CENTRALBIDDING
FROM CENTRAL AUCTION HOUSE

E05-22-11 South Shore Harbor Boat Slip Fire Protection Project

Flood Protection Authority - East

Project Manual for:

SOUTHSHORE HARBOR - BOAT SLIP BUILDING FIRE PROTECTION SYSTEM

6001 STARS AND STRIPES BLVD. NEW ORLEANS, LA

Prepared By:

LINFIELD, HUNTER & JUNIUS, INC.
Professional Engineers, Architects,
Surveyors, and Landscape Architects
3608 18th Street, Suite 200
Metairie, LA 70002

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Metairie, LA 70002

LH&J Project No. 22-005
APRIL 20th, 2022

BID SET

SPECIFICATION INDEX

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DIVISION 01 – GENERAL REQUIREMENTS

ADVERTISEMENT FOR BIDS

Sealed bids will be received by the Lakefront Management Authority (LMA), 6001 Stars & Stripes Blvd., Suite 219, New Orleans, Louisiana 70126 until 2:00 p.m. on May 18, 2022.

FOR: Southshore Harbor – Boat Slip Building Fire Protection System

Complete Bid Documents for this project are available in electronic and printed form. Printed bid documents are available upon payment of Seventy-Five dollars ($75.00) per set. Deposits on the first set of documents furnished bona fide prime bidders will be fully refunded upon return of the documents no later than ten days after receipt of bids. On other sets of documents furnished to bidders the deposit less actual cost of reproduction, will be refunded upon return of the documents no later than ten days after receipt of bids. Electronic bid documents may be obtained without charge and without deposit. Bid Documents may be obtained from:

Linfield, Hunter & Junius, Inc.
3608 18th Street
Metairie, Louisiana 70002
Attn: Benjamin Noble Chadwick
Email: Bchadwick@LHJunius.com
Phone: 504.833.5300

All bids shall be accompanied by bid security in the form of certified check, cashier's check, or Bid Bond as prescribed by LA RS 38:2218.A.C, in the amount equal to at least five percent (5%) of the total amount bid and payable without conditions to the Owner as a guarantee that the Bidder, if awarded the Contract, will promptly execute a Contract in accordance with bid proposal and all terms and conditions of the Bid Documents.

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.

A NON-MANDATORY PRE-BID CONFERENCE WILL BE HELD
at *10:00 AM CST* on *May 11, 2022* at the
New Orleans Lakefront Airport – 2nd Floor Conference Room
6001 Stars and Stripes Blvd. New Orleans, LA 70126.

A **highly-encouraged jobsite visit** will be held following the Pre-Bid Conference. The jobsite visit is not mandatory, but it is highly encouraged for those submitting a bid. The jobsite visit being conducted by LMA will facilitate access to project features that are located on private property. Outside of the recommended site visit, the Contractor may not have access to the features located on private property.

ANY PERSON REQUIRING SPECIAL ACCOMMODATIONS SHALL NOTIFY LMA OF THE TYPE(S) OF ACCOMMODATION REQUIRED NOT LESS THAN SEVEN (7) DAYS BEFORE THE BID OPENING.

Contact the Lakefront Management Authority at (504) 355-5990 if directions are needed to the Non - Mandatory Pre-Bid Conference or the highly encouraged Jobsite Visit.

Bids shall be accepted from Contractors who are licensed under LA. R.S. 37:2150-2163 for the classification of Commercial Building Construction.

The Owner reserves the right to reject any and all bids for just cause. In accordance with La. R.S. 38:2212 (A)(1)(b), the provisions and requirements of this Section, those stated in the advertisement bids, and those required on the bid form shall not be considered as informalities and shall not be waived by any public entity.

Advertise in the New Orleans Advocate 3x

Wednesday, April 20, 2022

Wednesday, April 27, 2022

Wednesday, May 4, 2022

DIVISION 0 – GENERAL REQUIREMENTS

SECTION INSTRUCTIONS TO BIDDERS

ARTICLE 1 – DEFINITIONS

1.1 The Bid Documents include the following:

- Advertisement for Bids
- Instructions to Bidders
- Bid Form
- Bid Bond
- Contract Between Owner and Contractor
- Performance and Payment Bond
- Affidavit
- General Provisions
- Special Provisions
- User Agency Documents (if applicable)
- Other Documents (if applicable)
- Addenda issued during the bid period and acknowledged in the Bid Form

1.2 All definitions set forth in the General Provisions and the Special Provisions of the Contract are applicable to the Bid Documents, unless otherwise specifically stated or written.

1.3 Addenda are written, and/or graphic instruments issued by the Engineer prior to the opening of bids which modify or interpret the Bid Documents by additions, deletions, clarifications, corrections and prior approvals.

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

1.5 Base bid is the sum stated in the bid for which the Bidder offers to perform the work described as the base, to which work may be added, or deleted for sums stated in alternate bids.

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

1.7 A Bidder is one who submits a bid for a prime Contract with the Owner for the work described in the Bid Documents.

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

1.9 Where the word "Engineer" is used in any of the documents, it shall refer to the Prime Designer of the project, regardless of discipline.

ARTICLE 2 – PRE-BID CONFERENCE

2.1 A Pre-Bid Conference shall be held at the time and location described in the Advertisement for Bids The purpose of the Pre-Bid Conference is to familiarize Bidders with the requirements of the Project and the intent of the Bid Documents, and to receive comments and information from interested Bidders. If the Pre-Bid Conference is stated in the Advertisement for Bids to be a Mandatory Pre-Bid Conference, bids shall be accepted only from those bidders who attend the Pre-Bid Conference. Bidders who are not in attendance for the entire Pre-Bid Conference will be considered to have not attended.

2.2 Any revision of the Bid Documents made as a result of the Pre-Bid Conference shall not be valid unless included in an addendum.

ARTICLE 3 – BIDDER'S REPRESENTATION

3.1 Each Bidder by making his bid represents that:

3.1.1 He has read and understands the Bid Documents and his bid is made in accordance therewith.

3.1.2 He has had the opportunity to visit the site and has familiarized himself with the local conditions under which the work is to be performed.

3.1.3 His bid is based solely upon the materials, systems, and equipment described in the Bid Documents as advertised and as modified by addenda.

3.1.4 His bid is not based on any verbal instructions contrary to the Bid Documents and addenda.

3.1.5 He is familiar with the Code of Governmental Ethics requirement that prohibits public servants and/or their immediate family members from bidding on or entering into contracts; he is aware that the Designer and its principal owners are considered Public Servants under the Code of Governmental Ethics for the limited purposes and scope of the Design Contract with the State on this Project (see Ethics Board Advisory Opinion, No. 2009-378 and 2010-128); and neither he nor any principal of the Bidder with a controlling interest therein has an immediate family relationship with the Designer or any principal within the Designer’s firm. (La. R.S. 42:1113). Any Bidder submitting a bid in violation of this clause shall be disqualified and any Contract entered into in violation of this clause shall be null and void.

3.2 The Bidder must be fully qualified under any State or local licensing law for Contractors in effect at the time and at the location of the work before submitting his bid. In the State of Louisiana, Revised Statutes 37:2150, et seq. will be considered, if applicable.

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

ARTICLE 4 – BID DOCUMENTS

4.1 Copies

4.1.1 Bid Documents may be obtained from the Lakefront Management Authority as stated in the Advertisement for Bids.

4.1.1.1 One (1) set of Plans and Specifications shall be furnished to each Bidder.

4.1.1.2 In addition to the availability of printed Bid Documents, the Lakefront Management Authority will provide the Bid Documents in electronic format. They may be obtained without charge and without deposit as stated in the Advertisement for Bids.

4.1.1.3 Where electronic distribution is provided, all other plan holders are responsible for their own reproduction costs.

4.1.2 Complete sets of Bid Documents shall be used in preparing bids; neither the Owner nor the Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bid Documents.

4.1.3 The Owner or Engineer in making copies of the Bid Documents available on the above terms, do so only for the purpose of obtaining bids on the work and do not confer a license or grant for any other use.

4.2 Interpretation or Correction of Bid Documents

4.2.1 The Contract and Bonds which govern the Work shall be performed in accordance with the Plans and Specifications. Items not covered in the provided plans and specifications shall be performed in accordance with the Louisiana Standard Specifications for Roads and Bridges, current edition. The Bidder understands that all quantities for performing the Work have been estimated by the Engineer, and that the Bid shall be the sum of the quantities multiplied by their respective unit rates.

4.2.2 Bidders shall promptly notify the Lakefront Management Authority contact person listed in the Advertisement for Bids of any ambiguity, inconsistency or error which they may discover upon examination of the Bid Documents or of the site and local conditions.

4.2.3 Bidders requiring clarification or interpretation of the Bid Documents shall make a written request to the Lakefront Management Authority contact person listed in the Advertisement for Bids, to reach him at least seven days prior to the date for receipt of bids.

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

4.3 Substitutions

4.3.1 The materials, products, and equipment described in the Bid Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution. No substitutions shall be allowed after bids are received.

4.3.2 No substitution will be considered unless written request for approval has been submitted by the Proposer and has been received by the Engineer at least seven (7) working days prior to the opening of bids. (La.R.S.38:2295C) Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including model numbers, drawings, cuts, performance and test data and any other information necessary for an evaluation.

A statement setting forth any changes in other materials, equipment or work that incorporation of the substitute would require shall be included. It shall be the responsibility of the proposer to include in his proposal all changes required of the Bid Documents if the proposed product is used. Prior approval is given contingent upon supplier being responsible for any costs which may be necessary to modify the space or facilities needed to accommodate the materials and equipment approved.

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

4.4 Addenda

4.4.1 Addenda will be emailed or delivered to all who are known by the Lakefront Management Authority to have received a complete set of Bid Documents.

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

4.4.3 Except as described herein, addenda shall not be issued within a period of seventy-two (72) hours prior to the advertised time for the opening of bids, excluding Saturdays, Sundays, and any other legal holidays. If the necessity arises of issuing an addendum modifying plans and specifications within the seventy-two (72) hour period prior to the advertised time for the opening of bids, then the opening of bids shall be extended at least seven but no more than twenty-one (21) working days, without the requirement of re- advertising. The Lakefront Management Authority shall be consulted prior to issuance of such an addendum and shall approve such issuance. The revised time and

date for the opening of bids shall be stated in the addendum.

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

4.4.5 The Owner shall have the right to extend the bid date by up to (30) thirty days without the requirement of re-advertising. Any such extension shall be made by addendum issued by the Lakefront Management Authority.

ARTICLE 5 – BID PROCEDURE

5.1 Form and Style of Bids

5.1.1 Bids shall be submitted on the Louisiana Uniform Public Work Bid Form provided by the Engineer.

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

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

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

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

5.1.6 Bidders are cautioned to complete all unit prices should such be required in the Bid Form. Unit prices represent a price proposal to do a specified quantity and quality of work.

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

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

5.1.9 The bid shall include the legal name of Bidder and shall be signed by the person or persons legally authorized to bind the Bidder to a Contract.

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

a) Signature on bid is that of any corporate officer or member of a partnership or

partnership in commendam listed on most current annual report on file with Secretary of State.

b) Signature on bid is that of authorized representative of corporation, partnership, or other legal entity and bid is accompanied by corporate resolution, certification as to the principal, or other documents indicating authority.
c) Corporation, partnership, or other legal entity has filed in the records of the Secretary of State, an affidavit, resolution or other acknowledged or authentic document indicating the names of all parties authorized to submit bids for public contracts.

The name and license number on the envelope shall be the same as the entity identified on the Bid Form.

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

5.2 Bid Security

5.2.1 No bid shall be considered or accepted unless the bid is accompanied by bid security in the amount identified in the advertisement for bids.

The bid security shall be in the form of a certified check or cashier's check drawn on a bank insured by the Federal Deposit Insurance Corporation, or a Bid Bond written by a surety company licensed to do business in Louisiana and signed by the surety's agent or attorney-in-fact. The Bid Bond shall be written on the Lakefront Management Authority Bid Bond Form, and the surety for the bond must meet the qualifications stated thereon. The Bid Bond shall include the legal name of the bidder be in favor of the Lakefront Management Authority and shall be accompanied by appropriate power of attorney. The Bid Bond must be signed by both the bidder/principal and the surety in the space provided on the Lakefront Management Authority Bid Bond Form. Failure by the bidder/principal or the surety to sign the bid bond shall result in the rejection of the bid.

