation details, and pertinent information that will be needed to describe the material or equipment in detail.
 - 1. Shop drawings shall be prepared using computerized digital software compatible with AutoDesk's AutoCAD
 - 2. Submit hardcopy of Shop Drawings in the quantity as required under Division 01. Hardcopies of Shop Drawings shall have each sheet clearly labeled with a unique sheet identification number.
 - 3. In addition to hardcopies required by Division 01, submit one copy of Shop Drawings in electronic format on Flash Drive. Files contained shall be named to correspond with the sheet names contained in the hardcopy set. Files on shall include both AutoCAD compatible source files and files printed to Portable Document Format (.pdf).
- B. Submittals shall be taken to mean catalog cuts, general descriptive information, catalog numbers, and manufacturer's name.
- C. Review of submittals or shop drawings shall not remove the responsibility for furnishing materials or equipment of proper dimensions, quantity and quality; nor will such review remove the responsibility for error in the shop drawings or submittals.

- D. Assume all costs and liabilities, which may result from the ordering of any material, or equipment prior to the review of the shop drawings or submittals, and no work shall be done until the shop drawings or submittals have been reviewed. In case of correction or rejection, resubmit until such time as they are accepted by the Owner's representative and such procedures will not be cause for delay. After the final review, 6 copies will be supplied if requested.
- E. Shop drawings and submittals will be returned unchecked if the specific items proposed are not clearly marked, or if the general Contractor's approval stamp is omitted.
- F. Shop drawings, unless mark-ups are very trivial, will not be returned, "No Exception Taken". They will be returned for re-submittal as many times as necessary, however, the Contractor shall be back charged for engineering review time beginning with the second resubmittal. Therefore, the Contractor should make every effort to comply with the requirements of this Project on the first submittal in order to avoid project delays.
- G. The Contractor shall submit to the Architect complete descriptive and dimensional data on the following items for review and approval when specified or provided:
 - 1. Cable Tray
 - 2. Disconnect Switches
 - 3. Electrical Contactors
 - 4. Electrical Controls and Time Switches
 - 5. Emergency/Standby generator set and transfer switches
 - 6. Enclosed Circuit Breakers
 - 7. Fire Alarm System Panels, Initiation Devices, and Annunciation Devices
 - 8. Fire Rated Cables and Connectors
 - 9. Lighting Controls and Occupancy Sensors
 - 10. Lighting Fixtures
 - 11. Panelboards and enclosures
 - 12. Site Lighting Poles and Fixtures
 - 13. Surge Protection Devices
 - 14. Wiring Devices

PART 3 METHODS OF INSTALLATIONS

3.1 CONTRACTOR COORDINATION

- A. The Drawings are diagrammatic in nature. Cooperate with other trades so the interferences of facilities and equipment will be avoided.
- B. Contractor to coordinate with door hardware provider, architect and owner prior to installation of any devices associated with doors to verify door operational requirement, placement of proximity readers, motion sensors, door switches, fire alarm control, magnetic locks, hold open devices, etc..

- C. Contractor to coordinate with architectural millwork shop drawings prior to rough-in for locations of under counter lighting to be installed in and around millwork. No receptacles shall be installed in an enclosed cabinet unless noted on the drawings. Outlets for refrigerators, microwaves, etc. shall be installed in the space identified on the millwork shop drawings.
- D. Space allocations for materials, equipment and devices have been made on the basis of present and known future requirements and the dimensions of items of equipment or devices of a particular manufacturer. Verify that all materials, equipment and devices proposed for use on this Project are within the constraints of the allocated space.
- E. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping installed at required slope. So, connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- F. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

3.2 OPENINGS, CUTTING AND PATCHING

- A. Cut all openings as required for the electrical work. Patching will be done by the various crafts whose work is involved. Furnish and install all necessary sleeves, thimbles, hangers, inserts, etc., at such times and in such a manner as not to delay or interfere with the work of other Contractors. Caulk, flash or otherwise make weatherproof all penetrations through the roof and exterior walls.
- B. Where conduit, cable or other items that are provided for under this contract penetrate fire rated walls or floors, the Contractor is to seal around the item to maintain the integrity of the rated system.

3.3 PAINTING

- A. Painting shall be performed as described in the painting specifications. No painting will be required by the Contractor except for touch-up of factory finishes on equipment furnished under this contract.

3.4 INSTALLATION

- A. Housekeeping Pads: All floor and ground mounted electrical equipment - panels, switchboards, motor control centers, transformers, etc. shall be installed with a reinforced concrete housekeeping pad, whether shown on the drawings or not. The pad shall extend 4" above either the finished floor or final grade (as applicable), have 45 degree chamfered edges, and be constructed of 3000psi concrete. The pad shall extend 4" beyond the edge of the respective electrical equipment. Concrete shall have smooth steel trowel finish.
- B. Equipment must be leveled and set plumb. Use corrosion resistant mounting hardware. For sheet metal enclosures mounted against a wall provide corrosion-resistant spaces to separate the wall by 1/4 inch or by 3 inches of air for freestanding units.
- C. Unused knockouts on panels and boxes shall be covered with approved cover plates manufactured for the purpose.

3.5 TESTS AND INSPECTIONS

- A. The Contractor shall assist in making periodic inspections or tests required by the Architect or Engineer. When requested, the Contractor shall provide the assistance of foremen and qualified craftsmen for reasonable duration of each test, etc.
- B. The contract will not be declared to be substantially complete until all of the following conditions are satisfied.
 - 1. the functional operation of the subsystems have been demonstrated and verified and reports have been provided, reviewed and accepted.
 - 2. The "As-Built" drawings have been submitted, reviewed and accepted by the Architect / Owner / Owner's Construction Representative.

3.6 SAFETY PRECAUTIONS DURING CONSTRUCTION

- A. It shall be the Contractor's responsibility to furnish and install proper guards and instruction signs for prevention of accidents and to provide and maintain for the duration of construction any installations needed for safety of life and property.

3.7 CONNECTIONS

- A. This Contractor shall be responsible for providing electrical service to all devices of the heating and air conditioning system, and is referred to the mechanical plan for the exact location of the various devices.
- B. Mechanical Controls: Provide 120VAC power connections as required to components of Mechanical Control system. Coordinated quantity of circuits, connection requirements and locations between trades and with provisions of Divisions 21, 22, and 23 sections.
- C. Security and Access Control: Where the Drawings indicate a 120VAC circuit in a general area labeled for security or access control use, the intent is for this circuit to be extended and connected to the security or access control device in that general area in coordination with other trades. Coordinated connection requirements and locations between trades and with Owner's Security vendor prior to installation.
- D. Motors and Motor Connections: Motors for driven equipment are specified in Divisions 21, 22, and 23. Provide connections as follows, unless otherwise indicated:
 - 1. Equipment provided with factory installed disconnecting means: Upon installation of motor and associated equipment, Provide the electrical installation in accordance with approved wiring diagrams and manufacturer's written instructions.
 - 2. Equipment furnished with factory disconnecting means: Upon installation of motor and associated equipment, Install factory furnished disconnecting means and provide the electrical installation in accordance with approved wiring diagrams and manufacturer's written instructions.
 - 3. Equipment not furnished with factory installed disconnecting means: Provide disconnect switch required in accordance with NFPA 70 or as indicated on the Drawings. Provide the electrical installation in accordance with approved wiring diagrams and manufacturer's written instructions.

3.8 LOAD BALANCING

- A. Balance load on all phases in each panel to within 10% of respective phase loads.

3.9 IDENTIFICATION OF EQUIPMENT

- A. Identification of Equipment: Refer to specification 26 05 53 Identification for Electrical Equipment.

3.10 COMPLETION

- A. The Contractor shall leave all electrical equipment with proper connections, and in proper working order. He shall test the entire electrical system to show that it is properly installed. Contractor shall leave all panels and switches completely fused or complete with circuit breakers.

3.11 RECORD DRAWINGS

- A. The Contractor shall furnish one (1) complete set of drawings on which any changes in the work shall be shown. In addition to changes in work contractor shall clearly indicate routing of all feeders both above and below ground. All underground conduit shall be noted on drawings to show "as built" locations. These drawings must be turned over to the Architect prior to final acceptance of the work.

3.12 GUARANTEE

- A. The Contractor shall guarantee to keep the entire electrical system as installed by him or his subcontractors in repair and in perfect working order for one (1) year from the date of the final Certification of Final Acceptance, and shall furnish free of cost to the Owner, all material and labor necessary to comply with the above guarantee; said guarantee shall be based upon defective material and workmanship. In any case where equipment has a factory warranty exceeding this one-year limit, the full extent of the warranty shall apply.

3.13 CLEANING

- A. When all work has been finally tested, the Contractor shall clean all fixtures, equipment, conduits, ducts, and all exposed work. All cover plates and other finished products shall be thoroughly cleaned.

3.14 INSTRUCTION MANUALS

- A. The Contractor shall provide three (3) operating and maintenance instruction manuals on all systems and equipment installed in the electrical work.
- B. The Contractor shall provide (3) copies of all warranties and guarantees for systems, equipment, devices, and materials.

3.15 CONTRACTOR SPECIAL NOTE

- A. The Contractor is again cautioned to refer to all parts of these Specifications and all Drawings, not just electrical sections, and the individual cross references made to other standard specifications or details describing any electrical work, which may be required under these other sections. The Contractor is cautioned to note carefully any other sections which may reference electrical work in order for this Contractor to fully understand the wiring requirements and electrical work that is required. Any conflicts found between the electrical sections of these Specifications or Drawings shall be immediately directed to the General Contractor for clarification.
- B. These Specifications and the electrical Drawings size equipment, wire, conduit, etc. based on the horsepower of motors and/or wattages of equipment as shown on the plans or specified herein. The Contractor shall install electrical raceways, conductors, fuses, safety switches, breakers, contactors, starters or any other electrical equipment with the capacities to suit the horsepower and/or wattages of the equipment actually furnished and installed. The Contractor shall not furnish or install any electrical raceways, conductors, safety switches, contactors or motor starters of sizes smaller than those shown on the Drawings or specified herein. The Contractor shall coordinate with the various sections of the Specifications and/or Drawings and with the various Sub-Contractors to provide the properly sized equipment without additional cost to the Owner.

END OF SECTION

SECTION 26 05 10

UTILITY COORDINATION SERVICE ENTRANCE

PART 1 GENERAL

1.1 WORK INCLUDED

- A. General: Electrical service shall be provided by local utility company. Provide infrastructure, conduit, ductbanks and pathways from public street right-of-way to building for telecommunications and cable service.
- B. Power Company Data: Obtain from utility company information and installation standards for electrical, telecommunication, and cable service installation.
- C. Responsibilities: Determine what equipment and labor is provided by utility company and what equipment and labor is required of this Contractor.

PART 2 PRODUCTS

2.1 PRIMARY SERVICE

- A. General: Division 26 shall provide primary service conduit, manholes, and pull boxes as required and as specified for electrical service. Division 26 shall provide grounding rods, grounding conductors, sleeves, conduits, pull boxes and manholes as required by telecommunications and cable service providers.
- B. Electric utility company shall provide transformer, primary cables, splices, terminations, and primary underground and overhead service conductors. Telecommunications and cable service utility companies shall provide cabling and connections to the Owner's demarcation point of service.

2.2 SECONDARY SERVICE CABLE TAP BOXES

- A. When required by local utility company contractor shall provide a NEMA-3R demarcation junction box per company standards.

2.3 SECONDARY SERVICE CONDUCTORS

- A. General: Division 26 shall provide secondary service entrance conductors and conduit.
- B. Where required by local utility standards provide in-grade pull boxes.

PART 3 EXECUTION

3.1 INSTALLATION

- A. The installation of the service entrance provisions shall comply with the published standards and requirements of the utility company, the utility company's specific construction requirements for this project, and with requirements of this Division.
- B. Any failure to meet the standards and requirements shall be corrected to the satisfaction of the utility company and Owner without any additional cost to the Owner.
- C. Contractor shall provide all construction materials and labor that the utility company determines to be the responsibility of the customer, at no additional cost to the Owner.

- D. The materials and labor required by the for a complete installation shall be provided by the contractor and includes, but is not limited to permanent or removable / lockable vehicular barriers, grounding rods, grounding conductors, sleeves, concrete pads, conduits, metering racks and metering enclosures.
- E. Primary distribution poles and service entrance ductbank locations shall be staked and surveyed prior to pole installation by the Contractor to verify their proper placement is within the Owner's property and respective utility easements. Contractor shall verify by survey that the pole and service entrance ductbank location and easements do not interfere with existing easements, right-of-ways, or other restricted properties. Conflicts with existing easements and restrictions shall be brought to the attention of the Architect prior to construction.
- F. Contractor shall initiate contact with the utility providers and Owner within 14 days of Notice to Proceed to ensure permanent power will be available to the site. Any delays resulting from lack of this coordination shall be the responsibility of the Contractor.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. building wires and cables rated 600V and less
 - 2. Connectors, splices and terminations rated 600 V and less
 - 3. Sleeves and sleeve seals for cables

1.3 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- Latest edition or edition enforced by state and local code authority.

PART 2 PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Refer to Part 3 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.
- C. Conductor Material: Copper unless indicated otherwise on Drawings; stranded conductor or solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.
- D. Conductor Insulation Types: Comply with NEMA WC 70 for Types THHN-THWN, XHHW, and SO, as indicated.
- E. Multiconductor Cables: Comply with NEMA WC 70; Exterior sheath color coded to differentiate cable voltages and quantity of phase conductors.
- F. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.
- G. Conductor Temperature Rating: Provide conductors with 75 degree C rating. For high temperature applications, provide conductors with temperature ratings in accordance with NDPA 70 for ambient condition.

PART 3 EXECUTION

3.1 CONDUCTOR AND INSULATION APPLICATIONS

- A. Service Entrance: Type THHN-THWN, single conductors in raceway.
- B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

- C. Feeders Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspace: Type THHN- THWN, single conductors in raceway.
- E. Exposed Branch Circuits, including in Crawlspace: Type THHN-THWN, single conductors in raceway.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway .
- G. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.
- H. Branch Circuits Installed below Raised Flooring: Type THHN-THWN, single conductors in raceway.
- I. Fire Alarm Cabling: Plenum rated, exposed. Secured per NFPA 70-760.
- J. Combining of more than three circuits in a conduit is not allowed. IE no more than three phase conductors.
- K. Single Phase Circuits: Provide a dedicated neutral. Sharing of neutrals is not allowed.
- L. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel,wire-mesh, strain relief device at terminations to suit application.

3.2 INSTALLATION

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Run feeders in continuous lengths, without joints or splices. Where continuous runs are impractical; obtain Engineer's approval for splice locations and application.
- C. Run branch in continuous lengths, without joints or splices. Where continuous runs are impractical it shall be permitted to splice, however no splices shall be permitted within in-grade pull boxes.
- D. Make joints in branch circuits only where circuits divide.
- E. Do not use gutters of panelboards as raceways, junction boxes, or pull boxes for conductors not terminating in said panelboards.
- F. Run conduits for emergency power conductors separate from all other wiring.
- G. Bundling Conductors: Bundle conductors in switchboards, panelboards, cabinets, and the like, using nylon ties made for the purpose. Bundle conductors larger than No. 10 in individual circuits. Smaller conductors may be bundled in larger groups.
- H. Terminations of multiple branch circuit conductors on a single circuit breaker is not acceptable.
- I. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours. Install all conductors in raceways, unless specifically noted otherwise.
- J. Support cables according to Section "Basic Electrical Materials and Methods."
- K. Identify and color-code conductors and cables according to Section "Identification for Electrical Equipment"
- L. Sizes:
 - 1. Provide conductors no smaller than No. 12 AWG, except for signal or control circuits.

2. Use #10 AWG conductors for 20 amperage 120V circuits when the circuit conductors are longer than 75 feet.
3. Use #10 AWG conductors for 20 amperage 277V circuits when the circuit conductors are longer than 200 feet.
4. Provide neutral conductors of the same size as the phase conductor(s) for individual branch circuit homeruns.

3.3 WIRE PULLING

- A. Pull no conductors into conduits until all Work of a nature which may cause injury to conductors is completed.
- B. Follow manufacturers' recommendations for regulating temperature conditions of conductors prior to installation.
- C. Exercise care in handling and installing cables to avoid damage. Carefully form cables in equipment pull boxes. Form bends in cables larger than the minimum radii shown in the cable manufacturer's published data for minimum bends such that bends will not reduce the cable life.
- D. Provide suitable installation equipment to prevent abrasion and cutting of conductors by raceways during the pulling of conductors. Use ropes of polyethylene, nylon or other suitable non-metallic material to pull in feeders. Metallic ropes are prohibited.
- E. Before any wire is pulled into any conduit, thoroughly swab the conduit to remove all foreign material and to permit the wire itself to be pulled into a clean, dry conduit.
- F. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- G. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

3.4 CONNECTIONS

- A. 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
- B. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.
- C. Provide temperature ratings of connectors and splices to match wire rating.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. NFPA 70 and IEEE C2 include basic grounding requirements for electrical safety. This Section supplements the minimum safety requirements of the Code with requirements for additional grounding and with optional grounding methods and materials for both power and electronic systems.
- B. This Section includes methods and materials for grounding systems and equipment, plus the following special applications:
 - 1. Underground distribution grounding.
 - 2. Common ground bonding with lightning protection system.

1.2 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For independent agency as defined in Division 26 Section "Common Work Results for Electrical".
- 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. Comply with UL 467 for grounding and bonding materials and equipment.
- D. Comply with NFPA 70
- E. Comply with IEEE C2
- F. Comply with ANSI/EIA/TIA-607

PART 2 PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper or Tinned-Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
 - 4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 5. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
 - 6. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
 - 7. Main Bonding Jumper: stranded copper conductors sized as indicated on Drawings.
 - 8. Grounding Electrode Conductor: stranded copper conductors sized as indicated on Drawings.

9. Common Grounding Electrode Conductor: stranded copper conductors sized as indicated on Drawings.
- C. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 4 inches (6 by 100 mm) in cross section, unless otherwise indicated; with insulators. Length as indicated on Drawings.

2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 5/8 inch (16 mm) diameter by 120 inches (3000 mm) long, unless otherwise indicated.

PART 3 EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install insulated solid conductor for No. 10 AWG and smaller, and insulated stranded conductors for No. 8 AWG and larger, unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 3/0 AWG minimum, unless otherwise indicated.
 1. Bury at least 30 inches (762 mm) below grade.
 2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct bank installation.
- C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- D. Grounding Bus: Install in electrical and telephone/communications equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 1. Install bus on insulated spacers 1 inch (25 mm), minimum, from wall 6 inches (150 mm) above finished floor, unless otherwise indicated.
 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.
- E. Conductor Terminations and Connections: Use the following connectors styles, unless otherwise indicated.
 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 2. Underground Connections: Exothermic Welded connectors, except at test wells and as otherwise indicated.
 3. Connections to Ground Rods at Test Wells: Bolted connectors.

4. Connections to Structural Steel: Exothermic Welded connectors.

5. Connections to Ufer Ground: Exothermic Welded connectors.

F. Comply with ANSI-607 requirements for telephone/communications grounding riser

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Grounding Handholes: Install a driven ground rod through handhole floor, close to wall, and set rod depth so 4 inches (100 mm) will extend above finished floor. If necessary, install ground rod before handhole/manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches (50 mm) above to 6 inches (150 mm) below concrete. Seal floor opening with waterproof, nonshrink grout.

C. Pad-Mounted Transformers and Switches: The following is a minimum if the utility company does not have requirements, otherwise meet the utility company requirements. Install two ground rods and a ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with transformer, switch, or substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches (150 mm) from the edge of foundation.

D. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits

3.3 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

1. Bond to each device, box, or luminaire, unless otherwise indicated.

2. Conductor insulation of the same rating as the phase conductors, for all feeders and branch circuits. Install the grounding conductors in the raceway with related phase and neutral conductors.

3. Where parallel conductors in separate raceways occur, provide a grounding conductor in each raceway that meets requirements of NFPA 70.

B. Enclosures: Install an insulated grounding conductor from grounding bushings to the frame of the enclosure, ground bus, and equipment grounding strap where each occurs. Install grounding bushings on all raceways terminating within electrical enclosures constructed of separate enclosure panels, which are not integrally welded together.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including but not limited to air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

- E. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
 - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-4 (6-by-1000) grounding bus. Length as indicated on the drawings.
 - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.4 INSTALLATION

- A. Provide permanent service neutral and equipment grounding in accordance with NFPA 70 and subject to the following additional requirements.
- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. Comply with mounting and support requirements specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- D. Connect the service neutral and equipment ground to a common point within the metallic enclosure containing the main service disconnecting means. Equipment grounds and the identified neutral of the wiring system shall not be interconnected beyond this point in the interior wiring system. From the common point of connection of the service neutral and the equipment ground, run in non-magnetic conduit a grounding electrode conductor without joint or splice to the grounding electrode system and connect it with an approved bolted pressure clamp.
- E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.
 - 4. Where expansion joints or telescoping joints occur, provide bonding jumpers.
- F. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

- H. Ground Rods: Drive rods until tops are 12 inches (50 mm) below finished floor or final grade, unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor a minimum of 30-inches below grade unless otherwise indicated. Make connections without exposing steel or damaging coating, if any.
 - 2. For grounding electrode system, install at least three rods spaced at least two-rod lengths from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- I. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches (300 mm) deep, with cover.
 - 1. Test Wells: Install at least three test wells for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- J. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.
- K. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, using a minimum of 20 feet (6 m) of bare copper conductor not smaller than No. 4 AWG.
 - 1. If concrete foundation is less than 20 feet (6 m) long, coil excess conductor within base of foundation.
 - 2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to grounding electrode external to concrete.

3.5 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components as specified in Division 26 Section "Identification for Electrical Systems."

3.6 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare certified test reports:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Test completed grounding system at each location where a maximum at service disconnect enclosure grounding terminal, at ground test wells, at individual ground rods and locations where a ground-resistance level is specified,. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
- B. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.
 - 1. Report measured ground resistances that exceed the following values:
 - a. Building's Grounding Triad: 2 ohms or less.

- b. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
- c. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
- d. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
- e. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm(s).
- f. Substations and Pad-Mounted Equipment: 5 ohms.
- g. Manhole/Handhole Grounds: 10 ohms.

C. Correct Deficiencies, Retest and Report:

- 1. Correct unsatisfactory conditions, and retest to demonstrate compliance; replace conductors, units, and rods as required to bring system into compliance.
- 2. Prepare a report, certified by testing agency, which identifies components checked and describes results. Include notation of deficiencies detected, remedial action taken, and observations and test results after remedial action.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

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. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. FMC: Flexible metal conduit.
- C. IMC: Intermediate metal conduit.
- D. RMC: Rigid metal conduit.
- E. RAC: Rigid aluminum conduit.
- F. RNC: Rigid nonmetallic conduit.
- G. RSC: Rigid Steel conduit.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways, raceways using NFPA 70 criteria and performance requirements and design criteria indicated.
 - 1. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- B. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel slotted support systems.
 - 2. Nonmetallic slotted support systems.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze hangers. Include Product Data for components.

2. Steel slotted channel systems. Include Product Data for components.
3. Nonmetallic slotted channel systems. Include Product Data for components.
4. Equipment supports.
5. Concrete Based for Equipment.

C. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 5. Channel Dimensions: Selected for applicable load criteria.
- B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- (14-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c., in at least 1 surface.

1. 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:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. Fabco Plastics Wholesale Limited.
 - d. Seasafe, Inc.
 2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
 3. Fitting and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.
 4. Rated Strength: Selected to suit applicable load criteria.
- C. Device Box Mounting Brackets and Stabilizer: Factory-fabricated sheet steel brackets for support of device boxes adjacent to or between studs.
1. 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:
 - a. Cooper B-Line, Inc.; a division of Cooper Industries.
 - b. ERICO International Corporation.
- D. Through-Stud Cable and Raceway Support Clips: Factory-fabricated spring steel clip for cables or raceways where run horizontally through metal studs.
1. 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:
 - a. Cooper B-Line, Inc.; a division of Cooper Industries.
 - b. ERICO International Corporation.
- E. Roof-mounted Raceway Support Blocking: Factory-fabricated support blocking for use under roof-mounted raceways. Wedge-shaped blocking constructed of 100% recycled UV-resistant Rubber with integral galvanized steel strut to accept raceway support clips.
1. 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:
 - a. Cooper B-Line, Inc.; a division of Cooper Industries.
 - b. ERICO International Corporation.
- F. Tee Bar Grid Box Hanger: Factory-fabricated metal electrical box hanger for supporting boxes at locations between ceiling system t-grid components. Height adjustable for various electrical box depths. Attached to ceiling tee bar with screws or integral clamp for stability. Includes tab for independent support wire attachment.
1. 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:
 - a. Cooper B-Line, Inc.; a division of Cooper Industries.
 - b. ERICO International Corporation.
- G. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

- H. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- I. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- J. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- K. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Horizontal and Vertical Support Spacing for Raceway(s): Space supports for EMT, IMC, and RMC as required by NFPA 70, but in no case less than listed below:
 - 1. For raceways 1" diameter and larger, provide one hanger at 8'-0" on center.
 - 2. For raceways less than 1" diameter, provide one hanger at 5'-0" on center.
- C. Minimum Hanger Rod Size for Raceway Supports: Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- D. Single Raceways or Cables:
 - 1. For Raceways 1-1/4-inch (32mm) and smaller: Install adjustable steel band hanger suspended on threaded rod.
 - 2. For Raceways larger than 1-1/4-inch (30mm): Install trapeze-type supports fabricated with steel slotted support system suspended on threaded rods. Size trapeze members, including the suspension rods, based on the support required for the size, and loaded weight of the conduits.
 - a. Secure raceway or cable to support with two-bolt conduit clamps or single-bolt conduit clamps using spring friction action for retention in support channel.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps single-bolt conduit clamps using spring friction action for retention in support channel.
- F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.
- G. Corrosive Areas: Provide non-metallic slotted support systems for supports installed in corrosive areas. Corrosive areas include, but are not limited to the following:
 - 1. Pools and Pool Equipment Areas.
 - 2. Within 25-feet (7.62-m) of Cooling Towers and Air Cooled Chillers.

3.2 SUPPORT INSTALLATION

- A. Comply with NFPA 70, NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT IMC RMC EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Fasten junction, pull and devices boxes securely to the building construction, independent of raceway system.

- D. Install Device Box Mounting Brackets supported between two studs. Do not attached Receptacle boxes directly to a single stud.
- E. Install Through-Stud Cable and Raceway Support Clips where cables or raceways run horizontally through metal studs.
- F. Support raceways at a distance above suspended ceilings to permit removal of ceiling panels and luminaires.
- G. Locate raceways so as not to hinder access to mechanical equipment.
- H. Do not secure conductors, raceways, or supports to suspended ceiling hanger rods or wires.
- I. Install Tee Bar Grid Box Hanger supported between two ceiling grid tee bars where devices boxes are located flush in recessed suspended ceilings.
 - 1. Install at least one independent support rod from box hanger to structure.
- J. Install Roof-mounted Raceway Support Blocking where raceways run on across roofing.
 - 1. Coordinate installation of roof supports with items specified in Division 07 Section "Roof Accessories." Provide products compatible with rooftop materials included in the Work.
- K. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- L. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 - 6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69 or Spring-tension clamps.
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- M. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 Section "Cast-in-Place Concrete."
- C. Anchor equipment to concrete base.
 - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

- A. Touchup: 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 minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 26 05 33

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
 - 1. Refer to architectural for firestopping materials and installation at penetrations through walls, ceilings, and other fire-rated elements.
 - 2. "Wiring Devices" for devices installed in boxes and for floor-box service fittings.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.
- C. FMC: Flexible metal conduit.
- D. IMC: Intermediate metal conduit.
- E. LFMC: Liquidtight flexible metal conduit.
- F. LFNC: Liquidtight flexible nonmetallic conduit.
- G. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

- A. Product Data: For surface raceways, floor boxes, and cabinets.
- B. Coordination Drawings: Submit Coordination Drawings in accordance with Division 26 Section "Basic Electrical Requirements". Include the following:
 - 1. Raceway routing plans, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - a. Proposed cable pull points.
 - b. Structural members in the paths of conduit groups with common supports.
 - c. HVAC, plumbing items, and architectural features in the paths of conduit groups. Denote where systems share common supports.
 - d. Purposed splice locations.

1.5 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-Latest edition or edition enforced by state and local code authority.

1.6 COORDINATION

- A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 PRODUCTS

2.1 METAL WIREWAYS

- A. Material and Construction: Sheet metal sized and shaped as indicated.
 - 1. Indoors: NEMA-1
 - 2. Outdoors: NEMA-3R
- B. Fittings and Accessories:
 - 1. Include couplings, offsets, elbows, expansion joints, adapters, hold- down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
 - 2. Provide spring nuts or guards on all screws installed toward the inside to prevent wire insulation damage.
- C. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70 and UL 870.
- D. Wireway Covers:
 - 1. Hinged type unless access restrictions require screw-cover type.
 - 2. Flanged-and-gasketed as required for NEMA type
- E. Finish: Manufacturer's standard enamel finish.

2.2 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Finish with manufacturer's standard prime coating and two coats of paint. Color by Architect.
- B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC with texture and color selected by Architect from manufacturer's standard colors.
- C. Surface raceways used together with couplings, clips, bushings, straps, connectors, connection covers, elbows, boxes, extension boxes, fixture boxes, extension adapters, blank covers and all other required fittings; size to accommodate the conductors to be installed therein in each case.

2.3 BOXES, ENCLOSURES, AND CABINETS

- A. Floor Boxes: Cast metal, fully adjustable, rectangular with four separate wiring compartments for power outlets, phone and data outlets as indicated on the drawing.
 - 1. Provide products by the following manufactures or submit prior approval for equals.
 - a. Wiremold RFB4E Series
 - b. T&B 665 Series
 - 2. Covers shall be UL Listed to U.S. and Canadian safety standards for tile, carpet, wood, bare concrete and terrazzo floors. Covers shall be selected by the architect.

- B. Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- C. Cast-Metal Pull and Junction Boxes: NEMA FB 1, cast aluminum, type FD with gasketed cover.
- D. Hinged-Cover Enclosures: with continuous hinge cover and flush latch.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Plastic, finished inside with radio-frequency-resistant paint.
 - 3. Ratings:
 - a. Indoor Locations: NEMA 250, Type 1.
 - b. Outdoor Locations: NEMA 250, Type 3R.
- E. Cabinets:
 - 1. Hinged door in front cover with flush latch and concealed hinge.
 - 2. Key latch to match panelboards.
 - 3. metal barriers to separate wiring of different systems and voltage and
 - 4. Accessory feet where required for freestanding equipment.
 - 5. Feet: Provide accessory feet for free standing equipment.
 - 6. Ratings:
 - a. Indoor Locations: NEMA 250, Type 1.
 - b. Outdoor Locations: NEMA 250, Type 3R.
- F. In Grade Enclosures, Boxes And Covers:
 - 1. required to conform to all test provisions of the most current ANSI/SCTE 77 for Tier 22 applications.
 - 2. When multiple "Tiers" are specified the boxes must physically accommodate and structurally support compatible covers while possessing the highest Tier rating.
 - 3. All covers are required to have the Tier level rating embossed on the surface. In no assembly can the cover design load exceed the design load of the box.
 - 4. Cover to be labeled per use of box, ie "Electrical, Communications, etc". Communications pull boxes shall be a minimum of 24"W X 36"L X 36 "D.

2.4 FACTORY FINISHES

- A. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard prime- coat finish ready for field painting.

2.5 METAL CONDUIT AND TUBING

- A. Rigid Steel Conduit: Comply with ANSI C80.1 and UL 6; Galvanized rigid steel, each length with a coupling on one end and thread protector on opposite end.
- B. Aluminum Rigid Conduit: Comply with ANSI C80.5 and UL 6A; Rigid aluminum, each length with a coupling on one end and thread protector on opposite end.
- C. IMC: Comply with ANSI C80.6. and UL 1242.

- D. Plastic-Coated Steel Conduit and Fittings: Comply with NEMA RN 1; PVC-coated RSC with 0.040 inch (1 mm), minimum coating thickness.
- E. EMT and Fittings: ANSI C 80.3 and UL 797
- F. FMC: Aluminum
- G. LFMC: Comply with UL 360; Flexible steel conduit with neoprene jacket and copper grounding strand.
- H. Conduit fittings for Hazardous (Classified) Locations: Comply with UL 886.
- I. Fittings for RSC, RAC and IMC: Provide factory made threaded couplings of same material as the conduit.
 - 1. Molded thermoplastic insulating bushing at all boxes and cabinets, with locknuts inside and outside box or cabinet. In wet locations, provide watertight hubs for conduit entry into enclosures.
 - 2. Thermoplastic insulated grounding bushing on all conduits where grounding bushings are required, with locknuts inside and outside the enclosure. In wet locations provide watertight hubs for conduit entry into enclosures.
 - 3. Provide bushings on all conduits 1" or larger.
- J. Fittings for EMT:
 - 1. Steel, set-screw or compression couplings.
 - 2. Steel, set-screw or compression insulated throat box connectors with molded thermoplastic insulating bushing at all boxes and cabinets, with locknuts inside box or cabinet.
 - 3. Steel, set-screw or compression insulated throat box connectors with thermoplastic insulated grounding bushing on all tubing where grounding bushings are required.
 - 4. Insulated throat material for fittings to be of a color that is easily distinguishable; clear thermoplastic throats are not acceptable.
 - 5. Provide bushings on all conduits 1" or larger.
 - 6. Provide thermoplastic bushings on all conduits for telecommunications, data, fire alarm cabling and similar.
- K. Fittings for FMC and LFMC:
 - 1. Adapters at connections between flexible and rigid conduit.
 - 2. Thermoplastic insulated throat, steel connectors at box or cabinet terminations.
 - 3. Insulated throat material for fittings to be of a color that is easily distinguishable; clear thermoplastic throats are not acceptable.
- L. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable:NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
- M. Joint Compound for RSC or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

PART 3 EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors:

1. Exposed: RSC, RAC, or IMC.
 2. Concealed: RSC, RAC, or IMC.
 3. Underground, Single Run: RNC.
 4. Underground, Grouped: RNC.
 5. Emergency Feeders: RSC
 6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 7. Boxes and Enclosures: NEMA 250, Type 3R, unless otherwise indicated.
- B. Indoors:
1. Exposed, Not Subject to Physical Damage: EMT. Concealed: EMT.
 2. Exposed and Subject to Physical Damage: RSC, or IMC.
 3. Concealed within Masonry Walls: RSC, or EMT.
 4. Concealed under Raised Floors: EMT or LFMC.
 5. Conductors over 600 volts: RAC, RSC, or IMC.
 6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except use LFMC in damp or wet locations.
 7. Damp or Wet Locations above Ground: RAC, RSC, or IMC
 8. Boxes and Enclosures: NEMA 250, Type 1, except as follows:
 - a. Damp or Wet Locations: NEMA 250, Type 4, stainless steel.
- C. Minimum Raceway Size:
1. Branch Circuits: 3/4-inch (21mm) trade size
 2. Feeder Circuits: 3/4-inch (21mm)
- D. Provide minimum 1/2-inch (16-mm) conduit for controls circuiting.
- E. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. RAC, RSC and IMC: Use threaded fittings, unless otherwise indicated.
- F. Junction and Pull Boxes: Sheet steel boxes, unless noted or required otherwise.
1. Provide boxes no smaller than 4 inches square and 1-1/2 inches deep.
 2. Size all junction and pull boxes in accordance with the NFPA 70, unless project conditions dictate use of larger boxes.
- G. Outlet and Device Boxes: Sheet steel boxes, unless noted or required otherwise.
1. For Lighting Fixture Outlets: 4 inch square with raised fixture ring.
 2. For Wall Switches, Receptacles, and Communication Use: 4 inch square, one-piece. Use boxes with plaster rings in all plastered walls where wall thickness permits. Use boxes less than 1-1/2 inch deep only in locations where deep boxes cannot be accommodated by construction.
 3. Boxes Used Outdoors or in Damp/Wet Locations: Cast metal boxes with gasketed covers and threaded hubs.