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

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

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

5.3 Submission of Bids

5.3.1 The Bid shall be sealed in an envelope. The bid envelope shall be identified on the outside with the name of the bid, and the name, address, and license number of the Bidder. The envelope shall contain only one bid form and will be received until the time specified and at the place specified in the Advertisement for Bids. It shall be the specific responsibility of the Bidder to deliver his sealed bid to Lakefront Management Authority at the appointed place and prior to the announced time for the opening of bids. Late delivery of a bid for any reason, including late delivery by United States Mail, or express delivery, shall disqualify the bid.

If the bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "Bid Enclosed" on the face thereof. Such bids shall be sent by Registered or Certified Mail or by express delivery, Return Receipt Requested, addressed to:

Lakefront Management Authority
6001 Stars and Stripes Blvd, Suite 219
New Orleans, LA 70126

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

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

5.3.4 Oral, telephonic, or telegraphic bids are invalid and shall not receive consideration. Owner shall not consider notations written on outside of bid envelope which have the effect of amending the bid. Written modifications enclosed in the bid envelope, and signed or initialed by the Contractor or his representative, shall be accepted.

5.4 Bidder Requirements

It is the responsibility of each Bidder before submitting a Bid to:

5.4.1 Examine the Bidding Documents including the Plans and Specifications and any Addenda or related data identified in the Bidding Documents;

5.4.2 Visit the Project Site to become familiar with the local conditions if they are believed to affect cost, progress, or the completion of the Work;

5.4.3 Become familiar and satisfied with all federal, state, and local Laws and Regulations that may affect cost, progress, or the completion of the Work;

5.4.4 Study and correlate all information known to the Bidder including observations obtained from Bidder's visits, if any, to the Project Site, with the Bidding Documents;

5.4.5 Submit a written notice to the Engineer within three (3) days regarding any conflicts, errors, ambiguities, or discrepancies discovered in the Bidding Documents and confirm that the written resolution thereof by the Engineer is acceptable to the Bidder; and

5.4.6 Determine that the Bidding Documents are generally sufficient to convey an understanding of all terms and conditions for completing the required Work.

The submission of a Bid will constitute an incontrovertible representation that the Bidder has complied with every requirement of the Bid Documents including all requirements specified in the Advertisement for Bids, the Instruction To Bidders, and the Plans and Specifications.

5.5 Modification or Withdrawal of Bid

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

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

5.5.3 Withdrawn bids may be resubmitted up to the time designated for the receipt of bids provided that they are then fully in conformance with these Instructions to Bidders. No bid can be withdrawn after the hour set for opening such bid except as provided in LSA-R.S. 38:2214C, i.e. bids containing patently obvious, unintentional, and substantial mechanical, clerical, or mathematical errors, or errors of unintentional omission of a substantial quantity of work, labor, material, or services made directly in the compilation of the bid, may be withdrawn by the contractor if clear and convincing sworn, written evidence of such errors is furnished to the Lakefront Management Authority within forty-eight (48) hours of the bid opening excluding Saturdays, Sundays, and legal holidays. Such errors must be clearly shown by objective evidence drawn from inspection of the original work papers, documents, or material used in the preparation of the bid sought to be withdrawn. If the Lakefront Management Authority determines that the error is a patently obvious mechanical, clerical, or mathematical error, or unintentional omission of a substantial quantity of work, labor, material, or service, as

opposed to a judgment error, and that the bid was submitted in good faith it shall accept the withdrawal and return the bid security to the contractor. A contractor who attempts to withdraw a bid under these provisions shall not be allowed to resubmit a bid on the project (LSA-R.S.38:2214D).

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

ARTICLE 6 – CONSIDERATION OF BIDS

6.1 Opening of Bids

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

6.2 Rejection of Bids

6.2.1 The Owner shall have the right to reject any or all bids and in particular to reject a bid not accompanied by any required bid security or data required by the Bid Documents or a bid in any way incomplete or irregular.

6.3 Acceptance of Bid

6.3.1 It is the intent of the Owner, if he accepts any alternates, to accept them in the order in which they are listed in the Bid Form. Determination of the Low Bidder shall be on the basis of the sum of the base bid and the alternates accepted. However, the Owner shall reserve the right to accept alternates in any order which does not affect determination of the Low Bidder.

6.4 Notice of Award

6.4.1 The Owner, or its designated bidding agent, shall provide written notice to the Successful Bidder stating that the Owner will sign and deliver the Contract upon compliance with the conditions enumerated therein and within the time specified.

ARTICLE 7 – POST-BID INFORMATION

7.1 Submissions

7.1.1 The Contractor shall submit all required deliverables in conformance with the Bid Documents.

It is the preference of the Owner that, to the greatest extent possible or practical, the Contractor utilize Louisiana Subcontractors, manufacturers, Suppliers and labor.

7.1.2 The Contractor will be required to establish to the satisfaction of the Engineer the

reliability and responsibility of the proposed Subcontractors to furnish and perform the work described in the sections of the Specifications pertaining to such proposed Subcontractor's respective trades. The General Contractor shall be responsible for actions or inactions of Subcontractors and/or material suppliers.

The General Contractor is totally responsible for any lost time or extra expense incurred due to a Subcontractor's/or Material Supplier's failure to perform. Failure to perform includes, but is not limited to, a Subcontractor's financial failure, abandonment of the project, failure to make prompt delivery, or failure to do work up to standard. Under no circumstances shall the Owner be obligated to mitigate the General Contractor's losses or reimburse the General Contractor for losses caused by these events.

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

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

ARTICLE 8

PERFORMANCE AND PAYMENT BOND

8.1 Bond Required

The Contractor shall furnish and pay for a Performance and Payment Bond written by a company licensed to do business in Louisiana, which shall be signed by the surety's agent or attorney-in-fact, in an amount equal to the total contract price as awarded. Surety must be listed currently on the U. S. Department of Treasury Financial Management Service List (Treasury List) as approved for an amount equal to or greater than the Contract amount or must be an insurance company domiciled in Louisiana or owned by Louisiana residents. If surety is qualified other than by listing on the Treasury list, the Contract amount may not exceed fifteen percent of policyholders' surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance and may not exceed the amount of $500,000. However, a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A. M. Best's Key Rating Guide shall not be subject to the $500,000 limitation, provided that the Contract amount does not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide nor fifteen percent of policyholders' surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance. The Bond shall be signed by

the surety's agent or attorney-in-fact. The Bond shall be in favor of the Lakefront Management Authority.

8.2 Time of Delivery and Form of Bond

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

8.2.2 8.2.2 Bond shall be in the form furnished by the Lakefront Management Authority, entitled CONTRACT BETWEEN OWNER AND CONTRACTOR and PERFORMANCE AND PAYMENT BOND, copies of which are included in the Bid Documents.

8.2.3 8.2.3 The Bidder shall require the Attorney-in-Fact who executes the required bond on behalf of the surety to affix thereto a certified and current copy of his power of Attorney.

8.3 Recordation of Contract and Bond [38:2241A (2)]

8.3.1 The Contractor 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. The Contractor shall obtain a Certificate of Recordation from the Clerk of Court and forward this Certificate immediately to the Lakefront Management Authority contact person listed in the Advertisement for Bids. No request for payment will be processed until receipt of the Certificate of Recordation.

ARTICLE 9 – FORM OF CONTRACT BETWEEN OWNER AND CONTRACTOR

9.1 Form to be Used

9.1.1 Form of the Contract to be used shall be furnished by the Lakefront Management Authority, an example of which is bound in the Bid Documents.

9.2 Award

9.2.1 Before award of the Contract, the successful Bidder shall furnish to the Owner a copy of a Disclosure of Ownership Affidavit stamped by the Secretary of State, a certified copy of the minutes of the corporation or partnership meeting which authorized the party executing the bid to sign on behalf of the Contractor.

9.2.2 In accordance with Louisiana Law, when the Contract is awarded, the successful Bidder shall, at the time of the signing of the Contract, execute the Non-Collusion Affidavit included in the Contract Documents

9.2.3 When this project is financed either partially or entirely with State Bonds, the award of this Contract is contingent upon the sale of bonds by the State Bond Commission. The State shall incur no obligation to the Contractor until the Contract between Owner and Contractor is duly executed.

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: Lakefront Management Authority
6001 Stars and Stripes Blvd, Suite 219
New Orleans, LA 70126

BID FOR: Southshore Harbor – Boat Slip Building
Fire Protection System

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:
Linfield, Hunter & Junius, Inc. and dated: April 2022.

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 *(Not Applicable)* for the lump sum of:

Not Applicable _____Dollars ($_____)

Alternate No. 2 *(Not Applicable)* for the lump sum of:

Not Applicable _____Dollars ($_____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

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

** If someone other than a corporate officer signs for the Bidder/Contractor, a copy of a corporate resolution or other signature authorization shall be required for submission of bid. Failure to include a copy of the appropriate signature authorization, if required, may result in the rejection of the bid unless bidder has complied with La. R.S. 38:2212(A)(1)(c) or RS 38:2212(O).

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

LOUISIANA UNIFORM PUBLIC WORK BID FORM
UNIT PRICE FORM

TO: Lakefront Management Authority
6001 Stars and Stripes Blvd, Suite 219
New Orleans, LA 70126

BID FOR: Southshore Harbor – Boat Slip Building Fire Protection System

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

DESCRIPTION:	☒Base Bid or ❑ Alt.#____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑Base Bid or ❑ Alt.#			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑Base Bid or ❑ Alt.#			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑Base Bid or ❑ Alt.#			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑Base Bid or ❑ Alt.#			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑Base Bid or ❑ Alt.#			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑Base Bid or ❑ Alt.#			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

All quantities are estimated. The contractor will be paid upon actual quantities as verified by owner.

BID BOND
FOR
LAKEFRONT MANAGEMENT AUTHORITY PROJECTS

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That _____ of _____, as Principal, and _____, as Surety, are held and firmly bound unto the Lakefront Management Authority (Obligee), in the full and just sum of _____, 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:

Southshore Harbor – Boat Slip Building for the LMA

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: _____	BY: _____
AUTHORIZED OFFICER-OWNER-PARTNER OR ATTORNEY-IN-FACT (SEAL)	AGENT

CONTRACT/PROJECT NAME

Southshore Harbor – Boat Slip Building Fire Protection System

STATE OF LOUISIANA

PARISH OF ORLEANS

ATTESTATIONS AFFIDAVIT

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

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

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

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

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

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

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

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

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

C. If awarded the Contract, Appearer shall require all Subcontractors to submit to it a sworn affidavit

verifying compliance with Paragraphs (A) and (B) of this Subsection.

CONTRACT/PROJECT NAME
Southshore Harbor – Boat Slip Building Fire Protection System

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

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

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

_____ _____
NAME OF BIDDER **NAME OF AUTHORIZED SIGNATORY OF BIDDER**

_____ _____
DATE **TITLE OF AUTHORIZED SIGNATORY OF BIDDER**

_____
SIGNATURE OF AUTHORIZED
SIGNATORY OF BIDDER/AFFIANT

Sworn to and subscribed before me by Affiant on the_____day of_____, 20___.

_____
Notary Public

CONTRACT BETWEEN OWNER AND CONTRACTOR

BEFORE the undersigned, a Notary Public, duly commissioned and qualified, and in the presence of the witnesses hereinafter named and undersigned,

PERSONALLY CAME AND APPEARED:

The Lakefront Management Authority ("Management Authority" or "Owner"), a political subdivision of the State of Louisiana and the governing authority of the non-flood protection assets of the Orleans Levee District ("District"), with its office located at 6001 Stars and Stripes Boulevard, New Orleans Lakefront, Terminal Building, Suite 219, New Orleans, Louisiana 70126, appearing through its Executive Director, Jesse D. Noel, duly authorized by a Resolution adopted by the Management Authority, and,

_____ ("Contractor"), a Louisiana _____, with its registered office located at _____, appearing through its sole member and manager, _____;

who declared, that for and in consideration of the payment, hereinafter provided for, to be made by the Management Authority, Contractor agrees and is obligated to furnish all labor, equipment, supplies, materials, and to perform all work necessary for the _____ (the "project"), and all other work required under and in accordance with the Bid by Contractor dated on _____, Contract Documents and Specifications prepared by _____, _____, dated on _____, Project No. _____, and Addenda _____, copies of which are incorporated and made a part hereof (the "work"), for the total price and sum of $_____ (the "Contract Sum"). The Contractor represents that its federal taxpayer identification number is _____.

It is recognized by the parties herein that the Contract Documents, including by way of example and not of limitation, the Plans, Specifications (including General Provisions, Special Provisions, and Technical Specifications), any Addenda thereto, Instructions to Bidders, this Contract, Advertisement For Bids, Affidavits, Bid Form, Bonds (Bid, Performance, and Payment),any Submitted Post-Bid Documentation, Notice of Award, Notice to Proceed, and Change Orders, if any, impose duties and obligations upon the parties herein, and the parties thereby agree that they shall be bound by said duties and obligations. For these purposes, all of the provisions contained in the aforementioned Contract Documents are incorporated herein by reference with the same force and effect as though said Contract Documents were herein set out in full.

Time for Completion: The work shall be commenced on a date to be specified in a written order of the Owner (Notice to Proceed) and shall be completed within **135** consecutive calendar days from and after the commencement date (the "Contract Time").

Liquidated Damages: For each day the Work remains incomplete beyond the Contract Time, or Extension of Contract Time the sum of **Five Hundred dollars ($500)** per calendar day will be deducted from any money due to the Contractor as liquidated damages. The Contractor and Surety shall be liable for any liquidated damages that are in excess of the amount due under this Contract to the Contractor.
The Contractor and Owner waive claims against each other for consequential damages arising out

of or relating to this Contract. This mutual waiver includes 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 Contract shall be governed under and by the laws of the State of Louisiana. Further, the parties acknowledge that this Contract has been entered into pursuant to the Louisiana Public Bid Law, La.Rev.Stat. 38:§2211, et seq. and agree that all terms and conditions required under the Louisiana Bid Law are incorporated herein as if written in their entirety.

The provisions of this Contract shall be enforced, and venue and jurisdiction of any suit, right or cause of action arising under or in connection with this Contract shall be in the Civil District Court for the Parish of Orleans, State of Louisiana.

In the event of litigation between the parties concerning this Contract, the parties agree that the prevailing party in any such litigation shall be entitled to recover reasonable attorney's fees, expenses and costs against the non-prevailing party.

The Contractor warrants that it has not employed or retained any company or person, other than a bona fide employee working solely for the Contractor, to solicit or secure this Contract, and that they have not paid or agreed to pay any company or person, other than a bona fide employee working solely for the Contractor, any fee, commission, percentage, brokerage fee, gifts, or any other consideration, contingent upon or resulting from the award or making of this Contract. For breach or violation of this warranty, the Owner shall have the right to terminate this Contract without notice or liability, and, in its discretion, deduct from the Contract price or consideration, or otherwise recover, the full amount of such fee, commission, percentage, brokerage fee, gift or contingent fee.

This Contract shall not be transferred or assigned by the Contractor without the prior written consent of the Owner.

This Contract constitutes the entire Contract between the Owner and the Contractor and supersedes all prior written or oral understandings. This Contract may only be amended, supplemented, modified or cancelled by a duly written instrument executed by the parties.

All notices required to be given under the Contract Documents shall be in writing and either personally served by hand delivery, sent by United States mail, sufficient postage prepaid, certified mail return receipt requested, or sent by a nationally recognized overnight commercial delivery service, and addressed to the parties at the addresses set forth above in this Contract, and shall be deemed to be given on the day that such Notice is received by the Party to whom it is sent. If notice is sent by Certified Mail and it is refused by the recipient and returned to the Post Office, notice shall be deemed to have been given on the date the recipient rejected the notice by Certified Mail.

Neither the form nor any language of this Contract shall be interpreted or construed in favor of or against either party hereto.

Nothing herein shall be construed as creating any personal liability on the part of any commissioner, public official, or officer or member of the public body which is a party to this Contract, or any of their representatives, agents, staff members, personnel or employees.

If any term or provision of this Contract, or of any of the Contract Documents, or the

application thereof to any person or circumstances, shall to any extent be invalid or unenforceable, the remainder of this Contract shall not be affected thereby, and each term and provision of this Contract shall be valid and be enforced to the fullest extent permitted by law.

The services contracted for are of such a nature, and the size of the contract, is such that Contractor's performance hereunder does not significantly impact Contractor's operations. Should the Contractor be adjudicated a bankrupt or there be the appointment of a Receiver for Contractor, or the filing of a bankruptcy, receivership or respite petition by the Contractor or upon Contractor's suspension, failure or insolvency, in such event, ipso facto, this Contract shall terminate, without any further notice to Contractor and without the Management Authority taking any further action.

The Contract Documents identified herewith, and made part hereof, have been paragraphed "**NE VARIETUR**" by the undersigned Notary for identification herewith. The parties hereto relieve and release the Notary from any and all liability in connection to the terms of the Contract.

This Contract shall inure to the benefit of and be binding upon the parties and their respective successors and assigns.

THUS DONE AND PASSED, in multiple originals, on the _____ day of _____, 20_____, in the presence of the undersigned competent witnesses, who signed their names with said appearer and me, Notary, after reading of the whole.

WITNESSES:

_____

_____

_____

_____

OWNER:

LAKEFRONT MANAGEMENT AUTHORITY

BY: _____
LOUIS J. CAPO
EXECUTIVE DIRECTOR

CONTRACTOR:

_____
Contractor (Name)

BY: _____
DULY AUTHORIZED INDIVIDUAL

STATE OF LOUISIANA

PARISH OF ORLEANS

On this _____ day of _____, 20____, before me, the undersigned authority, personally came and appeared:

_____

who declared and acknowledged to me that he executed the foregoing Contract and signed same for the purposes and object therein expressed, acting in the capacity of _____ for _____.

_____
(Signature)

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

_____
NOTARY PUBLIC

STATE OF LOUISIANA

PARISH OF ORLEANS

On this _____ day of _____, 20_____, before me, the undersigned authority, personally came and appeared:

_____

who declared and acknowledged to me that he executed the foregoing Contract and signed same for the purposes and object therein expressed, acting in the capacity of _____ for _____.

_____
(Signature)

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

_____
NOTARY PUBLIC

Performance and Payment Bond:

To these presents personally came and intervened_____, herein acting for_____, a corporation, and duly authorized to transact business in the State of Louisiana, as surety, who declared that having taken cognizance of this Contract and of the Construction Documents mentioned herein, he hereby in his capacity as its Attorney in Fact obligates his said company, as Surety for the said Contractor, unto the said Owner, up to the sum of _____ Dollars($). By issuance of this bond, the surety acknowledges they are in compliance with La. R.S. 38:2219.

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

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

The Contractor agrees to abide by the requirements of the following as applicable: Title VI and VII of the Civil Rights Act of 1964, as amended by the Equal Opportunity Act of 1972, Federal Executive Order 11246, the Federal Rehabilitation Act of 1973, as amended, the Vietnam Era Veteran's Readjustment Assistance Act of 1974, Title IX of the Education Amendments of 1972, the Age Act of 1972, and Contractor agrees to abide by the requirements of the Americans with Disabilities Act of 1990.

Contractor agrees not to discriminate in its employment practices, and will render services under this Contract without regard to race, color, sex, religion, national origin, genetic information, age, or disabilities. Any act of discrimination committed by Contractor or failure to comply with these statutory obligations when applicable shall be grounds for termination of this Contract.

In Witness whereof, the parties hereto on the day and year first above written have executed this Contract in eight (8) counterparts, each of which shall, without proof or accountancy for the other counterparts, be deemed an original thereof.

WITNESSES:

LAKEFRONT MANAGEMENT AUTHORITY

_____

BY: _____
Louis J. Capo, Executive Director

_____

_____ BY:_____

_____

SURETY:_____

_____

BY:_____
ATTORNEY IN FACT

_____

_____
ADDRESS

_____
TELEPHONE NUMBER

STATE OF LOUISIANA

PARISH OF ORLEANS

PROJECT NO.: 22-005
NAME:_Southshore Harbor – Boat Slip Building
Fire Protection Systems
LOCATION: Orleans Parish, Louisiana

A F F I D A V I T

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

PART I.

Section 2224 of Part II of Chapter 10 of Title 38 of the Louisiana Revised Statutes, as amended.

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

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

PART II.

Section 2190 of Part I of Chapter 10 of Title 38 of the Louisiana Revised Statutes, as amended.

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

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

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

_____
AFFIANT

SWORN TO AND SUBSCRIBED BEFORE ME THIS_____DAY OF _____, 20__.

_____
NOTARY

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PART I1 - GENERAL PROVISIONS

GP-1 DEFINITION OF TERMS

Whenever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to the singular or plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs and the titles of other documents or forms.

Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

a. Acceptance: A written approval from the Authority Representative which certifies that specific items of work in the Contract have been completed and/or obligations have been fulfilled by the Contractor.

b. Addenda: Those written or graphic documents which are issued prior to opening of Bids in accordance with the Bidding Requirements and clarify or change the bidding requirements or the proposed Contract Documents.

c. Application of Payment: That form which is used by the Contractor to request partial and final payment and is deemed acceptable to the Owner. It shall be accompanied by any supporting documentation required by the Contract Documents.

d. Authority: The Lakefront Management Authority(LMA)

e. Authority Representative: On site representative for the Lakefront Management Authority(LMA).

f. A.S.T.M.: American Society for Testing and Materials.

g. Bid: An offer or proposal submitted on the prescribed form setting forth the prices for the Work.

h. Bidder: The person, association of persons, firm, or corporation submitting an offer or proposal for the Work.

i. Bidding Requirements: The Advertisement for Bids, Instructions to Bidders, Form of Bid Security, if any, and Bid Form with any supplements.

j. Change Order: A written order which is submitted to the Contractor, signed by the Owner, and authorizes an addition, deletion, or revision in the Work, or an adjustment in the contract price or the contract time issued after the effective date of the Contract.

k. Claim: A written demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both or other relief with respect to the terms of the Contract.

l. Contract: The written agreement between the Owner and the Contractor which defines the work to be completed and shall be understood to include all Contract Documents.

m. Contract Documents: The Contract, all addenda which pertains to the Contract Documents, Bid Documents and specified Attachments accompanying the Bid and any post-bid documentation submitted prior to the Notice of Award, Contractor's Bid when attached as an exhibit to the Agreement, the Bonds (Bid and Performance/Payment), General Provisions, Special Provisions, Technical Specifications, Plans, and all Field or Change Orders issued after the execution of the Agreement. Shop Drawings and other submittals by the Contractor are not Contract Documents.

n. Contract Price: The moneys payable by the Owner to the Contractor for the Work in accordance with the Contract Documents as stated in the Contract.

o. Contract Time: The number of calendar days specified in the Contract for completion of the Work, together with any extensions authorized through change orders.

p. Contractor: The person, association of persons, firm, or corporation entering into the duly awarded Contract.

q. Contracting Agency: The Lakefront Management Authority(LMA).

r. Day: When any period of time is referred to in the Contract Documents using days, it will be computed to exclude the first day and include the last day of such period. If the last day of any such period falls on a Saturday, Sunday, or a legal holiday, that day will be omitted from the computation. A calendar day is measured as twenty-four (24) hour period starting at midnight and ending the following midnight.

s. Design Report: A written report by the Engineer which provides the design methodology for the Work.

t. Effective Date of the Contract: The date indicated in the Contract on which it becomes effective.

u. Engineer: The Lakefront Management Authority~~,~~ or its designee.

v. Equipment: All machinery, implements, and power-tools, in conjunction with the necessary supplies for the operation, upkeep, maintenance, and all other tools and apparatuses necessary for the proper construction and acceptable completion of the Work.

w. Extension of Contract: Any extension of time for completion of Work beyond the Contract Time which is granted by the Owner, recommended by the Engineer and approved by the Management Authority in the form of a Change Order.

x. Federal Sponsor: The federal agency which has been tasked, if applicable, to manage the implementation of the project.

y. Field Order: A written order issued by the Engineer which requires minor changes in

the Work but which does not involve a change in the Contract Price or Contract Time.

z. Laboratory: The firm, company, or corporation which is used to test materials and is approved for use by the Engineer.

aa. Laws and Regulations; Laws or Regulations: Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

bb. Materials: Any substance used in the Work to build structures, but does not include material used in false work or other temporary structures not incorporated in the Work.

cc. Milestone: A principal event specified in the Contract Documents relating to an intermediated completion date or time prior to the Contract Times.

dd. Notice of Award: A written notice to the successful Bidder stating that the Bid has been accepted by the Owner and that the successful Bidder is required to execute the Contract and furnish the Payment and Performance Bond and Non-Collusion Affidavit.

ee. Notice to Proceed: The written notice to the Contractor by the Owner which provides the starting date for the Contract Time.

ff. Owner: The Owner is the Lakefront Management Authority.

gg. Performance and Payment Bond: The approved form of security furnished by the Contractor and Surety for the faithful performance of the Work, and the payment for all labor, materials, and/or obligations incurred by the Contractor in the prosecution thereof.

hh. Plans: That part of the Contract Documents prepared or approved by the Engineer which graphically shows the scope, intent, and character of the Work to be completed by the Contractor.

ii. Project Site: The location where the Work is to be performed as stated in the Contract Documents.

jj. Resident Project Representative: An authorized representative of the Engineer who is responsible to inspect the Work and materials furnished by the Contractor.

kk. Right-of-way: That entire area reserved for constructing, maintaining, and protecting the proposed improvement, structures, and appurtenances of the Work.

ll. Samples: Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portions of the Work will be judged.

mm. Shop Drawings: All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for the Contractor and submitted by the Contractor to illustrate some portion of the Work to be performed.

nn. Specifications: That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the work to be performed and certain administrative details applicable thereto.

oo. State: Louisiana.

pp. Structures: Bridges, plugs, weirs, bulkheads, berms, dams, levees, and other miscellaneous construction encountered during the Work and not otherwise classified herein.

qq. Subcontractor: Any person, association of persons, firm, or corporation who contracts with the Contractor to perform any part of the project covered by the Contract.

rr. Submittals: Certificates, samples, shop drawings, and all other project data which are submitted to the Engineer in order to verify that the correct products will be installed on the project.

ss. Successful Bidder: The lowest responsible Bidder whom the Owner makes an award.

tt. Special Provisions: That part of the Contract Documents which amends or supplements these General Provisions.

uu. Surety: The corporate body, licensed to do business in Louisiana, bound with and for the Contractor's primary liability, and engages to be responsible for payment of all obligations pertaining to acceptable performance of the Work contracted.

vv. Temporary Structures: Any non-permanent structure required while engaged in the prosecution of the Contract.

ww. Work: All work specified herein or indicated on the Plans.

xx. Work Plan: A written plan by the Contractor that details how the Work will be provided including layout drawings, projected schedule (Initial Progress Schedule), and a list of labor hours, materials, and equipment.