3.2 INSTALLATION

- A. Install raceways a minimum of 6-inches (150 mm) away from parallel runs of flues, steam pipes, hot-water pipes, and other objects operating at high temperatures
- B. Install horizontal raceway runs above water and steam piping. Install raceways a minimum of 1-inch (25.4-mm) from pipe insulation.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in "Basic Electrical Requirements."
- E. Install temporary closures to prevent foreign matter from entering raceways.
- F. Recessed Boxes in Fire-Rated Partitions: For boxes located on opposite sides of same partition do not install boxes back-to-back; separate boxes with a minimum of 24 inch separation
- G. Recessed Boxes in partitions around Acoustically-Sensitive Spaces: For boxes located on opposite sides of same partition do not install boxes back-to-back; separate boxes with a minimum of 24 inch separation. Acoustically-Sensitive Spaces include, but are not limited to, the following:
 - 1. Confessional
 - 2. Pastor's Office
- H. Do not install aluminum conduits in contact with concrete.
- I. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.
- J. Conceal conduit:
 - 1. EMT shall be installed within finished walls, ceilings, and floors, unless otherwise indicated.
 - 2. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.
 - 3. On concealed conduit systems where boxes are not otherwise accessible, set boxes flush with finished surfaces for access, and provide overlapping covers.
- K. Raceways Embedded in Slabs: Install in middle 1/3 of slab thickness where practical and leave at least 2 inches (50 mm) of concrete cover.
 - 1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
 - 2. Space raceways laterally to prevent voids in concrete.
 - 3. Run conduit larger than 1-inch trade size (DN 27) parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
- L. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
 - 1. Run parallel or banked raceways together on common supports.
 - 2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- M. Join raceways with fittings designed and approved for that purpose and make joints tight.
 - 1. Use insulating bushings to protect conductors.
- N. Terminations:

1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

O. Stub-up Connections:

1. Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor.
2. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches (150 mm) above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.
3. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.
4. Change from ENT to RAC, RSC, or IMC before rising above the floor.

P. Flexible Conduit Connections:

1. Use minimum of 72 inches at final connections to equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
2. Use LFMC in damp or wet locations subject to severe physical damage including mechanical equipment rooms, at motor or equipment locations at or near pumps, and when installed outdoors.
3. Use LFMC in damp or wet locations not subject to severe physical damage.

Q. Install covers on junction boxes and conduit bodies after wiring and connections are completed.

R. Run conductors over 48 Volts in raceway, unless otherwise indicated.

S. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying raceways to receptacle or fixture ground terminals.

T. Pull Boxes:

1. Install no more than the equivalent of three 90-degree bends and a maximum of 150 feet between pull points in any conduit run except for communications conduits, for which fewer bends are allowed.
2. Provide boxes where shown and where necessary for the installation and pulling of cables and wires.

U. Pull Wires:

1. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength.
2. Leave at least 12 inches (300 mm) of slack at each end of pull wire.

V. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

3.3 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.4 CLEANING

- A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Furnish and install items for identification of electrical products installed under Division 26.

1.2 SUBMITTALS

- A. Product Data: For each electrical identification product indicated.
- B. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.
- C. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

1.3 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes and standards. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 PRODUCTS

2.1 RACEWAY AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Color for Printed Legend:
 - 1. Power Circuits: Black letters on an orange field.
 - 2. Legend: Indicate system or service and voltage, if applicable.
 - a. Typical:
 - 1) Type: Example – AC 60 Hertz
 - 2) Load: Example – Lighting and Power
 - 3) Voltage: Example – 120VA / 1 Phase
 - b. As Required

- 1) If more than one type of power is available in a conduit, then it shall be marked with the title "Electrical" on orange background.
- 2) If used for control of HVAC conduit shall be marked with the title "Control" on an orange background
- c. Conduit that contains communication systems shall have the exact contend and title on blue background.
- C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- D. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches (50 mm)wide; compounded for outdoor use.

2.2 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm)thick by 1 to 2 inches (25 to 50 mm) wide.
- B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

2.3 UNDERGROUND-LINE WARNING TAPE

- A. Description: Permanent, bright-colored, continuous-printed, polyethylene tape.
 1. Not less than 6 inches (150 mm) wide by 4 mils (0.102 mm) thick.
 2. Compounded for permanent direct-burial service.
 3. Embedded continuous metallic strip or core.
 4. Printed legend shall indicate type of underground line.

2.4 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145
- B. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.
- C. Baked-Enamel Warning Signs: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application. 1/4-inch grommets in corners for mounting. Nominal size, 7 by 10 inches.
- D. Warning label and sign shall include, but are not limited to, the following legends:
 1. Warning label and sign shall include, but are not limited to, the following legends:
 2. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENTHAS MULTIPLE POWER SOURCES."
 3. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR ## INCHES." Verify work space required for specific project conditions with NFPA 70 and replace "##" in previous sentence with appropriate distance.

4. Arc Flash Warning and Instructions: "WARNING – ARC FLASH AND SHOCK HAZARD. WEAR APPROPRIATE PPE. Determine appropriate protective clothing and personal protective equipment (PPE) for the task from NFPA 70E.

2.5 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.
- B. Engraved legend with black letters on white face.
- C. Punched or drilled for mechanical fasteners.
- D. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.6 ONE-LINE DIAGRM NAMEPLATE

- A. Preprinted engraved, laminated acrylic or melamine plastics sign. Nominal size, 12 by 12 inches (305 by 305 mm) by 1/8 inch (3.2 mm) thick. Engraved legend with black letters on white face. Image on sign depicting equipment components in single-line diagram format, using symbols and letter designations consistent with final one-line bus diagram. Produce a concise visual presentation of principal equipment components and connections.

2.7 EQUIPMENT IDENTIFICATION LABELS

- A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch. Lettering and Background colors as indicated below:
 1. Power Circuits:
 - a. Normal: White lettering on Black background.
 2. Fire Alarm System: Black lettering on Red background.
 3. Fire-Suppression Supervisory and Control System: Yellow lettering on Red background.
 4. Combined Fire Alarm and Security System: Blue lettering on Red background.
 5. Security System: Blue lettering on Yellow background.
 6. Mechanical and Electrical Supervisory System: Green lettering on White background.
 7. Telecommunication System: Blue lettering on White background.
 8. Control Wiring: Green lettering on White background.

2.8 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Cable Ties : Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.
 1. Minimum Width: 3/16 inch (5 mm)
 2. Tensile Strength: 50 lb (22.6 kg), minimum
 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 4. Color: Black, except where used for color-coding.

- B. Paint: Paint materials and application requirements are specified in Division 09 painting Sections.
- C. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 EXECUTION

3.1 APPLICATION

- A. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape. Identify each ungrounded conductor according to source and circuit number.
- B. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source and circuit number.
- C. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.
 - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.
- D. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- E. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.
 - 1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:
 - a. Power transfer switches.
 - 2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.
 - 3. Arc Flash Warning Labels: Apply label to door or cover at all access point of equipment including, but not limited to, the following:
 - a. Disconnect switches
 - b. Enclosed circuit breakers
 - c. Panelboards
 - d. Power transfer equipment (ATS/MTS)
- F. Junction Boxes and Pull Boxes: Identify voltage, source, and circuit number(s) on cover of pull and junction boxes with hand-written legible block lettering using black permanent marking pen.

G. Instruction Signs:

1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
2. Emergency Operating Instructions: Install instruction signs with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for power transfer load shedding, Kirk Key Controlled Breakers.

H. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. This applies to existing equipment that is modified during this project. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

- a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where 2 lines of text are required, use labels 2 inches high.
- b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
- c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

2. Equipment to Be Labeled Shall Include But Not Be Limited To:

- a. Panelboards, electrical cabinets, and enclosures.
- b. Access doors and panels for concealed electrical items.
- c. Emergency system boxes and enclosures.
- d. Disconnect switches.
- e. Enclosed circuit breakers.
- f. Power transfer equipment. (ATS/MTS)
- g. Contactors.
- h. Fire-alarm control panel and annunciators
- i. Power-generating units.
- j. All junction boxes. Label to include circuit numbers (panel and number).
- k. All receptacle device plates shall be etched with circuit numbers. (panel and number).
- l. All lighting switch plates shall have circuit numbers on the back of the plate. (panel and number).

Examples:

NORMAL	EMERGENCY SYSTEM	NORMAL

'HA' 480Y/277V FED FROM 'MDP'	'ATS-LS' 480Y/277V FED FROM 'MDP' NORMAL FED FROM 'EMSB' EMERGENCY FEEDS 'LS-HA'	'T-LA' 75KVA, 480V to 208Y/120V FED FROM 'HA' FEEDS 'LA'

3. Provide for each feeder overcurrent protective device in each switchgear, switchboard, distribution panelboard, motor control center, and any other similar equipment furnished under this Division, identification as to the specific load that it serves.

- I. Existing Panel Schedules: Any existing panel where a circuit was removed, relocated or added, the contractor shall provide a new panel schedule with updated information.

3.2 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach non-adhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.
- F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- G. Color-Coding for Identification, 600 V and Less: Use the colors listed below for ungrounded service, feeder, and branch-circuit conductors.
 1. Color shall be factory applied or for sizes larger than No. 1 AWG, if authorities having jurisdiction permit, field applied.
 2. Colors for Grounding Conductors:
 - a. Equipment Grounding Conductor: Green.
 - b. Isolated Equipment Grounding Conductor: Green with Yellow Stripe.
 3. Colors for 208/120-V Wye Systems:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - d. Grounded Conductor (Neutral): White
 4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply

last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

- H. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- I. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches (400 mm) overall.
- J. Painted Identification: Prepare surface and apply paint according to Division 09 painting Sections.

END OF SECTION

SECTION 26 05 72

OVERCURRENT PROTECTIVE DEVICE SHORT-CIRCUIT STUDY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes a computer-based, fault-current study to determine the minimum interrupting capacity of circuit protective devices.

1.3 DEFINITIONS

- A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.
- C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.
- D. SCCR: Short-circuit current rating.
- E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

- A. Product Data: For computer software program to be used for studies.
- B. Other Action Submittals: Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.
 - 1. Short-circuit study input data, including completed computer program input data sheets.
 - 2. Short-circuit study and equipment evaluation report; signed, dated, and sealed by a qualified professional engineer.
 - a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.
 - b. Revised single-line diagram, reflecting field investigation results and results of short-circuit study.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Short-Circuit Study Specialist and Field Adjusting Agency.
- B. Product Certificates: For short-circuit study software, certifying compliance with IEEE 399.

1.6 QUALITY ASSURANCE

- A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.
- B. Short-Circuit Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
 - 1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.
- C. Short-Circuit Study Specialist Qualifications: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.
- D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 COMPUTER SOFTWARE

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. SKM Systems Analysis, Inc.
 - 2. ETAP
- B. Comply with IEEE 399 and IEEE 551.
- C. Analytical features of fault-current-study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.
- D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output.

2.2 SHORT-CIRCUIT STUDY REPORT CONTENTS

- A. Executive summary.
- B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of the computer printout.
- C. One-line diagram, showing the following:
 - 1. Protective device designations and ampere ratings.
 - 2. Cable size and lengths.
 - 3. Transformer kilovolt ampere (kVA) and voltage ratings.
 - 4. Motor and generator designations and kVA ratings.
 - 5. Switchgear, switchboard, motor-control center, and panelboard designations.
- D. Comments and recommendations for system improvements, where needed.
- E. Protective Device Evaluation:
 - 1. Evaluate equipment and protective devices and compare to short-circuit ratings.

2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short-circuit duties.
 3. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
 4. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.
 5. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
- F. Short-Circuit Study Input Data: As described in "Power System Data" Article in the Evaluations.
- G. Short-Circuit Study Output:
1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.
 - b. Calculated fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. Equivalent impedance.
 2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.
 - b. Calculated symmetrical fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. Calculated asymmetrical fault currents:
 - 1) Based on fault-point X/R ratio.
 - 2) Based on calculated symmetrical value multiplied by 1.6.
 - 3) Based on calculated symmetrical value multiplied by 2.7.
 3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.
 - b. Calculated symmetrical fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. No AC Decrement (NACD) ratio.
 - e. Equivalent impedance.
 - f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
 - g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Obtain all data necessary for the conduct of the study.
 - 1. Verify completeness of data supplied on the one-line diagram. Call any discrepancies to the attention of Engineer.
 - 2. For equipment provided that is Work of this Project, use characteristics submitted under the provisions of action submittals and information submittals for this Project.
 - 3. For relocated equipment and that which is existing to remain, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. The qualifications of technicians and engineers shall be qualified as defined by NFPA 70E.
 - 4. Obtain all arc flash information from the local utility in a timely manner. No extension of the contract time shall be permitted due to coordination with the local utility.
- B. Gather and tabulate the following input data to support the short-circuit study. Comply with recommendations in IEEE 551 as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.
 - 1. Product Data for Project's overcurrent protective devices involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
 - 2. Obtain electrical power utility impedance at the service.
 - 3. Power sources and ties.
 - 4. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
 - 5. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
 - 6. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip, SCCR, current rating, and breaker settings.
 - 7. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
 - 8. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
 - 9. Motor horsepower and NEMA MG 1 code letter designation.
 - 10. Cable sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).

3.2 SHORT-CIRCUIT STUDY

- A. Perform study following the general study procedures contained in IEEE 399.
- B. Calculate short-circuit currents according to IEEE 551.
- C. Base study on the device characteristics supplied by device manufacturer.
- D. The extent of the electrical power system to be studied is indicated on Drawings.

- E. Begin short-circuit current analysis at the service, extending down to the system overcurrent protective devices as follows:
 - 1. To normal system low-voltage load buses where fault current is 10 kA or less.
 - 2. Exclude equipment rated 240-V ac or less when supplied by a single transformer rated less than 125 kVA.
- F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.
- G. The calculations shall include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and shall apply to low- and medium-voltage, three-phase ac systems. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.
 - 1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.
- H. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault at each of the following:
 - 1. Electric utility's supply termination point.
 - 2. Incoming switchgear.
 - 3. Unit substation primary and secondary terminals.
 - 4. Low-voltage switchgear.
 - 5. Motor-control centers.
 - 6. Control panels.
 - 7. Standby generators and automatic transfer switches.
 - 8. Branch circuit panelboards.
 - 9. Disconnect switches.

3.3 ADJUSTING

- A. Make minor modifications to equipment as required to accomplish compliance with short-circuit study.

3.4 DEMONSTRATION

- A. Train Owner's operating and maintenance personnel in the use of study results.

END OF SECTION

SECTION 26 05 73

OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes computer-based, overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping.

1.3 DEFINITIONS

- A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.
- C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.
- D. SCCR: Short-circuit current rating.
- E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

- A. Product Data: For computer software program to be used for studies.
- B. Other Action Submittals: Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.
 - 1. Coordination-study input data, including completed computer program input data sheets.
 - 2. Study and equipment evaluation reports.
 - 3. Overcurrent protective device coordination study report; signed, dated, and sealed by a qualified professional engineer.
 - a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Coordination Study Specialist and Field Adjusting Agency.
- B. Product Certificates: For overcurrent protective device coordination study software, certifying compliance with IEEE 399.

1.6 CLOSEOUT SUBMITTALS

**New Church and Hall
Christ the King Catholic Church
HS #23.033**

**COORDINATION
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- A. Operation and Maintenance Data: For the overcurrent protective devices to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. The following parts from the Protective Device Coordination Study Report:
 - 1) One-line diagram.
 - 2) Protective device coordination study.
 - 3) Time-current coordination curves.
 - b. Power system data.

1.7 QUALITY ASSURANCE

- A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.
- B. Coordination Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
 - 1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.
- C. Coordination Study Specialist Qualifications: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.
- D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

- A. Software Developers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. SKM Systems Analysis, Inc.
 - b. ETAP
- B. Comply with IEEE 242 and IEEE 399.
- C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.
- D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.
 - 1. Optional Features:

- a. Arcing faults.
- b. Simultaneous faults.
- c. Explicit negative sequence.
- d. Mutual coupling in zero sequence.

2.2 PROTECTIVE DEVICE COORDINATION STUDY REPORT CONTENTS

- A. Executive summary.
- B. Study descriptions, purpose, basis and scope. Include case descriptions, definition of terms and guide for interpretation of the computer printout.
- C. One-line diagram, showing the following:
 - 1. Protective device designations and ampere ratings.
 - 2. Cable size and lengths.
 - 3. Transformer kilovolt ampere (kVA) and voltage ratings.
 - 4. Motor and generator designations and kVA ratings.
 - 5. Switchgear, switchboard, motor-control center, and panelboard designations.
- D. Study Input Data: As described in "Power System Data" Article.
- E. Short-Circuit Study Output: As specified in "Short-Circuit Study Output" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260572 "Overcurrent Protective Device Short-Circuit Study."
- F. Protective Device Coordination Study:
 - 1. Report recommended settings of protective devices, ready to be applied in the field. Use manufacturer's data sheets for recording the recommended setting of overcurrent protective devices when available.
 - a. Phase and Ground Relays:
 - 1) Device tag.
 - 2) Relay current transformer ratio and tap, time dial, and instantaneous pickup value
 - 3) Recommendations on improved relaying systems, if applicable.
 - b. Circuit Breakers:
 - 1) Adjustable pickups and time delays (long time, short time, ground).
 - 2) Adjustable time-current characteristic.
 - 3) Adjustable instantaneous pickup.
 - 4) Recommendations on improved trip systems, if applicable.
 - c. Fuses: Show current rating, voltage, and class.
- G. Time-Current Coordination Curves: Determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:

1. Device tag and title, one-line diagram with legend identifying the portion of the system covered.
2. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.
3. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
4. Plot the following listed characteristic curves, as applicable:
 - a. Power utility's overcurrent protective device.
 - b. Medium-voltage equipment overcurrent relays.
 - c. Medium- and low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
 - d. Low-voltage equipment circuit-breaker trip devices, including manufacturer's tolerance bands.
 - e. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.
 - f. Cables and conductors damage curves.
 - g. Ground-fault protective devices.
 - h. Motor-starting characteristics and motor damage points.
 - i. Generator short-circuit decrement curve and generator damage point.
 - j. The largest feeder circuit breaker in each motor-control center and panelboard.
5. Series rating on equipment allows the application of two series interrupting devices for a condition where the available fault current is greater than the interrupting rating of the downstream equipment. Both devices share in the interruption of the fault and selectivity is sacrificed at high fault levels. Maintain selectivity for tripping currents caused by overloads.
6. Provide adequate time margins between device characteristics such that selective operation is achieved.
7. Comments and recommendations for system improvements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance. Devices to be coordinated are indicated on Drawings.
 1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

3.2 PROTECTIVE DEVICE COORDINATION STUDY

- A. Comply with IEEE 242 for calculating short-circuit currents and determining coordination time intervals.
- B. Comply with IEEE 399 for general study procedures.

- C. The study shall be based on the device characteristics supplied by device manufacturer.
- D. The extent of the electrical power system to be studied is indicated on Drawings.
- E. Begin analysis at the service, extending down to the system overcurrent protective devices as follows:
 - 1. To normal system low-voltage load buses where fault current is 10 kA or less.
 - 2. Exclude equipment rated 240-V ac or less when supplied by a single transformer rated less than 125 kVA.
- F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.
- G. Transformer Primary Overcurrent Protective Devices:
 - 1. Device shall not operate in response to the following:
 - a. Inrush current when first energized.
 - b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
 - c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.
 - 2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.
- H. Motor Protection:
 - 1. Select protection for low-voltage motors according to IEEE 242 and NFPA 70.
 - 2. Select protection for motors served at voltages more than 600 V according to IEEE 620.
- I. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and protection recommendations in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.
- J. Generator Protection: Select protection according to manufacturer's written recommendations and to IEEE 242.
- K. The calculations shall include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and shall apply to low- and medium-voltage, three-phase ac systems. The calculations shall also account for the fault-current dc decrement, to address the asymmetrical requirements of the interrupting equipment.
 - 1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.
- L. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and single line-to-ground fault at each of the following:
 - 1. Electric utility's supply termination point.
 - 2. Switchgear.
 - 3. Unit substation primary and secondary terminals.
 - 4. Low-voltage switchgear.

5. Motor-control centers.
6. Standby generators and automatic transfer switches.
7. Branch circuit panelboards.

M. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short-circuit ratings.
2. Adequacy of switchgear, motor-control centers, and panelboard bus bars to withstand short-circuit stresses.

3.3 LOAD-FLOW AND VOLTAGE-DROP STUDY

- A. Perform a load-flow and voltage-drop study to determine the steady-state loading profile of the system. Analyze power system performance two times as follows:
1. Determine load-flow and voltage drop based on full-load currents obtained in "Power System Data" Article.
 2. Determine load-flow and voltage drop based on 80 percent of the design capacity of the load buses.
 3. Prepare the load-flow and voltage-drop analysis and report to show power system components that are overloaded, or might become overloaded; show bus voltages that are less than as prescribed by NFPA 70.

3.4 MOTOR-STARTING STUDY

- A. Perform a motor-starting study to analyze the transient effect of the system's voltage profile during motor starting. Calculate significant motor-starting voltage profiles and analyze the effects of the motor starting on the power system stability.
- B. Prepare the motor-starting study report, noting light flicker for limits proposed by IEEE 141 and voltage sags so as not to affect the operation of other utilization equipment on the system supplying the motor.

3.5 POWER SYSTEM DATA

- A. Obtain all data necessary for the conduct of the overcurrent protective device study.
1. Verify completeness of data supplied in the one-line diagram on Drawings. Call discrepancies to the attention of Engineer.
 2. For new equipment, use characteristics submitted under the provisions of action submittals and information submittals for this Project.
 3. For existing equipment, whether or not relocated obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. The qualifications of technicians and engineers shall be qualified as defined by NFPA 70E.
- B. Gather and tabulate the following input data to support coordination study. The list below is a guide. Comply with recommendations in IEEE 551 for the amount of detail required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.
1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are

consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.

2. Electrical power utility impedance at the service.
3. Power sources and ties.
4. Short-circuit current at each system bus, three phase and line-to-ground.
5. Full-load current of all loads.
6. Voltage level at each bus.
7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
8. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.
12. Maximum demands from service meters.
13. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
14. Motor horsepower and NEMA MG 1 code letter designation.
15. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).
16. Medium-voltage cable sizes, lengths, conductor material, and cable construction and metallic shield performance parameters.
17. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:
 - a. Special load considerations, including starting inrush currents and frequent starting and stopping.
 - b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
 - c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
 - d. Generator thermal-damage curve.
 - e. Ratings, types, and settings of utility company's overcurrent protective devices.
 - f. Special overcurrent protective device settings or types stipulated by utility company.
 - g. Time-current-characteristic curves of devices indicated to be coordinated.
 - h. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.

- i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
- j. Panelboards, switchboards, motor-control center ampacity, and SCCR in amperes rms symmetrical.
- k. Identify series-rated interrupting devices for a condition where the available fault current is greater than the interrupting rating of the downstream equipment. Obtain device data details to allow verification that series application of these devices complies with NFPA 70 and UL 489 requirements.

3.6 FIELD ADJUSTING

- A. Adjust relay and protective device settings according to the recommended settings provided by the coordination study. Field adjustments shall be completed by the engineering service division of the equipment manufacturer under the Startup and Acceptance Testing contract portion.
- B. Make minor modifications to equipment as required to accomplish compliance with short-circuit and protective device coordination studies.
- C. Testing and adjusting shall be by a full-time employee of the Field Adjusting Agency, who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters. Perform NETA tests and inspections for all adjustable overcurrent protective devices.

3.7 DEMONSTRATION

- A. Engage the Coordination Study Specialist to train Owner's maintenance personnel in the following:
 - 1. Acquaint personnel in the fundamentals of operating the power system in normal and emergency modes.
 - 2. Hand-out and explain the objectives of the coordination study, study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpreting the time-current coordination curves.
 - 3. Adjust, operate, and maintain overcurrent protective device settings.

END OF SECTION

SECTION 26 05 74

OVERCURRENT PROTECTIVE DEVICE ARC-FLASH STUDY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes a computer-based, arc-flash study to determine the arc-flash hazard distance and the incident energy to which personnel could be exposed during work on or near electrical equipment.

1.3 DEFINITIONS

- A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- B. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.
- C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.
- D. SCCR: Short-circuit current rating.
- E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

- A. Product Data: For computer software program to be used for studies.
- B. Other Action Submittals: Submit the following submittals after the approval of system protective devices submittals. Submittals shall be in digital form.
 - 1. Arc-flash study input data, including completed computer program input data sheets.
 - 2. Arc-flash study report; signed, dated, and sealed by a qualified professional engineer.
 - a. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Arc-Flash Study Specialist and Field Adjusting Agency.
- B. Product Certificates: For arc-flash hazard analysis software, certifying compliance with IEEE 1584 and NFPA 70E.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance procedures according to requirements in NFPA 70E shall be provided in the equipment manuals.

- B. Operation and Maintenance Procedures: In addition to items specified in Section 017823 "Operation and Maintenance Data," provide maintenance procedures for use by Owner's personnel that comply with requirements in NFPA 70E.

1.7 QUALITY ASSURANCE

- A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.
- B. Arc-Flash Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
 - 1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.
- C. Arc-Flash Study Specialist Qualifications: Professional engineer in charge of performing the study, analyzing the arc flash, and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.
- D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

- A. Software Developers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. SKM Systems Analysis, Inc.
 - b. ETAP
- B. Comply with IEEE 1584 and NFPA 70E.
- C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

2.2 ARC-FLASH STUDY REPORT CONTENT

- A. Executive summary.
- B. Study descriptions, purpose, basis and scope.
- C. One-line diagram, showing the following:
 - 1. Protective device designations and ampere ratings.
 - 2. Cable size and lengths.
 - 3. Transformer kilovolt ampere (kVA) and voltage ratings.
 - 4. Motor and generator designations and kVA ratings.
 - 5. Switchgear, switchboard, motor-control center and panelboard designations.

- D. Study Input Data: As described in "Power System Data" Article.
- E. Short-Circuit Study Output: As specified in "Short Circuit Study Output" Paragraph in "Short-Circuit Study Report Contents" Article in Section 260572 "Overcurrent Protective Device Short-Circuit Study."
- F. Protective Device Coordination Study Report Contents: As specified in "Protective Device Coordination Study Report Contents" Article in Section 260573 "Overcurrent Protective Device Coordination Study."
- G. Arc-Flash Study Output:
 - 1. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
 - a. Voltage.
 - b. Calculated symmetrical fault-current magnitude and angle.
 - c. Fault-point X/R ratio.
 - d. No AC Decrement (NACD) ratio.
 - e. Equivalent impedance.
 - f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
 - g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis
- H. Incident Energy and Flash Protection Boundary Calculations:
 - 1. Arcing fault magnitude with and without required Arc Energy Reduction methods.
 - 2. Protective device clearing time.
 - 3. Duration of arc.
 - 4. Arc-flash boundary.
 - 5. Working distance.
 - 6. Incident energy.
 - 7. Hazard risk category.
 - 8. Recommendations for arc-flash energy reduction.
- I. Fault study input data, case descriptions, and fault-current calculations including a definition of terms and guide for interpretation of the computer printout.

2.3 ARC-FLASH WARNING LABELS

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems." Produce a 3.5-by-5-inch thermal transfer label of high-adhesion polyester for each work location included in the analysis.
- B. The label shall have an orange header with the wording, "WARNING, ARC-FLASH HAZARD," and shall include the following information taken directly from the arc-flash hazard analysis:
 - 1. Location designation.
 - 2. Nominal voltage.
 - 3. Flash protection boundary.

4. Hazard risk category.
 5. Incident energy.
 6. Working distance.
 7. Engineering report number, revision number, and issue date.
- C. Labels shall be machine printed, with no field-applied markings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine Project overcurrent protective device submittals. Proceed with arc-flash study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to arc-flash study may not be used in study.

3.2 ARC-FLASH HAZARD ANALYSIS

- A. Comply with NFPA 70E and its Annex D for hazard analysis study.
- B. Preparatory Studies:
1. Protective Device Coordination Study Report Contents: As specified in "Protective Device Coordination Study Report Contents" Article in Section 16402 "Overcurrent Protective Device Coordination Study."
- C. Calculate maximum and minimum contributions of fault-current size.
1. The minimum calculation shall assume that the utility contribution is at a minimum and shall assume no motor load.
 2. The maximum calculation shall assume a maximum contribution from the utility and shall assume motors to be operating under full-load conditions.
- D. Calculate the arc-flash protection boundary and incident energy at locations in the electrical distribution system where personnel could perform work on energized parts.
- E. Include medium- and low-voltage equipment locations, except equipment rated 240-V ac or less fed from transformers less than 125 kVA.
- F. Safe working distances shall be specified for calculated fault locations based on the calculated arc-flash boundary, considering incident energy of 1.2 cal/sq.cm.
- G. Incident energy calculations shall consider the accumulation of energy over time when performing arc-flash calculations on buses with multiple sources. Iterative calculations shall take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors and generators shall be decremented as follows:
1. Fault contribution from induction motors should not be considered beyond three to five cycles.
 2. Fault contribution from synchronous motors and generators should be decayed to match the actual decrement of each as closely as possible (e.g., contributions from permanent magnet generators will typically decay from 10 per unit to three per unit after 10 cycles).
- H. Arc-flash computation shall include both line and load side of a circuit breaker as follows:
1. When the circuit breaker is in a separate enclosure.
 2. When the line terminals of the circuit breaker are separate from the work location.

- I. Base arc-flash calculations on actual overcurrent protective device clearing time. Cap maximum clearing time at two seconds based on IEEE 1584, Section B.1.2.

3.3 POWER SYSTEM DATA

- A. Obtain all data necessary for the conduct of the arc-flash hazard analysis.
 1. Verify completeness of data supplied on the one-line diagram on Drawings and under "Preparatory Studies" Paragraph in "Arc-Flash Hazard Analysis" Article. Call discrepancies to the attention of Engineer.
 2. For new equipment, use characteristics submitted under the provisions of action submittals and information submittals for this Project.
 3. For existing equipment, whether or not relocated, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers.
- B. Electrical Survey Data: Gather and tabulate the following input data to support study. Comply with recommendations in IEEE 1584 and NFPA 70E as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT Level III certification or NICET Electrical Power Testing Level III certification.
 1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
 2. Obtain electrical power utility impedance at the service.
 3. Power sources and ties.
 4. Short-circuit current at each system bus, three phase and line-to-ground.
 5. Full-load current of all loads.
 6. Voltage level at each bus.
 7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in per cent, and phase shift.
 8. For reactors, provide manufacturer and model designation, voltage rating and impedance.
 9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
 10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
 11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.
 12. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
 13. Motor horsepower and NEMA MG 1 code letter designation.
 14. Low-voltage cable sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).
 15. Medium-voltage cable sizes, lengths, conductor material, and cable construction and metallic shield performance parameters.

3.4 LABELING

- A. Apply one arc-flash label for 600-V ac, 480-V ac, and applicable 208-V ac panelboards and disconnects and for each of the following locations:
 - 1. Motor-control center.
 - 2. Low-voltage switchboard.
 - 3. Switchgear.
 - 4. Medium-voltage switch.
 - 5. Control panel.

3.5 APPLICATION OF WARNING LABELS

- A. Install the arc-fault warning labels under the direct supervision and control of the Arc-Flash Study Specialist.

3.6 DEMONSTRATION

- A. Engage the Arc-Flash Study Specialist to train Owner's maintenance personnel in the potential arc-flash hazards associated with working on energized equipment and the significance of the arc-flash warning labels.

END OF SECTION

SECTION 26 20 00

SERVICE AND DISTRIBUTION

PART 1 GENERAL

1.1 SYSTEM VOLTAGE

- A. The building service from the utility company shall be 208Y/120V 3Ø 4W

1.2 TERMINATIONS

- A. All wiring shall be sized based on 75°C rated conductors. All connectors shall be rated for 75°C in accordance with N.E.C. Article 110-14 requirements.

PART 2 PRODUCTS

2.1 SAFETY SWITCHES

- A. Furnish and install safety switches as shown on the Drawings. All switches shall be fused NEMA Heavy Duty Type HD and Underwriter's Laboratories listed. All switches shall have blades that are fully visible in the "OFF" position with the door open. Switches shall be dead-front construction with permanently attached arc suppressers. Lugs shall be UL listed for copper and aluminum conductor and front removable. All current carrying parts shall be plated to resist corrosion. Switches shall be quick-make, quick-break type. During operation of the switch, the movable contacts shall not be able to be restrained by the handle once the closing or the opening action of the contacts has been initiated. Switches shall have cover interlocks to prevent opening of the switch door while the switch is in the "ON" position or closing the switch with the door open. Switch shall have padlocking capabilities in the "OFF" position.
- B. Safety switches shall be rated 600 volts for 480 volt service and rated 240 volts for 208 volt service. Switches shall be motor rated when used for motor loads. Switches shall be NEMA 1 enclosed for indoor applications and NEMA 3R for outdoor or wet area locations.
- C. Switches used for service entrance shall be service entrance rated. Safety switches shall be furnished complete with fuses.
- D. Approved Manufacturers:
 - 1. Eaton
 - 2. Square D (Schneider Electric)
 - 3. ABB
 - 4. Siemens

2.2 FUSES

- A. All fuse holders shall be provided with dual-element, time-lag fuses as scheduled on the Drawings or as recommended by the equipment manufacturer. Fuses shall be rated 200,000 AIC. Fuses shall be Buss Fusetron, Economy Econ, or Gould Shawmut Tri-Onic for component protection and Buss Limitron, Economy Econolin, or Gould Shawmut Amp-Trap for circuit protection.

2.3 CIRCUIT BREAKER PANELBOARDS

- A. Panelboards shall be sized as shown on the drawings and schedules, and shall be the bolted breaker panelboard type. Panelboards shall have copper bussing. Panelboards shall have door-in-door trim.
- B. All branch breakers are to be quick-make, quick-break (over center toggle device) with trip indication and common trip on all multiple breakers. Trip indication shall be clearly shown by breaker handle taking a position between "ON" and "OFF" position. Breakers shall be ambient compensated to carry full NEC load in 120 degree F room temperature. Panelboards shall have distributed phase busing throughout. Any two adjacent single pole breakers shall be replaceable by a two pole breaker, and any three adjacent single pole breakers shall be replaceable by a three pole breaker.
- C. Minimum interrupting capacity of breakers shall be as shown on panel schedules. No breakers shall be rated less than 10,000 RMS symmetrical amperes.
- D. Branch breakers shall be numbered 1, 3, 5, etc. from top to bottom beginning at the top of the left hand column so that #1 shall be on phase A, #3 on phase B, and #5 on phase C.
- E. Panelboards shall include main circuit breakers where indicated on plans and in the following conditions regardless of designation on plan:
 - 1. Panelboard is served from a transformer (utility or otherwise.) and no overcurrent protective device exists between the transformer and the panelboard.
 - 2. Panelboard is served from a wireway and no overcurrent protective device exists between the wireway and the panelboard.
- F. Approved Manufacturers:
 - 1. Eaton
 - 2. Square D (Schneider Electric)
 - 3. ABB
 - 4. Siemens

PART 3 EXECUTION

3.1 COORDINATION

- A. Contractor shall coordinate all service and distribution work with other crafts on the project.