GP-2 CONTACT INFORMATION

Prior to Bid opening date, the Contractor shall send all questions and requests for clarification or interpretation of the Bid Documents in writing to the attention of the DESIGN ENGINEER. The address and contact information are as follows:

Linfield, Hunter & Junius, Inc.
3608 18th Street
Metairie, LA

Benjamin Noble Chadwick AIA, NCARB
Bchadwick@LHJunius.com

After execution of the contract between Owner and Contractor, the successful Contractor shall contact the Engineer concerning contract documentation or questions. The addresses and

contact information for the Engineer is listed as follows:

Linfield, Hunter & Junius, Inc.
3608 18th Street
Metairie, LA

Benjamin Noble Chadwick AIA, NCARB
Bchadwick@LHJunius.com

The Owner and Engineer shall deliver all written Claims, Notices, Submittals, Plans, and other documents to the Contractor at the address indicated on the Bid.

GP-3 LAWS, REGULATIONS, STANDARDS, SPECIFICATIONS, AND CODES

Bidders are required to become familiar and remain in compliance with all Federal, State, and local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority which may affect those employed for the execution of the Work or which may affect the conduct of the Work. The Contractor shall indemnify the Owner and its representatives against any claim or liability arising from all violations of any laws, bylaws, ordinances, codes, regulations, orders, or decrees, whether by the Contractor or by the Contractor's employees. The filing of a bid will be presumptive evidence that the Bidder has complied with this requirement. The Owner will not be responsible for any inaccurate interpretations or conclusions drawn by the Contractor from information and documentation provided by the Owner.

References to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws and Regulations, whether such reference be specific or by implication, may not be in effect at the time of opening the Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents. No provision of any such standard, specification, manual, or code, or any instruction of a supplier shall be effective to change the duties or responsibilities of the Owner or Engineer, or any of their Subcontractors, consultants, agents, or employees from those set forth in the Bid Documents. No such provision shall be effective to assign to the Owner or Engineer, or any of their consultants, agents, or employees any duty or authority to supervise or direct the performance of the Contractor's obligations or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

The obligations imposed by these specifications are in addition to and are not to be construed in any way as a limitation of any rights available to the Engineer or Owner which are otherwise imposed by any laws or regulations or other provisions within the Contract Documents.

The Contractor shall abide by laws set forth in the Davis-Bacon Act of 1931 which states that all laborers and mechanics employed by recipients, the recipient's contractors, or subcontractors on this project shall be paid wages at rates no less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor in accordance with Subchapter IV of Chapter 31 of Title 40 United States Code. Additionally, with respect to the labor standards specified in this section, the Secretary of Labor shall have the authority and functions set forth in Reorganization Plan Number 14 of 1950 (64 Stat. 1267; 5 U.S.C. App.) and The Copeland Act of Title 40 (40 U.S.C. § 3145). Prevailing Wage

Determination Schedules, as determined by the United States Department of Labor, are provided in the Appendix. Prevailing Wage Determination Schedules are subject to modification by the United States Department of Labor. The Contractor is responsible for utilizing the most current Prevailing Wage Determination Schedule. These documents can be downloaded from the following link: http://www.wdol.gov/dba.aspx#3. Modifications to Prevailing Wage Determination Schedules shall be effective if received (or posted) no less than 10 days prior to bid opening.

GP-4 INSURANCE AND BONDS

A. Minimum Scope and Limits of Insurance

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

1) Worker's Compensation & Employer's Liability

Worker's Compensation insurance shall be in compliance with the Worker's Compensation law of the State of Louisiana. Employers Liability is included with a minimum limit of $500,000 per accident/per disease/per employee. If Work is to be performed over water and involves maritime exposure, applicable LHWCA, Jones Act or other maritime law coverage shall be included and the Employers Liability limit increased to a minimum of $1,000,000.

A.M. Best's insurance company rating requirement may be waived for Worker's compensation coverage only.

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

The required minimum combined single limit amount of insurance shall be as provided below:

Initial Contract Amount	Minimum Insurance
Up to $1,000,000	$1,000,000
From $1,000,001 to $2,000,000	$2,000,000
Over $2,000,000	$5,000,000

3) Automobile and Watercraft Liability

Automobile Liability Insurance and Watercraft Liability Insurance shall have a minimum combined single limit per occurrence of $1,000,000. ISO form number CA 00 01 (current form approved for use in Louisiana), or equivalent, is to be used in the policy. This insurance shall include third-party bodily injury and property damage liability for owned, hired and non- owned automobiles and/or watercraft. If any non-licensed motor vehicles and/or watercraft are engaged in operations within the terms of the contract on the site of the work to be performed thereunder, such insurance shall cover the use of any such vehicles.

NOTE: If the Contractor does not own automobiles and/or watercraft, and such vehicles are utilized in the execution of the contract, then hired and non-owned coverage is acceptable. If automobiles and/or watercraft are not utilized in the execution of the contract, then automobile and/or watercraft coverage is not required.

4) Excess Umbrella

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

5) 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. The policy shall not be cancelled for any reason, except non-payment of premium.

6) Builders Risk Coverage

Contractor shall procure at its expense a Builder's Risk Insurance policy covering the building and other constructions to be constructed under the Contract with coverage for the full value of the building and other constructions at the time of completion, naming the Owner and Orleans Levee District as additional insured.

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.

B. Other Insurance Provisions

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

i. Worker's Compensation and Employers Liability Coverage

ii. The insurer shall agree to waive all rights of subrogation against the Owner and the Orleans Levee District, their commissioners, officers, agents, and employees for losses arising from Work performed by the Contractor for the Owner.

2) General Liability Coverage

i. The Owner and the Orleans Levee District, and their commissioners, officers, agents, and employees are to be added as additional insureds as respects liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor, premises owned, occupied or used by the Contractor. ISO Form CG 20 10 (current form approved for use in Louisiana), or equivalent, is to be used;

ii. The Contractor's insurance shall be primary as respects the Owner and the Orleans Levee District, and their commissioners, officers, agents, and employees. The coverage shall contain no special limitations on the scope of protection afforded to the Owner and the Orleans Levee District, and their commissioners, officers, agents, and employees. Any insurance or self-insurance maintained by the Owner shall be excess and non-contributory of the Contractor's insurance;

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

3) All Coverages

i. Coverage shall not be canceled, suspended, or voided by either party (the Contractor or the insurer) or reduced in coverage or in limits except after 30 days written notice has been given to the Owner. Ten-day written notice of cancellation is acceptable for non-payment of premium. Notifications

shall comply with the standard cancellation provisions in the Contractor's policy;

ii. 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;

iii. 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;

iv. 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.

4) 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 as required in the contract.

C. 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 thereafter. The Certificate Holder must be listed as follows:

Lakefront Management Authority (LMA)
6001 Stars and Stripes Blvd, Suite 219
New Orleans, LA 70126
Attn: Project: Southshore Harbor – Boat Slip Building Fire Protection System

In addition to the Certificates, Contractor shall submit the declarations page and the cancellation provision endorsement for each insurance policy. 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 such insurance as above provided, this contract, at the election of the Owner, 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.

D. 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.

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

F. Indemnification/Hold Harmless Agreement

The Contractor shall indemnify and save harmless the Owner and the Orleans Levee District and their commissioners, officers, employees, or agents against any and all claims, losses, liabilities, demands, suits, causes of action, damages, and judgments of sums of money to any person for loss of life or injury or damage to property growing out of, resulting from, or by reason of, any negligent act or omission, operation or work of the Contractor, its agents, servants, or employees, while engaged upon or in connection with the Services required or performed by the Contractor under this contract. The obligation of the Contractor to defend the Owner and the Orleans Levee District shall arise upon notice of any such claim to Owner or the Orleans Levee District. The obligations under this provision of this Contract shall survive the expiration or earlier termination of this Contract.

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.

GP-5 NOTICE TO PROCEED AND CONTRACT TIME

The Contractor shall begin the Contract Time upon receipt of the Notice to Proceed and start the Work within thirty (30) calendar days after receipt of the Notice to Proceed from the Owner. The Work shall be conducted using sufficient labor, materials, and equipment as necessary to ensure completion within the Contract Time. The Contract Time for completion of the Base Bid for the Work is provided in the Instructions to Bidders, unless an extension is granted to the Contract Time as specified in GP-45. If the Bid contains an Alternate Bid(s), and the Alternate Bid(s) is awarded and included in the Contract, the Contract Time associated with the Alternate Bid(s) will be as provided in the Special Provisions.

GP-6 WORK PLAN

The Contractor shall develop a written Work Plan which accounts for all of the construction activities required by the Contract Documents. The Work Plan shall include a list of the individual construction tasks to be completed and the estimated dates for beginning and completing the tasks. It shall also include all other items which are applicable to completing the Work such as, but not limited to, the following:

a. Typical report form for the Bi-Weekly Progress Meeting;

b. Typical form for Daily Progress Report;

c. Hurricane and Severe Storm Plan;

d. Site-specific Health and Safety Plan;

e. The delivery method and source(s) of all construction materials (company or producer name, mailing and physical address, phone number, and name of contact person).

f. The personnel, material, subcontractors, fabricators, suppliers, types of equipment, and equipment staging areas the Contractor proposes to use for construction;

g. Shop drawings, test results, and sample submittals;

h. Survey layout and stakeout;

i. All supplemental items specified in the Special Provisions.

The Work Plan shall be submitted to the Engineer prior to the Pre-Construction Conference by the date provided in the Special Provisions. The Engineer shall review the Work Plan and have the Contractor make any necessary revisions prior to acceptance of the plan.

GP-7 PROGRESS SCHEDULE

The Contractor shall develop a written Progress Schedule which provides for an orderly progression of the Work, submittals, tests, and deliveries in order to complete the Work

within the specified Milestones and Contract Time. All of the items listed in the Work Plan shall be integrated into the Progress Schedule. The format of the schedule shall be composed using Microsoft Project®, or any other software deemed acceptable by the Engineer. It shall be updated weekly by the Contractor, at a minimum. The Progress Schedule shall also include, but not be limited to the following:

a. All of the elements in the Work Plan, including updates;

b. A work order issued from Louisiana One Call ordering all their subscribers in the project area to mark their utilities;

c. A telephone log verifying that all property owners and utilities have been contacted. This log should list the time, date, and names of the personnel representing the property owners, utilities, and Contractor;

The following table defines the monthly anticipated adverse weather days that are expected to occur during the Contract Time and will constitute the baseline monthly weather time for evaluations. The schedule is based upon National Oceanic and Atmospheric Administration (NOAA) or similar data for the regional geographic area.

Monthly Anticipated Adverse Weather Calendar Days											
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
13	8	9	5	6	9	9	8	7	3	6	11

The Progress schedule must reflect these anticipated adverse weather delays on all-weather dependent activities. Adverse weather days must prevent Work for fifty percent (50%) or more of the work day and delay work critical to the timely completion of the project. The number of actual adverse weather days shall be calculated chronologically from the first to the last day of each month.