3.2 TEST AND BALANCING

- A. At such times as the Architect directs, the Contractor shall conduct in the Architect's presence operating tests to demonstrate the electrical systems are installed and will operate properly and in accordance with the requirements of the specifications. The Contractor shall furnish instruments and personnel required for such tests. Any work that is found to be defective, or material that are found to vary from the requirements of the drawings or specifications shall be replaced by the Contractor without additional cost of the Owner.

3.3 EMERGENCY CIRCUITS

- A. All wiring for emergency power and lighting circuits shall be run in conduits independent of all other circuits or conductors. Emergency circuit installations shall be made in accordance with National Electrical Code Article 700.9.

3.4 EQUIPMENT FUSING

- A. All equipment shall be furnished complete with fuses as described herein and/or as shown on the Drawings. Contractor shall furnish one set of spare fuses for each size fuse furnished on the project. Fuses shall be delivered to Owner prior to acceptance of project.
- B. Fusing for protective equipment shall be of the type specifically designed for the intended application. Fuses for service entrance rated equipment shall be Class L. Fuses for branch circuit protection shall be Class RK5 unless specified otherwise. Provide protective fuses as specifically required by the equipment manufacturer.

3.5 INSTALLATION

- A. The Electrical Contractor shall place a sign at the Main Switchboard indicating the type and location of the emergency generator in accordance with National Electrical Code Article 702.8(A) requirements.
- B. Disconnecting means shall be provided for each motor and motor controller, and shall be located within site from the controller and motor locations in accordance with National Electrical Code Article 430.102 requirements.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

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. Receptacles, receptacles with integral GFCI, and associated device plates.
 - 2. Tamper-proof receptacles.
 - 3. Twist-locking receptacles.
 - 4. Snap switches and wall-box dimmers.
 - 5. Solid-state fan speed controls.
 - 6. Wall-box motion sensors.
 - 7. Wall-switch occupancy sensors and time switches.
 - 8. Pendant cord-connector devices.
 - 9. Cord and plug sets.

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. PVC: Polyvinyl chloride.
- D. RFI: Radio-frequency interference.
- E. TVSS: Transient voltage surge suppressor.
- F. UTP: Unshielded twisted pair.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Receptacles, switches, plates, floor outlets, poke through assemblies, service poles and multioutlet assemblies.
- B. Samples: One for each type of device and wall plate specified, in each color specified.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wiring device through one source from a single manufacturer.
- 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. Comply with NFPA 70 latest edition or edition enforced by state or local code authority.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Receptacles: Duplex 125 V, 20 A:
 - a. Hubbell - HBL 5362.
 - b. Leviton Mfg. Company Inc.-5362.
 - c. Pass & Seymour-CRB5362.
 - d. Pass & Seymour -PT5362A (Plug Tail Device).
2. GFI Receptacles: Weather Resistant 125 V, 20 A:
 - a. Hubbell Incorporated- BR20WR
 - b. Leviton Mfg. Company Inc.-WBR20
 - c. Pass & Seymour- WR5362.
3. GFI Receptacles: Weather Resistant and Tamper Resistant 125 V, 20 A:
 - a. Hubbell - BR2WRTR.
 - b. Leviton Mfg. Company Inc.-TWR20
 - c. Pass & Seymour- WR20TR.
4. Receptacles: Tamper Resistant 125 V, 20 A:
 - a. Hubbell - BR20TR.
 - b. Leviton Mfg. Company Inc.-TWR20
 - c. Pass & Seymour- TR5362.
5. Switches-Single Pole:
 - a. Hubbell- HBL 1221.
 - b. Pass & Seymour - PS20AC1.
 - c. Leviton Mfg. Company, Inc.- 1221-1
6. Switches-Three Pole:
 - a. Hubbell- HBL1223
 - b. Leviton Mfg. Company, Inc.-1223-2.
 - c. Pass & Seymour-PS20AC3.
7. Switches – Occupancy Sensor Wall Type:
 - a. Hubbell - LH-MT
 - b. Leviton - OD15-ID
 - c. Sensor Switch - WSD-PD

- d. Watt Stopper - WA-200
- 8. Switches – Key Operated / Security Switches:
 - a. Hubbell - HBL1221RKL.
 - b. Leviton - 1221-2KL
 - c. Pass & Seymour - PS20AC1-KL.
- 9. Dimmer Switches Line Voltage:
 - a. Lutron Nova T
 - b. Pass & Seymour CD2000
 - * Dimmer must be compatible with Ballast or LED Driver.
- 10. Dimmer Switches 0-10V:
 - a. Synergy ISD
 - b. Cooper SF10P
 - * Dimmer must be compatible with Ballast or LED Driver.

2.2 RECEPTACLES

- A. Straight-Blade-Type Receptacles: Comply with UL 498, 20 amp.
- B. Straight-Blade and Locking Receptacles: Heavy-Duty grade 20 amp.
- C. GFCI Receptacles: Straight blade, feed-through type, Heavy-Duty grade, with integral NEMA WD 6, Configuration 5-20R duplex receptacle; complying with UL 498 and UL 943. Design units for installation in a 2-3/4-inch- (70-mm-) deep outlet box without an adapter.
- D. Tamper resistant in all public areas.

2.3 CORD AND PLUG SETS

- A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.
 - 1. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and equipment-rating ampacity plus a minimum of 30 percent.
 - 2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.4 SWITCHES

- A. Single- and Double-Pole Switches: Comply with UL 20, 20 amp.
- B. Snap Switches: Heavy-Duty grade, quiet type 20 amp, 120/277 volt.
- C. Live Voltage Dimmer: 120V, 2000 watt, slide to-off. Dimmer must be compatible with ballast or driver.
- D. 0-10V Dimmer: 120/277VAC, capable of three way, max wattage 1200 w 120VAC, 150000 277 VAC, Dimmer must be compatible with ballast or driver. 100% to 1% continuous.

2.5 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
 - 1. Plate-Securing Screws: Metal with head color to match plate finish.

2. Material for Finished Spaces: As selected by Architect.
3. Material for Unfinished Spaces: Galvanized steel.
4. Material for Wet Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."

B. Wet-Location, Weatherproof Cover Plates:

1. NEMA 250, complying with type 3R weather-resistant while-in-use metal or impact-resistant thermoplastic with lockable cover; non-removable gasket between the mounting plate/base and cover; stainless steel hinges and mounting hardware

2.6 SPECIAL CONFIGURATION & TWIST-LOCKING RECEPTACLES

A. General: NEMA and Non-NEMA configurations as indicated on Drawings.

1. Comply with NEMA WD 1, NEMA WD 6; and UL 498.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hubbell
 - b. Leviton
 - c. Pass & Seymour

2.7 FINISHES

A. Color:

1. Wiring Devices Connected to Normal Power System: As selected by Architect, unless otherwise indicated or required by NFPA 70.2.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install devices and assemblies level, plumb, and square with building lines.
- B. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- C. Remove wall plates and protect devices and assemblies during painting.
- D. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.
- E. Install weather resistant receptacles in damp and wet locations per N.E.C. requirements.
- F. Mounting Heights: Comply with applicable codes and requirements of Authorities Having Jurisdiction. Mount devices as indicated on Drawings, including but not limited to Architectural elevations. Coordinate all above counter receptacles with backsplash to avoid interferences. All dimensions are given to centerline of box above finished floor (AFF), unless otherwise indicated.
- G. Device Plates and Covers:
 1. Do not use oversized or extra-deep plates.
 2. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

3. Install weather-proof-while-in-use covers over receptacles in wet, damp and exterior locations.
4. Group adjacent devices under single, multigang wall plates.

H. Floor Service Outlets, Service Poles and Poke-Thru Device

1. Adjust locations of floor service outlets, service poles, and Poke-Thru devices to suit arrangement of partitions and furnishings. Coordinate revised location with Structural Engineer.

3.2 APPLICATION

A. GFCI Receptacles: Install in locations as indicated but in no case less than those listed below:

1. Where device is located on the exterior of the building, provide with Wet-Location Weatherproof Cover Plate.
2. Where device is located within kitchen.
3. Where device is located within a garage.
4. Where device is located in an elevator pit.
5. Where device is located within 6 feet (2-m) of a lavatory or sink, except where located on patient headwall.

B. Tamper-Resistant Receptacles: Install in locations as indicated but in no case less than those listed below:

1. Entry
2. Nave
3. Hall
4. Restrooms
5. Confessional

3.3 CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding."
- B. Connect wiring according to Division 26 Section "Conductors and Cables."
- C. Tighten electrical connectors and terminals according to manufacturer's published torque- tightening values.

3.4 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements.
2. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.

B. Remove malfunctioning units, replace with new units, and retest as specified above.

3.5 CLEANING

- A. On completion of wall plate installation, inspect exterior surfaces and perform the following:
 1. Remove paint splatters and other spots.

2. Remove all temporary markings and labels.
3. Replace cracked or damaged wall plates.
4. Wipe down all wall plates with approve cleaning agent to remove fingerprints and dust.

END OF SECTION

SECTION 26 32 13

NATURAL GAS GENERATOR SETS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

1.3 DEFINITIONS

- A. Emergency Standby Power (ESP): Per ISO 8528: The maximum power available during a variable electrical power sequence, under the stated operating conditions, for which a generating set is capable of delivering in the event of a utility power outage or under test conditions for up to 200 hours of operation per year with the maintenance intervals and procedures being carried out as prescribed by the manufacturers. The permissible average power output (Ppp) over 24 hours of operation shall not exceed 70 percent of the ESP unless otherwise agreed by the RIC engine manufacturer.
- B. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:
 - 1. Thermal damage curve for generator.
 - 2. Time-current characteristic curves for generator protective device.
 - 3. Sound test data, based on a free field requirement.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, and location and size of each field connection.
 - 1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
 - 2. Wiring Diagrams: Control interconnection, Customer connections.
- C. Certifications:
 - 1. Submit statement of compliance which states the proposed product(s) is certified to the emissions standards required by the location for EPA, stationary emergency application.

1.5 INFORMATIONAL SUBMITTALS

- A. Source quality-control test reports.
 - 1. Certified summary of prototype-unit test report. See requirements in Part 2 "Source Quality Control" Article Part A. Include statement indicating torsional compatibility of components.
 - 2. Certified Test Report: Provide certified test report documenting factory test per the requirements of this specification, as well as certified factory test of generator set sensors per NFPA110 level 1.
 - 3. List of factory tests to be performed on units to be shipped for this Project.

4. Report of exhaust emissions and compliance statement certifying compliance with applicable regulations.
- B. Warranty:
 1. Submit manufacturer's warranty statement to be provided for this Project.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.
- C. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.
- D. Comply with NFPA 37 (Standard For the Installation and Use of Stationary Combustion Engines and Gas Turbines).
- E. Comply with NFPA 70 (National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702).
- F. Comply with NFPA 110 (Emergency and Standby Power Systems) requirements for Level 1 emergency power supply system.
- G. Comply with UL 2200.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
 1. Ambient Temperature: 4.44 deg C (40.0 deg F) to 51.11 deg C (124.0 deg F).
 2. Relative Humidity: 0 to 95 percent.
 3. Altitude: Sea level to 60.0 feet (18.29 m).

1.8 WARRANTY

- A. Base Warranty: Manufacturer shall provide base warranty coverage on the material and workmanship of the generator set for a minimum of twenty-four (24) months for Standby product and twelve (12) months for Prime/Continuous product from registered commissioning and start-up.
- B. Extended Warranty: Manufacturer shall offer extend coverage of 5 years from date of registered commissioning and start-up.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: The basis for this specification is Cummins Power Generation equipment, approved equals may be considered if equipment performance is shown to meet the requirements herein.

2.2 ENGINE-GENERATOR SET

- A. Factory-assembled and -tested, engine-generator set.
- B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.
 1. Rigging Information: Indicate location of each lifting attachment, generator-set center of gravity, and total package weight in submittal drawings.

C. Capacities and Characteristics:

1. Power Output Ratings: Electrical output power rating for Standby operation of not less than 250.0, at 80 percent lagging power factor, 208/120, Series Wye, Three phase, 4 -wire, 60 hertz. Output breaker rating shall be: 1000A/3P
2. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component. The engine-generator nameplate shall include information of the power output rating of the equipment.

D. Generator-Set Performance:

1. Steady-State Voltage Operational Bandwidth: 1.0 percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 seconds.
3. Steady-State Frequency Operational Bandwidth: 0.25 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within 3 seconds.
6. Output Waveform: At full load, harmonic content measured line to line or line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50.
7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds without damage to generator system components. For a 1-phase, bolted short circuit at system output terminals, system shall regulate both voltage and current to prevent over-voltage conditions on the non-faulted phases.
8. Start Time: Comply with NFPA 110, Level 1, Type 10, system requirements.
9. Ambient Condition Performance: Engine generator shall be designed to allow operation at full rated load in an ambient temperature under site conditions, based on highest ambient condition. Ambient temperature shall be as measured at the air inlet to the engine generator for enclosed units, and at the control of the engine generator for machines installed in equipment rooms.

2.3 ENGINE

A. Fuel: Natural Gas

B. Rated Engine Speed: 1800RPM.

C. Lubrication System: The following items are mounted on engine or skid:

1. Lube oil pump: shall be positive displacement, mechanical, full pressure pump.
2. Filter and Strainer: Provided by the engine manufacturer of record to provide adequate filtration for the prime mover to be used.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

D. Engine Fuel System: The engine fuel system shall be installed in strict compliance to the engine manufacturer's instructions

- E. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity and performance.
 - 1. Designed for operation on a single 120 VAC, Single phase, 60Hz power connection. Heater voltage shall be shown on the project drawings.
 - 2. Installed with isolation valves to isolate the heater for replacement of the element without draining the engine cooling system or significant coolant loss.
 - 3. Provided with a 24VDC thermostat, installed at the engine thermostat housing
- F. Governor: Adjustable isochronous, with speed sensing. The governing system dynamic capabilities shall be controlled as a function of engine coolant temperature to provide fast, stable operation at varying engine operating temperature conditions. The control system shall actively control the fuel rate as appropriate to the state of the engine generator. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed, accelerating to rated speed, and operating in various isochronous states.
- G. Cooling System: Closed loop, liquid cooled
 - 1. The generator set manufacturer shall provide prototype test data for the specific hardware proposed demonstrating that the machine will operate at rated standby load in an outdoor ambient condition of 40 deg C.
 - 2. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
 - 3. Size of Radiator overflow tank: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
 - 4. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
 - 5. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
 - 6. Duct Flange: Generator sets installed indoors shall be provided with a flexible radiator duct adapter flange.
- H. Muffler/Silencer: Selected with performance as required to meet sound requirements of the application, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements. For generator sets with outdoor enclosures the silencer shall be inside the enclosure.
- I. Air-Intake Filter: Engine-mounted air cleaner with replaceable dry-filter element and restriction indicator.
- J. Starting System: 12 or 24V, as recommended by the engine manufacturer; electric, with negative ground.
 - 1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
 - 2. Cranking Cycle: As required by NFPA 110 for level 1 systems.
 - 3. Battery Cable: Size as recommended by engine manufacturer for cable length as required. Include required interconnecting conductors and connection accessories.
 - 4. Battery Compartment: Factory fabricated of metal with acid-resistant finish.
 - 5. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation. The battery charging alternator shall have sufficient capacity to recharge the batteries with all parasitic loads connected within 4 hours after a normal engine starting sequence.

6. Battery Chargers: Unit shall comply with UL 1236, provide fully regulated, constant voltage, current limited, battery charger for each battery bank. It will include the following features:
 - a. Operation: Equalizing-charging rate based on generator set manufacturer's recommendations shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
 - b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 20 deg C to plus 40 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
 - c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
 - d. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
 - e. Provide LED indication of general charger condition, including charging, faults, and modes. Provide a LCD display to indicate charge rate and battery voltage. Charger shall provide relay contacts for fault conditions as required by NFPA110.
 - f. Enclosure and Mounting: NEMA, Type 1, wall-mounted cabinet.

2.4 CONTROL AND MONITORING

- A. Engine generator control shall be microprocessor based and provide automatic starting, monitoring, protection and control functions for the unit.
- B. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. (Switches with different configurations but equal functions are acceptable.) When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of the local (generator set-mounted) and/or remote emergency-stop switch also shuts down generator set.
- C. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of the local (generator set-mounted) and/or remote emergency-stop switch also shuts down generator set.
- D. Configuration: Operating and safety indications, protective devices, system controls, engine gages and associated equipment shall be grouped in a common control and monitoring panel. Mounting method shall isolate the control panel from generator-set vibration. AC output power circuit breakers and other output power equipment shall not be mounted in the control enclosure.
- E. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:
 1. AC voltmeter (3-phase, line to line and line to neutral values).
 2. AC ammeter (3-phases).
 3. AC frequency meter.
 4. AC kVA output (total and for each phase). Display shall indicate power flow direction.
 5. Ammeter-voltmeter displays shall simultaneously display conditions for all three phases.

6. Emergency Stop Switch: Switch shall be a red "mushroom head" pushbutton device complete with lock-out/tag-out provisions. Depressing switch shall cause the generator set to immediately stop the generator set and prevent it from operating.
 7. Fault Reset Switch: Supply a dedicated control switch to reset/clear fault conditions.
 8. DC voltmeter (alternator battery charging).
 9. Engine-coolant temperature gage.
 10. Engine lubricating-oil pressure gage.
 11. Running-time meter.
 12. Generator-voltage and frequency digital raise/lower switches. Rheostats for these functions are not acceptable. The control shall adjustment of these parameters in a range of plus or minus 5% of the voltage and frequency operating set point (not nominal voltage and frequency values.)
 13. AC Protective Equipment: The control system shall include over/under voltage, over current, short circuit, loss of voltage reference, and over excitation shut down protection. There shall be an overload warning, and overcurrent warning alarm.
 14. Status LED indicating lamps to indicate remote start signal present at the control, existing alarm condition, not in auto, and generator set running.
 15. A graphical display panel with appropriate navigation devices shall be provided to view all information noted above, as well as all engine status and alarm/shutdown conditions (including those from an integrated engine emission control system). The display shall also include integrated provisions for adjustment of the gain and stability settings for the governing and voltage regulation systems.
 16. Panel lighting system to allow viewing and operation of the control when the generator room or enclosure is not lighted.
 17. DC control Power Monitoring: The control system shall continuously monitor DC power supply to the control, and annunciate low or high voltage conditions. It shall also provide an alarm indicating imminent failure of the battery bank based on degraded voltage recover on loading (engine cranking).
- F. Remote Alarm Annunciator: Comply with NFPA 110. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition.
- G. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

2.5 GENERATOR OVERCURRENT AND FAULT PROTECTION

- A. Generator Overcurrent Protection: The generator set shall be provided with a UL Listed/CSA Certified protective device that is coordinated with the alternator provided to prevent damage to the generator set on any possible overload or overcurrent condition external to the machine. The protective device shall be listed as a utility grade protective device under UL category NRGU. The control system shall be subject to UL follow-up service at the manufacturing location to verify that the protective system is fully operational as manufactured. Protector shall perform the following functions:
1. Initiates a generator kW overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
 2. Under single phase or multiple phase fault conditions, or on overload conditions, indicates an alarm conditions when the current flow is in excess of 110% of rated current for more than 10 seconds.

3. Under single phase or multiple phase fault conditions, operates to switch off alternator excitation at the appropriate time to prevent damage to the alternator.
4. The operator panel shall indicate the nature of the fault condition as either a short circuit or an overload.
5. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot greater than 120% of nominal voltage.
6. The protective system provided shall not include an instantaneous trip function.

2.6 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

- A. Comply with NEMA MG 1.
- B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.
- C. Electrical Insulation: Class H
- D. Temperature Rise: 105 / Class F environment.
- E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, over speed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.
- F. Permanent Magnet Generator (PMG) shall provide excitation power for optimum motor starting and short circuit performance.
- G. Enclosure: Drip-proof.
- H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified. The voltage regulation system shall be microprocessor-controlled, 3-phase true RMS sensing, full wave rectified, and provide a pulse-width modulated signal to the exciter. No exceptions or deviations to these requirements will be permitted.
- I. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.
- J. Subtransient Reactance: 12 percent maximum, based on the rating of the engine generator set.

2.7 OUTDOOR GENERATOR-SET ENCLOSURE

- A. Description: Sound Attenuated Aluminum housing. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Instruments, control, and battery system shall be mounted within enclosure.
- B. Construction:
 1. Louvers: Equipped with bird screen to permit air circulation when engine is not running while excluding birds and rodents.
 2. Hinged Doors: With padlocking provisions. Restraint/Hold back hardware to prevent door to keep door open at 180 degrees during maintenance. Rain lips over all doors.
 3. Exhaust System:
 - a. Muffler Location: Within enclosure.
 4. Hardware: All hardware and hinges shall be stainless steel.
 5. Wind Rating: Wind rating shall be 150 mph
 6. Mounting Base: Suitable for mounting on sub-base fuel tank or housekeeping pad.
 7. A weather protective enclosure shall be provided which allows the generator set to operate at full rated load with a static pressure drop equal to or less than 0.5 inches of water.
 8. Inlet ducts shall include rain hoods

- C. Engine Cooling Airflow through Enclosure: Housing shall provide ample airflow for engine generator operation at rated load in an ambient temperature of 40 deg C.
- D. Sound Performance: Reduce the sound level of the engine generator while operating at full rated load to a maximum of 79 dBA measured at any location 23 ft from the engine generator in a free field environment.
- E. Site Provisions:
 - 1. Lifting: Complete assembly of engine generator, enclosure shall be designed to be lifted into place as a single unit, using spreader bars.

2.8 VIBRATION ISOLATION DEVICES

- A. Vibration Isolation: Generators installed on grade shall be provided with elastomeric isolator pads integral to the generator, unless the engine manufacturer requires use of spring isolation.
 - 1. IBC Compliance: Isolators complying with IBC requirements shall be specified in the equipment documentation, as well as the installation requirements for the unit.

2.9 FINISHES

- A. Indoor and Outdoor Enclosures and Components: Powder-coated and baked over corrosion-resistant pretreatment and compatible primer. Manufacturer's standard color or as directed on the drawings.

2.10 SOURCE QUALITY CONTROL

- A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.
 - 1. Tests: Comply with NFPA 110, Level 1 Energy Converters. In addition, the equipment engine, skid, cooling system, and alternator shall have been subjected to actual prototype tests to validate the capability of the design under the abnormal conditions noted in NFPA110. Calculations and testing on similar equipment which are allowed under NFPA110 are not sufficient to meet this requirement.
- B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:
 - 1. Test engine generator set manufactured for this Project to demonstrate compatibility and functionality.
 - 2. Full load run.
 - 3. Maximum power.
 - 4. Voltage regulation.
 - 5. Steady-state governing.
 - 6. Single-step load pickup.
 - 7. Simulated safety shutdowns.
 - 8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Comply with packaged engine-generator manufacturers' written installation, application, and alignment instructions and with NFPA 110.

- B. Equipment shall be installed by the contractor in accordance with final submittals and contract documents. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.
- C. Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections (when required), under the supervision of the equipment supplier.
- D. Contractor shall coordinate remote pushbutton location (when required) with engineer prior to installation. Provide allowance for 75' of conduit and required cabling unless otherwise located on plans.
- E. Contractor shall provide all interconnections and conduit between generator and remote annunciator including conduit and cabling.
- F. Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer's instructions and seismic requirements of the site.
- G. Equipment shall be initially started and operated by representatives of the manufacturer. All protective settings shall be adjusted as instructed by the consulting engineer.
- H. All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to initial operation and final testing of the system.
- I. On completion of the installation by the electrical contractor, the generator set supplier shall conduct a site evaluation to verify that the equipment is installed per manufacturer's recommended practice.

3.2 ON-SITE ACCEPTANCE TEST

- A. The complete installation shall be tested to verify compliance with the performance requirements of this specification following completion of all site work. Testing shall be conducted by representatives of the manufacturer, with required fuel supplied by Contractor. The Engineer shall be notified in advance and shall have the option to witness the tests. The generator set manufacturer shall provide a site test specification covering the entire system. Tests shall include:
- B. Prior to start of active testing, all field connections for wiring, power conductors, and bus bar connections shall be checked for proper tightening torque.
- C. Installation acceptance tests to be conducted on site shall include a "cold start" test, a two hour full load (resistive) test, and a one-step rated load pickup test in accordance with NFPA 110. Provide a resistive load bank and make temporary connections for full load test, if necessary.
- D. Perform a power failure test on the entire installed system. This test shall be conducted by opening the power supply from the utility service, and observing proper operation of the system for at least 2 hours. Coordinate timing and obtain approval for start of test with site personnel.

3.3 TRAINING

- A. The equipment supplier shall provide training for the facility operating personnel covering operation and maintenance of the equipment provided. The training program shall be not less than 4 hours in duration and the class size shall be limited to 5 persons. Training date shall be coordinated with the facility owner.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

3.5 SERVICE AND SUPPORT

- A. The generator set supplier shall maintain service parts inventory for the entire power system at a central location which is accessible to the service location 24 hours per day, 365 days per year. The inventory shall have a commercial value of \$3 million or more. The manufacturer of the generator set shall maintain a central parts inventory to support the supplier, covering all the major components of the power system, including engines, alternators, control systems, paralleling electronics, and power transfer equipment.
- B. The generator set shall be serviced by a local service organization that is trained and factory certified in generator set service. The supplier shall maintain an inventory of critical power system replacement parts in the local service location. Service vehicles shall be stocked with critical replacement parts. The service organization shall be on call 24 hours per day, 365 days per year. The service organization shall be physically located within 100 miles of the site.
- C. The manufacturer shall maintain model and serial number records of each generator set provided for at least 20 years.

END OF SECTION

SECTION 26 36 23

AUTOMATIC TRANSFER SWITCHES

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 transfer switches rated 600 V and less, including the following:
 - 1. Automatic transfer switches
 - 2. Remote annunciation systems
- B. Related Sections include the following:

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.
 - 1. Technical data on all major components of all transfer switches and other products described in this section. Data is required for the transfer switch mechanism, control system, cabinet, and protective devices specifically listed for use with each transfer switch. Include steady state and fault current ratings, weights, operating characteristics, and furnished specialties and accessories.
 - 2. Single Line Diagram: Show connections between transfer switch, power sources and load.
- B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.
 - 1. Dimensioned outline drawings of assembly, including elevations, sections, and details including minimal clearances, conductor entry provisions, gutter space, installed features and devices and material lists for each switch specified.
 - 2. Internal electrical wiring and control drawings.
 - 3. Interconnection wiring diagrams, showing recommended conduit runs and point-to-point terminal connections to generator set.
 - 4. Installation and mounting instructions, including information for proper installation of equipment to meet seismic requirements.
- C. Manufacturer and Supplier Qualification Data
 - 1. The transfer switch manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.
 - 2. The manufacturer of this equipment shall have produced similar equipment for a minimum period of 10 years. When requested, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.
- D. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
 - 1. Features and operating sequences, both automatic and manual.

2. List of all factory settings of relays, timers and protective devices; provide setting and calibration instructions where applicable.
- E. Warranty documents demonstrating compliance with the project's contract requirements.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: The equipment supplier shall maintain a service center capable of providing training, parts, maintenance and emergency repairs to equipment, including transfer switch generator sets and remote monitoring equipment (if applicable) at the site within a response period of less than (eight hours or appropriate time period designated for Project) from time of notification.
1. The transfer switch shall be serviced by technicians employed by, and specially trained and certified by, the generator set supplier and the supplier shall have a service organization that is factory-certified in both generator set and transfer switch service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.
 2. Submit names, experience level, training certifications, and locations for technicians that will be responsible for servicing equipment at this site.
 3. The manufacturer shall maintain model and serial number records of each transfer switch provided for at least 20 years.
- B. Source Limitations: All transfer switches are to be obtained through one source from a single manufacturer. The generator set manufacturer shall warrant transfer switches to provide a single source of responsibility for products provided.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked as suitable for use in emergency, legally required or optional standby use as appropriate for the connected load.
- D. The automatic transfer switch installation and application shall conform to the requirements of the following codes and standards:
1. Transfer switches and enclosures shall be UL 1008 listed and labeled as suitable for use in emergency, legally required, and optional standby applications.
 2. CSA 282, Emergency Electrical Power Supply for Buildings, and CSA C22.2, No. 14-M91 Industrial Control Equipment
 3. NFPA 70, National Electrical Code. Equipment shall be suitable for use in systems in compliance with Articles 700, 701 and 702.
 4. Comply with NEMA ICS 10-1993 AC Automatic Transfer Switches
 5. IEEE 446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
 6. EN55011, Class B Radiated Emissions and Class B Conducted Emissions
 7. IEC 1000-4-5 (EN 61000-4-5); AC Surge Immunity
 8. IEC 1000-4-4 (EN 61000-4-4) Fast Transients Immunity
 9. IEC 1000-4-2 (EN 61000-4-2) Electrostatic Discharge Immunity
 10. IEC 1000-4-3 (EN 61000-4-3) Radiated Field Immunity
 11. IEC 1000-4-6 Conducted Field Immunity
 12. IEC 1000-4-11 Voltage Dip Immunity
 13. IEEE 62.41, AC Voltage Surge Immunity

14. IEEE 62.45, AC Voltage Surge Testing

- E. Comply with NFPA 110 – Emergency and Standby Power Systems. The transfer switch shall meet all requirements for Level 1 systems, regardless of the actual circuit level.
- F. The manufacturer shall warrant the material and workmanship of the transfer switch equipment for a minimum of five (5) year from the warranty start date. The warranty start date is the date of registered commissioning and start up or eighteen (18) months from date of shipment, whichever is sooner.
- G. The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, repair parts cost, and etc. during the minimum noted warranty period described above.

1.5 COORDINATION

- A. Size and location of concrete bases and anchor bolt inserts shall be coordinated. Concrete, reinforcement and formwork must meet the requirements specified in Division 03. See section "INSTALLATION" for additional information on installation

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cummins Power Generation
 - 2. ASCO
 - 3. Trystar (Docking stations & Manual Transfer Switches)
- B. Switches manufactured by other manufacturers that meet the requirement of this specification are acceptable, if approved not less than two weeks before scheduled bid date. Proposals must include a line-by-line compliance statement based on this specification.
- C. Transfer switches utilizing molded case circuit breakers do not meet the requirements of this specification and will not be accepted.

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

- A. Provide transfer switches in the number and ratings that are shown on the drawings.
- B. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer.
- C. Fault-Current Closing and Withstand Ratings: UL 1008 WCR ratings must be specifically listed as meeting the requirements for use with protective devices at installation locations, under specified fault conditions. Withstand and closing ratings shall be based on use of the same set of contacts for the withstand test and the closing test.
- D. Solid-State Controls: All settings should be accurate to +/- 2% or better over an operating temperature range of - 40 to + 60 degrees C (- 40 to + 140 degrees F).
- E. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- F. Electrical Operation: Accomplished by a non-fused, momentarily energized solenoid or electric motor operator mechanism, mechanically and electrically interlocked in both directions (except that mechanical interlock is not required for closed transition switches).
- G. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

1. Switches using molded-case switches or circuit breakers, or insulated case circuit breaker components are not acceptable.
2. Transfer switches shall be double-throw, electrically and mechanically interlocked, and mechanically held in the Source 1 and Source 2 positions.
3. Main switch contacts shall be high pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishing. Arc chutes shall have insulating covers to prevent inter-phase flashover.
4. Contacts shall be operated by a high-speed electrical mechanism that causes contacts to open or close within three electrical cycles from signal.
5. Transfer switch shall be provided with flame retardant transparent covers to allow viewing of switch contact operation but prevent direct contact with components that could be operating at line voltage levels.
6. The transfer switch shall include the mechanical and control provisions necessary to allow the device to be field-configured for operating speed. Transfer switch operation with motor loads shall be as is recommended in NEMA MG1.
 - a. Phase angle monitoring/timing equipment is not an acceptable substitute for this functionality
7. Transfer switches designated on the drawings as "4-pole" shall be provided with a switched neutral pole switched which is switched simultaneously with phase poles.
8. Transfer switches designated on the drawings as "service entrance" switches shall meet the requirements of section "SERVICE ENTRANCE TRANSFER SWITCHES" of this specification.
- H. Control: Transfer switch control shall be capable of communicating with the genset control, other switches and remote programming devices over a high-speed network interface.
- I. Factory wiring: Transfer switch internal wiring shall be composed of pre-manufactured harnesses that are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s), to allow the control system to be easily disconnected and serviced without disconnecting power from the transfer switch mechanism
- J. Terminals: Terminals shall be pressure type and appropriate for all field wiring. Control wiring shall be equipped with suitable lugs, for connection to terminal strips.
- K. Enclosures: All enclosures shall be third-party certified for compliance to NEMA ICS 6 and UL 508, unless otherwise indicated:
 1. The enclosure shall provide wire bend space in compliance to the latest version of NFPA70, regardless of the direction from which the conduit enters the enclosure.
 2. Exterior cabinet doors shall provide complete protection for the system's internal components. Doors must have permanently mounted key-type latches. Bolted covers or doors are not acceptable.
 3. Transfer switches shall be provided in enclosures that are third party certified for their intended environment per NEMA requirements.
 4. Indoor transfer switches shall be NEMA-1. Outdoor transfer switches shall be NEMA-3R.

2.3 SERVICE ENTRANCE TRANSFER SWITCHES

- A. Transfer switches must be specifically intended for service entrance applications, and labeled "Suitable for service entrance use only"
- B. Transfer switch shall meet NEC requirements for emergency, legally required and standby applications as specified in UL 1008.

- C. Entire transfer switch including enclosure must be listed and labeled to UL 1008; switches with only the mechanism listed are not acceptable.
- D. Molded case circuit breaker must be UL 489 listed.

2.4 MANUAL TRANSFER SWITCHES (MTS)

- A. The transfer switch unit shall be manually operated and mechanically held. The switch shall be mechanically interlocked to ensure only one of three possible positions, Source 1, Source 2, or Center Off. Fused disconnect type switches shall not be acceptable.
- B. The switch shall be positively locked and unaffected by momentary outages so that contact pressure is maintained at a constant value and temperature rise at the contacts is minimized for maximum reliability and operating life.
- C. All main contacts shall be silver composition. Switches rated 600 amperes and above shall have segmented blow-on construction for high withstand current capability and be protected by separate arcing contacts.
- D. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors.
- E. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof which are not intended for continuous duty, repetitive switching or transfer between two active power sources are not acceptable.
- F. Where neutral conductors must be switched, the MTS shall be provided with fully-rated neutral transfer contacts.
- G. Where neutral conductors are to be solidly connected, a neutral terminal plate with fully-rated AL-CU pressure connectors shall be provided.
- H. The MTS shall be tested in accordance with UL 1008 for transfer switches. Switch ratings of 260 amperes and less shall have endurance rating of 6000 cycles, 400 ampere shall have endurance rating of 4000 cycles, and 600 – 1200 ampere shall have endurance rating of 3000 cycles.
- I. Operation:
 - 1. The transfer switch shall be arranged for manually actuated manual operation.
 - 2. The manual transfer shall be actuated via a mechanical operating mechanism.
 - 3. The manual operating handle shall be capable of external operation without opening the enclosure door.
 - 4. It shall have the same contact to contact speed as automatic operation
 - 5. There shall be three positions for manual operation:
 - a. Connected to Source 1 (preferred)
 - b. Connected to Source 2 (alternate)
 - c. Connect to center off (disconnected position)
 - 6. Switch position when connected to Source 1, or Source 2 shall be pad – lockable
- J. Additional Features:
 - 1. Mechanical position indicators (yellow) visible to the operator shall be included for Source 1 (preferred), Source 2, (alternate), and Center Off (disconnected).
 - 2. LED indicators for Source 1 (preferred), and Source 2 (alternate).
 - 3. Auxiliary position indicating contacts, rated 10 amps, 250 Vac shall be provided consisting of one closed when the MTS is connected to Source 1 (preferred), and one contact closed when the MTS is connected to Source 2 (alternate)

4. A form A contact shall be provided to indicate switch is in the Center Off (disconnected) position.
5. Auxiliary Contacts: Position indicating contacts, rated 10 amps, 250 Vac shall be provided consisting of two closed when the MTS is connected to Source 1 (preferred), and two contact closed when the MTS is connected to Source 2 (alternate).
6. Integrated Quick Connects: contains quick connects which provide a connecting means for connecting a portable generator.
 - a. Quick connects shall be located on Source 2 (emergency):
 - i. For 400A and below models, there shall be one (1) row of up to five (5) series single pole connections.
 - ii. For 600A - 800A models, there shall be two (2) rows of up to five (5) single pole connections.
 - iii. For 1000A-1200A models, there shall be three (3) rows of up to 5 single pole connections.
 - b. All electrical connections shall be 16 cam type single pole connectors, available color coded as per industry standard practice.

K. Withstand and Closing Ratings:

1. The MTS shall be rated to close on and withstand the available RMS symmetrical short circuit current at the MTS terminals with the type of overcurrent protection shown on the plans. WCR MTS ratings @ 480v shall be as follows when used with specific circuit breakers or current limiting fuses:

MTS Ampacity	Withstand & Closing Rating MCCB	W/CLF
150-600	50,000A	200,000
800-1200	65,000A	200,000

PART 3 EXECUTION

3.1 INSTALLATION

- A. Design each fastener and support to carry load indicated by seismic requirements and according to seismic-restraint details. See Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
- B. Floor-Mounting Switch: Anchor to floor by bolting.
 1. Floor-mounted transfer switches (except drawout switches supported by wheeled carriages, which must be rolled out at floor level) shall be mounted on concrete bases complying with the following requirements:
 - a. Concrete Bases: 4 inches (100 mm) high, reinforced, with chamfered edges. Extend base no more than 4 inches (100 mm) in all directions beyond the maximum dimensions of switch, unless otherwise indicated or unless required for seismic support. Construct concrete bases according to Division 26 Section "Hangers and Supports for Electrical Systems." Where Section "Hangers and supports for Electrical Systems." Is not included in the spec book refer to Division 26 Section "Basic Electrical Requirements".
- C. Annunciator Panel Mounting: Flush in wall, unless otherwise indicated.
- D. Identify components according to Division 26 Section "Identification for Electrical Systems." Where section "Identification for Electrical Systems" is not included in the spec book refer to Division 26 section "Basic Electrical Requirements"

- E. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

3.2 CONNECTIONS

- A. Wiring to Remote Components: Match type and number of cables and conductors to control and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.
- B. Field control connections shall be made on a common terminal block that is clearly and permanently labeled.
- C. Transfer switch shall be provided with AL/CU mechanical lugs sized to accept the full output rating of the switch. Lugs shall be suitable for the number and size of conductors shown on the drawings.
- D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems." Where section "Grounding and Bonding for Electrical Systems" is not included in the spec book refer to Division 26 section "Basic Electrical Requirements"
- E. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables." Where section "Grounding and Bonding for Electrical Systems" is not included in the spec book refer to Division 26 section "Basic Electrical Requirements"

3.3 SOURCE QUALITY CONTROL

- A. Prior to shipping, factory shall test and inspect components, assembled switches, and associated equipment to ensure proper operation.
- B. Factory shall check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements.
- C. Factory shall perform dielectric strength test complying with NEMA ICS 1.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: The supplier of the transfer switch(es) and associated equipment shall inspect, test, and adjust components, assemblies, and equipment installations, including connections, and report results in writing.
- B. Manufacturer's representative shall perform tests and inspections and prepare test reports.
- C. After installing equipment and after electrical circuitry has been energized, installer shall test for compliance with requirements.
 - 1. Perform recommended installation tests as recommended in manufacturer's installation and service manuals.
 - 2. After energizing circuits, demonstrate interlocking sequence and operational function for each switch.
 - a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
 - b. Verify time-delay settings.
 - c. Verify that the transfer switch is accurately metering AC voltage and current.
 - d. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.
- D. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
3. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 DEMONSTRATION

- A. After generator set installation, the generator and transfer switch supplier shall conduct a complete operation, basic maintenance, and emergency service seminar covering generator set and transfer switch equipment, for up to 10 people employed by the Owner.
 1. The seminar shall include instruction on operation of the transfer equipment, normal testing and exercise, adjustments to the control system, use of the PC based service and maintenance tools provided under this contract, and emergency operation procedures.
 2. The class duration shall be at least 8 hours in length, and include practical operation with the installed equipment.

3.6 SERVICE AND SUPPORT

- A. The manufacturer shall supply the Service Provider with a complete set of the service and maintenance software required to support the product. The software shall be provided at a training class attended by the user, to qualify the user in proper use of the software. The software shall have the following features and capabilities:
 1. The software shall allow adjustment of all functions described herein, adjustment of operating levels of all protective functions, and programming of all optional functions in the controller. Adjustments shall be possible over modem from a facility that is remote from the generator set.
 2. The software shall be capable of storing and displaying data for any function monitored by the generator set control. This data shall be available in common file formats, and on graphical "strip chart" displays.
 3. The software shall automatically record all control operations and adjustments performed by any operator or software user, for tracking of changes to the control.
 4. The software shall display all warning, shutdown, and status changes programmed into transfer switch controller. For each event, the control shall provide information on the nature of the event, when it last occurred, and how many times it has occurred.

END OF SECTION

SECTION 26 43 13

TVSS FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes Transient Voltage Surge Suppression for low-voltage power, control, and communication equipment.

1.2 DEFINITIONS

- A. SVR: Suppressed voltage rating.
- B. TVSS: Transient voltage surge suppressor.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating weights, operating characteristics, furnished specialties, and accessories.
- B. Product Certificates: For transient voltage suppression devices, signed by product manufacturer certifying compliance with the following standards:
 - 1. UL 1283.
 - 2. UL 1449.
 - 3. MIL-STD 220A. Conduct spectrum analysis of each unit based on test procedures between 50kHz and 200kHz indicating the device noise attenuation.
 - 4. ANSI/IEEE C62.41 and ANSI/IEEE C62.45: Provide certified documentation of applicable Location Category Testing in full compliance guidelines.
- C. Shop Drawings: Submit shop drawings to indicate information not fully described by the product data.
 - 1. Include electrical characteristics and ratings for the specified equipment.
 - 2. Include wiring diagrams indicating the internal connections of the specified equipment within its enclosure.
 - 3. Indicate device dimensions, weights, mounting provisions, and connection details.
- D. Warranty: Warranty statement clearly establishing the terms and conditions to the building/facility owner/operator.
- E. Operation and Maintenance Data: For transient voltage suppression devices to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain suppression devices and accessories through one source from a single manufacturer.
- 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. Comply with IEEE C62.41, "IEEE Guide for Surge Voltages in Low Voltage AC Power Circuits," and test devices according to IEEE C62.45, "IEEE Guide on Surge Testing for Equipment Connected to Low-Voltage AC Power Circuits."
- D. Comply with NEMA LS 1, "Low Voltage Surge Protection Devices."
- E. Comply with UL 1283, "Electromagnetic Interference Filters," and UL 1449, "Transient Voltage Surge Suppressors."

1.5 COORDINATION

- A. Coordinate location of field-mounted surge suppressors to allow adequate clearances for maintenance.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fail in materials or workmanship within ten years from date of Substantial Completion.

1.7 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. Replaceable Protection Modules: One of each size and type installed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ABB, Electrification Business
 - 2. Eaton
 - 3. Siemens Industry, Inc
 - 4. Square D

2.2 COMMON REQUIREMENTS FOR SUPPRESSORS

- A. Surge Protection Device Description: Modular design with field-replaceable modules, sine-wave-tracking type with the following features and accessories:
 - 1. Fuses, rated at 200-kA interrupting capacity.
 - 2. Fabrication using bolted compression lugs for internal wiring.
 - 3. Redundant suppression circuits.
 - 4. Redundant replaceable modules.
 - 5. Arrangement with wire connections to phase buses, neutral bus, and ground bus.
 - 6. LED indicator lights for power and protection status.
 - 7. Audible alarm, with silencing switch, to indicate when protection has failed.
 - 8. One set of dry contacts rated at 5 A and 250-V ac, for remote monitoring of protection status. Coordinate with building power monitoring and control system.

9. Surge-event operations counter: Six-digit transient counter set to total all transient surges that deviate from the fundamental sine wave by more than 125V.
 10. Normal Audible Noise less than 0dB.
 11. EMI/RFI Noise attenuation: Exceeding 55dB at 100kHz, using 50 ohm insertion loss test.
 12. Magnetic Fields: No appreciable magnetic fields shall be generated. The device shall be capable of use directly in computer rooms in any location without danger to data storage systems or devices.
 13. Leakage Current less than 1mA.
- B. Integral Disconnect Switch (If Required, Refer to "Installation of Surge Protection Devices")
1. The device shall have an optional NEMA compliant safety interlocked integral disconnect switch with an externally mounted metal manual operator.
 2. The switch shall disconnect all ungrounded circuit conductors from the distribution system to enable testing and maintenance without interruption to the facility's distribution system.
 3. The switch shall be rated for 600Vac.
 4. The SPD device shall be tested to UL1449 3rd Edition listed with the integral disconnect switch and the UL1449 VPR ratings shall be provided.
 5. The integral disconnect switch shall be capable of withstanding, without failure, the published maximum surge current magnitude without failure or damage to the switch.
 6. The line side of the integral disconnect shall be blocked off so that when the SPD is opened there is no direct access to the voltage present on the line side of the disconnect.

2.3 SERVICE ENTRANCE SUPPRESSORS (CAT C)

- A. Service Entrance Suppressors to meet "Common Requirements for Suppressors" listed above, unless otherwise indicated.
- B. Maximum Category C combination wave clamping voltage shall not exceed the following:
1. 600V, line to neutral and line to ground on 120/208 V systems.
 2. 1000V, line to neutral and line to ground on 277/480 V systems
- C. Withstand Capabilities: 3000 Category C surges with less than 5 percent change in clamping voltage.
- D. Peak Single-Impulse Surge Current Rating:
1. 320/160 kA per phase/mode.
- E. Connection Means: Permanently wired.
- F. Protection modes and UL 1449 SVR for grounded wye circuits with voltages of 480Y/277, 3- phase, 4-wire circuits shall be as follows:
1. For Non-Fused Devices:
 - a. Line to Neutral: 800 V for 480Y/277.
 - b. Line to Ground: 800 V for 480Y/277.
 - c. Neutral to Ground: 800 V for 480Y/277.
 2. For Fused Devices:

- a. Line to Neutral: 1000 V for 480Y/277.
- b. Line to Ground: 1000 V for 480Y/277.
- c. Neutral to Ground: 1000 V for 480Y/277.

2.4 DISTRIBUTION PANELBOARD SUPPRESSORS (CAT B)

- A. Distribution Panelboard Suppressors to meet "Common Requirements for Suppressors" listed above, unless otherwise indicated.
- B. Maximum Category B combination wave clamping voltage shall not exceed the following:
 - 1. 600V, line to neutral and line to ground on 120/208 V systems.
 - 2. 1000V, line to neutral and line to ground on 277/480 V systems
- C. Withstand Capabilities: 3000 Category B surges with less than 5 percent change in clamping voltage.
- D. Peak Single-Impulse Surge Current Rating:
 - 1. 240/120 kA per phase/mode.
- E. Protection modes and UL 1449 SVR for grounded wye circuits with voltages of 480Y/277, 3- phase, 4-wire circuits shall be as follows:
 - 1. For Non-Fused Devices:
 - a. Line to Neutral: 800 V for 480Y/277.
 - b. Line to Ground: 800 V for 480Y/277.
 - c. Neutral to Ground: 800 V for 480Y/277.
 - 2. For Fused Devices:
 - a. Line to Neutral: 1000 V for 480Y/277.
 - b. Line to Ground: 1000 V for 480Y/277.
 - c. Neutral to Ground: 1000 V for 480Y/277.

2.5 LIGHTING AND APPLIANCE PANELBOARD SUPPRESSORS (CAT A)

- A. Lighting and Appliance Panelboard Suppressors to meet "Common Requirements for Suppressors" listed above, unless otherwise indicated.
- B. Maximum Category B combination wave clamping voltage shall not exceed the following:
 - 1. 600V, line to neutral and line to ground on 120/208 V systems.
 - 2. 1000V, line to neutral and line to ground on 277/480 V systems
- C. Withstand Capabilities: 3000 Category B surges with less than 5 percent change in clamping voltage.
- D. Peak Single-Impulse Surge Current Rating:
 - 1. 80/40 kA per phase/mode.
- E. Protection modes and UL 1449 SVR for grounded wye circuits with voltages of 480Y/277 or 208Y/120, 3-phase, 4-wire circuits shall be as follows:
 - 1. For Non-Fused Devices:
 - a. Line to Neutral: 800 V for 480Y/277 and 400 V for 208Y/120.

- b. Line to Ground: 800 V for 480Y/277 and 400 V for 208Y/120.
- c. Neutral to Ground: 800 V for 480Y/277 and 400 V for 208Y/120.

2.6 ENCLOSURES

- A. NEMA 250, with type matching the enclosure of panel or device being protected.

PART 3 EXECUTION

3.1 INSTALLATION OF SURGE PROTECTION DEVICES

- A. Install devices at service entrance on load side, with ground lead bonded to service entrance ground.
- B. Install devices for panelboard and auxiliary panels with conductors or buses between suppressor and points of attachment as short and straight as possible. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.
 - 1. Provide multipole, 60-A frame circuit breaker as a dedicated disconnect for suppressor, unless otherwise indicated. Comply with manufacturer's written recommendation for conductor and trip rating of circuit-breaker for connecting TVSS devices to distribution system. Match circuit-breaker size to conductor size.
 - 2. Where the panel on plan does not indicate a dedicated breaker for SPD. An integral disconnect shall be provided as described in "Common Requirements For Suppressors"

3.2 FIELD QUALITY CONTROL

- A. Prepare for acceptance tests as follows:
 - 1. Test insulation resistance for each component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Testing Agency: Engage a qualified independent testing and inspecting agency as defined in Division 26 Section "Common Work Results for Electrical" to perform the following field tests and inspections and prepare certified test reports:
 - 1. After installing surge protection devices, but before electrical circuitry has been energized, test for compliance with requirements.
 - 2. Complete startup checks according to manufacturer's written instructions.
 - 3. Perform each visual and mechanical inspection and electrical test stated in NETA ATS 7.19.1, "Surge Arresters, Low-Voltage Surge Protection Devices" Section. Certify compliance with test parameters.

3.3 CLEANING

- A. Clean components according to manufacturer's written instructions.
- B. Prior to installation of front trim and cover plates inspect interior surfaces and perform the following:
 - 1. Remove paint splatters and other spots.

END OF SECTION

SECTION 26 50 00

LIGHTING

PART 1 GENERAL

1.1 LIGHTING SCHEDULE

- A. The Contractor shall install lighting fixtures and accessories as shown on the drawings and/or described herein. The Contractor shall also install lamps for all fixtures.

PART 2 PRODUCTS

2.1 LED LIGHTING

- A. Lighting fixtures with LED light sources shall meet the following fixture and light source requirements:
1. LED Color Temperature – Per Drawings
 2. CRI > 80
 3. Line Voltage – Universal Voltage 120-277 volts
 4. Governmental Standards – LM79 and LM80 Compliant
 5. Expected Lamp Life – LED Life Rating (L70 B10) to be 60,000 hours to 100,000 hours; Defined as time of operation (in hours) to 30% lumen depreciation (i.e. 70% lumen maintenance), derived from Luminaire in-situ temperature measurement testing (i.e. LED chip package temperature (TS) measurement obtained with the LED chip package operating in given luminaire and in a given stabilized ambient environment) under UL1598 environments and directly correlated to LED package manufacturers IESNA LM-80-08 data. Predicted (L70 B10) Limits (@ 25°C luminaire ambient operating environment): Greater than 60,000 hours @ 350mA Drive Current
 6. Driver – Components must be fully encased in potting material for moisture resistance, and must comply with IEC and FCC standards
 7. Surge Protection – Surge protection must be provided including separate surge protection built into electronic driver
 7. Mechanical – Luminaire LED system components to be low copper aluminum, with high performance heat sink(s) designed specifically for LED luminaires. No active cooling features (Fans, etc.). Luminaire configuration must allow for modular upgradability and/or field repair of all electrical components (i.e. LED modules, Driver(s), etc.). Drivers and vertical light bars must be all mounted to a twist-lock tool-less assembly for ease of installation and trouble-shooting.

2.2 LIGHTING ACCESSORIES

- A. All lighting shall be equipped with the appropriate housing for the ceiling type shown on the architectural reflected ceiling plan.
1. GYP Ceilings –
 - a. 1'X4' 2'X2' & 2'X4' Troffers: Provide flange kit or surface mount kit. If not explicitly indicated on plan contractor shall price based on the more costly product and submit an RFI to Engineer prior to purchase.
 - b. Downlights: Provide recessed housing and appropriate flange kit.
 - c. Strip lighting: Provide surface mount kit. In areas with ceiling heights greater than 10'

contractor shall provide chain suspension hardware.

- d. Architectural linear fixtures: Where indicated as recessed contractor shall provide flange kit or mud-in kit as required. If not explicitly indicated on plan contractor shall price based on the more costly product and submit an RFI to Engineer prior to purchase.
2. Grid Ceilings – Provide appropriate mounting hardware to recess fixtures into grid.
- B. Fire ratings: Lighting in fire rated ceiling shall be equipped with fire padding, caulking, and/or housings as required to maintain fire ratings. Contractor shall refer to architectural plans for all fire ratings prior to bid.
- C. Emergency battery backup and inverters:
 1. Where remote battery backup is utilized contractor shall coordinate all remote test switch locations with owner/architect prior to rough in. They shall not be located in ceiling adjacent to fixture.
 2. Where integral battery backup is utilized the fixture shall include self-diagnostics. This shall not be required if specified fixture does not include a self-diagnostic option.
 3. Where an inverter is utilized contractor shall provide UL924 transfer devices in the quantity required to accomplish control as shown on plans. Where inverter fixture utilized line voltage dimming contractor shall notify engineer immediately prior to bid.

2.3 OCCUPANCY SENSORS

- A. Sensor shall be a self-contained dual voltage ceiling mounted device capable of directly switching loads upon detection of human activity. Sensor must be circular, and mount to either a single gang enclosure, or surface mount to a round pancake box.
- B. Sensor must be rated for 120 through 277 VAC and be capable of switching zero to 1200 watts of electronic ballast loads. Sensors must be capable of parallel wiring for multi-sensor applications.
- C. Sensor time delay shall be factory set for typical applications, and field adjustable from 30 seconds to 20 minutes. Sensor must provide a green LED motion indicator. Red LED denoting life safety shall not be permitted.
- D. PIR sensing must utilize a high density Fresnel domed lens, providing a circular view pattern of at least 360 degrees by 56 degrees.
- E. Passive Dual Technology (PDT) sensing must incorporate PIR with Microphonics, which utilizes a passive microphone with automatic gain control (AGC) to sense both occupants moving and sounds. The PIR must be used to initiate an on condition, once on the PIR or Microphonics shall keep the load on. After the time delay expires and the load goes off, the Microphonics shall remain active up to 10 seconds as a back-up grace period.
- F. Wall box mounted occupancy sensors shall mount in a standard utility box. Sensor shall have self-contained relay (no power pack required), utilize PIR and microphonics detection, and include auto sensitivity adjustment. Wall box sensor shall be intrinsically grounded and include ON/OFF switch and adjustable time delay.
- G. Occupancy Sensor:
 1. Ceiling mount for offices and restrooms – Lutron #LOS-CUS-1000-WH / PP-DV; Wattstopper UT-305-2/BZ-50; Sensor Switch CM PDT9
 2. Wall mount for offices, storage rooms, etc. – Lutron #MS+OPS6M-DV-color; Wattstopper WD-170-FINISH; Sensor Switch WSX
 3. Ceiling mount in large rooms – Lutron #LOS-CDT-2000WH, with #PP-DV universal power pack;

Wattstopper DT-205 / BZ-50; Sensor Switch CM PDT10 with PP16

4. Wall/ceiling mount at end of corridors – Lutron #LOS-WIR-WH / PP-DV 1600'ft coverage; Wattstopper CX-105 / BZ-50; Sensor Switch WV16 with PP16
5. Wall/ceiling mount at center of corridors – Watt Stopper #CX-100-3 series, with #BZ-50 universal power pack; Sensor Switch WV16 with PP16
6. Room controllers – Wattstopper #LMRC-101; nLight #nPP 16

2.4 FIXTURES

- A. Fixtures as described in the Fixture Schedule on the drawings shall be furnished by the Contractor and shall be properly installed. Where fixtures are specified with emergency remote test switches, contractor shall coordinate location of remote test switch with Owner/Architect prior to installation.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Unless otherwise specified, lighting fixtures shall be permanently installed and connected to the wiring system.
- B. The Contractor shall support each fixture, independently from the building structure. Ceiling framing members shall not be used to support fixtures except in specified areas where ceiling supports for this purpose have been specified elsewhere in these specifications. Each fixture shall have at least two fixture supports.
- C. Flexible conduit used for fixture whips shall be at least twelve (12) inches, but not more than 48 inches long.
- D. Site lighting poles shall include a foundation with a minimum depth below grade of 8'. Those located within parking areas shall extend from grade 3' in pedestrian areas a reduction in foundation height is permitted, refer to foundation drawings for specific pedestrian area requirements.

3.2 CEILING COMPATIBILITY

- A. Catalog numbers shown on the drawings or descriptions of lighting fixtures contained herein may indicate fixture compatibility with certain types of ceiling construction. Contractor shall determine exact type of ceiling actually to be furnished in each area and shall obtain fixtures to suit, deviation from specified catalogue numbers or descriptions only where necessary and only to the extent necessary to ensure fixture/ceiling compatibility.

3.3 LIGHT LEAKS

- A. The Contractor shall, at the end of this project, adjust all recessed lighting fixtures so that there will be no light leaks between the fixture trim and the ceiling. Contractor shall also adjust recessed fluorescent fixtures to eliminate any light leaks between fixture trim and ceiling grid member.

3.4 LAMPS

- A. The Contractor shall install lamps in all fixtures and shall obtain replacement lamps should any not properly operate or become damaged during construction.

3.5 EXIT FIXTURES

- A. Exit fixtures shall be installed according to Life Safety Code requirements, with face(s) plainly visible and directional arrows indicating the proper direction of egress.

END OF SECTION

SECTION 27 00 00

STRUCTURED CABLING SYSTEM

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 PURPOSE

- A. This document defines the products and the execution requirements required to furnish and install a complete distribution system utilizing a structured cabling system.
- B. All cables and related terminations, support and grounding hardware shall be furnished, installed, tested, and documented by the structured cabling contractor as detailed in this document.
- C. The distribution system shall be all inclusive and represent a complete installation at the sites shown on the attached drawings and in the attached specifications. The Vendor shall be responsible for all parts, labor, and all other associated apparatus necessary to completely install, test and turnover for acceptance to the Customer the cabling system detailed herein.
- D. Product specifications and general design considerations are provided in this document. Quantities of telecommunication outlets, typical installation details, cable routing and outlet types will be provided as an attachment to this document. The successful vendor shall meet or exceed all requirements for the cable system described in this document.
- E. Refer to contract drawings for additional requirements to include color coding of faceplates, jacks and cables, labeling, installation, etc.

1.3 RELATED REQUIREMENTS

- A. Drawings and general provision of Contract, including General and Supplementary Conditions, Division 1 Specification, and Electrical sections apply to work in this section.
- B. Install raceways for auxiliary systems.
- C. Interior conduit EMT, minimum 1" unless noted otherwise.
- D. Conduit to extend from wall and floor outlets to above accessible ceiling and terminate with a bushing.
- E. All conduits indicated as spare shall have nylon pullcord.

1.4 REFERENCE STANDARDS

- A. ANSI/TIA/EIA-568B.1-Commercial building Telecommunications Cabling Standard, Part 1: General Requirements
- B. .ANSI/TIA/EIA-568-B.2-Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted Pair Cabling Components.
- C. ANSI/TIA/EIA-568-B.3- Optical Fiber Cabling Components Standard.
- D. ANSI/TIA/EIA-569B-Commercial Building Standard for Telecommunications Pathways and spaces.
- E. ANSI/TIA/EIA-606(A)-The Administration Standard for the Telecommunications Infrastructure of

Commercial Buildings.

- F. ANSI-J-STD-607(A)- Commercial Building Grounding and Bonding Requirements for Telecommunications.
- G. TIA-526-7-OFSTP-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
- H. TIA-526-14A-OFSTP-14 Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant.
- I. ANSI/TIA/EIA-758(A)- Customer-Owned Outside Plant Telecommunications Cabling Standard.
- J. TIA TSB-140 Additional Guidelines for Field Testing Length, Loss and Polarity of Optical
- K. ANSI/TIA/EIA 568 B-2.10- 10GIG ETHERNET
- L. Install Cabling in accordance with the most recent edition of BICSI publications.
 - 1. BICSI-Telecommunications Distribution Methods Manual.
 - 2. BICSI-Installation Transport Systems information Manual.
 - 3. BICSI-Network Design Reference Design Manual.
 - 4. BICSI-Outside Plant Design Reference Manual.
- M. Federal, State and local codes, rules, regulations, and ordinances governing the work, are fully part of the specifications as if herein repeated or hereto attached.
- N. If the contractor should note items in the drawings or the specifications, construction of which would be a code violation, promptly call them to the attention of the owner's representative in writing.
- O. Where the requirements of other sections of the specifications are more stringent than applicable codes, rules, regulations, and ordinances, the specifications shall apply.
- P. All material shall be listed by UL or other National Independent testing standard shall apply.
- Q. If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All construction documents listed are believed to be the most current. The Vendor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.
- R. This document does not replace any code, either partially or wholly. The Contractor must be aware of local codes that may impact this project.

1.5 APPROVED CONTRACTOR

- A. The Contractor shall have total responsibility for the coordination and installation of the work shown and described in the Drawings and Specifications. The Contractor shall be a company specializing in the design, fabrication and installation of integrated telecommunication systems.
- B. The installation of all cable, equipment, terminations, & associated services shall be performed by a company that is a Manufacturer's Certified Structured Cabling System Installer in good standing with a minimum of three (3) years of experience on similar systems.
- C. A copy of certification documents must be submitted with the product submittals for quote to be valid. The telecommunications contractor is responsible for workmanship and installation practices in accordance with the manufacturer's written policies.
- D. The cable or connectivity manufacturer will extend a 25-year manufacturer's warranty for all products

installed in this project to the end user once the telecommunications contractor fulfills all requirements under these specifications.

- E. The contractor must have an office with qualified service and installation personnel within 100 miles of the project site.
- F. The Telecommunications cabling contractor must provide a reference list with contact names and phone numbers for three (3) projects of similar scope.
- G. The contractor shall employ a full-time RCDD to perform the role of Project Manager. RCDD shall be available for consultation and to attend project meetings. The contractor shall not subcontract a third party RCDD.
- H. A BICSI certified installer shall be employed by the contractor and be on site as the installation manager.
- I. The owner reserves the right to require the Vendor to remove from the project any such employee the Owner deems to be incompetent, careless or insubordinate.
- J. All clean up activity related to work performed, will be the responsibility of the Contractor and must be completed daily before leaving the site.

1.6 COORDINATION WITH OTHER TRADES

- A. The Contractor shall coordinate telecommunications work with that of other Sections as required ensuring that the entire telecommunications work will be carried out in an orderly, complete and coordinated fashion.

1.7 SUBMITTALS

- A. Submit to the engineer/designer shop drawings, product data (including cut sheets and catalog information), and samples required by the contract documents. Submit shop drawings, product data, and samples with such promptness and in such sequence as to cause no delay in the work or in the activities of other contractors. The engineer/designer will indicate approval of shop drawings, product data, and samples submitted to the engineer by stamping submittals "APPROVED" with a stamp. Submitted shop drawings shall be initialed or signed by the contractor's legitimate firm name.
 - 1. By submitting shop drawings, product data, and samples, the Vendor represents that he/she carefully reviewed and verified materials, quantities, field measurements, and field construction criteria related thereto. It also represents that the Vendor has checked, coordinated, and verified that information contained within shop drawings, product data, and samples conform to the requirements of the work and of the contract documents.
 - 2. The engineer's/designer's approval of shop drawings, product data, and samples submitted by the Vendor shall not relieve the Vendor of responsibility for deviations from requirements of the contract documents, unless the Vendor has specifically informed the engineer/designer in writing of such deviation at time of submittal, and the engineer/designer has given written approval of the specific deviation. The vendor shall continue to be responsible for deviations from requirements of the contract documents not specifically noted by the Vendor in writing, and specifically approved by the engineer in writing.
 - 3. The engineer's/designer's approval of shop drawings, product data, and samples shall not relieve the Vendor of responsibility for errors or omissions in such shop drawings, product data, and samples.
 - 4. Storage and handling requirements and recommendations.
 - 5. Installation method.

- B. Shop Drawings: Show compliance with requirements on isometric schematic diagram of network layout, showing cable routings, telecommunication closets, rack and enclosure layouts and locations, service entrance, and grounding, prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
- C. Submit proof from manufacturer that the contractor is in good standing with the manufacturer's warranty program.
- D. Submit letter from manufacturer stating that the manufacturer will provide twenty-five (25) year warranty in accordance with the requirements stated in this document.
- E. Submit copy of RCDD certification.
- F. Upon request by the engineer/designer, furnish a list of references with specific information regarding type of project and involvement in providing of equipment and systems.
- G. Submit references as required.
- H. At completion of project, Contractor shall submit the following:
 - 1. Horizontal certification test results printed and saved to USB drive.
 - 2. Backbone certification test results printed and saved to USB drive.
 - 3. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD). The record documents shall be bound and consist of the following:
 - a. Product cut sheets for all products supplied.
 - b. Test reports for horizontal cabling.
 - c. Test reports for backbone cabling.
 - d. Manufactures warranties.
 - e. "D-Size" As built drawings.
- I. As built drawings should accurately record location of service entrance conduit, termination backboards, outlets boxes, cable raceways, cable trays, pull boxes, and equipment racks electronically using AutoCAD 2000 or later version and on minimum "D" size reproducible paper prints.
- J. The contractor shall prepare an 18" x 24" as-built serving zone drawing for each Telecommunication Room. The drawing shall be laminated, framed and secured to the wall in the Telecom Room.
- K. Work shall not proceed without the Engineer's approval of the submitted items. The Contractor shall receive approval from the Engineer on all substitutions of material. No substituted materials shall be installed except by written approval from the engineer.

1.8 QUALITY ASSURANCE

- A. Equipment and materials required for installation under these Specifications shall be the current model and new (less than one (1) year from the date of manufacture), unused and without blemish or defect.
- B. Equipment and materials of the type for which are independent standard testing requirements, listings, and labels, shall be listed and labeled by the independent testing laboratory.
- C. Material and equipment shall be new, and conform to grade, quality, and standards specified. Equipment and materials of the same type shall be a product of the same manufacturer throughout installation.

D. Product Requirements:

1. The product shall be manufactured by an ISO 9001-2000 Certified Facility.
2. Product shall be free from defects in material and workmanship.
3. The manufacturer must have a field representative who holds an RCDD who will perform quality control inspections monthly, during the life of the project.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Products must be stored according to manufacturers' recommendations.
- B. Keep stored products clean and dry.
- C. If the Telecommunications Contractor wishes to have a trailer on site for storage of materials, arrangements shall be made with the owner.

1.10 DRAWINGS

- A. It shall be understood that the electrical details and drawings provided with the specification package are diagrammatic. They are included to show the intent of the specifications and to aid the Telecommunications Contractor in bidding for the job. The Telecommunications Contractor shall make allowance in bid proposal to cover whatever work is required to comply with the intent of the plans and specifications.
- B. The Telecommunications Contractor shall verify all dimensions at the site and be responsible for their accuracy.
- C. Prior to submitting the bid, the telecommunications Contractor shall call the attention of the Engineer to any materials or apparatus the Telecommunication Contractor believes to be inadequate and to any necessary items of work omitted.

1.11 WARRANTY

- A. See Section "Closeout Submittals" for additional warranty requirements.
- B. The Contractor shall provide a manufactures warranty to guarantee end-to-end high performance cabling systems that meet application requirements. The guarantee shall include all Horizontal drops and Backbone fiber optic cable and connectivity components and have one point of contact for all cabling system issues. The system shall be warranted for a period of 25 years.
- C. Materials and workmanship hereinafter specified shall be fully guaranteed by the vendor for a (1) one year period after Date of Substantial Completion against any defects. Defects which may occur as the result of faulty materials or workmanship within one year after installation and acceptance by The Customer shall be corrected by the Vendor at no additional cost to the Customer. The Vendor shall promptly, at no cost to The Customer, correct re-perform (including modifications or additions as necessary) any nonconforming or defective work within one year after completion of the project of which the work is part.

1.12 SEPARATION FROM EMI SOURCES

- A. Comply with BICSI TDMM and ANSI/TIA/EIA-569-B recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
- B. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

1. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
 2. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
 3. Electrical Equipment Rating More than 5 kVA: A minimum of 12 inches.
- C. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows.
1. Electrical Equipment Rating Less than 2 kVA: A minimum of 2 ½ inches.
 2. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
 3. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.
- D. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
1. Electrical Equipment Rating Less than 2 kVA: No requirement.
 2. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
 3. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.
- E. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
- F. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 12 inches.

PART 2 PRODUCTS

2.1 EQUIVALENT PRODUCTS

- A. Due to the nature and type of communications all products, including but not limited to racks, patch panels, jacks, faceplates, patch cords, J-hooks shall be manufactured by Hubbell, Siemon, or Panduit.
- B. Provide products of manufacturers as named in individual articles.
- C. Where no manufacturer is specified, provide products of manufacturers in compliance with requirements.
- D. Where equipment is identified by manufacturer and catalog number, it shall be a base of requirements for quality and performance. Where manufacturers for equipment are identified by name, the Contractor may submit for approval, similar equipment of other manufactures as substitution. The Engineer's decision as to whether the submitted equipment is acceptable shall be final and binding.
- E. The request for substitutions must be received (10) ten days prior to bid opening by Engineer in writing, listing all physical and technical differences between product specified and product request for substitution. Product samples of each item must accompany written request.
- F. Accepted substitutions will be approved by means of addendum.

2.2 CATEGORY 6 HORIZONTAL DISTRIBUTION CABLE

- A. All Horizontal station cables shall terminate on modular patch panels in their respective Telecommunication Room or Equipment Room as specified on the drawings.
- B. All cable, workstation jack modules and patch panel jack modules shall be the same color as designated on prints. If colors are not designated Coordinate color with Engineer. See details.