The Progress Schedule shall be submitted to the Engineer prior to the Pre-Construction Conference by the date provided in the Special Provisions. The Engineer shall perform a review and have the Contractor make necessary any necessary revisions prior to acceptance of the schedule. Acceptance will not impose responsibility on the Owner or Engineer for the sequencing, scheduling, or progression of the Work. The Contractor is fully responsible for progression of the Work in order to maintain the compliance with the Progress Schedule.

GP-8 DAILY PROGRESS REPORTS

The Contractor shall record the following daily information on Daily Progress Reports:

a. Date and signature of the author of the report;

b. Dollar amount of all bid items that are fabricated, installed, backfilled, pumped, constructed, damaged, replaced, etc. The amount of material shall be expressed in the units stated in the bid;

c. Field notes of all surveys;

d. Notes on all inspections;

e. Details of Health and Safety meetings;

f. A brief description of any Change Orders, Field Orders, Claims, Clarifications, or Amendments;

g. Weather conditions (adverse weather day, wind speed and direction, temperature, wave height, precipitation, etc.);

h. The amount of time lost to severe weather or personnel injury, etc;

i. Notes regarding compliance with the Progress Schedule;

j. Visitor log including Name, organization affiliation, contact number and email.

The daily progress reports shall be submitted to the Engineer at the Bi-Weekly Progress Meetings specified in GP-13 in both hard copy and digital format (Adobe Acrobat® Format, or approved equal). The typical form for Daily Progress Reports shall be developed by the Contractor and incorporated into the Work Plan.

GP-9 HURRICANE AND SEVERE STORM PLAN

11.1 Hurricane and Severe Storm Plan

Hurricane season extends from 1 June to 30 November. The Contractor shall develop and maintain a written Hurricane and Severe Storm Plan. The Plan shall include, but not be limited to, the following:

a. What type of actions will be taken before storm strikes at the Project Site. The plan should specify what weather conditions will require shutdown of the Work and removal of equipment, personnel, etc.

b. Notes from continuous monitoring of NOAA marine weather broadcasts and other local commercial weather forecasts.

c. Equipment list with details on their ability to handle adverse weather. The time each phase of the plan will be put in effect. The time shall be the number of hours remaining for the storm to reach the worksite if it continues at the predicted speed and direction.

d. The estimated time necessary to secure and evacuate the site including any emergency flood protection.

e. Methods which will be used to secure equipment left onsite during adverse weather conditions.

f. Evacuation or immediate reaction plans to be taken by personnel for sudden storm occurrences.

g. Communications protocol with local law enforcement and fire and rescue agencies.

The Contractor shall incorporate the Hurricane and Severe Storm Plan into the Work Plan. The Owner and Engineer are not responsible for the adequacy of this plan.

GP-10 HEALTH AND SAFETY PLAN AND INSPECTIONS

The Contractor shall develop and maintain a written Health and Safety Plan which allows the Work to be performed in compliance with all applicable laws, ordinances, rules, and regulations of any government agency having jurisdiction over the safety of personnel or property. This includes maintaining compliance with the Code of Federal Regulations, Title 29, Occupational Safety and Health Administration (OSHA) and all applicable Health and Safety Provisions of the State of Louisiana.

The Contractor shall institute a daily inspection program to assure that the requirements of the Health and Safety Plan are being fulfilled. Inspections shall include the nature of deficiencies observed, corrective action taken or to be taken, location of inspection, date, and signature of the person responsible for its contents. The results of the inspections shall be recorded on Daily Progress Reports and kept at the Project Site during the Work.

The Contractor shall incorporate the Health and Safety Plan into the Work Plan. The Owner and Engineer are not responsible for the adequacy of this plan.

GP-11 PROGRESS MEETINGS AND REPORTS

The Engineer shall schedule meetings to review the progress of the Work, coordinate future efforts, discuss compliance with the Progress Schedule and resolve miscellaneous problems. The Engineer or Resident Project Representative, Contractor, and all Subcontractors actively working at the Project Site shall attend each meeting. Representatives of suppliers, manufacturers, and other Subcontractors may also attend at the discretion of the Contractor. The Contractor shall record the details of each meeting in a Progress Report. The format of this report shall be developed by the Contractor, approved by the Engineer, and included in the Work Plan. The progress meetings and reports shall be scheduled according to the Special Provisions.

GP-12 PRE-CONSTRUCTION CONFERENCE

A Pre-Construction Conference shall be held by the Contractor, Owner, Engineer, local stakeholders, and other appropriate personnel prior to starting construction on a date specified by the owner following the Award of the contract. This conference shall serve to establish a mutual understanding of the Work to be performed, the elements of the Progress Schedule and Work Plan, expectations for bi-weekly progress meetings, the Plans and Specifications, processing Applications for Payment, and any other items of concern. If any subcontractors are not present, another pre-construction conference will be required.

GP-13 CONTRACT INTENT

The Bid Documents are complementary; what is called for by one is as binding as if called for by all. Clarifications and interpretations or notifications of minor variations and deviations of the Contract Documents will be issued by Engineer as provided in these Specifications. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Bid Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided at no additional cost to the Owner.

GP-14 ENGINEER AND AUTHORITY OF ENGINEER

The Engineer will be the designated representative of the Owner, the initial interpreter of the Contract Documents and the judge over acceptability of all the Work. Claims, disputes, and other matters relating to the acceptability of the Work, performance by the Contractor or the interpretation of the requirements of the Contract Documents must be submitted to the Engineer in writing. Upon written request from the Contractor, the Engineer shall issue written clarifications or interpretations which are consistent with the overall intent of the Contract Documents. Such written clarifications and interpretations will be binding on the Owner and the Contractor. Either the Owner or the Contractor may make a Claim if a written clarification or interpretation justifies an adjustment in the Contract Price or Contract Times.

The Engineer has the authority to suspend the Work in whole or in part due to failure of the Contractor to correct conditions unsafe for workmen or the general public, carry out provisions of the Contract, perform conformance work, or to carry out orders. The Engineer shall submit a written order to the Contractor for work which must be suspended or resumed. Nothing in this provision shall be construed as establishing responsibility on the part of the Engineer for safety which is the responsibility of the Contractor.

The Engineer or Resident Project Representative shall keep a daily record of weather and flood conditions and may suspend the Work as deemed necessary due to periods of unsuitable weather, conditions considered unsuitable for execution of the Work, or for any other condition or reason deemed to be in the public interest.

GP-15 CONFORMITY WITH PLANS AND SPECIFICATIONS

All work and materials involved with the Work shall conform with the lines, grades, cross sections, dimensions, and other requirements shown on the Plans or indicated in these Specifications unless otherwise approved by the Engineer.

GP-16 CLARIFICATIONS AND AMENDMENTS TO CONTRACT DOCUMENTS

The Contract Documents may be clarified or amended by the Engineer to account for additions, deletions, and revisions to the Work after the Effective Date of the Contract. The clarifications and amendments shall be addressed by either a Change Order or a written clarification by the Engineer. The Contractor shall not proceed with the Work until the Change Order or clarification has been issued by the Engineer. The Contractor shall not be liable to the Owner or Engineer for failure to report any such discrepancy unless the Contractor had reasonable knowledge.

The Contractor may request a clarification or amendment for the following:

a. Any conflict, error, ambiguity, or discrepancy within the Contract Documents; or

b. Any conflict, error, ambiguity, or discrepancy between the Bid Documents and the provision of any Law or Regulation applicable to the performance of the Bid; or

c. Any standard, specification, manual, or code (whether or not specifically incorporated by reference in the Bid Documents); or

d. Instructions by a supplier.

The written clarification shall be filled out appropriately by the Contractor and submitted to the Engineer. The Engineer shall clarify the issue in writing on either the Field Order or a Change Order and submit it to the Contractor.

GP-17 SUBCONTRACTS

The Contractor shall provide the names of all Subcontractors to the Engineer in writing before awarding any Subcontracts. The Contractor shall be responsible for the coordination of the trades and Subcontractors engaged in the Work. The Contractor is fully responsible to the Owner for the acts and omissions of all the Subcontractors. The Owner and Engineer will not settle any differences between the Contractor and Subcontractors or between Subcontractors. The Contractor shall have appropriate provisions in all Subcontracts to bind Subcontractors to the Contractor by the terms of the General Provisions and other Contract Documents, as applicable to the Work of Subcontractors. The provisions should provide the Contractor the same power regarding termination of Subcontracts that the Owner may exercise over the Contractor under any provisions of the Contract Documents.

GP-18 WORKERS, METHODS, AND EQUIPMENT

The Contractor shall provide competent, qualified, and trained personnel to perform the Work. The Contractor shall not employ any person found objectionable by the Engineer. Any person employed by the Contractor or any Subcontractor who, in the opinion of the Engineer, does not perform the Work in a proper, skillful, and orderly manner shall be immediately removed upon receiving a written order by the Engineer. The Engineer may also suspend the Work until the Contractor removes the employee or provides a suitable replacement. Such an employee shall not be re-employed in any portion of the Work without written approval from the Engineer.

The on-site superintendent for the Contractor shall be competent, English-speaking, and qualified to receive orders, supervise, and coordinate all Work for the Contractor and any Subcontractors. The qualifications of the superintendent must be established and approved by the Engineer prior to commencement of the Work. The superintendent shall be furnished by the Contractor regardless of how much Work may be sublet. In the performance of the Work under this Contract, the Contractor shall conduct operations to avoid interference with any other Contractors.

All equipment, products, and material incorporated into the Work shall be as specified, or if not specified, shall be new, of good quality, and protected, assembled, used, connected, applied, cleaned, and conditioned in accordance with the manufacturer's instructions, except as otherwise may be provided in the Bid Documents. All equipment shall be of sufficient size and mechanical condition to meet the requirements of the Work and produce a satisfactory quality of work. Equipment shall not damage adjacent property throughout the performance of the Work. The Plant and Equipment Schedule should be completed by the Contractor.

The Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures used to complete the Work in conformance with the Contract Documents.

The Contractor shall obtain permission from the Engineer if a method or type of equipment other than specified in the Contract is desired. The request shall be in writing and shall include a full description of the methods, equipment proposed, and reasons for the modification. A proposed item of material or equipment may be considered by the Engineer to be functionally equal to an item specified in the Contract if:

a. It is at least equal in quality, durability, appearance, strength, and design characteristics;

b. There is no increase in any cost including capital, installation, or operating to the Owner;

c. The proposed item will conform substantially, even with deviations, to the detailed requirements of the item named in the Bid Documents.

If, after trial use of the substituted methods or equipment, the Engineer determines that the Work produced does not meet Contract requirements, the Contractor shall discontinue use of the substituted methods or equipment and shall complete the Work with the specified methods and equipment. The Contractor shall remove the deficient Work and replace it with Work of specified quality or take other corrective action as directed. No change will be made in basis of payment for construction items involved or in Contract Time as a result of authorizing a change in methods or equipment.

GP-19 ACCIDENT PREVENTION, INVESTIGATIONS, AND REPORTING

The Contractor shall be responsible to develop and maintain all safeguards and safety precautions necessary to prevent damage, injury, or loss throughout the performance of the Work. All accidents at the Project Site shall be investigated by the immediate supervisor of employee(s) involved and reported to the Engineer or Resident Project Representative within one (1) working day. A complete and accurate written report of the accident including estimated lost time days shall be submitted to the Engineer within four (4) calendar days. A follow- up report shall be submitted to the Engineer if the estimated lost time days differ from the actual lost time days.

GP-20 PRESERVATION AND RESTORATION OF PROPERTY, MONUMENTS, ETC.

The Contractor shall comply with all applicable laws, ordinances, rules, and regulations of any government agency having jurisdiction over the preservation and protection of public and private property. The Contractor shall install and maintain suitable safeguards and safety precautions during the Work as necessary to prevent damage, injury, or loss to property. This

responsibility shall remain with the Contractor until the Work has been completed and accepted. Any damage, injury, or loss to property which is caused by the Contractor or Subcontractors shall be repaired or replaced at the expense of the Contractor.