C. Unshielded Twisted-Pair Cabling:

1. Cable construction shall be 23 AWG with four twisted pairs of insulated solid bare annealed copper conductors with separator.
2. Outer jacket shall meet NEC requirements and have a Nominal Cable diameter not to exceed .200 for CMP (in)
3. Cable shall have a minimum bend radius of 1.0 (in).
4. Contain "Crossweb" Filler
5. Must have positive PSACR beyond 250 MHz.
6. Application assurance warranty.
7. All transmission performance parameters shall be independently verified by UL or ETL third party testing organization.
8. Contractor will use a plenum rated cable jacket unless being installed in slab and below grade.
9. Approved Manufacturer - Category 6 Horizontal Cable:

Manufacturer	CMR	CMP
Hubbell	HC6RRx	HC6RPx
Siemon	9C6R4-E4-(XX)-RBA	9C6P4-E4-(XX)-RBA
Panduit	PUR6504xx-UY	PUP6504xx-UY

D. ANY CABLE LOCATED IN SLAB BELOW GRADE SHALL BE RATED FOR WET LOCATIONS.

1. Approved Manufacturer - Indoor/Outdoor Rated Cable:

Manufacturer	CMP
Hubbell	C6IOSPBK
Siemon	9U6W4-A5-12-R1A
Panduit	PUO6AS04BL-G

2.3 CATEGORY 6A HORIZONTAL DISTRIBUTION CABLE

- A. All Horizontal WAP Cable shall terminate on modular patch panels in their respective Telecommunication Room or Equipment Room as specified on the drawings.
- B. All cable and patch panel jack modules shall be the same color as designated on prints. If colors are not designated Coordinate color with Engineer. See details.
- C. Unshielded Twisted-Pair Cabling:
 1. Cable construction shall be 23 AWG with four twisted pairs of insulated solid bare annealed copper conductors with separator.
 2. Outer jacket shall meet NEC requirements and have a reduced diameter not to exceed .265 for CMP (in)
 3. Cable shall have a minimum bend radius of 1.0 (in).
 4. Contain "Crossweb" filler.
 5. +7dB of Headroom Above Standards to suppress Alien Crosstalk

6. High Power PoE (4PPoE) Read
7. All transmission performance parameters shall be independently verified by UL or ETL third party testing organization.
8. Approved Manufacturer - Category 6A Horizontal Cable:

Manufacturer	CMR	CMP
Hubbell	C6ASRDSY	C6ASPDSY
Siemon	9C6R4-A5-05AR1A	9C6P4-A5-05AR1A
Panduit	PUR6AV04YL-G	PUP6AV04YL-G

2.4 WORK AREA OUTLETS

- A. WAO shall consist of a single gang 2 Port or 4 Port thermoplastic face plate.
- B. Work area outlets shall each be terminated at their designated work area location in the connector types described below.
- C. The same orientation and positioning of jacks and connectors shall be utilized throughout the installation. Prior to installation, the Telecommunications Contractor shall submit the proposed configuration for each outlet assembly, with labeling, for review by the owner.
- D. The wiring scheme for this project shall be T568B unless otherwise directed by the owner.
- E. Category 6 Modular Jack:
 2. Third Party Verified Category 6 Component
 3. Cobra-Lock Termination Technology
 4. Wires Secured Under Constant Compression
 5. Easily Re-Terminate
 6. 25 IDC Re-termination Cycles
 7. Qualified to 150% of 802.3bt PoE Current Level
 8. Where color is not indicated coordinate with Engineer prior to installation.
 9. Approved Manufacturer - Category 6 Modular Jack (WAO):

Manufacturer	Modular Jack
Hubbell	HJU6xx
Siemon	U6-K0xx
Panduit	CJ688TGxx

- F. Jacks at WAO and patch panels shall be color-coded with appropriate colored jacks or icons as follows:
 1. Two port face plates:
 - a. The left jack shall be BLUE, and the right jack RED. Contractor shall be responsible for making sure the color at the patch panel coordinates with jack at WAO.
 2. Four port face plates:

- a. The upper left jack shall be BLUE, the upper right. jack shall be RED, the bottom-left jack shall be GREEN, and the bottom right jack shall be GRAY.

2.5 WIRELESS ACCESS POINT OUTLET

- A. WAP outlets shall consist of a minimum of two (2) Category 6A cables be terminated above ceiling using a Cat6A Yellow jack in a 2-port Surface Box or using a Cat6A MPTL assembly. Either option shall leave a 10-foot service loop on the horizontal cable run.
- B. Each WAP location shall be identified with a 1"x 2" black phenolic tag with white lettering affixed to the underside of the ceiling grid. It shall be the contractor's responsibility to verify measurements of the ceiling grid prior to ordering the phenolic tags, so as not to create an overhang by the label.
- C. Each cable shall be identified with a printed wire wrap label.
- D. The wiring pattern for this project shall be T568B unless otherwise directed by the owner.
- E. The wiring pattern of jacks and connectors shall be utilized throughout the installation. Prior to installation, the Telecommunications Contractor shall submit the proposed configuration for each outlet assembly, with labeling, for review by the owner.
- F. Category 6A Modular Jack:
 1. Third Party Verified Category 6 Component
 2. Cobra-Lock Termination Technology
 3. Wires Secured Under Constant Compression
 4. Easily Re-Terminate
 5. 25 IDC Re-termination Cycles
 6. Qualified to 150% of 802.3bt PoE Current Level
 7. Where jack color is not indicated coordinate with Engineer prior to installation.

- a. Approved Manufacturer - Category 6A Modular Jack Assembly (WAP):

Manufacturer	Jack	Surface Box
Hubbell	HJU6AY	HSB2W(P)
Siemon	U6A-K05	MX-SMZ2-02
Panduit	CJ688TGYL	CBX2IW-AY

- b. Approved Manufacturer - Category 6A Modular Plug (WAP):

Manufacturer	Modular Plug
Hubbell	SCP6A
Siemon	ZP1-6AS-01S
Panduit	FP6X88MTG

2.6 COPPER PATCH CABLES

- A. Patch Cables shall be factory terminated with modular plugs featuring a tangle-free latch design and clear strain-relief boots to support easy moves, adds and changes. Each patch cord shall be 100% performance tested at the factory to the TIA/EIA Category 6 standard. *Each patch cord shall be made by the same factory as the Cat6 jacks and patch panels used in the project.*

- B. Contractor shall provide one 5ft patch cable for each cable terminated at patch panel. Contractor shall provide one patch cable for each terminated WAO, with half the WAO patch cables being 10ft and remaining half being 15ft. Provide an additional 5% surplus equally divided between 5ft, 10ft & 15ft. Confirm lengths and color with owner prior to ordering and transmittal.

- C. Approved Manufacturer - Patch Cable:

Manufacturer	5ft Cat6	10ft Cat6	15ft Cat6
Hubbell	HCL6x05	HCL6x10	HCL6x15
Siemon	MC6-05-xx-28	MC6-10-xx-28	MC6-15-xx-28
Panduit	UTP28SP5xx	UTP28SP10xx	UTP28SP15xx

Manufacturer	5ft Cat6A	10ft Cat6A	15ft Cat6
Hubbell	HCL6x01	HCL6x07	HCL6Ax01
Siemon	SP6A-05-xx	SP6A-10-xx	SP6A-15-xx
Panduit	UTP28X5xx	UTP28X10xx	UTP28X15xx

2.7 MODULAR PATCH PANELS

- A. All horizontal voice, data and wireless, CCTV & AV cables shall be installed in a modular rack mount patch panel. Each patch panel shall have strain relief bars for each row of 24 ports (a 48-port panel gets 2 relief bars).

- B. Approved Manufacturer - Patch Panel:

Manufacturer	24 Port	48 Port	Strain Relief
Hubbell	HPJ24	HPJ48	CMBR
Siemon	KPNL-F1-24-01S	KPNL-F2-48-01S	KPNL-RWM
Panduit	CPPL24WBLY	CPPL48WBLY	SRB19BLY

2.8 HIGH IMPACT THERMOPLASTIC FACEPLATES WITH LABEL FIELDS

- A. Verify color of faceplate with architect and engineer prior to ordering.

- B. Approved Manufacturer -Faceplate:

Manufacturer	1-Port	2-Port	4-Port
Hubbell	IFP11W	IFP12W	IFP14W
Siemon	KFP-S-01-02	KFP-S-02-02	KFP-S-04-02
Panduit	CFPL1W	CFPL2W	CFPL4W

2.9 BACKBONE FIBER OPTIC CABLE

- A. Furnish and install a minimum of one (1) 12 strand fiber optic cable from the MDF to each IDF, unless otherwise indicated on backbone Riser diagram.
- B. All indoor fiber optic cable shall be tight buffered construction with Interlocked Armored Plenum rated.
- C. All outdoor or underground fiber optic cables shall be an indoor/outdoor jacket with tight buffered construction.
- D. Approved Manufacturer - Indoor Interlocking Armored Fiber Optic Cable:

Manufacturer	Singlemode (OS2)	Multimode (OM4)
Hubbell	HFCD15012PS	HFCD15012P4
Siemon	9BC5P012G-E205	9BC5P012G-T512

Panduit	FSP912Y	FOPPZ12Y

E. Approved Manufacturer - Indoor/Outdoor Fiber Optic Cable:

Manufacturer	Singlemode (OS2)	Multimode (OM4)
Hubbell	HFCD14012PSBK	HFCD14006P4BK
Siemon	9GD8012G-E201	9GD5012G-T501
Panduit	FSCP912Y	FOCPZ12Y

2.10 FIBER OPTIC RACK MOUNT ENCLOSURE

- A. Enclosure shall be mounted in standard 19" rack or cabinet. Shall have front and rear access on all modules via molded-hinged doors. Must have radius control and cable management for fiber patch cords. Shall have multiple cable entry locations. Include fiber optic cable routing kit (grommets, cable ties, saddle clips, strain relief bracket and ID/caution labels for various cable management solutions.
- B. Approved Manufacturer - Rack Mount Fiber Optic Enclosure:

Manufacturer	1U	2U	4U
Hubbell	FCR1U3SPT	FCR2U6SPT	FCR4U15SPT
Siemon	LVE-1U-MD-P01A	LVE-2U-MD-P01A	LVE-4U-MD-P01A
Panduit	FCE1U	FCE2U	FCE4U

2.11 FIBER OPTIC ADAPTER PANELS

- A. All adapter panels shall be LC form factor and use zirconia ceramic split sleeves. Use blank adapters in each empty port in each fiber optic enclosure.
- B. Fill unused slots of fiber enclosure with blank panels
- B. Approved Manufacturer - LC Adapter Panel:

Manufacturer	LC 12-Port OS2	LC 12-Port OM4	Blank Panel
Hubbell	FSPNLCDS6AQ	FSPNLCDS6AQ	FSPNB
Siemon	LVA12-LCQ-BC-A	LVA12-LCQ-BC-A	LVA-BLANK-01A
Panduit	FAP6WBUDLCZ	FAP12WAQDLCZ	FAPB

2.12 FIBER OPTIC CONNECTORS

- A. Fiber connectors shall have a LC UPC interface. Connectors may be a mechanical or splice-on type connector.
- B. Approved Manufacturer - Fiber Optic Connectors:

Manufacturer	LC; OS2 Mechanical	LC; OM4 Mechanical	LC; OS2 Splice-On	LC; OM4 Splice-On
Hubbell	FCLC900KSM 12	FCLC900K50GM 12	FCLCF900SMBP	FCLCF900M50G BP
Siemon	FC1-LB-LCU- 9BL	FC1-LB-LC5- 9AQ	FC-F-LCU-29BL	FC-F-LC5-29AQ
Panduit	FLCSSCBUY	FLCSMCXAQY	FLCS2/9SOCU9 BU	FLCS2/9SOCPX AQ

2.13 FIBER OPTIC PATCH CABLES

- A. Contractor shall provide six (6) duplex fiber patch cords for each 12 strands of fiber installed. Patch

cables shall be capable of connecting from fiber patch panel to owner provided equipment.

- B. Fiber patch cables shall be manufactured in the USA.
- C. Approved Manufacturer - Fiber Patch Cables Products:

Manufacturer	OS2; LC/LC; 1M; YL; Plenum	OM4; LC/LC; 1M; AQ; Plenum
Hubbell	DFHPCLCLCS1SM	DFHPCLCLCF1MM
Siemon	FPSLDLD001M	FP4LDLD001M
Panduit	F92RPU1U1ONM001	FZ2RPU1U1ONM001

2.14 Network/EQUIPMENT CABINETS

- A. Secure cabinet per manufactures instructions and install 18" Ladder Rack from top of each rack to wall.
- B. Each ladder rack shall utilize a "waterfall" or cable drop out at each 2-post rack to maintain the bend radius to each vertical cable manager.
- C. Ground each cabinet per ANSI/TIA/EIA-607 Requirements.
- D. Maintain 36" clearance from the front and rear of cabinet and on one side.
- E. Where no dedicated MDF/IDF closet is available or space will not allow for the use of a floor mounted cabinet use a Wall Mount Swing Gate Style Cabinet
- F. Where space is extremely narrow use Hubbell REBOX Part Number: RE4XB or equivalent.
- G. Reference riser diagram to determine Cabinet type.

- 1. Approved Manufacturer - Cabinets:

- a. Floor Cabinet

Manufacturer	45RU Floor Cabinet
Hubbell	H3S4748
Siemon	V62B-2AB121-45
Panduit	XG84822BS0005

- b. Wall Mount Cabinets

Manufacturer	24"H x 26"D Wall Cabinet	36"H x 26"D Wall Cabinet
Hubbell	HSQ2426	HSQ3626
Siemon	WC2-P101-12	WC2-P101-18
Panduit	PZWMC12W	PZWMC1830W

2.15 EQUIPMENT RACKS

- A. Secure each 2-post relay rack to floor per manufactures instructions and install 18" Ladder Rack from top of each rack to wall.
- B. Each ladder rack shall utilize a "waterfall" or cable drop out at each 2-post rack to maintain the bend radius to each vertical cable manager.
- C. Ground each rack per ANSI/TIA/EIA-607 Requirements.
- D. Maintain 36" clearance from the front and rear of rack and on one side.

- E. If more than one rack is installed, install all racks in a straight line, side by side with vertical wire management between each rack (see section 2.26.B).
- F. Where no dedicated MDF/IDF closet is available or space will not allow for the use of a floor mounted rack use a Wall Mounted Cabinet.
- G. Reference riser diagram to determine rack type.
 - 1. Approved Manufacturer – Floor Racks:

Manufacturer	2-Post; 45RU Rack	4-Post; 45RU Rack
Hubbell	HPW84RR19	SF841929T
Siemon	RS1-07-S	RSQ1-07-S
Panduit	R2P	R4P

2.16 CABLE MANAGEMENT

- A. Vertical Cable management shall be provided on each side and between each set of racks.
- B. Install 6" vertical cable management at the end of each rack row and 10" vertical cable management between each rack.
- C. Reference drawings for further detail:
- D. Approved Manufacturer – Vertical Cable Manager:

Manufacturer	45RU; 6 in; Vert Cable Mgr	45RU; 10 in; Vert Cable Mgr
Hubbell	VM620	VM1020
Siemon	VCM-6D	VCM-10D
Panduit	PR2VD06	PR2VD10

- E. Approved Manufacturer – Horizontal Cable Manager:

Manufacturer	Horz. Cable Mgr
Hubbell	HM277C
Siemon	RS-RWM-2DS
Panduit	CMPH2

2.17 LADDER TRAY FOR TELECOMMUNICATION ROOMS

- A. All ladder tray shall be 18" in width and have 1 1/2" x 3/8" stringers, unless instructed otherwise per drawings,
- B. Ladder tray shall be made of tubular steel; and the finish shall be black powder coat.
- C. Furnish and install 18" ladder tray from each floor mount rack/server cabinet to wall. Furnish and install 18" ladder tray around wall as required to support cables. (A minimum of (2) walls shall be completely covered by ladder tray).
- D. Furnish and install cable retaining post on each side of tray every 4ft as required to support cables.
- E. A "waterfall" or cable drop out shall be utilized for each transition from ladder tray to vertical cable manager. A proper bend radius shall be maintained at all times.
- F. All raw ladder tray ends shall be covered with a protective cap to match the color of the ladder tray itself.
- G. Provide necessary accessories from original ladder rack manufacturer for a complete solution.

H. Approved Manufacturer – Ladder Tray:

Manufacturer	12 in Ladder Tray	18 in Ladder Tray
Hubbell	HLS0612B	HLS1018B
Legrand	TRT10-12B	TRT10-18B

2.18 RACK MOUNT PDU

- A. Contractor shall provide and install (1) 30A/208V metered/switched vertical PDU in each cabinet or 4 post rack specified on project, and (1) 30 amp basic rack mount horizontal PDU in each floor mount 2 Post rack.

B. Approved Manufacturer – Power Distribution:

Manufacturer	Horizontal PDU	Vertical PDU
Hubbell	PHJB02	PV72IC30EBD-10
Panduit	P12B47M	P24E28M

2.19 COPPER BACKBONE CABLING

- A. Furnish, install and terminate a minimum Cat3 100pr 24awg solid copper cable from the MDF to each IDF unless indicated otherwise on the Riser Diagram.

- B. All indoor conductors are to be terminated on 100pr wall mount 110 terminal block kits. Each 100pr 110 block shall be terminated with C5 blocks.

- C. Where cable routes above ceiling provide a plenum rated cable. Where cable routes underground provide an outdoor PE-89 type cable with building entrance protector at each end.

D. Approved Manufacturers – 100 Pair Cable:

Manufacturer	Indoor 100Pr Plenum	Outdoor 100Pr PE-89
Essex	18-799-36	09-104-92
Prysmian	2131758	7525819

E. Approved Manufacturers - 110 Block Kits:

Manufacturer	100pr 110 Terminal Block Kit with C5 blocks
Hubbell	18-799-36
Siemon	S110AA2-100FT
Panduit	P110KB1005Y

- F. The building entrance protector shall be a 100 pair 110 in/110out with cover and splice chamber. Unit shall be 16awg powder coated and allow up to 22awg line termination. Unit shall be stackable for future expansion and equipped with internal fuse link and accommodate industry standard 5-pin protection modules. The unit shall be UL497 approved. Contractor shall fully populate each 5-Pin protector port with the specified protector module.

1. Approved Manufacturers – Building Entrance Protectors:

Manufacturer	100pr Building Entrance Protector	5-pin protection modules
CircaMax	1880ECA1-100	3B1E
Tii Technologies Inc.	24100-110-M110C	75-3C1EW-N

2.20 CATV HORIZONTAL CABLES

A. Coax Cable shall be Series 6 quad shield plenum rated.

1. Approved Manufacturers – Series 6 Cable:

Manufacturer	Series 6 Quad Shield; Plenum
Essex	78-14C-91
Prysmian	2131758

B. Coax Terminations & Connectors :

1. All coax shall be terminated with compression style connectors. All corresponding strippers and crimp tools shall be used for complete and proper termination.

2. Approved Manufacturers – Series 6 Connectors:

Manufacturer	Series 6 Compression Connectors
Hubbell	FRG625
Siemon	RG6C
Panduit	FSNS6U

2.21 GROUNDING AND BONDING

A. Grounding shall conform to ANSI-J-STD607(A)- Commercial building Grounding and bonding Requirements for Telecommunications, National Electrical Code, ANSI/NECA/BICSI-568 and manufacture's grounding requirements as minimum.

B. Bond and ground equipment racks, housings, messenger cables, and raceways.

C. Connect cabinets, racks, and frames to single-point ground which is connected to building ground system via (minimum #6) green insulated copper grounding conductor.

D. Contractor shall verify actual measurement of the Telecommunication Bonding Backbone (TBB) and size the bonding backbone accordingly.

E. Approved Products:

Manufacturer	Primary Bonding Busbar (PBB)	Secondary Bonding Busbar (SBB)	Compression Lug; 2-Hole	Ladder Tray Bonding Jumper Kit
Hubbell	HBBB14416H	HBBB14212	HGBLxxx	HGRKTKA9KA5
Burndy	BBB14416H	BBB14212N	BGBLxxx	BGRKTKA9KA5

F. Contractor to provide all additional necessary components, including but not limited to C-Taps, H-Taps, RB, RBC, TEBC

2.22 J-HOOKS

A. The cable support used must maintain complete horizontal and vertical 1" bend radius control.

B. Do not exceed EIA/TIA standards or manufactures recommendations of 40% fill ratio in each cable support.

C. All J-Hooks are to be placed no more than 4-5 feet apart.

D. Approved Products:

1. Hubbell

2. Caddy
3. B-Line

PART 3 EXECUTION

3.1 PRE-INSTALLATION SITE SURVEY

- A. Prior to start of system, meet at the project site with owner's representative and representatives of trades performing related work to coordinate efforts. Review areas of potential interference and resolve conflicts before proceeding with the work. Facilitation with the General Contractor will be necessary to plan the crucial schedule completions of the equipment room and telecommunication closet.
- B. Examine areas and conditions under which the system is to be installed. Do not proceed with work until satisfactory conditions have been achieved.

3.2 INSTALLATION GUIDELINES

- A. The work included under this specification, consist of furnishing all labor, equipment, material, and supplies and performing all operations necessary to complete the installation of this structured cabling system in compliance with the specifications and drawings. The Telecommunications contractor will provide and install all of the required material to form a complete system whether specifically addressed in the technical specification or not.
- B. All work performed on this project will be installed in accordance with the current edition of the National Electrical code, the current edition of The National Electrical Safety Code, the current issue of the National Electrical Code, The current edition of ANSI/NECA/BICSI-568- Standard for Installing Commercial Building Telecommunications Cabling, the current edition of the BICSI Telecommunications Distribution Methods Manual, the current edition of the BICSI Cabling Installation Manual, the latest issue of ANSI/TIA/EIA Standards as published Global Engineering Documents as ANSI/TIA/EIA Telecommunications Building Wiring Standards, and all local codes and ordinances. Should conflicts exist with the foregoing, the authority having jurisdiction for enforcement will have responsibility for making interpretation.
- C. If this document and any other documents listed above are in conflict, then the more stringent requirements shall apply. All documents listed are believed to be the most current release of the documents. The Vendor has the responsibility to determine and adhere to the most current release.
- D. This document does not replace any code, either partially or wholly. The Vendor must be aware of local codes that may impact this project. All, local, State and federal codes are to be followed.
- E. All materials shall be UL Listed or listed by other National Independent testing agency and shall be marked as such.
- F. Section Includes: Equipment, materials, labor, and services to provide a complete structured cabling system including, but not limited to:
 2. Furnish and install a complete telecommunication wiring infrastructure.
 3. Furnish, install, terminate and test all copper and Optical fiber cables.
 4. Furnish and install Raceway, boxes, and cable tray.
 5. Furnish and install all wall plates, jacks, patch panels, and patch cords as described.
 6. Furnish and install all required cabinets and/or racks as required and as indicated.
 7. Furnish any other material required to form a complete system.

8. Perform Link testing (100% of horizontal and/or backbone links) and certification of all components. All test must meet or exceed link testing requirements as specified in this document.
9. Furnish test results of all cabling to the owner on disk and paper format, listed by each closet, then by workstation ID.
10. Provide owner test results and documentation. (Testing documentation and as-built drawings).
11. Removal of abandoned cable, if required.

3.3 WORK NOT INCLUDED

- A. Unless otherwise indicated, the Vendor is not responsible for providing data concentrators, hubs, switches, servers, computers, and other active devices such as PBX's.

3.4 INSTALLATION

- A. Install materials and equipment in accordance with applicable standards, codes, requirements, and recommendations of national, state, and local authorities having jurisdiction, and current National Electrical Code and with manufacturer's instructions.
- B. Install in accordance with manufacturer's instructions.
- C. All cable shall conform to the requirements for communications circuits defined by the National Electrical code (Article 800). Cable listed to NEC Article 800-51(a) will be used for "Plenum" installations. Cable listed to NEC Article 800-51(b) shall be installed in vertical runs penetrating more than one floor.
- D. Adhere to manufacturer's specifications for pulling tension, minimum bend radii, and sidewall pressure when installing cables.
 1. Where manufacturer does not provide bending radii information, minimum-bending radius shall be 15 times cable diameter. Arrange and mount equipment and materials in a manner acceptable to the engineer and the owner.
- E. Penetrations through floor and fire-rated walls shall utilize intermediate metallic conduit (IMC) or galvanized rigid conduit (GRC) sleeves and shall be fire stopped after installation and testing, utilizing a fire stopping assembly for that application. Contractor may also utilize EZ Path fire rated pathway or equivalent.
- F. Install station cabling to the nearest telecommunications room (TR), unless otherwise noted.
- G. Installation shall conform to the following basic guidelines.

Use of approved wire, cable, and wiring devices.

Neat and uncluttered wire termination.
- H. Where cable tray is not used, attach cables to permanent structure with suitable attachments at intervals of 48 to 60 inches. Support cables above removable ceilings.
- I. Follow manufactures recommendations on spacing and number and type of cables installed in j-hooks or cable tray to avoid cable stress.
- J. Separation and physical barriers between communication cabling and power cables must be always maintained.
- K. Install adequate support structure for 10-foot service slack at each TR.
- L. Support riser cables every (3) floors and at top of run with cable grips.

- M. Limit number of four-pair data riser cables per grip to fifty (50).
- N. Install cables in one continuous piece. Splices or taps will not be allowed.
- O. Provide overvoltage protection on both ends of cabling exposed to lightning or accidental contact with power conductors.

3.5 LABELING

- A. Label each outlet with permanent self-adhesive label.
- B. Label each cable within 1" of termination on each end.
- C. Use labels on the face of patch panels. Provide facility assignment records in a protective cover at each telecommunications closet location that is specific to the facilities therein.
- D. Use color-coded labels for each termination field that conforms to ansi/TIA/EIA-606(A) standard color codes for termination blocks.
- E. Labels shall be machine-printed. Handwritten labels shall not be acceptable.
- F. Mark up floor plans showing outlet locations, type, and cable marking of cables. Turn these drawings over to the owner two (2) weeks prior to move in date.
- G. Three (3) sets of as-built drawings shall be delivered to the owner within four (4) weeks of acceptance of project by the owner. A set of as-built drawings shall be provided to the owner in electronic form utilizing CAD software that is acceptable to the owner. The electronic media shall be delivered to the owner within six (6) weeks of acceptance of project by owner.

3.6 TESTING

- A. Testing shall conform to ANSI/TIA/EIA-568-B.1 standard. Testing shall be accomplished using a level IIe or higher field testers.
- B. All testing shall meet or exceed Manufactures recommendation for 25-year warranty program,
- C. Test each pair and shield of each cable for open shorts, grounds, and pair reversal. Correct grounded and reversed pairs.
- D. If copper backbone cable contains more than one (1) percent bad pairs, remove and replace entire cable.
- E. If horizontal cable contains bad conductors or shield, contractor shall remove and replace cable at no additional cost to owner.
- F. Test optical cable with a light source and power meter utilizing procedures as stated in ANSI/TIA/EIA-526-14a: OFSTP-14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant and ANSI/TIA/EIA-526-7 Measurements of Optical Power Loss of Installed Singlemode Fiber Cable Plant. Measure results shall be plus/minus 1 dB of submitted loss budget calculations. Correct improper splices and replace damaged cables at no charge to the owner.
 - 1. Cables shall be tested at 850 and 1300 nm for multimode optical fiber cables. Cables shall be tested at 1310 and 1550 for singlemode optical fiber.
 - 2. Testing procedures shall utilize "Method B"- one jumper reference.
 - 3. Bi-directional testing of optical fiber is required.
 - 4. Submit printout for each cable tested. The use of handwritten test results will not be acceptable.

3.7 FIELD QUALITY CONTROL

- A. Employ job superintendent or project manager during the course of the installation to provide coordination of work of this specification and of other trades and provide technical information when requested by other trades. This person shall maintain current RCDD (Registered Communication Designer) registration and shall be responsible for quality control during installation, equipment set-up, and testing.
- B. Installation personnel shall meet manufacturer's training and education requirements for implementation of extended warranty program.

END OF SECTION

SECTION 28 31 00

FIRE DETECTION AND ALARM

PART 1 GENERAL

1.1 INCLUDED IN THIS SPECIFICATION

- A. Provide a complete fire alarm system per this project's plans and specifications. The system shall include a state-of-the-art, software-based control panel using addressable and analog type initiating.
- B. These specifications and the accompanying Drawings define the intent of the fire alarm system to be provided. In addition to the system as specified herein and shown on the Drawings, the Contractor shall provide all planning, design, calculations, equipment, devices, raceways, boxes, cabling, system programming and any other component or service required for a complete, fully operational and code compliant system.

1.2 REFERENCES

- A. Electrical Industries Association (EIA):
 - 1. RS-232-D – Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange
 - 2. RS-485 – Electrical Characteristics of Generators and Receivers for Use in Balanced Multipoint Systems
- B. National Fire Protection Association (NFPA):
 - 1. NFPA 12 – Standard on Carbon Dioxide Extinguishing Systems.
 - 2. NFPA 13 – Installation of Sprinkler Systems.
 - 3. NFPA 15 – Standard for Water Spray Fixed Systems for Fire Protection.
 - 4. NFPA 16 – Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems.
 - 5. NFPA 16A – Standard for the Installation of Closed Head Foam-Water Sprinkler Systems.
 - 6. NFPA 70 – National Electrical Code (NEC).
 - 7. NFPA 72 – National Fire Alarm Code 2010 Edition
 - 8. NFPA 90A – Standard for the Installation of Air Conditioning and Ventilating Systems.
 - 9. NFPA 101 – Life Safety Code 2012 Edition
 - 10. NFPA 750 – Standard on Water Mist Fire Protection Systems.
 - 11. NFPA 5000 – Building Construction and Safety Code.
 - 12. IBC Chapters 9 & 10 2012 Edition
 - 13. ADAAG Americans with Disabilities Act Application Guidelines
- C. Fire Alarm Control Panel Equipment: System shall comply with applicable provisions of the following

UL standards and classifications:

1. UL 864 9th Edition
2. UOJZ, Control Units, System.
3. SYZV Control Units, Releasing Device.
4. UOXX, Control Unit Accessories, System.

D. The Fire Alarm Control Panel's U.L. Listed signaling types shall be:

1. Digital alarm communicator
2. Other Technology

1.3 SUBMITTALS

A. Equipment Submittal Brochures:

1. Provide minimum 10 copies of submittal brochures and shop drawings.
2. Submittal brochures shall be bound my means of 3 ring binders, binding combs or similar. Stapled brochures will be rejected.
3. Provide one submittal brochure in color, highlighted and reserved for use by the Louisiana State Fire Marshal Plan Review Office. This copy shall become the record copy for the project.
4. Include a cover page that indicates the following minimal information:
 - a. Project name and address.
 - b. Engineered systems distributor's name and contact information.
 - c. Installing contractor's name and contact information.
 - d. The date of the equipment submittals and date of any subsequent required re-submittals. Indicate on revised submittals the original submittal date and re-submittal date.
 - e. Architectural project review number assigned by the Louisiana State Fire Marshal's Office.
5. Provide a Scope of Work Narrative describing the system's basic operating premise in written word.
6. Provide a detailed Sequence of Operation Matrix Grid tailored for this project indicating the cause and effect of all fire alarm system control panels, input and output functions.
7. Include a system bill of material prepared specifically for this project. Include the make, model, description, quantity and manufacturer for every component to be installed in the project.
8. Provide manufacturer's data sheet for each component to be installed in the project. For data sheets that include multiple part numbers, options and accessories, the components included or pertinent to this project shall be highlighted in yellow.
9. Include the U.L. (Underwriters Laboratories) Certification for each component to be installed in the system. The U.L. Certification shall be placed directly behind its corresponding data sheet.
10. Manufacturers device compatibility documentation shall be included proving testing and operational compatibility between control panels and peripheral devices.

11. Separate battery calculations shall be provided for each control panel and prepared on manufacturer's official worksheets.

B. Shop Drawings

1. Shop drawings shall be prepared with the contractor's own title block which shall include:
 - a. Project name and address.
 - b. Contractor's name, address and phone number.
 - c. Date.
 - d. Drawing pages shall be numbered.
 - e. Bound with spines and stapled.
 - f. Floor plan scale.
 - g. Louisiana State Fire Marshal architectural assigned project number.
 - h. Revision number with re-submittal dates.
2. Drawings shall contain one floor per page. If a floor must be split use match lines and references that refer sheet number to match lines.
3. Floor plan shop drawings shall be prepared in AutoCAD.
4. Prepare floor plans to a 1/8" = 1'-0" scale unless directed otherwise by the architect.
5. Show all equipment, control panels, and device locations.
6. Include a distinct address for every device including panels, initiating, notification, auxiliary, and peripheral devices. All visual notification appliances shall have their candela indicated.
7. Floor plans shall include the following:
 - a. Door swings.
 - b. Room names and numbers.
 - c. Reflected ceiling plan overlay.
 - d. Ceiling heights.
 - e. Fire and smoke barriers.
 - f. Office furnishings when available.
8. Include a symbol schedule of devices for this project.
9. Include the necessary details and general notes for mounting heights, device placement restrictions, etc.
10. End-of-line symbols shall be shown on the floor plans.
11. Riser locations shall be indicated on the floor plan by a bold circle.
12. A detailed riser shall be provided as part of the shop drawings. The riser shall include:

- a. Control panels, power supplies, annunciators, demark cabinets, each identified with its own address and description matching the symbol schedule.
- b. Operating power requirements with breaker panel and breaker number identification.
- c. All system circuits including initiating, notification, SLC, power, control, monitor, network, audio, riser, fiber optic, phone, category cable and auxiliary circuits. Circuits shall be individually addressed indicating wire type, size, quantity and color.
- d. Provide a point to point diagram of every system device on its riser circuit using the exact device symbol as the floor plan. Provide the corresponding device address and candela rating next to each device.
- e. Provide the cumulative current draw at the end of each notification appliance circuit.
- f. Indicate location and placement of surge suppressors.
- g. Provide detail circuit diagrams for connections with systems from other trades.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, number and manufacturer.
- B. Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
- C. Protect materials from damage during handling and installation.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Personnel shall be trained and certified by manufacturer for installation of units required for this Project and shall be supervised by a Nicet Level III Supervisor.
 - 2. Manufacturer's product shall have been in satisfactory operation on three installations of similar size, type and design as this project, for approximately 3 years.
 - 3. The installing contractor shall have been actively engaged in the business of designing, selling, installing, and servicing fire alarm systems for at least ten (10) years.
 - 4. The installing contractor shall provide 24-hour, 365 days per year emergency service with factory trained, state licensed service technicians.
- 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. Source Limitations: Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer.

1.6 MAINTENANCE AGREEMENT

- A. Contractor shall warranty material and installation against defects in manufacturing and workmanship for a period of one year beginning on the date of final acceptance of the project. Warranty related service calls shall be provided at no charge during the contractor's normal working hours.
- B. Initial Maintenance Service: Beginning at Substantial Completion, provide full inspection and maintenance by skilled employees of manufacturer's designated service organization during the Warranty period, including any special warranty period specified.

1. Include inspection, maintenance, testing, and repair contract in compliance with the manufacturer's recommended routine preventive maintenance program and NFPA 72 requirements necessary to maintain full ongoing listing on the complete installed system.
 2. Provide parts and supplies same as those used in the manufacture and installation of the original equipment.
 3. The contractor performing the contract services shall be qualified and listed to maintain ongoing certification and listing of the completed system.
- C. Extended Maintenance Service: Offer for the Owner's consideration and evaluation at the time of Product Data Submittal, a priced inspection, maintenance, testing, and repair contract in compliance with the manufacturer's recommended routine preventive maintenance program and NFPA 72 requirements necessary to maintain full ongoing listing on the complete installed system.
1. The services offered under this contract shall begin after the completion of the Initial Maintenance Service and Warranty Period.
 2. The Owner shall have the option of renewing for single or multiple years, up to five years, at the price quoted upon completion of the Warranty period.
 3. The contractor performing the contract services shall be qualified and listed to maintain ongoing certification and listing of the completed system.

1.7 COORDINATION

- A. Coordinate installation and operational requirements for automatic elevator recall, including but not limited to the recall signal time frame, with Division 14 and with authorities having jurisdiction.
- B. Coordinate installation and operational requirements for fire-protection systems, including but not limited to water-based sprinkler system, pre-action system and clean agent extinguishing system, with Division 21.
- C. Coordinate installation and operational requirements for smoke control systems with Division 23.
- D. Coordinate installation and operational requirements for kitchen fire-suppression systems with hood manufacturer, fire-suppression system manufacturer and with Division 23.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. The following are acceptable manufacturers and series for control panels.
 1. Edwards EST3X Series
 2. Gamewell E3 Series
- B. References to manufacturer's model numbers and other information is intended to establish minimum standards of performance, function, and quality.
- C. Substitute equipment proposed as equal to equipment specified shall meet or exceed requirements of this section. For equipment other than listed above provide proof that such substitute equipment equals or exceeds features, functions, performance, and quality of specified equipment. This proof shall be provided by submission of a copy of specification with each copy of the submittals that has had each paragraph marked as either compliant or non-compliant along with a letter from engineering manager or product manager at factory that certifies information presented as either compliant or non-compliant including a detailed explanation of each paragraph identified as non-compliant. In order to

ensure that the Owner is provided with a system that incorporates required survivability features, this letter shall also specifically certify that the system is capable of complying with the test requirements of this section.

2.2 FIRE ALARM SYSTEM OPERATIONAL DESCRIPTION

- A. The fire alarm system shall be fully addressable with notification and initiation devices as shown on drawings. Additional components shall be provided as required for a complete, functional, and code compliant system.
- B. Alarm Signals:
 - 1. Fire Alarm signal initiation shall be by one or more of the following devices and/or systems:
 - a. Manual Pull Stations
 - b. Heat Detectors
 - c. Smoke Detectors
 - d. Heat detectors in elevator shaft and pit.
 - e. Automatic sprinkler system water flow
 - f. Fire-extinguishing system operation including but not limited to fire suppression for kitchen, dry-pipe sprinkler system and pre-action sprinkler systems.
 - 2. Supervisory signal initiation shall be by one or more of the following devices and/or actions:
 - a. Duct-Mounted smoke detectors.
 - b. Valve supervisory switch. (Operation of a fire-protection system valve tamper switch.)
 - c. Low-air-pressure switch of a dry-pipe sprinkler system.
 - d. Low-air-pressure switch of a pre-action sprinkler system.
 - e. Fire-pump running.
 - f. Fire-pump power failure, including a dead-phase or phase-reversal condition.
 - g. Elevator shunt-trip supervision.
 - 3. System trouble signal initiation shall be by one or more of the following devices and/or actions:
 - a. Open circuits, shorts, and grounds in designated circuits.
 - b. Opening, tampering with, or removing alarm-initiating and supervisory signal initiating devices.
 - c. Loss of primary power at fire-alarm control unit.
 - d. Ground or a single break in fire-alarm control unit internal circuits.
 - e. Abnormal ac voltage at fire-alarm control unit.
 - f. Break in standby battery circuitry.
 - g. Failure of battery charging.

- h. Abnormal position of any switch at fire-alarm control unit or annunciator.

C. Specialized Alarm Actions:

1. Elevator Recall: Activate elevator recall system to start in accordance with ANSI Standard A17.1 and NFPA 72. Comply with the following:
 - a. Initiate Elevator Recall Sequence to return elevators to their primary or alternate recall floors upon receipt of a General Alarm by the Fire Alarm Control Panel (FACP).
 - b. Smoke detectors designated for Elevator Recall shall be connected to fire-alarm system. Initiate a General Alarm upon detection of smoke.
 - c. Actuation of the elevator lobby detector located on the designated primary recall floor shall signal the cars to move to the alternate recall floor.
2. Elevator Shunt-Trip Operation: Heat detectors designated for elevator power removal shall be connected to fire-alarm system. Alarm-initiating devices, except those listed, shall not start elevator power removal.
 - a. Actuation of heat detectors in the locations indicated below shall shut down power, via a shunt trip operator, to the elevators associated with the location without time delay:
 - 1) Heat detector in elevator machine room; locate detector within two feet of each sprinkler head.
 - 2) Heat detectors in elevator hoistway; locate detector within two feet of each sprinkler head.
3. Air-Handling System Shut-Down: Upon receipt of a General Alarm by the Fire Alarm Control Unit perform the following, unless otherwise indicated in sequence for smoke control system or sequence for smoke venting system in a windowless anesthetizing locations:
 - a. Operate control relay contacts to signal shutdown of the Air-Handling system(s) serving the evacuation signaling zone where the alarm signal originated. Signal shall remain on until alarm conditions are cleared and fire-alarm system is reset. Signal shall not stop in response to alarm acknowledge or signal silence commands. Coordinate and interface with Division 23.
 - b. Shut the smoke or combination fire/smoke dampers at that specific air-handling units' supply and return connections.
 - c. Shut all smoke and combination fire/smoke dampers associated with the air handling system.
 - d. Provide for an adjustable time delay, initially set at 20 seconds, to delay the transmission of close signals to the dampers. The intent of this time delay is to allow the air-handling unit fan(s) to receive the stop signal and slow down before closing any dampers in order to avoid a high static-pressure alarm/trip on the air-handling system.
4. Duct-mounted smoke detector: Duct-mounted smoke detector shall initiate the following functions, unless otherwise indicated in sequence for smoke control system or sequence for smoke venting system in a windowless anesthetizing locations:
 - a. Initiate a Supervisory Alarm.
 - b. Shutdown the associated air-handling unit.

- c. Shut the smoke or combination fire/smoke dampers associated with that specific smoke detector and shut the smoke or combination fire/smoke dampers at the associated air-handling unit.
 - d. Provide for an adjustable time delay, initially set at 20 seconds, to delay the transmission of close signal to the dampers. The intent of this time delay is to allow the air-handling unit fan(s) to receive the stop signal and slow down before closing any dampers in order to avoid a high static-pressure alarm/trip on the air-handling system.
- 5. Kitchen Fire-Suppression: An alarm signal from the kitchen fire-suppression system shall initiate the following functions prior to discharge of fire extinguishing agent:
 - a. Initiate General Alarm when the kitchen fire-suppression system is activated.
 - b. Operate control relay contacts to remove power from equipment located equipment under kitchen hood. Relay control shall open circuit breaker via use of breaker-mounted shunt trip operator(s).
 - c. Operate control relay contacts to close solenoid valve(s) to shut-off fuel supply to kitchen equipment under kitchen hood.
 - d. Operate control relay contacts to initiate the smoke evacuation system. Coordinate and interface with Division 23.

2.3 CONTROL PANEL

A. General Requirements:

- 1. The system shall have the capability of being activated into alarm, supervisory and trouble modes of operation from both manual and automatic devices.
- 2. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864

B. System Cabinet

- 1. Shall be all metal with a textured finish suitable for surface or semi-flush mounting. Cabinets containing anything non-metal are not acceptable.
- 2. Front door of steel construction with lockout or dead-front inner door of steel construction to conceal internal circuitry and wiring.
- 3. Cabinet shall be capable of housing batteries.
- 4. Cabinet shall be pre-fabricated to accept all available internal circuitry. Installations with loosely hanging internal panel components will not be accepted.

C. Main Power Supply

- 1. Shall incorporate the latest power-saving switching technology using no step-down transformers.
- 2. Shall provide minimum 7 amps of continuous rated output to supply all necessary power under normal and emergency conditions.
- 3. Shall include an internal battery charger capable of charging up to 55 amp hour batteries while under full load.
- 4. The incoming power to the system shall be supervised so that any power failure must be audibly

and visually indicated at the fire alarm control panel. A green "power on" LED shall be displayed continuously while incoming power is present at the building fire alarm control panel.

D. Batteries

1. Provide U.L. Listed batteries of sufficient capacity to provide power for the entire system automatically upon loss of AC power for a period of 24 hours with 15 minutes of alarm signaling at the end of the 24 hour period.
2. Battery connectors shall be the exact size and type required for the standby battery posts or tabs.
3. Connect batteries to the main panel with minimum 14 AWG stranded hook up wire. Red for positive and black for negative. Use fully insulated crimp style connectors.

E. Battery Cabinets

1. Provide U.L. listed metal battery cabinet and enclosures with key lockable door for installations requiring batteries too large to be housed in control panels.
2. Battery cabinet shall be textured painted to match the control panel it is housing the batteries for.

F. Display

1. Main control panel shall include a color touch screen display for user interface.
2. Display shall be capable of a minimum 200 characters.
3. The touch screen communications shall be textual RS-485 based with the capability of being mounted locally or remotely.
4. The display shall provide both audible and visual annunciation of all system events.
5. Separate LED's shall be dedicated for:
 - a. AC (normal power): Green
 - b. Fire: Red
 - c. Hazard: Blue
 - d. Supervisory: Yellow
 - e. Trouble: Yellow
 - f. Silenced: Yellow
6. Pre-programmed keys shall be on board for:
 - a. Menu
 - b. Fire Drill
 - c. System Reset
7. Display shall contain a minimum 5 keys that can be custom programmed for system functions
8. The display shall be suitable to be remotely installed as a remote annunciator up to 3,000 feet away from the main CPU cabinet. The remote display shall be available with a manufacturer's

custom metal cabinet suitable for surface or semi flush installation complete with a lockable see through door and textured finish matching the main control cabinet.

G. Main System CPU

1. System CPU shall incorporate a 32-bit RISC multiprocessor design on a single circuit board. An isolated watchdog circuit shall monitor the microprocessor and shall activate system trouble on the display upon any failure. The system program shall not be lost upon any loss of power. The CPU software shall support control-by-event (CBE) programming using Boolean logic including AND, OR, NOT, XOR and TIMING functions to provide complete custom programming flexibility. An auto programming option shall be available where only devices that are present on the SLC shall activate.
2. System shall be programmed via the manufacturer's proprietary field configuration program (FCP), allowing the project configuration custom programming to be uploaded and downloaded via a portable laptop computer at the project.
3. An RJ-45 Ethernet port shall be provided to accept downloaded programs from a portable computer, or provide 80-column readout of all alarms, troubles, location descriptions, time, and date. Communication shall operate at 10/100 speeds.
4. An on-board supervised RS-232C Serial Output shall be included to operate remote printers and video terminals.
5. The system CPU shall include an on-board supervised RS-485 Serial Output for connection and communication to system modules. The RS-485 port shall allow for communication with remote annunciator modules up to 3,000' from the cabinet.
6. Smoke detector alarm verification shall be a standard software option while allowing other devices such as manual stations and sprinkler flow to create immediate alarms. This feature shall be selectable for smoke sensors that are installed in environments prone to nuisance or unwanted alarms.
7. Standard software shall provide for the analog drift compensation of smoke detectors allowing each smoke detector to automatically adjust its sensitivity to accommodate changes caused by the effects of component aging or its surrounding environment including dust. Each sensor shall maintain its actual sensitivity under adverse conditions to respond to alarm conditions while ignoring factors which generally contribute to nuisance alarms. System trouble circuitry shall activate, display smoke detectors that require cleaning and maintenance.
8. System software shall automatically test each analog smoke sensor a minimum of 3 times daily. Test shall be a recognized functional test of each photocell (analog photoelectric sensors) and ionization chamber (analog ionization sensors) as required annually by NFPA 72. Failure of sensor test shall activate system trouble circuitry, display "Test Failed" indication, and identify individual device that failed.
9. The system control panel shall be capable of setting any detector or sensor into Positive Alarm Sequence mode. Positive Alarm Sequence will operate in the following manner. Any alarms received from a device will activate an alarm at the control panel but will not execute any output functions (e.g. turning on the strobes or fire horns). The operator has 30 seconds to "acknowledge" the event or the system will activate a general alarm and sound all the fire horn and strobes. If the operator does acknowledge the vent within thirty (30) seconds, the panel will start a timer for 180 seconds (3 minutes) in which time the operator must find the device in alarm and reset the device. If the operator has not performed a reset within 180 seconds or a second device reports an alarm, the system will immediately sound the general alarm.
10. The CPU display shall have the option of being configured as an additional remote annunciator.

This annunciator shall be mounted in its own metal cabinet with lockable door.

11. The CPU shall maintain a 4100 event history log. The log shall be maintained upon loss of any power.
12. 24 volt D.C. power-limited 1 amp outputs shall be provided for both resettable and non-resettable power. The outputs shall be screw terminal on board the CPU board.
13. Manufacturer's standard software shall accommodate a 1 man walk test feature.

H. Signaling Line Circuits

1. Provide 1 SLC loop for this project. Projects including more than 1 floor shall include a second SLC loop. Each SLC shall be capable of being wired Class B Style 4 or Class A Style 6 and shall operate in NFPA Style 7 configuration when equipped with isolator modules.
2. Each SLC shall accommodate a maximum 159 analog sensors and 159 monitor/control devices.

I. Notification Appliance Circuits

1. The CPU shall include a minimum 4 on-board polarized NAC circuits rated at 2 amps DC each. Each NAC shall be capable of being wired Class B, Style Y or Class A, Style Z.

J. Dry Contacts

1. Form C dry contacts with a 2 amp at 30VDC resistive rating shall be included on-board the CPU for alarm, trouble and supervisory events.

K. DACT

1. Fire alarm control panel shall include a Digital Alarm Communicator Transmitter (DACT) for signaling to central station. DACT shall contain "Dialer-Runaway" feature preventing unnecessary transmissions as result of intermittent faults in system and shall be Carrier Access Code (CAC) compliant, accepting up to 20-digit central station telephone numbers. Fire department shall be consulted as to authorized central station companies serving municipality. Fire alarm system shall transmit both alarm and trouble signals, with alarm having priority over trouble signal. Contractor shall be responsible for all installation charges and Owner will be responsible for line lease charges
2. DACT shall be a U.L. listed internal component of the main control panel and shall be capable of transmitting specific detailed point by point system events to the monitoring station.
3. Systems using external standalone digital communicators will not be accepted.

L. Cellular/IP COMMUNICATOR

1. Provide a dual path commercial fire communicator as part of this project.
2. Acceptable manufacturers:
3. Fire-Lite Alarms Model IPGSM-4G by Honeywell. All equipment must be available "over the counter" through security equipment distributor network markets and can be installed by dealerships who are independent of the manufacturer. No substitutions allowed.
4. The central station's supervisory equipment shall be Honeywell's AlarmNet Network Control Center.
5. Contract the services of a monitoring company sub-contractor or distributor to provide, program

the communicator and provide monitoring of the system.

6. The communicator shall use the internet or GSM cellular network as a primary transmission format.
7. IPGSM-4G Communicator is connected to any Fire Alarm Control Panel DACT telephone ports, the system shall be capable of transmitting Contact ID formatted alarms, supervisory or troubles to a Honeywell's AlarmNet Network Control Center equipped with a Honeywell AlarmNet receiver via Ethernet over a private or public WAN/LAN, Intranet or Ethernet.
8. The IPGSM-4G Communicator shall include connections to the Fire Alarm Control Panel's phone outputs and shall convert the contact ID protocol into Ethernet Packets.
9. The IPGSM-4G Communicator shall be completely field-programmable locally from a 7720P Programming Tool.
10. The IPGSM-4G Communicator shall be capable of transmitting events in contact ID format.
11. Communication shall include vital system status such as:
 - a. Independent Zone (Alarm, trouble, non-alarm, supervisory)
 - b. Independent Addressable Device Status
 - c. AC (Mains) Power Loss
 - d. Low Battery and Earth Fault
 - e. System Off Normal
 - f. 24 Hour Test Signal
 - g. Abnormal Test Signal (per UL requirements)
12. The IPGSM-4G Communicator shall support independent zone reporting via the Contact ID format. This format shall enable the central station to have details concerning the location of the fire for emergency response. The IPGSM-4G Communicator shall be capable of providing simulated phone lines to the Fire Alarm Control Panel. The IPGSM-4G Communicator shall communicate over IP or GSM primary and shall be transparent to the Fire Alarm Control Panel normal operation over phone lines.

2.4 VOICE EVACUATION PANEL

- A. Provide a standalone voice evacuation panel from one of the approved manufactures
- B. The voice evacuation panel shall be a single assembly complete with metal lockable enclosure, power supply, amplifier, audio controller board and supervised hand-held microphone.
- C. Provide a system with 4 on-board circuits capable of supervising U.L. listed speakers.
- D. The amplifier shall provide a minimum of 50 watts of output power on either 25 or 70.7 Vrms circuits.
- E. The panel shall support a minimum of two pre-recorded messages and have the capability of adding application specific messages through the use of a P.C.
- F. The system audio notification emergency message shall initiate automatically from a supervised D.C. polarity reversing fire alarm notification appliance circuit.
- G. The power supply shall be capable of charging up 18 amp hours batteries.

- H. The audio controller board shall be complete with form C dry trouble and alarm contacts, and LED's for the following:
 - 1. Speaker circuit trouble
 - 2. Alarm
 - 3. Microphone trouble
 - 4. Ground fault
 - 5. Low battery
 - 6. Power fail
- I. The system shall be available with a U.L. listed remote microphone accessory manufactured for the system.

2.5 REMOTE ANNUNCIATOR

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit.
- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit.

2.6 PRINTERS

- A. A printer shall not be required for this project.

2.7 SUPPLEMENTARY NOTIFICATION APPLIANCE POWER SUPPLIES

- A. The following are acceptable manufacturers and series for supplementary notification appliance circuit power supplies. No substitutions are allowed. It is the intent of this specification that all notification equipment must be available over the counter through security equipment distributor network markets
 - 1. APS6 or APS10 with the appropriate amp.
- B. The supplementary NAC power supply shall offer up to 6.0 amps continuous regulated 24-volt power. The power supply shall include the following features:
 - 1. Integral Charger: Charge up to 35.0 amp-hour batteries and support 60-hour standby.
 - 2. 2 Input Triggers. Input trigger shall be Notification Appliance Circuit (from fire alarm control panel) or supervised addressable relay.
 - 3. Surface-mount back box.
 - 4. Ability to delay AC fail delay in accordance with applicable NFPA requirements.
 - 5. Power limited circuitry in accordance with applicable UL standards.
 - 6. Operates as sync follower or a sync generator.
 - 7. Shall have on-board built in sync capability for System Sensor and Wheelock brand appliances.
- C. Do not exceed 75% of the power supply's available listed current. Provide the necessary quantity of power supplies to satisfy this requirement with the quantity of devices indicated on the plans.

2.8 SYSTEM PERIPHERALS

- A. Every device's address shall be set by means of a rotary-decimal switch using a standard screwdriver. Devices using or requiring binary switches, handheld device programmers or addressed only through software mapping shall not be acceptable.
- B. Smoke detectors
 - 1. General Description:
 - a. UL 268 listed, operating at 24-V dc, nominal.
 - b. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
 - c. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status.
 - 2. Photoelectric Smoke Detectors:
 - a. Sensor: LED or infrared light source with matching silicon-cell receiver.
 - b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.
 - 3. Duct Detectors
 - a. Duct detectors shall be System Sensor DNR or DNRW Series housings.
 - b. Housings and all the related accessories listed below shall be provided for the each of the following:
 - 1) On the ductwork of every supply branch of every HVAC air handling/rooftop unit exceeding 2,000 CFM
 - 2) On the ductwork of every return branch of HVAC air handling/rooftop unit exceeding 2,000 CFM. Where duct detectors cannot be practically or effectively installed on return ductwork, securely fasten the duct detector on the side of the AHU and install and secure its sampling tube across the front of the return air filter.
 - 3) On every shown smoke and fire/smoke damper. Where duct detectors cannot be practically installed on dampers consult with the general contractor to coordinate their installation with other trades.
 - c. The housing shall include the listed addressable photoelectric smoke detector head which shall twist in and lock inside the housing.
 - d. Provide System Sensor DST Series sampling tube of enough length to extend 75% of the width of the duct it is being installed in. Sampling tubes in ducts exceeding widths of 6 feet shall exceed and install across the entire width of the duct and be supported by drilling a hole in the opposite side of the ductwork.
 - e. A System Sensor model RTS151KEY module shall be installed for each duct detector. Provide phenolic labels identifying the related HVAC unit it is connected to. The RTS151KEY module shall mount in a standard single gang electrical box. Verify and coordinate location of RTS151KEY modules with architect.
 - f. Provide one addressable relay module for each HVAC required function including:

- 1) AHU Shutdown
- 2) Smoke damper operation
- 3) Smoke sequence/exhaust/pressurization operations
- g. System designs incorporating hardwired, conventional relays for any mechanical functions are not allowed and will be subsequently rejected.

C. Pull Stations

1. Shall be fully listed and compatible with the furnished system, dual action, and constructed of Lexan with clearly visible operating instructions provided on cover. The word FIRE shall appear on front of stations in raised letters.
2. Stations shall be designed so after actuation they cannot be restored except by key reset.
3. Stations shall be keyed alike with the fire alarm control panel and NAC power supply.
4. Surface boxes shall be available as an option from the manufacturer.
5. Pull stations shall not utilize glass rods.

D. Thermal Detectors

1. Shall be listed and compatible with the furnished system.
2. Detector shall be rated at 135 degrees and shall have rate of rise element rated at 15 degrees per minute.
3. UL521 listed

E. Addressable Monitor Modules

1. Where required provide addressable monitor modules to monitor normally open dry contacts from other non-addressable equipment.
2. Module shall be suitable for installation on a standard 4" square electrical box 2-1/8" deep and shall include the manufacturer's matching cover plate.
3. An LED shall be visible on the outside of the module's cover plate and shall flash under normal conditions and remain on steady when it's connected device is in alarm.
4. Modules not suitable for mounting directly onto a 4" square electrical box or those which wire with pigtail type connectors are not acceptable.

F. Supervised Addressable Output Module

1. Provide addressable supervised output module where required for the project to provide a supervised, programmed 24volt DC reverse polarity output.
2. Module shall be suitable for installation on a standard 4" square electrical box 2-1/8" deep and shall include the manufacturer's matching cover plate.
3. An LED shall be visible on the outside of the module's cover plate and shall flash under normal conditions and remain on steady when the module is activated.

G. Addressable Relay Output Module

1. Provide addressable modules suitable for installation on a standard 4" square electrical box 2-1/8" deep and shall include the manufacturer's matching cover plate.
2. The module shall provide two isolated sets of Form-C normally open and normally closed contacts
3. Contact ratings shall be rated at minimum 2.0 amps resistive or 1.0 amp inductive
4. An LED shall be visible on the outside of the module's cover plate and shall flash under normal conditions and remain on steady when the module is activated.

H. Audio Visual Notification Appliances

1. Shall be System Sensor SpectrAlert Advance Series listed for use on both wall and ceiling as indicated on the plans.
2. Provide devices white in color with red FIRE screened on device from manufacturer.
3. Audio visual devices shall be one complete assembly utilizing a speaker for audible notification for this project.
4. The device shall be suitable for mounting on standard electrical boxes using the manufacturer's universal mounting plate. The strobe device shall snap into the mounting plate and secured by one fastener.
5. The manufacturer's mounting plate shall include screw terminals to accept all field wiring.
6. Candelas shall be selectable in settings of 15, 15/75, 30, 75, 95, 110, 115, 135, 150, 177 and 185.
7. The strobe shall be listed to U.L. 1971 standards and meet all current ADAAG Guidelines.
8. The horn shall be listed to U.L. 464 approved for fire protective service and shall have three audibility options and an output to switch between a temporal three pattern and a non-temporal continuous pattern.
9. Provide manufacturer's surface mount and weatherproof backboxes where required.

I. MAGNETIC DOOR HOLDERS

1. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
 - a. Electromagnet: Requires no more than 3 W to develop 25-lbf (111-N) holding force.
 - b. Wall-Mounted Units: Flush mounted unless otherwise indicated.
 - c. Rating: 24-V ac or dc.
2. Material and Finish: Match door hardware.

2.9 WIRE AND CABLE

A. The following are acceptable manufacturers:

1. Windy City Wire
2. General Cable

- B. Cable shall be approved for plenum use without conduit per the NFPA 262 Flame Test
- C. Cable shall be approved per NEC 800, 760; UL, CMP, FPLP UL, RoHS Complaint

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and surfaces to receive fire alarm system.
 - 1. Notify Architect of conditions that would adversely affect installation or subsequent use.
 - 2. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION

- A. Install fire alarm system in accordance with NFPA 72, NFPA 70, state and local codes, manufacturer's instructions, and as indicated on the Drawings.
- B. Conceal conduit, junction boxes, and conduit supports and hangers in finished areas. Conceal or expose conduit, junction boxes, and conduit supports and hangers in unfinished areas.
- C. Do not install smoke detectors before system programming and test period. If construction is ongoing during this period, take measures to protect smoke detectors from contamination and physical damage.
- D. Flush-mount fire detection and alarm system devices, control panels, and remote annunciators in finished areas. Flush-mount or surface-mount fire detection and alarm system devices, control panels, and remote annunciators in unfinished areas.
- E. Ensure manual stations are suitable for surface mounting or semi-flush mounting as indicated on the Drawings. Install not less than 42 inches, not more than 48 inches, above finished floor measured to operating handle.
- F. Duct-Mounted Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.
- G. Heat Detectors in Elevator Shafts: Coordinate temperature rating, thermal response characteristic and location with sprinkler rating and location.
- H. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.
- I. Smoke- or Heat-Detector Spacing:
 - 1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing
 - 2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
 - 3. Smooth ceiling spacing shall not exceed the listing of the detector.
 - 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A in NFPA 72.
 - 5. HVAC: Locate detectors not closer than 5 feet (1.5 m) from air-supply diffuser or 3 feet(1 m) from return-air opening.

6. Lighting Fixtures: Locate centerline of detectors not closer than 12 inches (300 mm) from any part of a lighting fixture.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide service of competent, factory-trained technician authorized by manufacturer to technically supervise and participate during pre-testing and acceptance testing of system.
- B. Testing:
 1. Conduct complete visual inspection of control panel connections and test wiring for short circuits, ground faults, continuity, and insulation before energizing cables and wires.
 2. Close each sprinkler system control valve and verify proper supervisory alarm at Control Panel.
 3. Verify activation of flow switches.
 4. Open initiating device circuits and verify that trouble signal actuates.
 5. Open signaling line circuits and verify that trouble signal actuates.
 6. Open and short notification appliance circuits and verify that trouble signal actuates.
 7. Ground initiating device circuits and verify response of trouble signals.
 8. Ground signaling line circuits and verify response of trouble signals.
 9. Ground notification appliance circuits and verify response of trouble signals.
 10. Check installation, supervision, and operation of intelligent smoke detectors.
 11. Introduce on system each of the alarm conditions that system is required to detect. Verify proper receipt and proper processing of signal at Control Panel and correct activation of control points.
 12. Consult manufacturer's manual to determine proper testing procedures when system is equipped with optional features. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality, and similar.
- C. Acceptance Testing:
 1. Before installation shall be considered completed and acceptable by AHJ, a complete test using as a minimum, the following scenarios shall be performed and witnessed by representative approved by Engineer. Monitoring company and/or fire department shall be notified before final test in accordance with local requirements.
 2. Contractor's job foreman, in presence of representative of manufacturer, representative of Owner, and fire department shall operate every installed device to verify proper operation and correct annunciation at control panel.
 3. Open signaling line circuits and notification appliance circuits in at least 2 locations to verify presence of supervision.
 4. When testing has been completed to satisfaction of both Contractor's job foreman and representatives of manufacturer and Owner, a notarized letter co-signed by each attesting to satisfactory completion of said testing shall be forwarded to Owner and fire department.

5. Leave fire alarm system in proper working order and, without additional expense to Owner, replace defective materials and equipment provided within 1 year (365 days) from date of final acceptance by the owner.

3.4 DEMONSTRATION

- A. Provide instruction as required for operating fire alarm system.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Clearing and grubbing.
- B. Selective removal and trimming.

1.2 REFERENCE STANDARDS

- A. 29 CFR 1910.266 - Logging Operations; Current Edition.
- B. ANSI A300 Part 1 - American National Standard for Tree Care Operations - Tree, Shrub, and Other Woody Plant Management - Standard Practices (Pruning); 2017.
- C. ANSI Z133 - American National Standard for Arboricultural Operations - Safety Requirements; 2017.

PART 3 EXECUTION

2.1 CLEARING AND GRUBBING

- A. Clearing: Cut trees, stumps, shrubs, downed timber, and other vegetation for removal within identified area as indicated on drawings according to 29 CFR 1910.266. Follow recommendations of ANSI Z133 and best local practices for species involved.
- B. Do not remove or damage vegetation beyond limits indicated on drawings.

2.2 SELECTIVE REMOVAL AND TRIMMING

- A. Selective Removal: Individual tree and shrub identified for removal as indicated on drawings according to 29 CFR 1910.266.
- B. Selective Trimming: Individual limbs and branches cut back according to ANSI A300 Part 1 identified for removal as indicated on drawings. Follow recommendations of ANSI Z133 and best local practices for species involved.

2.3 REMOVED VEGETATION PROCESSING

- A. Do not burn, bury, landfill, or leave on-site, except as indicated on drawings.
- B. Trees: Sell if marketable.

END OF SECTION

SECTION 31 22 00

GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Rough grading.
- B. Fine grading.

1.2 PRICE AND PAYMENT PROCEDURES

- A. Unit Prices:
 - 1. See Section 01 22 00 - Unit Prices for additional requirements.
 - 2. Basis of Measurement for Rough Grading: By square foot.
 - 3. Basis of Measurement for Fine Grading: By square foot.

1.3 REFERENCE STANDARDS

- A. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017 (Reapproved 2025).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.5 QUALITY ASSURANCE

- A. Perform in accordance with State of Louisiana, Highway Department standards.
 - 1. Maintain one copy on-site.

1.6 FIELD CONDITIONS

- A. Existing Conditions: See site and utility survey, hazardous material survey, existing conditions survey, and site drawing.

PART 3 EXECUTION

2.1 EXAMINATION

- A. Verify survey bench mark and intended elevations for grading areas are as indicated.
- B. Verify the absence of standing or ponding water.

2.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect above- and below-grade utilities to remain.

- D. Provide temporary means and methods to remove standing or ponding water from areas prior to grading.
- E. Protect site features to remain, including but not limited to bench marks, survey control points, and fences.

2.3 ROUGH GRADING

- A. Excavate and fill subgrade material to elevations indicated on plans.
- B. Remove and replace unsuitable materials as specified fill.

2.4 FINE GRADING

- A. Scrape and spread subgrade material uniformly smooth and without disruptions as indicated on drawings.
- B. Slopes: Transition smoothly to adjacent areas.

2.5 TOLERANCES

- A. Top Surface: Plus or minus 1/2 inch.

2.6 CLEANING

- A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
- B. Remove unused stockpiled subsoil. Grade stockpile area to prevent standing water.
- C. Leave site clean and raked, ready to receive work.

END OF SECTION

SECTION 31 31 16
TERMITE CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Soil-applied chemical treatment.
- B. Site-applied termiticide for wood, steel, and concrete.

1.2 REFERENCE STANDARDS

- A. Title 7, United States Code, 136 through 136y - Federal Insecticide, Fungicide and Rodenticide Act; 2019.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.
- C. Test Reports: Indicate regulatory agency approval reports when required.
- D. Manufacturer's Instructions: Indicate caution requirement.

1.4 QUALITY ASSURANCE

PART 2 PRODUCTS

2.1 MATERIALS

- A. Soil-Applied Chemical Treatment:
 - 1. Toxicant: Comply with Title 7, United States Code, 136 through 136y.
 - 2. Color: Synthetically dyed for visual identification of treated soil.
 - 3. Diluent: Recommended by toxicant manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that soil surfaces are unfrozen and dry to absorb toxicant, ready to receive treatment.
- B. Verify final grading is complete; see Section 31 22 00.
- C. Verify utility trenches are wide enough to receive application.

3.2 APPLICATION

- A. Comply with manufacturer's written instructions.
- B. Soil-Applied Chemical Treatment:
 - 1. Comply with requirements of U.S. EPA and applicable state and local codes.

2. Spray-apply toxicant in accordance with manufacturer's instructions.
3. Apply toxicant at the following locations:
 - a. Building footprint immediately prior to finish grading work outside foundations.
 - b. At interior and exterior sides of foundation walls.
 - 1) Apply toxicant immediately prior to finish grading.
 - c. Soil within 10 feet of building perimeter immediately prior to finish grading.
 - d. Along utility conveyances from foundation to 10 feet of building perimeter.

3.3 PROTECTION

- A. Do not permit soil grading over treated work.
- B. Protect applications from damage after completion. Repair disturbances according to manufacturer's written instructions.

END OF SECTION

SECTION 32 31 23
PLASTIC FENCES AND GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Posts, rails, and frames.
- B. Plastic filler panels.
- C. Concrete.
- D. Manual gates with related hardware.

1.2 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM D1784 - Standard Classification System and Basis for Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds; 2020.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer: Company with demonstrated successful experience installing similar projects and products, with not less than five years of documented experience.

PART 2 PRODUCTS

2.1 PLASTIC FENCES AND GATES

- A. Linear Low Density Polyethylene (LLDPE) Posts, Rails, and Panels:
 - 1. Products:
 - a. Trex; Seclusions Composite Fencing: <https://www.trex.com>.
 - 2. Fence Style: Full privacy.
 - 3. Line Posts: 5 by 5 inches, minimum.
 - a. Internal Reinforcement: ASTM A36/A36M, galvanized steel ,11 gauge, 0.125-inch Z-shape.
 - 4. Corner Posts: 5 by 5 inches, minimum.
 - a. Internal Reinforcement: ASTM A36/A36M, galvanized steel 18 gauge, 0.052-inch box tube.
 - 5. End Posts: 5 by 5 inches, minimum.
 - a. Internal Reinforcement: ASTM A36/A36M, galvanized steel 16 gauge, 0.064-inch box tube.
 - 6. Gate Posts: 5 by 5 inches, minimum.
 - a. Internal Reinforcement: ASTM A36/A36M, galvanized steel 11 gauge, 0.125-inch box tube.
 - 7. Gate Hardware:
 - a. Hinges: Manufacturer's standard 120-degree, spring-loaded type; black finish. Provide two for gates up to 60 inches high, three for taller gates.

- b. Latch: Manufacturer's standard heavy duty latch; black finish.
 - c. Manufacturer's standard heavy duty striker rod and drop rod; black finish.
- 8. Fence Panels: Impact- and UV-resistant, rotational molded, LLDPE plastic shell, with manufacturer's standard galvanized steel reinforcement in top and bottom of panel.
- 9. Gates: Impact- and UV-resistant, rotational molded, LLDPE plastic shell, with manufacturer's standard galvanized steel reinforcement.
- 10. Post Caps and Filler Panels: Impact- and UV-resistant, rotational molded, LLDPE plastic shell.
- B. Fasteners: Manufacturer's standard stainless steel fasteners.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Verify that areas are clear of obstructions or debris.