The Contractor shall protect all land monuments, State and United States bench marks, geodetic and geological survey monuments, and property markers from disturbance or damage until an authorized agent has witnessed or otherwise referenced their location. The Contractor shall also provide protection for all public and private property including trees, utilities, pipes, conduits, structures, etc. These items shall not be removed unless directed by the Engineer. The Contractor shall be responsible to completely repair all damages to public or private property due to any act, omission, neglect, or misconduct in the execution of the Work unless it is due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God, public enemies, or governmental authorities. The damage must be repaired at the expense of the Contractor before final acceptance of the Work can be granted by the Engineer. If the Contractor fails to repair the damage within forty-eight (48) hours, the Owner may independently proceed with the repairs at the expense of the Contractor by deducting the cost from the Contract. If the Contractor cannot provide for the cost of repairs, the Surety of the Contractor shall be held until all damages, suits, or claims have been settled

GP-21 PROTECTION OF THE WORK, MATERIALS, AND EQUIPMENT

It shall be the responsibility of the Contractor to protect the Work, materials, and equipment from damages or delays due to inflows, tidal rise, and storm water runoff which may occur at the Project Site. The Owner shall not be held liable or responsible for these types of delays or damages.

GP-22 LAND RIGHTS

The Owner has care, custody, control, or sufficient property interests therein for construction and operation, maintenance, repair, rehabilitation, and replacement of this alteration.

GP-23 UTILITIES

The Owner has been granted all of the temporary easements, servitudes, and right-of-way agreements from known public and private utilities in order to perform the Work. The utilities include, but are not limited to telephone, telegraph, power poles or lines, water or fire hydrants, water or gas mains and pipelines, sewers, conduits, and other accessories or appurtenances of a similar nature which are fixed or controlled by a city, public utility company or corporation.

The Contractor shall conduct the Work in such a manner as to cooperate and minimize inconveniences with utilities. Prior to commencement of the Work, the Contractor is responsible to notify all of the utilities and abide by stipulations required by the utility company(s). The Contractor shall also call Louisiana One Call at 1-800-272-3020 a minimum of five (5) working days prior to construction to locate existing utilities at the Project Site.

Any damage to utilities that is caused by the Contractor within the Project Site shall be repaired

at the expense of the Contractor. The Owner will not be responsible for any delay or damage incurred by the Contractor due to working around or joining the Work to utilities left in place or for making adjustments.

Any unidentified pipes or structures which may be discovered within the limits of the Project Site shall not be disturbed and shall be reported to the Engineer as soon as possible. Construction or excavation shall not be performed around unidentified utilities without prior approval from the Engineer.

GP-24 PERMITS

Federal and State permits that are required to perform the Work, such as the Department of the Army Permit and Coastal Use Permit have been secured by the Owner. Permit conditions affecting the construction processes have been included in these Specifications. Copies of these permits will be provided to the Contractor at the pre-construction conference. These permits will not relieve the responsibility of the Contractor from obtaining any additional permits which may be needed to complete the Work. Copies of any special permits that are obtained by the Contractor must be submitted to the Owner. The Contractor shall conform to the requirements therein and display copies of the permits in a public setting at the Project Site at all times.

GP-25 PROJECT SITE CLEAN-UP

The Contractor shall keep the Project Site free from accumulations of waste material or trash at all times. All trash and waste materials shall be removed by the Contractor and disposed off-site in an approved waste disposal facility. In addition, all equipment, tools, and non-conforming work shall also be removed prior to the Work being accepted. No materials shall be placed outside of the Project Site.

GP-26 OWNER INSPECTION

The Owner and Resident Project Representative shall have the right to perform reasonable inspections and testing of the Work at the Project Site. Access shall be granted to the entire Project Site including all materials intended for use in the Work. The Contractor shall allow reasonable time for these inspections and tests to be performed. The inspections shall not relieve the Contractor from any obligation in accordance with the requirements of the Contract.

The Owner shall notify the Contractor prior to all tests, inspections, and approvals of the Work which are to be conducted at the Project Site. The Owner shall also provide the Contractor with the written results of all inspections and tests. Inspections, tests, or Payments made by the Owner shall not constitute acceptance of non-conforming Work or prejudice the Owner's rights under the Contract.

GP-27 DUTIES OF RESIDENT PROJECT REPRESENTATIVE

A Resident Project Representative shall be assigned by the Engineer to the Project Site to observe the Contractor and monitor the progress and manner in which the Work is being

performed. The Resident Project Representative will also report to the Engineer and Contractor whenever materials or Work fail to comply with the Contract. The Resident Project Representative is authorized to reject any materials or suspend work which does not comply with the Contract until the issue is resolved by the Engineer.

However, the Resident Project Representative is not authorized to revoke, alter, enlarge, relax, or release any requirements of the Contract, or to approve or accept any portion of the Work, or to issue instructions contrary to the Plans and Specifications. The Resident Project Representative shall not manage or perform duties for the Contractor.

GP-28 CONSTRUCTION STAKES, LINES, AND GRADES

The Engineer shall direct the Contractor to all control points necessary for setting stakes and establishing lines and grades as shown on the Plans. The Contractor shall be responsible for laying out all of the Work. All layouts shall be witnessed and verified by the Engineer or Resident Project Representative prior to beginning the Work. The Contractor shall be responsible for proper execution of the Work according to the layouts after receiving verification from the Engineer.

The Contractor shall be responsible for furnishing and maintaining stakes such that the Work can be verified for acceptance. The Engineer may suspend the Work at any time if it cannot be adequately verified due to the number, quality, or condition of the stakes.

GP-29 CONTRACTOR'S RESPONSIBILITY FOR WORK

The Contractor shall execute all items covered by the Contract, and shall furnish, unless otherwise definitely provided in the Contract, all materials, implements, machinery, equipment, tools, supplies, transportation, and labor necessary to complete the Work. The Contractor shall pay constant attention to the progress of the Work and shall cooperate with the Engineer in every way possible. The Contractor shall maintain a complete copy of the Contract at all times, including the Plans, Specifications, and any authorized modifications.

GP-30 ENVIRONMENTAL PROTECTION

The Contractor shall comply with and abide by all federal, state, and local laws and regulations controlling pollution of the environment, including air, water, and noise. The Contractor shall take precautions to prevent pollution of waters and wetlands with fuels, oils, bituminous materials, chemicals, sewage, or other harmful materials and contaminants, and to prevent pollution of the atmosphere from particulate and gaseous matter, in accordance with all terms and conditions of federal, state, and local air and water pollution control laws and programs and their rules and regulations, including the federal Clean Air Act and the federal Clean Water Act.

The Contractor shall adhere to the provisions which require compliance with all standards, orders, or requirements contained under Section 306 of the Clean Air Act and Section 508 of the Clean Water Act, which prohibit the use under non-exempt Federal contracts, grants, or loans, of facilities included on the Environmental Protection Agency (EPA) list of Violating Facilities.

Construction operations in rivers, streams, lakes, tidal or coastal waters, reservoirs, canals, wetlands, and any other impoundments shall be restricted to areas where it is necessary to accomplish the Work and performed in accordance with any applicable federal, state, and local laws, regulations, permit requirements, and guidelines, and the Contractor shall conduct the Work in a manner that will not cause damaging concentrations of silt or pollution to water.

Contractor shall maintain and operate equipment to minimize noise, dust, and vibration near noise, dust and vibration-sensitive areas such as churches, hospitals, schools, and residential areas, and assure that any activities conducted near such areas are not unduly disruptive. Contractor shall maintain all equipment with properly functioning mufflers.

The Contractor shall be responsible for determining and utilizing any erosion and pollution control features or methods that may be necessary to comply with all federal, state, and local laws and regulations.

When any item having apparent historical or archeological interest is discovered in the course of any construction activities, then no work will proceed in the area containing these cultural resources until a CEMVN archaeologist has been notified and final coordination with the State Historic Preservation Officer and any federally-recognized Tribes has been completed. The Contractor will leave the archeological find undisturbed and shall immediately report the find to the Authority so that the proper authorities may be notified.

GP-31 SANITARY PROVISION

The Contractor shall provide and maintain sanitary accommodations for use by all employees and Subcontractors. Facilities shall comply with the requirements of the Louisiana State Board of Health and Hospitals and other authorities having jurisdiction. Committing public nuisance on the Project Site is prohibited.

GP-32 PAYMENT OF TAXES

The Contractor shall be solely responsible for all taxes and duties that maybe levied under existing State, Federal, and local laws arising in connection with the Contractor's receipt of payments made pursuant to this Agreement during the completion of the Work. The Owner will presume that the amount of such taxes is included in the unit prices bid by the Contractor and will not provide additional reimbursement.

GP-33 RADIO AND TELEPHONES

The Contractor shall furnish and maintain radio and telephone equipment throughout the Contract Time which will allow communication between the Contractor and the Engineer or Resident Project Representative.

GP-34 NAVIGATION

All marine vessels shall comply with the following Federal Laws and Regulations:

a. The International Navigational Rules Act of 1977 (Public Law 95-75, 91 Stat. 308, or 33 U.S.C. 1601- 1608); and

b. The Inland Navigation Rules Act of 1980 (Public Law 96-591, 94 Stat. 3415, 33 U.S.C. 2001-2038).

These rules can be found on the Internet at:
http://www.navcen.uscg.gov//?pageName=navRulesContent.

All marine vessels shall display the lights and day shapes required by Part C- Lights and Shapes of the Inland Navigation Rules. The location, type, color, and size of the lights and day shape shall be in accordance with Annex I - Positioning and Technical Details of Lights and Shapes. Any vessel engaged in dredging is considered a "Vessel restricted in her ability to maneuver" and shall display all the lights and shapes required in Rule 27, "Vessel Not Under Control."

GP-35 OBSTRUCTION TO NAVIGATION

The Contractor shall minimize all obstructions to navigation in compliance with pertinent U. S. Coast Guard regulations while conducting the Work. The Contractor shall promptly move any floating equipment or marine vessels which obstruct safe passage of other marine vessels. Upon completion of the Work, the Contractor shall remove all marine vessels and other floating equipment such as temporary ranges, buoys, piles, and other marks or objects that are not permanent features of the Work.

GP-36 MARINE VESSELS AND MARINE ACTIVITIES

All marine vessels operated by the Contractor shall possess a valid United States Coast Guard (USCG) inspection certificate and current American Bureau of Shipping (ABS) Classification. All officers and crew shall possess valid USCG licenses as required by USCG regulations. These certificates, classifications, and licenses shall be posted in a public area on board each vessel.

All marine vessels not subject to USCG certification or ABS Classification shall be inspected annually by a marine surveyor accredited by the National Association of Marine Surveyors (NAMS) or the Society of Accredited Marine Surveyors (SAMS). All inspections shall be documented using an appropriate report format. At a minimum, the inspections shall evaluate the structural integrity of the vessel and comply with the National Fire Protection Association Code No. 302- Pleasure and Commercial Motor Craft. The most recent inspection report shall be posted in a public area on board each vessel.

GP-37 (RESERVED)

GP-38 (RESERVED)

GP-39 (RESERVED)

GP-40 RECORD KEEPING

The Contractor shall maintain orderly records of the Progress Schedule, Daily Progress Reports, Progress Meetings, correspondence, submittals, reproductions of original Contract Documents, Change Orders, Field Orders, certificates, additional drawings issued subsequent to the executed Contract, clarifications and interpretations of the Contract Documents by the Engineer, and other related documents at the Project Site until all of the Work is accepted by the Engineer.

GP-41 CERTIFICATES OF COMPLIANCE

Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in three (3) copies. Each certificate shall be certified by an authorized agent of the supplying company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date of shipment. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the testing date. The Contractor shall also certify that all materials and test reports conform to the requirements of the Contract. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material if the material is tested and determined to be in nonconformance.

GP-42 SUBMITTALS

The Contractor shall review all Submittals for compliance with the requirements of the Contract prior to delivery to the Engineer. Each Submittal shall contain a signed statement by the Contractor that it complies with the Contract requirements with any exceptions

explicitly listed. The Contractor shall comply with these requirements for Submittals from Subcontractors, manufacturers, and suppliers.

All Submittals shall include sufficient data to demonstrate that the requirements of the Contract are met or exceeded. All submittals shall be legible and marked with the project title and clearly identify the item submitted. Each submittal package shall include an itemized list of the items submitted.

All Submittals will be reviewed within fourteen (14) days after being received by the Engineer. The Contractor shall allow the Engineer sufficient time for review, corrections, and resubmission of all Submittals prior to beginning the associated Work. The Contract Time shall not be extended based on incorrect or incomplete Submittals.

The Contractor shall maintain a submittal register for the project in accordance with the specifications. The submittal register shall show items or equipment and materials for which submittals are required by the specifications; this submittal register may not be all inclusive and additional submittals may be required. The Authority will provide the initial submittal register in electronic format. Thereafter, the Contractor shall maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Authority will be included in its export file to the Contractor. The Contractor shall track all submittals.

GP-43 CLAIMS FOR EXTRA COST

The Contractor is expected to complete the Work for the Contract Price specified in the Contract Documents. If the Contractor deems additional compensation is due for work, materials, delays or other additional costs/or expenses not covered in the Contract or not ordered as extra work, the Contractor shall give the Engineer written notice thereof within fourteen (14) calendar days after the receipt of such instructions and, in any event, before commencing the work. The Contractor shall justify the claim for extra cost by providing supporting data and calculations. The Engineer shall determine whether the Contractor is entitled to be compensated for such extra cost and shall make any required adjustments of the Contract in accordance with GP-43. If no written claim is made within this fourteen (14) calendar-day period, the Contractor will be deemed to have waived any claim for extra cost for such work.

Claim for damages or delays of the Work shall not be made by the Contractor for a relocation of the construction operation or portions thereof to other locations within the geographical scope of the project, when in the opinion of the Engineer, such relocation is necessary for the most effective prosecution of the Work and may be accomplished without undue hardship.

GP-44 ALTERATION OF THE CONTRACT AND COMPENSATION

Using Change Orders, Field Orders, or Written Amendments, the Owner may order extra work or make changes by altering the details of construction, add to or deduct from the Work. The requirements and stipulations of these documents shall be binding on the Owner and Contractor throughout the remainder of the Contract. Any claim for an extension of Contract Time caused thereby shall be adjusted at the time of ordering such change.

The value of any such extra work or change shall be determined in one or more of the following ways and in the following priority:

a. By application of the unit prices in the Contract to the quantities of the items involved or subsequently agreed upon; or

b. By mutual acceptance between the Owner and Contractor of a lump sum.

If none of the above methods is agreed upon, the Contractor, provided he is so ordered by the Owner in writing, shall proceed with the Work on a "force account" basis. In such a case, the Contractor shall keep and preserve in such form as the Engineer may direct, a correct itemized account of the direct cost of labor, materials, equipment, together with vouchers bearing written certification by the Contractor. In any case, the Engineer shall certify to the amount, including an allowance of fifteen percent (15%) for jobsite and home office overhead indirect expenses and profit due to the Contractor. Where such change involves a subcontractor, an allowance of fifteen percent (15%) for overhead and profit shall be due the subcontractor and an allowance of ten percent (10%) shall be due the Contractor. Pending final determination of value, payments on account of changes shall be made on the Engineer's estimate and as approved in an executed Change Order.

If the Contractor is prevented from completing the Work according to the Contract Price due to the Owner, the Contractor may be entitled to any reasonable and necessary addition of cost as determined by the Engineer. Neither the Owner nor the Contractor shall be entitled to any damages arising from events or occurrences which are beyond their control, including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, acts of war, and other like matters. The provisions of this section exclude recovery for damages caused by the Contractor and compensation for additional professional services by either party.

GP-45 EXTENSION OF CONTRACT TIME

The Contractor is expected to complete the Work within the Contract Time specified in the Bid Documents. A legitimate increase of the Contract time may be requested by the Contractor throughout the course of the Work. This Claim must be submitted to the Engineer in writing within fourteen (14) days of the event which caused the time delay to the Contractor. If an extension of Contract Time involves an increase in Contract Price, both claims shall be submitted together. The Contractor shall justify the increase of the Contract Time in the Claim using supporting data and calculations. The Engineer may deny the claim if there is insufficient information to make a determination. The Contract Time shall be increased on a basis that is commensurate with the amount of additional or remaining Work. For example, the Contract Time can be increased where the number of actual adverse weather days exceeds the number of days estimated in the Contract.

GP-46 TIME EXTENTIONS FOR UNUSUALLY SEVERE WEATHER

This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with GP-7 and GP-46. In order for the Owner to award a time extension under this clause, the following conditions must be satisfied:

9.1 The weather experienced at the Project Site during the Contract Time must be found to be unusually severe; that is, more severe than the adverse weather anticipation for the Project Site during any given month as listed in GP-7;

9.2 The unusually severe weather must actually cause a delay to the completion of the Project. The delay must be beyond the control and without the fault or negligence of the Contractor. Throughout the Contract, the Contractor will record on the Daily Progress Report, the actual occurrence of adverse weather and resultant impact to normal scheduled work. Actual adverse weather delay days must prevent work on critical activities for fifty percent (50%) or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month) be calculated chronologically from the first to the last day of each month and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of anticipated days, the Engineer may grant an extension of Contract Time, giving full consideration for equivalent fair-weather work days, in accordance with GP-46.

GP-47 OWNER'S RIGHT TO TERMINATE CONTRACT FOR CAUSE OR CONVENIENCE

47.1 TERMINATION FOR CAUSE

The Owner shall submit a written notice to the Contractor and Surety which justifies placement of the Contractor in default if:

a. The Work is not begun within the time specified in the Notice to Proceed; or

b. The Work is performed with insufficient workmen, equipment, or materials to assure prompt completion; or

c. The Contractor performs unsuitable, neglected or rejected work, refuses to remove materials; or

d. The Work is discontinued; or

e. The Work is not completed within the Contract Time or time extension; or

f. Work is not resumed within a reasonable time after receiving a notice to continue; or

g. The Contractor becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency; or

h. The Contractor allows any final judgment to stand unsatisfied for a period of ten (10) days; or

i. The Contractor makes an assignment for the benefit of creditors; or

j. The Work is not performed in an acceptable manner.

If the Contractor or Surety does not remedy all conditions cited in the written notice within two (2) days after receiving such a notice, except as provided in sub-section h. above, the Contractor will be in default and the Owner shall remove the Contractor from the Work. If the Contractor is placed into default, the Owner may obtain the necessary labor, materials, and equipment or enter into a new Contract in order to complete the Work.

If the Contractor is placed into default, all costs incurred by the Owner for completing the Work will be deducted from the payment due the Contractor, including any costs, expenses and attorney fees incurred in connection with the completion of the work, without prejudice to other remedies the Owner may have under this Contract. If the expense exceeds the sum payable under the Contract, the Contractor and Surety shall be liable to pay the Owner the difference.

47.2 TERMINATION FOR CONVENIENCE

Owner may, at any time, terminate this Contract or any portion thereof, for Owner's convenience, upon providing written notice to the Contractor. In such case, Contractor shall be paid for all work completed through the date notice was provided (less payments already received) and reasonable demobilization and restocking charges incurred and reasonable overhead and profit based upon industry standards on the work performed. In no event shall the Contractor be entitled to payment of overhead and profit on work not performed. In the event it is determined that the Contractor was wrongfully terminated for cause, pursuant to Section GP 45.1 above, such termination shall be automatically converted to a termination for convenience under and payment made as provided under this Section.

GP-48 TEMPORARY SUSPENSION OF WORK

The Engineer shall have the authority to temporarily suspend the Work in whole or in part. A Field Order shall be issued to the Contractor for any of the Work that is suspended for periods exceeding one (1) calendar day. The Field Order shall include the specific reasons and details for the suspension. The Contract Time shall not be extended if the Work is suspended due to failure by the Contractor to comply with a Field Order or with the Plans and Specifications. If the Work is suspended in the interest of the Owner, the Contractor shall make due allowances for the lost time.

GP-49 NON-CONFORMING AND UNAUTHORIZED WORK

Work not conforming to the Plans, Specifications, Field Orders, or Change Orders shall not be accepted for payment. Unacceptable or unauthorized work shall be removed and replaced in an acceptable manner at the expense of the Contractor in order to obtain final acceptance of the Work.

If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the Owner after seven (7) calendar days written notice to the Contractor, may correct such deficiencies itself or by use of other contractors without prejudice to any other remedy it may have, and may deduct the cost thereof from the payment then or thereafter due to the Contractor.

GP-50 CONTRACTOR'S RIGHT TO TERMINATE CONTRACT

The Contractor may terminate the Contract or Work and recover payment from the Owner for labor and materials if the Work is stopped through no act or fault of the Contractor for more than three (3) months. For example, such an occurrence could be caused by a court order or other public authority. In any case, the Contractor shall submit a written notice to the Engineer at the beginning of the occurrence, and a written Claim to the Owner at the end of the occurrence.

GP-51 BREACH OF CONTRACT

The Owner shall submit a written Claim to the Contractor regarding any breach of the Contract. The Contractor must provide a written response to the Owner regarding the breach of Contract within ten (10) days after the Claim. This response must provide either an admission to the Claim or a detailed denial based on relevant data and calculations. The failure of the Contractor to provide a proper response within ten (10) days shall result in justification of the Claim by default.

GP-52 NO WAIVER OF LEGAL RIGHTS

The Owner shall not be prevented from recovering costs from the Contractor, Surety, or both due to failure of the Contractor to fulfill all of the obligations under the Contract. If a waiver is provided to the Contractor for a breach of Contract by the Owner, it shall not apply to any other breach of Contract. Final acceptance of the Work shall not prevent the Owner from correcting any measurement, estimate, or certificate. The Contractor shall be liable to the Owner without prejudice to the terms of the Contract or any warranty for latent defects, fraud, or gross negligence.

GP-53 LIABILITY FOR DAMAGES AND INJURIES

To the fullest extent permitted by Laws and Regulations, the Contractor shall indemnify and hold harmless the Owner, Orleans Levee District, Engineer, and their officers, employees, representatives, and/or agents from all suits, actions, claims, costs, losses, demands, and judgments (including but not limited to fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) brought because of injuries or damage sustained by an person or property due to the operations of Contractor; due to negligence in safeguarding the Work, or use of unacceptable materials in constructing the Work,; or any negligent act, omission, or misconduct of the Contractor; or claims or amounts recovered under the Workmen-s Compensation Act or other law, ordinance, order, or decree; any money due the Contractor as considered necessary by the Owner for such purpose may be retained for use of the Owner or in case no money is due, the performance and payment bond may be held until such suits, actions, claims for injuries or damages have been settled and suitable evidence to that effect furnished to the Owner; except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that adequate Workman's Compensation, Public Liability, and Property Damage Insurance are in effect.

The indemnification obligations of the Contractor shall not extend to the liability of the Owner, Engineer, and their affiliates arising out of the preparation or approval of the Plans, Specifications, maps, opinions, reports, surveys, or Change Orders or for the intentional acts or gross negligence of the Owner, Engineer and their officers, employees, representatives, and/or agents.

Should the Owner or Contractor suffer from any injury or damage due to an error, omission, or act of the other party or their legally liable affiliates, a written Claim shall be submitted to the other party within ten (10) days. The Claim shall provide all details regarding the injury or damage, the results of any investigations, and the action to be taken to prevent any reoccurrence.

GP-54 LIABILITY FOR LOSSES BY ACTS OF THE GOVERNMENT

The Owner shall not be liable for any loss or damage suffered by the Contractor arising out of a cessation of Work under this Contract due to any act or order of any local, state, or federal government agency. If this cessation occurs, the Contractor may request an extension of the Contract Time according to the provisions in GP-44.

GP-55 SUBSTANTIAL COMPLETION AND NOTICE OF ACCEPTANCE

Upon notice from the Contractor that it believes the project has reached substantial completion, and before final acceptance, the Engineer will make an inspection of the Work. “Substantial Completion” is defined as the date on which the Work is complete in accordance with the Contract Documents in order that the Owner can occupy and use the project for its intended use. The date of Substantial Completion shall be specified in the Notice of Acceptance.

If the Owner or its representative determines the Project is substantially complete, the Owner shall issue a Notice of Acceptance identifying the date the Project reached Substantial Completion and attach a punch list, if applicable, identifying the remaining items that must be completed before final payment. The Contractor shall then file the executed Notice of Acceptance with the Clerk of Court in the Parish where the work is performed and shall forward one copy of the recorded acceptance to the Owner and Engineer.

If the inspection discloses any work as being unsatisfactory or incomplete and such work generates a formal punch list, the Engineer will give the Contractor instructions for correction of same, and the Contractor shall immediately comply with such instructions. Upon satisfactory completion of the corrections, when a “Punch List” is generated, the Engineer shall prepare a “Recommendation of Acceptance” incorporating the punch list and submit to the Owner. Upon approval of the Recommendation of Acceptance, the Owner may issue a Notice of Acceptance of the Contract which shall establish the date of Substantial Completion.

In accordance with Louisiana Revised Statutes Title 38, Section 2248(B), any punch list generated during this project shall include the cost estimates for the particular items of work based on the mobilization, labor, material, and equipment costs of each punch list item. The Owner shall retain his working papers used to determine the punch list items cost estimates should the matter be disputed later. The Owner shall not withhold from payment more than the value of the punch list. Punch list items completed shall be paid upon expiration of the forty-

five day retainage period provided for under the Louisiana Public Works Act and delivery of a clear Lien & Privilege Certificate. La.Rev.Stat. 38:2248, et seq.