3.2 PREPARATION

- A. Removal: Obstructions or debris.
- B. Ground Preparation:
 - 1. Grading as indicated on Drawings.

3.3 INSTALLATION

- A. Install framework, pickets, fence panels, accessories and gates in accordance with manufacturer's instructions.

END OF SECTION

Geotechnical Engineering Report

**Christ the King Catholic Church
Gulf Highway (LA Hwy 385) and East Tank Farm Road
Lake Charles, Louisiana**

for

**Hoffpauir Studio, LLC
1669 Lobdell Avenue, Suite H1
Baton Rouge, LA 70806**

prepared by

**Daniel J. Holder, P.E., Inc.
Consulting Civil / Geotechnical Engineer
2767 Scarborough Drive
Lake Charles, LA 70615**

**DJH File 22-017
27 April 2022**

Daniel J. Holder, P.E., Inc.
Consulting Civil / Geotechnical Engineer

2767 Scarborough Drive
Lake Charles, LA 70615
dan@danholderpe.com
337-274-4125

27 April 2022

Hoffpauir Studio, LLC
1669 Lobdell Avenue, Suite H1
Baton Rouge, LA 70806

Attn: Ms. Lisa C. Hargrave, A.I.A.

RE: Geotechnical Engineering Report
Christ the King Catholic Church
Gulf Highway (LA Highway 385) and East Tank Farm Road
Lake Charles, Louisiana
DJH File 22-017

Dear Ms. Hargrave:

We have completed the Geotechnical Engineering Report for the referenced project, and are submitting the same herewith. This work was performed in general accordance with our written scope of work dated 14 March 2022, which was authorized by your e-mail to this office received on 15 March 2022.

Please advise if you have any questions regarding this information, or if I may be of any additional assistance. It has been a pleasure working with you on this project.

Sincerely,



Daniel J. Holder, P.E.
Louisiana P.E. Reg. No. 26532



Report Distribution:

1 electronic file (.PDF)

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APPENDIX

Geotechnical Engineering Report

Christ the King Catholic Church Gulf Highway (LA Highway 385) and East Tank Farm Road Lake Charles, Louisiana

DJH File 22-017; 27 April 2022

PROJECT INFORMATION

1. Description of Project. According to the information provided, it is understood that this project will consist of a new, one-story, 9,000+/- square foot (78' by 160' in overall plan) Main Church building; a new, one-story, 675 square foot (24' by 28' in plan) Restroom Building; a new two-story, 5,500 (45' by 67' in overall plan) Office Building; and associated site paving. Building loads are expected to be no more than about 50 kips per column and 2 kips per lineal foot for walls. Minimal (2 foot or less) of new, net fill is expected to be placed to bring the site to the desired subgrade elevation. Portland cement concrete (PCC) paving is anticipated for the project. Traffic is expected to consist of frequent, lightly loaded passenger car and trucks, with occasional heavier truck loads for deliveries and/or garbage trucks.

The site is located on the northeast corner of Gulf Highway (LA Highway 385) and East Tank Farm Road, in Lake Charles, Louisiana. Refer to the Site Vicinity Map (Figure 1), the Aerial Photograph / Boring Location Plan (Figure 2), and the Site Plan / Boring Location Plan (Figure 3) in the Appendix.

RESULTS OF INVESTIGATION

2. General. This investigation included the following work activities.

- a review of available geologic information;
- a site reconnaissance by the project engineer;
- seven (7) soil borings, including three (3) to the 15 to 25 foot depth in the building areas, and four (4) to the 4 to 6 foot depth in the pavement areas;
- laboratory testing of selected soil samples,
- engineering analyses and evaluations, and,
- the preparation of this report by the Geotechnical Engineer.

The locations of the soil borings are shown on Figures 2 and 3, and the Soil Boring Logs are included in the Appendix. The results of the field and laboratory testing programs are shown on the Soil Boring Logs, and on other figures in the Appendix, where applicable. Finally, a Description of the Field and Laboratory Testing Procedures is also included in the Appendix.

3. Site Conditions. At the time of our investigation, the site consisted of an open field of short grass. Gulf Highway (LA Highway 385) and East Tank Farm Road border the site to the west and south, respectively, each with shallow roadside ditches alongside the roadways. Similar open field borders the site to the east, and a commercial property and open field to the north. Two (2) culverts in the ditches provide access to a sparsely graveled area in the southwest corner of the property, and another some 850 feet east of Gulf Highway provides access from East Tank Farm Road to Drainage Lateral L-1 at the southeast corner of the property. Overall, the property appears to be relatively flat and level, with fair to poor drainage directed to the open ditches.

It is estimated that the center of the building site is located at an approximate latitude and longitude of N 30° 07.535' and W 93° 12.734', respectively. The appropriate U.S.G.S. Topographic Map (i.e., Figure 1) indicates that the site is at an elevation of about EL +10 or so.

According to historic aerial photographs available on the Calcasieu Parish Police Jury GIS Mapping Application (e.g., Figure 2), it appears that the site has remained relatively unchanged since the 1963 photograph. Prior to that, until the 1940 photograph (the earliest available), the site appears to be a rice field.

According to the Geologic Map of Louisiana (Pope, et al, 1984), the site is underlain by the Prairie Formation of Pleistocene Age. These soils are described as "*Light gray to light brown clay, sandy clay, silt, sand, and some gravel.*"

Please note that this discussion of site conditions is necessarily general in nature, and that a comprehensive description of current or previously existing site conditions is beyond the scope of this investigation. Reference is made to Figures 1, 2 and 3 in the Appendix, and the other sources noted herein.

4. Soil and Ground Water Conditions. In general, the soils encountered in the soil borings made for this project may be summarized as follows (the shallow borings have been omitted for clarity).

Generalized Soil Profile⁽¹⁾

	<u>Depth⁽²⁾ of Strata (ft)</u>		
<u>Strata</u>	<u>B-1</u>	<u>B-2</u>	<u>B-3</u>
Firm dark gray CLAYEY SILT (CL-ML) to very SILTY CLAY (CL), w/ oxides & roots – poor	0 to 4	0 to 1	0 to 2½
Stiff to firm light gray w/ tan CLAY (CH) to slightly SILTY CLAY (CL), w/ oxides & gray silt streaks	4 to 12½	1 to 10	2½ to 10

Generalized Soil Profile⁽¹⁾ (cont.)

<u>Strata</u>	<u>Depth⁽²⁾ of Strata (ft)</u>		
	<u>B-1</u>	<u>B-2</u>	<u>B-3</u>
Firm (or medium dense) reddish brown to light gray very SILTY SAND (SM) to CLAYEY SILT (CL-ML)	12½ to 16½	10 to 21	10 to 15
Stiff reddish brown CLAY (CH) & SILTY CLAY (CL), w/ lots of shells in Boring B-1 below the 21 foot depth	16½ to 25	21 to 24½	n / a

⁽¹⁾ Soil Stratification Varied. Refer to Boring Logs in Appendix.

⁽²⁾ Depths Measured From Top of Ground Surface

The borings were (initially) advanced using dry auger methods to determine the presence of and the hydrostatic conditions of ground water in the boreholes. Ground water was generally first encountered at about the 10 foot depth, and rose to about the 5½ foot depth after a brief (about 15 minute or so) observation period. The depth to ground water can fluctuate with seasonal variations in rainfall and evaporation, etc., but is typically first encountered in this area from about the 8 to 12 foot depth, and will generally rise to about the 4 to 6 foot depth after a period of time. Much shallower ground water levels (i.e., “perched water”) can often be observed after periods of precipitation. The actual depth to ground water should be determined more accurately at the time of construction.

The information contained in this section has been generalized from the data obtained from all of the soil borings made for this investigation, and is meant to provide a general overview of the soil and ground water conditions. For more specific information, refer to the Boring Logs in the Appendix.

GEOTECHNICAL RECOMMENDATIONS

5. General Considerations. Surface drainage appeared to be relatively fair to poor at this site, and directed to the previously described drainage ditch. Establishing and maintaining good drainage will be critical for earthwork and foundation construction at this site; otherwise, significant construction difficulties and/or additional measures (e.g., additional undercutting, subgrade stabilization, etc.) can be expected to be required. Performing earthwork operations during wet weather conditions and/or after long, wet periods should be avoided. If dewatering is necessary, sump and pump methods may be suitable if large enough pumps are utilized and the contractor is diligent; otherwise, other measures may be required.

The upper 1 to 2 (to as much as 4) feet or so of silty soils are not considered suitable for the support of the building foundations or floor slabs. In addition, the underlying clay is marginally “fat”, and therefore has a low to moderate potential for shrink / swell movements with fluctuations in moisture content (i.e., it is expansive). The likelihood and/or the magnitude of expansive soil movements are difficult to predict, but if they do occur, they can cause significant distress to building foundations and floor slabs. Consideration should be given to removing these fat clays to some depth and replacing with compacted select fill as part of the site preparation activities to help reduce the potential for expansive movements.

The unsuitable materials described above should be removed and replaced with compacted select fill as part of the site preparation activities. Ideally, this undercut, when combined with the new fill that is to be placed to achieve the desired subgrade elevations, should provide a new, uniform building pad of compacted select fill that is at least 4 feet thick (i.e., 2 feet below the bottom of the footings and/or grade beams, and 4 feet below the bottom of the slab). The more new, net fill to be placed, the less undercut that has to be made; however, a minimum of 2 feet of undercut (i.e., the silty soils) should be anticipated. Reference is made to the Recommended Procedure for New Building Pad in Figure 4 of the Appendix. Recommendations for site preparation and earthwork activities are provided in Section 6.

The new building pad described in the preceding paragraph should be suitable for the support of shallow foundations for the new buildings. The use of a reinforced slab foundation (i.e., a “ribbed slab”) is recommended to provide rigidity in the slab to help resist differential soil movements. The slab foundation may be conventionally reinforced (with “rebar” and welded wire mesh) or post-tensioned with high strength steel tendons. This approach has been used successfully on many projects in this area, but will not guarantee that some movements won’t occur, particularly under extreme conditions of moisture change (e.g., extended droughts or periods of excessive rainfall, etc.) and/or severe loading conditions. However, any such movements should be relatively minor, causing only cosmetic damages, if any; serious structural damage is not likely. Cosmetic damages that might occur include minor cracks in brick and masonry exteriors and interior finishes and floor slabs, slight unlevelness of floors and other horizontal surfaces, and door and window jambs that “stick” or become slightly out of square (these types of damages could also occur from many other sources). In any event, the higher the quality of the earthwork construction, and the stiffer the foundation is constructed, the less likely are the chances for the movements described above. Recommendations for shallow foundations are provided in Section 7.

If the possibility of these minor movements is not acceptable and/or heavier building loads are anticipated, then drilled, cast-in-place concrete shafts may be utilized to support the new building, along with a floor slab-on-grade supported on the new uniform building pad described above. Drilled shafts are especially suitable for supporting large column loads and resisting lateral loads and overturning moments, and/or with relatively

little settlement movement(s). However, the installation of drilled shafts at this site will be significantly impacted by the presence of the wet sands encountered in the soil borings. Excavations for drilled shafts will probably require temporary steel casing and/or full depth drilling slurry to remain stable (i.e., not cave and/or have the bottom become “quick”). Temporary steel casing may be effective if the casing can be “sealed” into the underlying clays to provide a dry excavation; otherwise, full depth drilling slurry will be required. Recommendations for drilled shafts are provided in Section 8.

It is anticipated that the complete removal and replacement of the unsuitable shallow soils may not be economical for the support of the pavements planned for this project. In these areas, although less desirable, consideration may be given to stripping the vegetation and any unsuitable soils containing roots and/or organic matter, and placing fill for the support of the pavement section on the resulting subgrade surface, provided it is firm enough to support the construction activities. Treatment of the upper 8 to 12 inches or so of the silty soils may assist with this option. (This option should only be considered with the understanding that significant construction difficulties could result if the subgrade is wet or yields excessively under construction activities, and that the complete removal of the shallow unsuitable soils could then be required.) Recommendations for Site Preparation and Earthwork Activities are provided in Section 6; recommendations for Site Pavements are provided in Section 9.

6. Site Preparation and Earthwork Activities. As noted in Section 5, establishing and maintaining good drainage will be critical for earthwork and foundation construction at this site. Poor drainage and/or wet conditions at the time of construction can be expected to cause delays and/or cost overruns due to additional undercutting or stabilization measures. The contractor should be prepared to make every reasonable effort to provide dry working conditions (i.e., cut drainage ditches prior to earthwork activities; thoroughly “process,” or dry the subgrade soils, if necessary; and take advantage of dry weather conditions; etc.).

The upper 1 to 2 (and as much as 4) feet or so of silty soils and any underlying poor or otherwise unsuitable soils should be completely removed to expose the firm clayey subgrade. Additional undercut should be made as required to achieve the minimum building pad thickness described in Section 5. The exposed clay subgrade surface should be inspected to ensure that a suitable surface exists upon which to place select fill. This inspection may include proofrolling the subgrade with a loaded, tandem-axle dump truck or other means as determined by the inspector. The clayey subgrade material will be sensitive to moisture, and will likely pump and rut excessively if it is wet and/or if exposed to excessive (or even moderate) construction traffic. Any areas that are determined to be unsuitable for fill placement should be further undercut or treated to achieve a stable subgrade surface.

Treatment of the clay subgrade may be considered, if necessary, to help provide a firm working table upon which to conduct fill operations. Lime treatment should be effective

for the clayey subgrade soils and should be performed in accordance with *LA DOTD Standard Specifications for Roads and Bridges*, Section 304, Type D, Working Table. The treatment percentage should be determined in the lab using a procedure similar to LA DOTD TR 432, or by test strips constructed and evaluated in the field; a treatment percentage of 6 to 8% (by volume) may be assumed for design purposes. The project documents should allow for an adjustment of the treatment percentage based on the results of the lab tests. A full depth stabilizer machine should be utilized for the treatment operations (farm discs will not be effective).

As noted in Section 5, treatment of the silty soils may also be considered in the pavement areas; however, all roots and organic matter and any other deleterious materials should be removed, and treatment must provide a suitable surface upon which to conduct further construction activities. Lime may not be an effective treatment agent in these silty soils; cement or lime-flyash treatment should be considered. Treatment should be performed in general accordance with *LA DOTD Standard Specifications for Roads and Bridges*, Section 303, In-Place Cement Stabilized and Treated Base Courses. The treatment percentage should be determined in the lab using a procedure similar to LA DOTD TR 432, or test strips may be constructed and evaluated in the field. A full depth stabilizer machine should be utilized for the treatment operations (farm discs will not be effective).

Once a firm subgrade exists upon which to conduct fill operations, select fill may be placed to achieve the desired building pad elevation, if required. The new building pad should extend a minimum horizontal distance of 5 feet outside the exterior building lines, and be sloped at a minimum of 10 Horizontal to 1 Vertical (10H:1V), but no steeper than 3H:1V, to facilitate drainage away from the building foundations.

Select fill should consist of a silty or sandy clay with a Liquid Limit of 30 to 42 and a Plasticity Index of 12 to 22. The fill should be placed in 6 inch thick loose lifts or less and compacted to 95% of the Standard Proctor Maximum Dry Density at $\pm 2\%$ of the Optimum Moisture Content (ASTM D 698). Each lift should be tested to ensure compliance with these recommendations prior to placing subsequent lifts. A minimum testing frequency of one test per 2,500 square feet, but not less than 3 tests, per lift is recommended.

Good surface drainage should be established prior to and during the earthwork activities. Standing water on the subgrade or in any excavations should be promptly drained or pumped off. Performing earthwork construction during wet weather conditions could be very challenging at this site.

All site preparation and earthwork activities should be inspected and tested by qualified Construction Material Testing (CMT) personnel experienced in earthwork construction. This should include full-time inspection of the site preparation and testing of fill

placement and compaction. These services are essential for the reliable construction of the building pad for this project.

7. Shallow Foundations. Following the completion of the Site Preparation and Earthwork activities described in Section 6, shallow foundations should be suitable for the support of the new buildings, provided some settlement and/or other minor soil movements can be tolerated, as described in Section 5. The use of a reinforced slab foundation is recommended to help accommodate soil movements.

7.1 Reinforced Slab (or “Ribbed”) Foundation. A reinforced slab foundation consists of a monolithic slab-on-grade with turned-down edges (perimeter grade beams); interior grade beams may be included if required by the building loads and/or stiffness considerations. The perimeter grade beams function as shallow foundations to carry the exterior wall loads and serve to cutoff moisture fluctuations in the soils supporting the slab from the surrounding environment. Interior grade beams serve to stiffen the slab system, allowing it to better accommodate movements in the supporting soils. Interior grade beams should be located beneath any load bearing interior walls and/or columns, in which case they should be designed as a shallow foundation. The spacing and dimensions of the interior grade beams should be determined by the structural engineer, if applicable; typically, a maximum spacing of 15 feet or less (each way) is utilized. Adequate reinforcement, as determined by the structural engineer, should be provided in the slab-on-grade foundation and grade beams. The entire slab system should be placed monolithically (in one pour), or dowelled to provide equivalent rigidity.

The slab foundation may be reinforced with conventional reinforcing steel (rebar and welded wire mesh) or post tensioned steel tendons (i.e., a post-tensioned slab). The grade beam and slab dimensions and reinforcement of either foundation system should be determined by a qualified design professional knowledgeable in the design of slabs-on-grade.

It is recommended that consideration be given to placing a suitable polyethylene vapor barrier and a granular leveling layer beneath the floor slab. The practice of and the details of using a vapor barrier and/or granular leveling layer beneath slabs are left to the discretion of the project designer.

7.2 Bearing Capacity and Soil Movements. Shallow foundations or load bearing grade beams should bear within the new, properly placed and compacted fill pad described in Sections 5 and 6. Shallow foundations or load bearing grade beams bearing designed in accordance with these recommendations may be designed for a maximum net allowable soil bearing capacity of 2,000 pounds per square foot (psf); capacities for column footings may be increased to 2,600 psf. The

exterior grade beams should extend to a depth of at least 2 feet below finished exterior grades to help minimize moisture fluctuations in the foundation soils.

Net allowable soil capacities take into account the weight of the concrete and backfill below grade; thus, no adjustments to the design loads are necessary. The bearing capacities provided in this section include a factor of safety of at least 2 against shear failure of the bearing soils. A minimum footing or grade beam width of 18 inches (24 inches for column footings) is recommended to minimize the possibility of shear “punch” failure of the bearing soils.

Post-construction soil movements from normal foundation settlements are expected to be on the order of one inch or less. Differential movements should be about one-half to two-thirds of the total observed movement.

7.3 Rectangular Footings and Overturning. Capacities for rectangular footings may be increased according to the following formula:

$$q_r = q_w (1 + 0.3 B/L)$$

where q_r = net allowable bearing pressure for rectangular footings (psf)
 q_w = net allowable bearing pressure for continuous footings given in Section 7.2 (psf)
 B = footing width
 L = footing length ($L > B$)

Resistance to overturning loads should only consider the **effective** footing area, i.e., the portion of the footing centered beneath and effective in carrying the load. The equivalent footing dimensions B' and L' of the effective footing area are defined as:

$$B' = B - 2e_B \quad \text{and} \quad L' = L - 2e_L$$

where e_B and e_L are the eccentricity in each direction. Eccentricity is defined as the moment (M) divided by the axial load (P), or

$$e_B = M_B / P_B \quad \text{and} \quad e_L = M_L / P_L$$

7.4 Lateral Loads. Lateral loads on the foundation will be resisted by sliding resistance between the base of the foundation and the underlying soil and by lateral earth pressure against the side of the foundation; the latter should be neglected for shallow foundations for this project. The allowable sliding resistance, $f_{s, all}$, may be taken as 0.2 times the applied bearing pressure, not to exceed a value of 250 psf. This is an allowable value; a safety factor of about 1½ to 2 against sliding resistance has already been included.

7.5 Uplift Loads. Foundations placed to depths of about 4 feet or less should be designed for uplift by taking into account the dead weight of the concrete and any overlying backfill. A typical unit weight of 120 pounds per cubic foot (pcf) should be utilized for the soil backfill if properly placed and compacted (refer to Section 6). Granular soils should not be used for backfill over foundations subject to uplift because the soils could become saturated if poor drainage exists. Buoyant unit weights (i.e., subtract the unit weight of water, 62.4 pcf) should be used for uplift calculations if proper drainage cannot be assured.

7.6 Construction Considerations. Shallow excavations (i.e., 4 feet deep or less) for foundations in firm clayey soils at this site should remain stable (i.e., should not cave) for short periods of time, particularly in the absence of surface or ground water. Deeper excavations, excavations in sandy soils, or excavations that remain open for longer periods of time could be subject to significant ground or surface water intrusion.

The reinforcing steel and concrete for the foundations should be placed expeditiously following the completion of the excavation. The excavations should not be permitted to stand open any longer than necessary. Any water that may accumulate in the excavations should be pumped out immediately.

The soils at this site can become significantly weaker if wetted or disturbed during the construction operations. Traffic in the excavations should be prohibited, and drainage should be provided to direct surface and ground water (if any) away from the excavations. If the concrete for the foundation will not be placed on the same day as the excavation, a “mud mat” of lean concrete should be placed to protect the bearing surface.

According to OSHA regulations (CFR 1926.650 through 1926.652, and Appendix A to Subpart P), the contractor is responsible for developing and maintaining the appropriate safety systems for excavations on the project. The soils should be classified as Type C for this purpose. Recommendations for temporary slopes and/or shoring are beyond the scope of this investigation, but can be provided upon request once more specific design details are available.

All excavation and concreting operations should be inspected and tested by qualified Construction Material Testing (CMT) personnel experienced in shallow foundation construction. This should include full-time inspection of the foundation excavations and testing of concrete placement. These services are essential for the reliable construction of shallow foundations for this project.

8. Drilled Shaft Foundations. As noted in Section 5, drilled, cast-in-place, concrete shafts may also be considered for the support of the planned buildings. Straight-sided drilled shafts should be utilized for this project; belled (underreamed) shafts are not recommended. Excavations for drilled shafts will probably require temporary steel casing and/or full depth drilling slurry to remain stable (i.e., not cave and/or have the bottom become “quick”). Temporary steel casing may be effective if the casing can be “sealed” into the underlying clays to provide a dry excavation; otherwise, full depth drilling slurry will be required. In any event, the contractor should be thoroughly experienced with the use of these drilling techniques and prepared to use same or significant construction difficulties and/or inadequate shaft sections could result. Refer to Section 8.5 for construction considerations.

8.1 Axial Capacity. The compressive axial capacity of drilled shafts is derived from skin friction at the soil-shaft interface and end bearing. Uplift resistance is provided by skin friction and the buoyant weight of the shaft.

Static capacity analyses have been made using field and laboratory strength values, along with local soil strength correlations and experience. The top 4 feet or so has been neglected to account for surface effects and/or for clearance for pile caps and/or grade beams.

Numerous shaft diameters and embedment depths were considered in order to allow the project designer to select the most suitable shaft geometry for the specific loading conditions. These values are tabulated below. The allowable shaft capacities include factors of safety of 2 and 2.5 for skin friction and end bearing in compression, respectively, and 2.5 for skin friction in uplift. The buoyant unit weight of the shaft is also included in the provided uplift capacities, along with a factor of safety of 1.1. Capacities for intermediate diameters and/or depths may be interpolated from the table. Extrapolation beyond the specified diameters and depths is not recommended without further consultation.

Allowable Compression/Uplift Loads for Single Drilled Shaft Foundations (kips)

<u>Depth ⁽¹⁾ (ft)</u>	<u>18 Inch Diameter</u>	<u>24 Inch Diameter</u>
8'	18 / 10	Not Rec'd
10'	22 / 14	33 / 20
15'	34 / 25	49 / 34
20'	47 / 36	66 / 49

⁽¹⁾ Depth Measured Below Top of Existing Ground Surface.

All shaft capacities cited above are based on good quality construction procedures being utilized. Sufficient full depth reinforcement, as determined by the structural engineer, is required to develop the full tensile capacity of the shaft.

8.2 Settlement. Total settlements for drilled shaft foundations designed and constructed in accordance with these recommendations are estimated to be about one quarter inch or less. Differential settlements between adjacent shafts should be about one-half to three-quarters of the observed total settlement. These settlement estimates assume that no more than 1 to 2 feet of new fill will be added to the site. Furthermore, these settlement estimates are based only on the specified loading conditions, and do not include settlements that might occur due to regional subsidence.

8.3 Lateral Loads and Overturning Moments. It is not known if the tops of the drilled shafts will be subject to lateral loads and/or overturning moments, or if these forces will be resisted by the structure itself. The evaluation of lateral loading and overturning moments on drilled shafts can be complex and time consuming for a large number of shaft geometries, such as that provided in Section 8.1. Once the final loading conditions on the drilled shafts are known, this office should be contacted for further evaluation.

8.4 Shaft Spacing and Group Effects. Shafts should be spaced a minimum of 2.5 to 3 diameters center-to-center or 5% of the shaft length, whichever is greater. Large groups of shafts are not anticipated; however, if groups of 5 or more shafts are utilized, the Geotechnical Engineer should be permitted to evaluate group efficiencies.

8.5 Construction Considerations. Excavations for drilled shafts will probably require temporary steel casing and/or full depth drilling slurry to remain stable (i.e., not cave and/or have the bottom become "quick"). Temporary steel casing may be effective if the casing can be "sealed" into the underlying clays to provide a dry excavation; otherwise, full depth drilling slurry will be required. In any event, the contractor should be thoroughly experienced with the use of these drilling techniques and prepared to use same or significant construction difficulties and/or inadequate shaft sections could result.

Drilling slurry, if utilized, should be introduced into the excavation immediately upon drilling, and maintained at full depth during the drilling and concreting operations. The excavation and concrete placement should proceed as expeditiously as possible. Once the excavation is started, it should be completed and concrete placed without delay. The slurry should be premixed and brought to the proper consistency, etc., before introducing into the excavation. The drilling tools (augers) should be designed such that the slurry can pass freely around or through the tool as the auger is withdrawn, and the auger should be

operated slowly enough that suction does not develop beneath the auger and cause caving. The bottom of the excavation should be cleaned out with an air lift pump or similar device; a clean-out bucket is not recommended. Prior to cleanout, the slurry should be allowed to stand undisturbed for about 15 to 30 minutes to allow all suspended solids to settle out.

The reinforcing steel and concrete for the shaft should be placed immediately after the clean out operations are complete. The reinforcing cage should be fixed in place with centralizers or other means so that it is not disturbed by the concrete placement. If temporary steel casing is used achieve a dry excavation, the concrete may be dropped freely through the excavation, provided it is not permitted to strike any obstructions on the way down and does not land in standing water. A "head" of concrete of at least 5 feet above the bottom of the casing should be maintained while the temporary casing is withdrawn.

If a dry excavation cannot be achieved or drilling slurry is utilized, a full depth tremie should be utilized to place the concrete. The concrete should be placed by means of a full depth, water-tight tremie with a valve or other means of separating the slurry from the concrete (e.g., a pig). The concrete should be proportioned so that it has the proper strength as determined by the project designers, while maintaining a slump of 6 to 8 inches at the time of placement. This is critical to ensure that the slurry is completely displaced, and that no voids remain within the completed shaft. All drilling and concreting operations should be observed by qualified personnel experienced in drilled shaft inspection techniques.

8.6 Floor Slabs and Grade Beams. As long as the site preparation and earthwork activities are properly performed, as described in Section 6, the floor slabs may consist of ground supported slabs-on-grade placed monolithically with exterior and interior grade beams, or as structural floor slabs. The grade beams should be designed to rest upon and span across the drilled shaft foundations. The exterior grade beams should extend to a minimum depth of 2 feet below exterior finished grade to help minimize moisture fluctuations of the soils supporting the floor slab. The interior grade beams may be placed at any convenient depth as required by the structural considerations for the floor slab system. The dimensions and spacing of the interior grade beams should be determined by the structural engineer. Typically, the interior beam spacing matches the drilled shaft layout; in any case, a maximum spacing of 15 feet or less (each way) is generally utilized. Sufficient reinforcement (for both positive and negative moments) and control joint spacing, as determined by the structural engineer, should be utilized.

It is recommended that consideration be given to placing a suitable polyethylene vapor barrier and a granular leveling layer beneath the floor slab. The practice of

and the details of using a vapor barrier and/or granular leveling layer beneath the slab are left to the discretion of the designer of record.

According to OSHA regulations (CFR 1926.650 through 1926.652, and Appendix A to Subpart P), the contractor is responsible for developing and maintaining the appropriate safety systems for excavations on the project. The soils should be classified as Type C for this purpose. Recommendations for temporary slopes and/or shoring are beyond the scope of this investigation, but can be provided upon request once more specific design details are available.

All drilling and concreting operations should be inspected and tested by qualified Construction Material Testing (CMT) personnel experienced in drilled shaft construction. This should include full-time inspection of the shaft excavations and testing of concrete placement. These services are essential for the reliable construction of drilled shafts for this project.

9. Pavements. Following the completion of the Site Preparation and Earthwork activities described in Section 6, the prepared subgrade should be suitable for the support of the project pavements. The success of any pavement system depends primarily on the following factors: traffic volume and wheel (or axle) loadings, drainage, construction quality, and regular inspection and maintenance. These considerations are discussed in Section 9.1.

Local experience indicates that Portland cement concrete (PCC) pavements generally perform better than asphaltic concrete (AC) pavements in this area, and thus are recommended for use on this project. PCC pavements generally require a larger initial investment; however, future maintenance costs are generally less than that of AC pavements. Recommendations for PCC pavements are provided in Section 9.2.

The previous paragraph notwithstanding, properly designed and maintained asphalt pavements can also perform satisfactorily for projects of this type, and are discussed for the project designer's consideration. AC pavements generally involve less initial investment, although greater future maintenance costs are involved. Recommendations for AC pavements can be provided upon request.

9.1 General Considerations for Pavement Systems.

- Traffic Loading Conditions. Pavement sections should be designed to accommodate the anticipated traffic volume and loadings. Overloading pavement sections through excessive wheel loads and/or repetitions will lead to premature pavement failure.

It is anticipated that traffic loading conditions for this project will be limited to site access and parking for light passenger car and truck traffic, and occasional

delivery trucks and/or garbage trucks. It is further expected that the larger vehicles will be separated from the parking areas of patron vehicles and limited to specific traffic lanes.

- **Drainage.** Establishing and maintaining good drainage is essential to the successful performance of pavements. Without good drainage conditions, premature pavement failure can be expected. The final subgrade surface should be contoured to channel surface and subsurface water away from the pavements. If site grades allow, the pavement sections should be elevated so that an aggregate base course can drain freely. Otherwise, a soil-cement base or other such base that will not trap water beneath the pavements should be utilized.
- **Construction Quality.** Quality construction practices and inspection services are essential for the successful installation and performance of pavements. Construction inspection services by Geotechnical Engineer's representative are considered essential for this phase of the project.
- **Inspection and Maintenance.** A regular inspection and maintenance program should be conducted to ensure that the pavement is maintained in good operating condition. The pavements should be inspected regularly to verify that adequate drainage is maintained and that all joints are properly sealed and free of vegetation or debris. When pavement distress is noted, the appropriate measures (e.g., patching, sealing, resurfacing, etc.) should be performed to keep the pavements in good operating condition.

9.2 Portland Cement Concrete (PCC) Pavements. The automobile parking pavement section should consist of 5 inches of concrete (minimum compressive strength of 3,000 psi) underlain by 4 inches of crushed aggregate or 6 inches of soil-cement base. The aggregate should meet the gradation requirements of LA DOTD Section 1003.03.1 Stone. Locally available products known as 610 Road Base or No. 57 Stone, although not strictly meeting 1003.03.1, should be suitable for use as base material. Traffic lanes should consist of 6 inches of concrete (8 inches beneath any truck or dumpster traffic) underlain by 4 inches of crushed, well graded aggregate or 6 inches of cement-treated base. If any pavements will be subject to heavy truck loading, the pavement thickness should be at least 8 inches over the aggregate or cement-treated base. The PCC pavement should be at least 9 inches thick in the dumpster loading zone, if applicable.

A suitable non-woven geotextile (US Fabrics US 160NW, or equal) should be provided between the aggregate base and the subgrade to prevent the mixing of the base and subgrade. If suitable drainage cannot be provided for a granular base, a 6 inch thick soil-cement base should be utilized. The cement-treated base, if utilized, should be constructed in accordance with *LA DOTD Standard*

Specifications for Roads and Bridges Section 303. A treatment percentage of 10% cement (by volume) may be used for planning purposes; however, the appropriate treatment percentage should be determined by additional laboratory testing prior to construction using *LA DOTD Testing Procedure Manual* TR 432.

Appropriate reinforcement as determined by the design engineer should be used and adequate control joint spacing (15 feet or less is suggested) should be observed. Pavements should be isolated from building foundations by means of suitable expansion and/or control joints, if applicable.

All aspects of the pavement design and construction should conform to the American Concrete Institute (ACI) *Standard 330R-08: Guide for Design and Construction of Concrete Parking Lots*, the *LA DOTD Standard Specifications for Roads and Bridges, Section 601 - Portland Cement Concrete*, and other applicable engineering specifications.

9.3 General. Note that the pavement sections provided in this report were derived from the experience of this firm based on similar projects that have been observed to perform satisfactorily over the last 20 years. Rigorous pavement designs have not been performed because traffic data was not provided for that purpose. Minor deviations from the pavement sections provided in this section should not necessarily be detrimental to the performance of the pavements at this site, provided traffic is limited to light passenger traffic, a good subgrade is established and fill placement is of high quality, and good construction practices are utilized when constructing the pavements (especially observing minimum specified pavement thicknesses). We will be happy to provide additional analyses for the pavement sections if requested.

OTHER GEOTECHNICAL CONSIDERATIONS

10. Drainage and Landscaping. Proper long term drainage should be provided to direct surface water away from the completed building foundations and pavements. Gutters and downspouts, as well as positive site grading, should be utilized for this purpose as required. Landscaping near the building foundations and pavements should be avoided to minimize fluctuations in the moisture contents of the surrounding soils, or a suitable drainage barrier (e.g., geosynthetic liner) should be utilized. Trees should be located no closer to the building foundations than the drip line of the mature tree canopy.

11. Additional Consulting Services. The Geotechnical Engineer should be kept informed of and permitted to address all aspects of the soils-related aspects of the project. Often, concerns may arise that are not specifically addressed by the

Geotechnical Engineering Report. A brief conference can often address any such concerns, and can identify any other issues not anticipated by the design team.

Upon completion of design, and prior to the start of construction, the Geotechnical Engineer should be provided with the opportunity to review the design drawings and specifications to assure compliance with the Geotechnical Engineering Report. Such review is considered to be an integral part of the recommendations of this report.

12. Construction Materials Testing (CMT) Services. Construction Materials Testing (CMT) services for this project are essential to assure that the soil conditions do not vary from that assumed in this report and to ensure that the recommendations in this report are followed. These services should be retained by the owner to assure that unbiased reporting is provided. The Geotechnical Engineer of Record should be provided with timely copies of all test results. Otherwise, the suitability of these recommendations and/or the performance of the earthwork and foundations for this project cannot be assured.

13. Limitations. This report is based upon the information provided by the owner's representative, as well as the soil and ground water conditions encountered during the field investigation. Variations may occur away from or between the borehole locations. If such variations become apparent, or if the nature of the project changes significantly, the Geotechnical Engineer should be consulted for additional recommendations.

The recommendations in this report pertain only to the soils-related aspects of the project. The structural design of the building foundations is beyond the scope of these services. Likewise, this report does not address the environmental aspects of the project. We would be pleased to assist with these additional services if requested.

14. Compliance with Applicable Standards and Regulations. All geotechnical and related civil aspects of this project should be designed and constructed in compliance with the latest editions of any and all applicable building standards and regulations. These should include but not be limited to concrete and reinforcing steel standards by the American Concrete Institute (ACI), applicable sections of the International Building Code (IBC) and ASCE/SEI 24 (Flood Resistant Design and Construction), safety standards by the Occupational Safety and Health Administration (OSHA), and any other applicable local, state, or federal building standards, codes or permit requirements. Nothing contained in this report is intended to conflict with or should be construed to supersede any such applicable standards and regulations.

APPENDIX

U.S.G.S. Topographic Map / Site Vicinity Map (Figure 1)

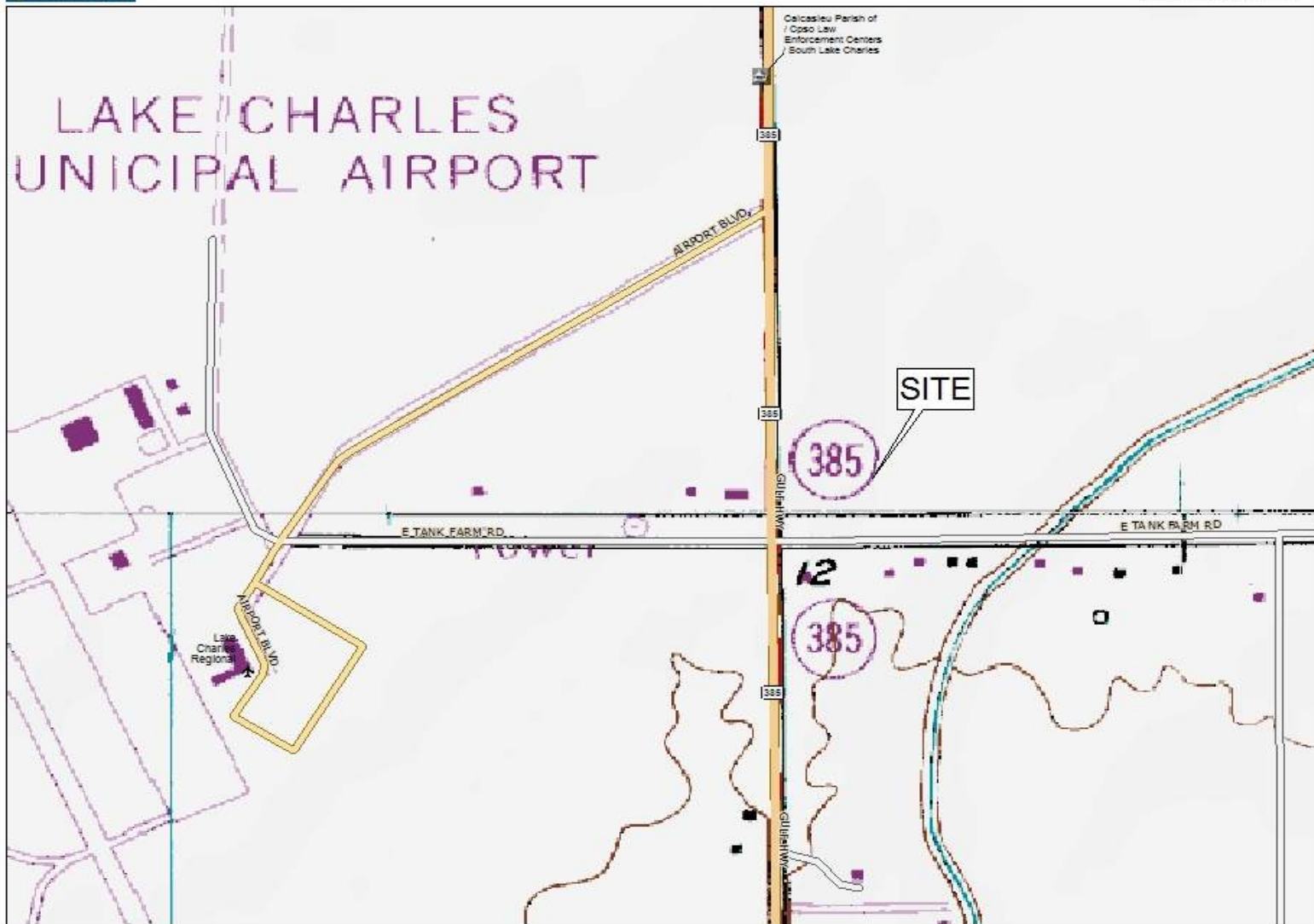
Aerial Photograph / Boring Location Plan (Figure 2)

Site Plan / Boring Location Plan (Figure 3)

Recommended Procedure for New Building Pad (Figure 4)

Soil Boring Logs (7)

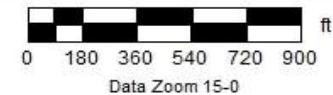
Description of Field and Laboratory Testing Procedures



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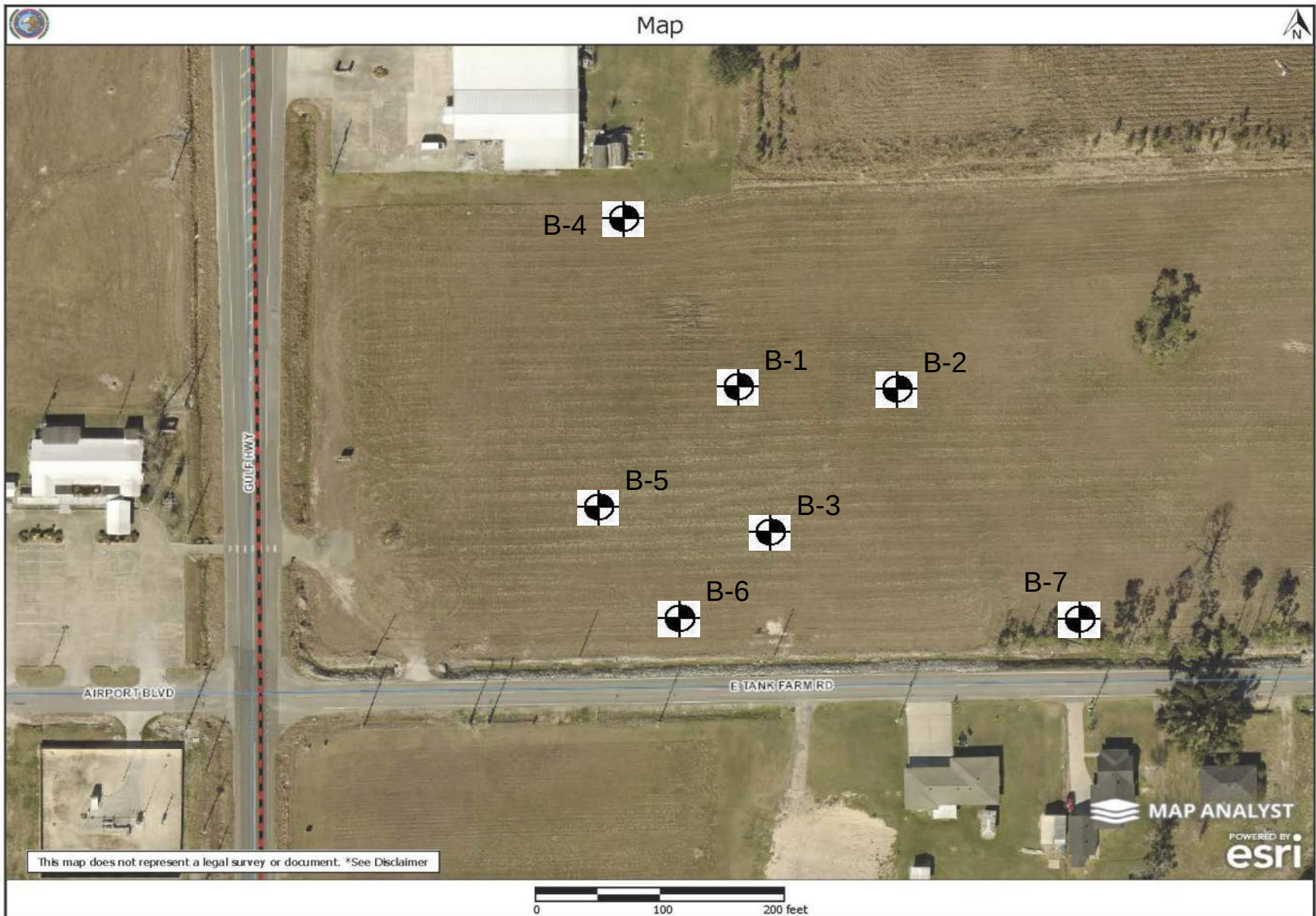
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Christ the King Catholic Church
 Lake Charles, Louisiana
 for
 Hoffpauir Studio Architecture
 Baton Rouge, Louisiana

Project Engineer: DJH	DJH File No. 22-017
Drawn By: dan	Date: 26 Apr 2022
Checked By: <i>[Signature]</i>	Figure No. 1

Site Vicinity Map /
 U.S.G.S. Topographic Map

Source: U.S.G.S. 7.5 Minute Topographic Map, 1999 (3-D TopoQuads, DeLorme)

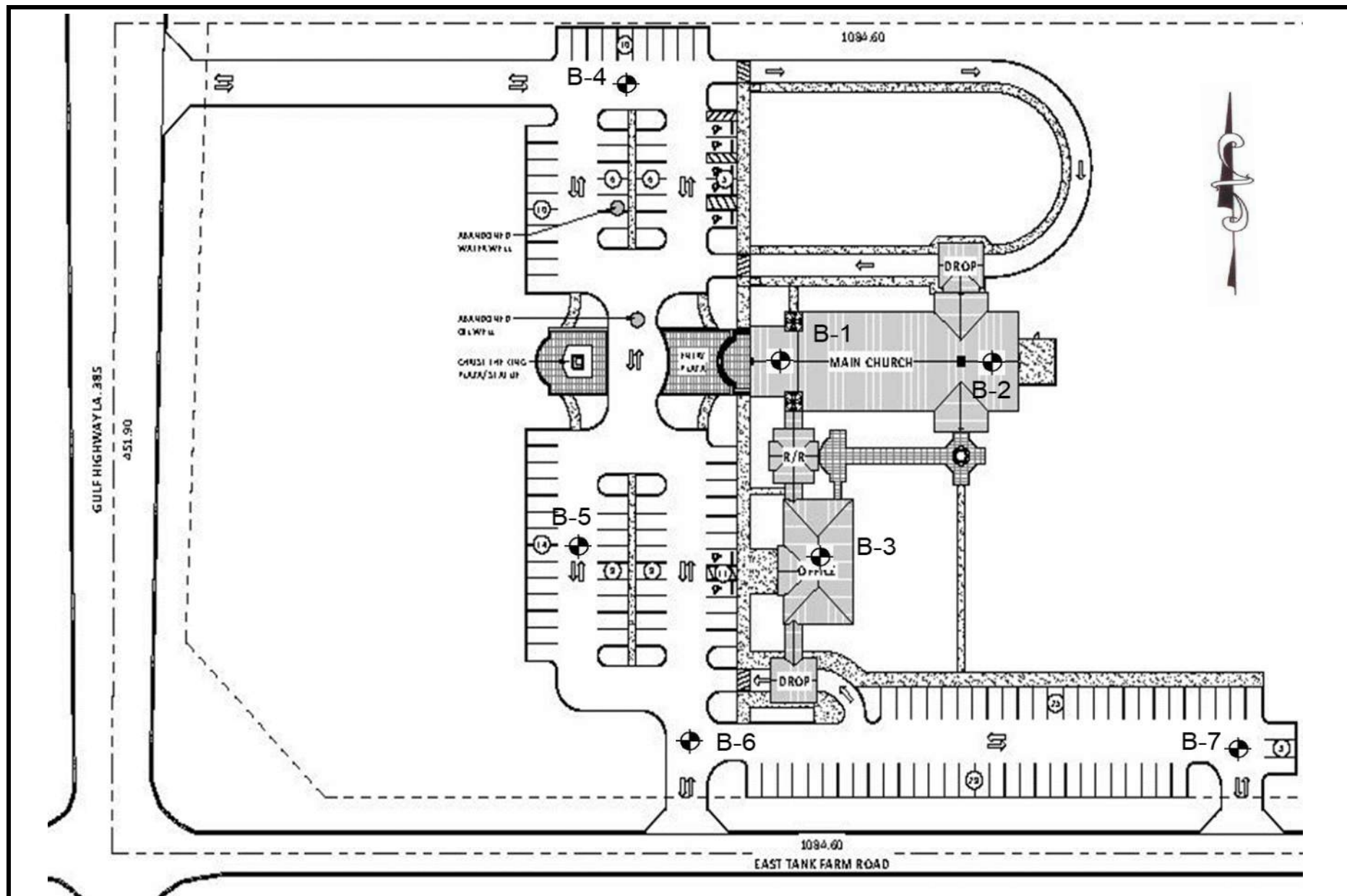


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Project Engineer: DJH	DJH File No. 22-017
Drawn By: dan	Date: 26 Apr 2022
Checked By: <i>[Signature]</i>	Figure No. 2
Aerial Photograph / Boring Location Plan	

Source: Calcasieu Parish Police Jury GIS Mapping Application - 2022



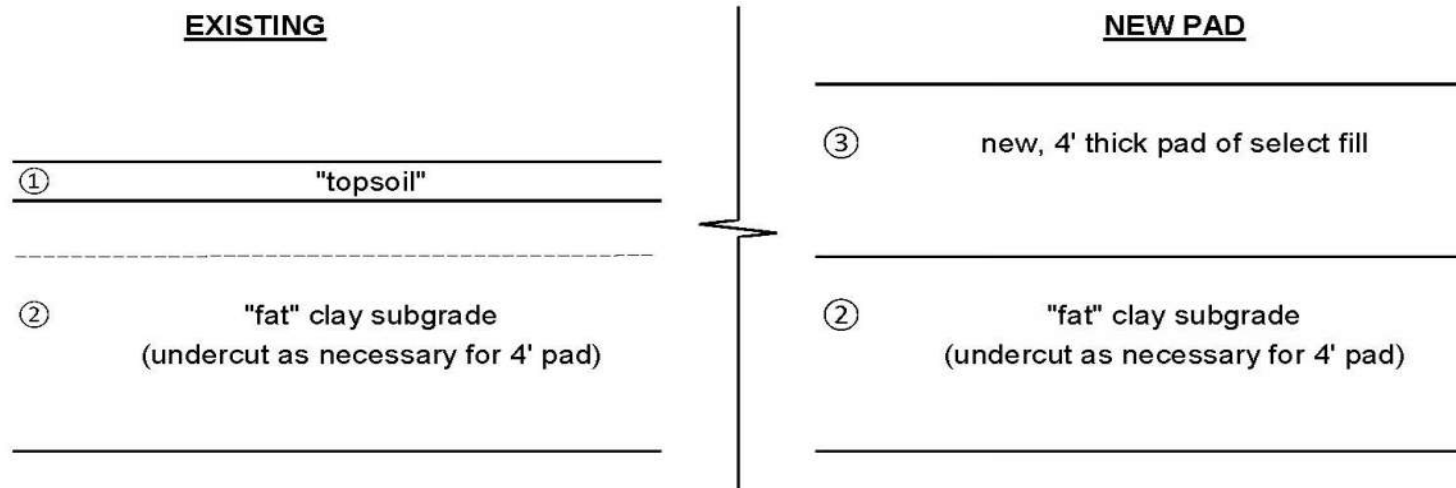
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 Baton Rouge, Louisiana

Project Engineer: DJH	DJH File No. 22-017
Drawn By: dan	Date: 26 Apr 2022
Checked By: <i>[Signature]</i>	Figure No. 3
Site Plan / Boring Location Plan	

Source: Site Plan Provided by Hoffpauir Studio Architecture

RECOMMENDED PROCEDURE FOR NEW BUILDING PAD



- ① Remove all "topsoil" and other unsuitable materials to expose firm clayey subgrade.
- ② Remove (undercut) enough "fat" clay subgrade to provide at least 4' thick building pad below bottom of design floor slab elevation, and 2' below bottom of any footings or grade beams.
- ③ Place and compact new, select fill pad (at least 4' thick) in 6" to 8" loose "lifts".
Test each lift in at least three (3) locations for compaction and material verification.

NOTE: Refer to Sections 5 and 6 of Geotechnical Engineering Report

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Project Engineer: DJH	DJH File No. 22-017
Drawn By: dan	Date: 26 Apr 2022
Checked By: <i>[Signature]</i>	Figure No. 4
Recommended Procedure for New Building Pad	

SOIL BORING LOG

Boring No. B-1

Page 1 of 1

Project: Christ the King Catholic Church
 Location: Gulf Highway (LA Hwy 385) and East Tank Farm Road
 Lake Charles, Louisiana
 Client: Hoffpauir Studio Architecture
 Baton Rouge, Louisiana

DJH File No: 22-017
 Date Drilled: 4/12/2022
 Logged By: Silas Henrich
 Drilled By: Data Acquisition Services
 Equipment: Ardco Top Drive (Truck)

Depth (ft)	Field Tests			Laboratory Tests							Symbol	Description
	Sample Type	Penetrometer (tsf) or SPT (bpf)	Ground Water	Qu / UU (tsf)	Dry Density, γd (pcf)	Moisture Content, w (%)	Atterberg Limits			Notes / Other Tests		
							Liquid Limit, %	Plastic Limit, %	Plasticity Index, %			
1	ST	3½ tsf										Firm dark gray CLAYEY SILT (CL-ML), w/ fine roots & gray silt pockets - poor
2												
3	ST	2½ tsf		1.3	105	22	30	20	10	εf = 7.9%		Stiff dark gray very SILTY CLAY (CL-ML), w/ roots, oxides & silt pockets - poor
4	ST	2 tsf		1.4	105	22	52	20	32	εf = 10%		Stiff light gray w/ tan CLAY (CH), w/ tan & black oxides & gray silt streaks
5												
6	ST	3½ tsf										Stiff light gray w/ tan slightly SILTY CLAY (CL), w/ tan & black oxides
7												
8	ST	3 tsf	▽	1.6	99	26	47	25	22	εf = 4.3%		Stiff brown w/ light gray slightly SILTY CLAY (CL), w/ brown & black oxides
9												
10	ST	1½ tsf		0.9	101	24				εf = 8.6%		Firm light gray w/ tan SANDY CLAY (CL), w/ brown oxides
11												
12												
13												
14	ST	1 tsf										Firm reddish brown to light gray very SILTY fine SAND (SM) - wet
15												
16												
17												
18												
19	SS	12 bpf 7-5-7										Stiff reddish brown CLAY (CH)
20												
21												
22												
23												
24	ST	2 tsf		0.6	93	30	37	21	16	εf = 2.9%		Stiff dark brown to brown very SANDY CLAY (CL), w/ lots of small shells - fair
25												Boring Completed at 25' Depth
Boring Data						Ground Water Data					Notes / Other Tests	
Boring Advancement:						▽ First Encountered: 10'					εf = Failure Strain	
Dry Auger: 0' to 10'						▽ After 15 Minutes: Dry						
Rotary Wash: 10' to 25'						Boring Caved to 9' After 15 Minutes						
Boring Abandonment:						Sample Type:						
Boring Backfilled w/ Soil						ST: Shelby Tube (ASTM D 1587)					Soil Stratification is Approximate	
Cuttings Upon Completion						SS: Split Spoon (ASTM D 1586)						

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SOIL BORING LOG

Boring No. B-2

Page 1 of 1

Project: Christ the King Catholic Church
 Location: Gulf Highway (LA Hwy 385) and East Tank Farm Road
 Lake Charles, Louisiana
 Client: Hoffpauir Studio Architecture
 Baton Rouge, Louisiana

DJH File No: 22-017
 Date Drilled: 4/12/2022
 Logged By: Silas Henrich
 Drilled By: Data Acquisition Services
 Equipment: Ardco Top Drive (Truck)

Depth (ft)	Field Tests			Laboratory Tests							Symbol	Description
	Sample Type	Penetrometer (tsf) or SPT (bpf)	Ground Water	Qu / UU (tsf)	Dry Density, γd (pcf)	Moisture Content, w (%)	Atterberg Limits			Notes / Other Tests		
							Liquid Limit, %	Plastic Limit, %	Plasticity Index, %			
From Handheld GPS (approximate): N 30° 07.535' W 93° 12.709'												
1	ST	1½ tsf									Firm dark gray CLAYEY SILT (CL-ML), w/ fine roots - poor	
2												
3	ST	1 tsf		1.4	105	21	50	19	31	ε _f = 10%	Stiff light gray w/ tan CLAY (CH), w/ tan oxides & large gray silt pockets	
4												
5	ST	1½ tsf	▽	0.9	102	25				ε _f = 10%	Firm light gray & tan slightly SILTY CLAY (CL), w/ tan & black oxides,	
6											gray silt pockets & a large crawfish hole	
7	ST	1½ tsf		1.4	105	23	41	21	20	ε _f = 2.9%	Stiff brown w/ light gray SILTY CLAY (CL), w/ brown & black oxides	
8												
9	ST	2½ tsf		1.4	105	25				ε _f = 6.4%	Stiff reddish brown CLAY (CH), w/ a	
10			▽								few black oxides & light gray silt pockets	
11	ST	1½ tsf									Firm reddish brown & light gray SILTY	
12											fine SAND (SM) - wet	
13												
14	ST	½ tsf									- ditto	
15												
16												
17												
18												
19	SS	20 bpf 9-9-11									- ditto, medium dense	
20												
21												
22												
23												
24	SS	16 bpf 5-5-11									Stiff reddish brown SILTY CLAY (CL)	
25											Boring Completed at 24½' Depth	
Boring Data						Ground Water Data					Notes / Other Tests	
Boring Advancement:						▽ First Encountered: 10'					ε _f = Failure Strain	
Dry Auger: 0' to 10'						▽ After 15 Minutes: 5½'						
Rotary Wash: 10' to 24½'						Boring Caved to 9' After 15 Minutes						
Boring Abandonment:						Sample Type:					Soil Stratification is Approximate	
Boring Backfilled w/ Soil						ST: Shelby Tube (ASTM D 1587)						
Cuttings Upon Completion						SS: Split Spoon (ASTM D 1586)						

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SOIL BORING LOG

Boring No. B-3

Page 1 of 1

Project: Christ the King Catholic Church
 Location: Gulf Highway (LA Hwy 385) and East Tank Farm Road
 Lake Charles, Louisiana
 Client: Hoffpauir Studio Architecture
 Baton Rouge, Louisiana

DJH File No: 22-017
 Date Drilled: 4/12/2022
 Logged By: Silas Henrich
 Drilled By: Data Acquisition Services
 Equipment: Ardco Top Drive (Truck)

Depth (ft)	Field Tests			Laboratory Tests							Symbol	Description
	Sample Type	Penetrometer (tsf) or SPT (bpf)	Ground Water	Qu / UU (tsf)	Dry Density, γ_d (pcf)	Moisture Content, w (%)	Atterberg Limits			Notes / Other Tests		
							Liquid Limit, %	Plastic Limit, %	Plasticity Index, %			
1	ST	1½ tsf	★									Firm dark gray CLAYEY SILT (CL-ML), w/ fine roots - poor
2												
3	ST	2 tsf		1.0	104	21	51	21	20	$\epsilon_f = 10\%$		Firm to stiff dark gray w/ tan CLAY (CH), w/ tan oxides & dark gray silt pockets
4												
5	ST	2½ tsf		1.4	110	20	52	18	34	$\epsilon_f = 10\%$		Stiff light gray w/ tan CLAY (CH), w/ tan oxides & large gray silt pockets
6												
7	ST	2 tsf		1.3	110	20				$\epsilon_f = 10\%$		Stiff light gray w/ tan slightly SILTY CLAY (CL), w/ tan & black oxides
8												& large gray silt pockets
9	ST	1½ tsf										Stiff light gray & tan to brown SANDY
10												CLAY (CL), w/ tan & black oxides
11	ST	1½ tsf										Firm brown w/ light gray very SILTY
12												fine SAND (SM)
13												
14	ST	<¼ tsf										Firm reddish brown very SILTY fine SAND (SM) to CLAYEY SILT (CL-ML)
15												
16												Boring Completed at 15' Depth
17												
18												
19												
20												
21												
22												
23												
24												
25												
Boring Data						Ground Water Data					Notes / Other Tests	
Boring Advancement:						★ No Ground Water Encountered					ϵ_f = Failure Strain	
Dry Auger: 0' to 15'												
Rotary Wash: n / a												
Boring Abandonment:						Sample Type:					Soil Stratification is Approximate	
Boring Backfilled w/ Soil						ST: Shelby Tube (ASTM D 1587)						
Cuttings Upon Completion						SS: Split Spoon (ASTM D 1586)						

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SOIL BORING LOG

Boring No. B-4

Page 1 of 1

Project: Christ the King Catholic Church
 Location: Gulf Highway (LA Hwy 385) and East Tank Farm Road
 Lake Charles, Louisiana
 Client: Hoffpauir Studio Architecture
 Baton Rouge, Louisiana

DJH File No: 22-017
 Date Drilled: 4/12/2022
 Logged By: Silas Henrich
 Drilled By: Data Acquisition Services
 Equipment: Ardco Top Drive (Truck)

Depth (ft)	Field Tests			Laboratory Tests							Symbol	Description
	Sample Type	Penetrometer (tsf) or SPT (bpf)	Ground Water	Qu / UU (tsf)	Dry Density, γ_d (pcf)	Moisture Content, w (%)	Atterberg Limits			Notes / Other Tests		
							Liquid Limit, %	Plastic Limit, %	Plasticity Index, %			
1	ST	2 tsf	★	0.9	115	18	28	18	10	$\epsilon_f = 9.8\%$	From Handheld GPS (approximate): N 30° 07.560' W 93° 12.751'	
2												
3	ST	1½ tsf										
4												
5											Boring Completed at 4' Depth	
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
Boring Data						Ground Water Data					Notes / Other Tests	
Boring Advancement:						★ No Ground Water Encountered					ϵ_f = Failure Strain	
Dry Auger: 0' to 4'												
Rotary Wash: n / a												
Boring Abandonment:						Sample Type:					Soil Stratification is Approximate	
Boring Backfilled w/ Soil						ST: Shelby Tube (ASTM D 1587)						
Cuttings Upon Completion						SS: Split Spoon (ASTM D 1586)						

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SOIL BORING LOG

Boring No. B-5

Page 1 of 1

Project: Christ the King Catholic Church
 Location: Gulf Highway (LA Hwy 385) and East Tank Farm Road
 Lake Charles, Louisiana
 Client: Hoffpauir Studio Architecture
 Baton Rouge, Louisiana

DJH File No: 22-017
 Date Drilled: 4/12/2022
 Logged By: Silas Henrich
 Drilled By: Data Acquisition Services
 Equipment: Ardco Top Drive (Truck)

Depth (ft)	Field Tests			Laboratory Tests							Symbol	Description
	Sample Type	Penetrometer (tsf) or SPT (bpf)	Ground Water	Qu / UU (tsf)	Dry Density, γ_d (pcf)	Moisture Content, w (%)	Atterberg Limits			Notes / Other Tests		
							Liquid Limit, %	Plastic Limit, %	Plasticity Index, %			
1	ST	1½ tsf	★	1.1	106	20				$\epsilon_f = 5.7\%$		From Handheld GPS (approximate): N 30° 07.519' W 93° 12.755'
2												
3	ST	1 tsf										Stiff tan w/ light gray slightly SILTY CLAY (CL), w/ tan oxides
4	ST	1 tsf										Firm to stiff light gray & tan slightly SILTY CLAY (CL), w/ tan oxides & large gray silt streaks - fair
5												
6												Boring Completed at 6' Depth
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
Boring Data						Ground Water Data					Notes / Other Tests	
Boring Advancement: Dry Auger: 0' to 6' Rotary Wash: n / a Boring Abandonment: Boring Backfilled w/ Soil Cuttings Upon Completion						★ No Ground Water Encountered					ϵ_f = Failure Strain	
						ST: Shelby Tube (ASTM D 1587) SS: Split Spoon (ASTM D 1586)					Soil Stratification is Approximate	

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SOIL BORING LOG

Boring No. B-6

Page 1 of 1

Project: Christ the King Catholic Church
 Location: Gulf Highway (LA Hwy 385) and East Tank Farm Road
 Lake Charles, Louisiana
 Client: Hoffpauir Studio Architecture
 Baton Rouge, Louisiana

DJH File No: 22-017
 Date Drilled: 4/12/2022
 Logged By: Silas Henrich
 Drilled By: Data Acquisition Services
 Equipment: Ardco Top Drive (Truck)

Depth (ft)	Field Tests			Laboratory Tests							Symbol	Description
	Sample Type	Penetrometer (tsf) or SPT (bpf)	Ground Water	Qu / UU (tsf)	Dry Density, γ_d (pcf)	Moisture Content, w (%)	Atterberg Limits			Notes / Other Tests		
							Liquid Limit, %	Plastic Limit, %	Plasticity Index, %			
1	ST	1½ tsf	★	0.9	109	18	24	18	6	$\epsilon_f = 4.3\%$		From Handheld GPS (approximate): N 30° 07.502' W 93° 12.743'
2												
3	ST	1 tsf										Firm dark gray CLAYEY SILT (CL-ML), w/ roots - poor
4												Firm to soft dark gray very SILTY CLAY (CL), w/ fine roots - poor
5												Boring Completed at 4' Depth
6												
7												
8												
9												
10												
11												
12												
13												
14												
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22												
23												
24												
25												
Boring Data						Ground Water Data					Notes / Other Tests	
Boring Advancement: Dry Auger: 0' to 4' Rotary Wash: n / a Boring Abandonment: Boring Backfilled w/ Soil Cuttings Upon Completion						★ No Ground Water Encountered					ϵ_f = Failure Strain	
						ST: Shelby Tube (ASTM D 1587) SS: Split Spoon (ASTM D 1586)					Soil Stratification is Approximate	

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SOIL BORING LOG

Boring No. B-7

Page 1 of 1

Project: Christ the King Catholic Church
 Location: Gulf Highway (LA Hwy 385) and East Tank Farm Road
 Lake Charles, Louisiana
 Client: Hoffpauir Studio Architecture
 Baton Rouge, Louisiana

DJH File No: 22-017
 Date Drilled: 4/12/2022
 Logged By: Silas Henrich
 Drilled By: Data Acquisition Services
 Equipment: Ardco Top Drive (Truck)

Depth (ft)	Field Tests			Laboratory Tests							Notes / Other Tests	Symbol	Description
	Sample Type	Penetrometer (tsf) or SPT (bpf)	Ground Water	Qu / UU (tsf)	Dry Density, γ_d (pcf)	Moisture Content, w (%)	Atterberg Limits						
							Liquid Limit, %	Plastic Limit, %	Plasticity Index, %				
1	ST	2½ tsf	★	0.9	106	19	25	19	6	$\epsilon_f = 2.1\%$		From Handheld GPS (approximate): N 30° 07.502' W 93° 12.681'	
2													
3	ST	2 tsf										Firm dark gray CLAYEY SILT (CL-ML), w/ roots & gray silt pockets - poor	
4												Firm tan to brown SILTY CLAY (CL)	
5												Boring Completed at 4' Depth	
6													
7													
8													
9													
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20													
21													
22													
23													
24													
25													
Boring Data						Ground Water Data					Notes / Other Tests		
Boring Advancement: Dry Auger: 0' to 4' Rotary Wash: n / a Boring Abandonment: Boring Backfilled w/ Soil Cuttings Upon Completion						★ No Ground Water Encountered					ϵ_f = Failure Strain		
						ST: Shelby Tube (ASTM D 1587) SS: Split Spoon (ASTM D 1586)					Soil Stratification is Approximate		

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Description of Field and Laboratory Testing Procedures

Field Testing Procedures. The borings were located in the field using the information provided by the client's representative and standard GPS and/or taping procedures from relevant physical features shown on the site plan provided for our use. The borings were (initially) advanced using dry auger methods. Soil samples were obtained continuously in the upper 10 foot and on 5 foot centers thereafter. The sample depths and types are recorded on the soil boring logs.

In general, relatively undisturbed "Shelby" tube samples (ASTM D 1587) were taken in clays and silty clays. Undisturbed soil samples are required for strength and density tests, and other properties that are dependent upon the soil being close to its natural state. In this procedure, the boring is advanced to the desired sampling depth, then a 3 inch diameter, thin-walled "Shelby" tube is inserted into the borehole. The tube is then pushed hydraulically about 2 feet into the undisturbed soil. The tube is withdrawn, and the sample extruded with a hydraulic piston. The sample is visually classified and tested with a spring loaded penetrometer, which provides a crude estimate of the unconfined compressive strength. The penetrometer test result is recorded on the soil boring log, and a representative portion of the sample is secured for transport to the laboratory.

In sands and silts, Standard Penetration Tests (ASTM D 1586) are generally made. This test provides a measure of the in-situ density or stiffness of the soil and provides a relatively disturbed sample that may be used for classification testing. In this procedure, the boring is advanced to the desired sampling depth, and a relatively heavy walled "split spoon" sampler is inserted into the borehole. The sampler is driven into the soil using a 140 pound "drop" hammer with 30 inch strokes. The number of blows required to drive each 6 inch increment is recorded. The first increment is a seating drive; the number of blows required to drive the second and third increments are added together to determine the "N-value," which has units of blows per foot (bpf). The N-value and the number of blows per increment are recorded on the soil boring log. The sample is visually classified, and a representative portion secured for transport to the laboratory.

Laboratory Testing Procedures. Representative samples from the field investigation were selected by the project engineer for laboratory testing to determine their relevant engineering characteristics. These tests generally fall into one of the following categories.

Strength Tests. Strength tests generally consist of the Unconfined Compressive Strength, or Qu Test, (ASTM D 2166), and the Unconsolidated, Undrained Triaxial Compressive Strength, or UU Test, (ASTM D 2850). In each of these tests, a cylindrical sample of undisturbed soil is subjected to an axial load until failure occurs, yielding the compressive strength of the soil. The principal difference between the two tests is that the Qu is not confined laterally, which can lead to premature failure, and thus, lower compressive strength values. The UU test is confined laterally in a triaxial cell, typically to the lateral stress that the in-situ soil sample was subject to. The compressive strength and axial strain at failure (ϵ_f) are recorded on the soil boring log. The confining stress of UU tests is also recorded.

Classification Tests. Common classification tests include the Atterberg Limit Tests and Particle Size Analyses. Atterberg Limit Tests (ASTM D 4318) are performed to determine the consistency (or "clayeyiness") of a soil. The Atterberg limits consist of the Liquid Limit (LL) and the Plastic Limit (PL), and the Plasticity Index (PI), which is the difference between the LL and the PL. These values are recorded on the soil boring log.

The Particle Size Analysis Test (ASTM D 422) is performed to determine the distribution of the individual particle sizes of a soil sample. The test is typically performed using mechanical sieves for soils containing gravel and sands, or a "hydrometer" for clayey and silty soils. The results of the Particle Size Analysis are typically plotted on a log scale.

Physical Tests. Common physical tests include the Moisture Content Test (ASTM D 2216) and the Dry Density Test (ASTM D 7263). As the names indicate, these tests determine the moisture content and dry density (or dry unit weight) of a soil sample.