If the dollar value of the punch list exceeds the amount of funds, less retainage amount, in the remaining balance of the Contract, the Project shall not be accepted as Substantially Complete. If the funds remaining are less than required to complete the punch list work, the Contractor shall pay the difference. The provisions listed above shall not be subject to waiver.

Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work/project as provided in the Notice of Acceptance, unless otherwise agreed to in writing by the Owner and Contractor. In the instance where the Owner has accepted the Work/project as substantially complete and issued a Notice of Acceptance, and the Contractor must remain on the premises to complete the "Punch List" or for whatever reason, the Contractor shall maintain Commercial General Liability insurance, Auto Liability insurance and Worker's Compensation insurance as set forth herein until the expiration of the forty-five (45) day lien period or upon the completion of the work/project, whichever is later. Builder's Risk insurance, if applicable, may be cancelled only with the written permission of the Owner or the Owner's representative at Substantial Completion.

If the punch list is not completed within forty-five (45) days, through no fault of Owner or Engineer, the Owner may, but is not required, to place the Contractor in default. Thereafter, the Owner shall notify the Surety. If the Surety has not completed the punch list within forty-five days of receipt of notification, the Owner may, but is not required to, complete the remaining punch list items. Any costs incurred shall be paid for first out of any remaining Contract funds. If the costs incurred exceed the remaining Contract funds, the Contractor and its Surety shall be liable for such costs.

Upon completion of the punch list, Contractor shall request Final Inspection.

GP-56 FINAL INSPECTION AND ACCEPTANCE

Whenever the work provided for, or contemplated by the contract, have been satisfactorily completed, all punch list items completed and the final cleaning up is performed, the Engineer shall be notified in writing that said work is completed and ready for final inspection. The Engineer shall, unless otherwise provided, make the final inspection within a reasonable length of time after the receipt of such notification.

If all construction provided for in the contract is found completed to the Engineer's satisfaction that inspection shall constitute the final inspection and the Engineer will make recommendation to the Owner for final acceptance and notify the Contractor in writing of this recommendation of acceptance.

GP-57 AS-BUILT DRAWINGS

The Contractor shall submit all originals and copies of the As-Built Drawings to the Engineer for review and acceptance in accordance with the Special Provisions. The As-Built Drawings shall provide complete data for quantities, dimensions, specified performance and design criteria, and similar items which clearly represent the services, materials, and equipment the Contractor has provided. All revision sheets shall be clearly stamped with the words "As-Built".

GP-58 COMPLETION OF CONTRACT

Notwithstanding any other provision of this Contract and all applicable and necessary time delays under Louisiana law, completion of the Contract requires all of the Work to be complete, inspected by the Engineer, accepted by the Owner as recommended by the Engineer, and after final payment is made. After the Contract is complete, the Contractor will then be released from further obligation except as set forth in the Contract Bond and Contractor's Guarantee.

GP-59 CONTRACTOR'S GUARANTEE

The Contractor is obligated to provide a written guarantee to the Owner that all of the Work conforms to the Contract Documents.

a. The guarantee shall exclude defects or damage caused by:

    1. Abuse or improper modification, maintenance, or operation by anyone other than the Contractor; or

    2. Wear and tear under normal usage.

b. This obligation by the Contractor shall be absolute. The following actions will not constitute acceptance of non-conformance Work or release the Contractor from obligation to furnish the Work in accordance with the Contract Documents:

    1. Observations by the Owner or Engineer; or

    2. Recommendations by the Engineer or payment by the Owner; or

    3. Use of the Work by the Owner; or

    4. Issuance of a notice of acceptance by the Owner pursuant to the provisions of GP-53, or failure to do so; or

    5. Any inspection, test, or approval by others; or

    6. Any correction to non-conforming work by the Owner.

GP-60 DISPUTE RESOLUTION

The parties shall use their best efforts to resolve all disputes in an amicable fashion. Prior to filing suit by either party with respect to any claims, or disputes arising between the parties, the disputes shall be submitted first to non-binding mediation. The mediation shall be conducted in accordance with the Construction Industry Mediation Rules of the American Arbitration Association. If the parties cannot agree to a private mediator, then the mediator shall be selected by the American Arbitration Association, upon the filing of a demand for mediation.

If the dispute is not resolved by mediation within 60 days from the request for mediation, then either party may institute legal proceedings. Any litigation involving the Owner and arising under or related to the Contract or the bidding or award thereof shall be instituted exclusively in the Civil District Court for the Parish of Orleans, State of Louisiana.

GP-61 PAYMENT

The Owner hereby agrees to pay to the Contractor as full compensation for all work performed under the contract, and/or supplemental agreements thereto, the monetary value of the actual quantities in the completed work according to the schedule of unit prices and/or lump sum prices set forth in attached bid proposal and/or duly authorized supplements thereto, and made a part of the Contract.

Partial payments under the Contract shall be made at the request of the Contractor not more than once each month, based upon partial estimates agreed to by the Contractor and Engineer and shall be furnished to the Engineer and approved by the Engineer prior to transmittal to the Owner for approval and payment.

The partial estimates will be approximately stated, and all partial estimates and payments shall be subject to corrections in the estimate rendered following the discovery of any error in any previous estimates.

The payment of the partial estimate shall be taken as verification that the work has been performed and that its quality is satisfactory, however it will in no way serve as a release to the Contractor for the responsibility of any portions thereof. The Work and any particulars relating thereto shall be subject to revision and adjustment by the Engineer and/or the Owner at any time prior to final payment, regardless of any previous action taken.

There shall be reserved from the payments provided for the Contract ten percent (10%) for contracts less than $500,000 or five percent (5%) for contracts of $500,000 or more, of the estimates submitted, said sum to constitute a trust fund for the protection of and payment to any person or persons, mechanic, subcontractor or material men who shall perform any labor upon such contract, or the doing of said work, and all persons who shall supply such person or persons or subcontractors with provisions and supplies for the carrying on of such work, and shall be withheld for a minimum of forty-five (45) calendar days after final acceptance of the completed contract.

In accordance with Louisiana Revised Statutes Title 38, Section 2248(A), payment of the retainage held by the Owner shall be made forty-five (45) days after recordation of acceptance

of the work in the office of the Clerk of Court, Ex-Officio Recorder of Mortgages for the Parish of Orleans, State of Louisiana and after delivery by the Contractor to the Owner of a Certificate from the Clerk of Court, Ex-Officio Recorder of Mortgages for the Parish of Orleans showing that no liens or claims have been filed in connection with the work, except for punch list items that have not been completed, which will be paid after completion of the punch list items. The cancellation of all liens and claims that might be recorded, growing out of this Contract, shall be at the cost and expense of the Contractor, and the cost of same may be retained by the Owner from payments due or to become due until the liens and claims are cancelled by the Contractor.

GP-62 PAYMENTS WITHHELD

In addition to the percentage provided for in Section GP-61 of these General Provisions and in accordance with any other provision of this Contract, the Owner may withhold such amounts from any payment as may be necessary to protect himself from loss on account of:

a. Defective work not remedied;

b. Claims filed or reasonable evidence indicating probable filing of claims;

c. Failure of the Contractor to make payments properly to subcontractors or for material or labor;

d. Reasonable evidence that the Work will not be completed within the Contract time and that the unpaid balance would not be adequate to cover damages for the anticipated delay;

e. A reasonable doubt that the contract can be completed within the time period remaining under the contract;

f. Damage to another contractor;

g. Failure to submit required reports; or

h. Modifications of the contract which necessitate the execution of change orders prior to payment of funds.

Furthermore, nothing contained in this Section shall be deemed to limit the right of the Owner to withhold liquidated damages, as stated in the Instructions to Bidders and as permitted under the Special Provisions, from any amounts which may be due and owing the Contractor for work performed under the contract.

GP-63 LIENS

Neither the final payment nor any part of the retained percentage shall come due until the Contractor shall deliver to the Owner a complete release of all liens arising out of this contract, or receipts in full in lieu thereof, and, if required by the Owner, an affidavit that so far as he has knowledge or information, the releases and receipts include all labor and material for

which a lien could be filed; but if any subcontractor refuses to furnish a release or receipt in full, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against any lien, construction cost, or attorney's fees.

GP-64 DISADVANTAGED BUSINESS ENTERPRISES

It is the established policy of the Management Authority to provide reasonable opportunities for Disadvantaged Business Enterprises to compete for or perform on contracts let by the Management Authority. Toward this end, the Management Authority encourages, to the extent feasible, the structuring of major projects into categories which may be commensurate with the capabilities of Disadvantaged Business Enterprises and actively encourages major prime contractors to provide opportunities for these businesses to become involved as subcontractors. The goal for participation is 18%.

"Disadvantaged Business Enterprise" means a small business organized for profit performing a commercially useful function which is owned and controlled by one or more DBE individuals or businesses. Owned and controlled means a business in which one or more DBE owns at least fifty-one percent, or in the case of a corporation, at least fifty-one percent of the voting stock and controls at least fifty-one percent of the management and daily business operations of the business.

Whenever the decision is made to sublet any of the work required under this Contract, affirmative steps should be taken to include small business and disadvantaged/women owned business participation. A list of certified firms in each specialized field may be obtained from the Louisiana Department Of Transportation. Affirmative steps shall include the following:

1. Including qualified small and disadvantaged/women businesses on solicitation lists.

2. Assuring that small and disadvantaged/women businesses are solicited whenever they are potential sources.

3. When economically feasible, dividing total requirements into smaller tasks or quantities so as to permit maximum small and disadvantaged/women business participation.

4. Where the requirements permit, establishing delivery schedules which will encourage participation by small and disadvantaged/women businesses.

5. Using the services and assistance of the Small Business Administration, the Office of Disadvantaged Business Enterprise of the Department of Commerce and the Community Services Administration as required.

The Contractor is requested to submit a statement to the Owner detailing its efforts to comply with the DBE goal.

GP-65 EQUAL EMPLOYMENT OPPORTUNITY

The LMA is an equal opportunity employer, and looks to its Contractor, subcontractors, vendors and suppliers to take affirmative action to effect this commitment in its operations.

By submitting the bid proposal and executing the Contract, the Contractor agrees to abide by the requirements of the following as applicable: Title VI and VII of the Civil Rights Act of 1964, as amended by the Equal Opportunity Act of 1972, Federal Executive Order 11246,

the Federal Rehabilitation Act of 1973, as amended, the Vietnam Era Veterans Readjustment Assistance Act of 1974, Title IX of the Education Amendments of 1972, and the Age Act of 1975, and the Contractor agrees to abide by the requirements of the Americans with Disabilities Act of 1990.

The Contractor agrees not to discriminate in its employment practices, and will render services the Contract, without regard to their race, age, color, religion, sex, national origin, veteran status, political affiliation or disabilities. Any act of discrimination committed by the Contractor, or failure to comply with these statutory obligations when applicable, shall be grounds for termination of the Contract.

GP-66 ANTI-KICKBACK CLAUSE

The Contractor agrees to adhere to the mandate dictated by the Copeland "Anti-Kickback" Act which provides that each contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the completion of the work, to give up any part of the compensation to which he is otherwise entitled.

GP-67 SUSPENSION/DEBARMENT

Contractor certifies, by signing and submitting any bid, that their company, any subcontractors, or principals are not suspended or debarred by the General Services Administration (GSA) in accordance with the requirements in OMB Circular A-133. A list of parties who have been suspended or debarred can be viewed via the internet at www.epls.gov.

Contractor agrees to secure from any contractor(s) and subcontractor(s) for the captioned project, certification that such contractor(s) and subcontractor(s) are not suspended, debarred or declared ineligible from entering into contracts with any department or agency of the Federal Government or of the State of Louisiana, or in receipt of a notice of proposed debarment or suspension.

Contractor shall provide immediate notice to Owner in the event of it or its contractor(s) or any subcontractor(s) being suspended debarred or declared ineligible by any department or agency of the Federal Government or of the State of Louisiana, or upon receipt of a notice of a proposed debarment or suspension, either prior to or after execution of this Contract.

Upon receipt of notice of suspension, debarment, or declaration that Contractor or its contractor(s) or any subcontractor(s) is/are ineligible to enter into contracts with any department or agency of the Federal Government or of the State of Louisiana, either prior to or after execution of this Contract, Owner reserves the right to review cause for said debarment, suspension, or declaration of ineligibility, and to terminate this Contract pursuant to the terms of GP-45 OWNER'S RIGHT TO TERMINATE CONTRACT FOR CAUSE OR CONVENIENCE, or take such other action it deems appropriate under this Contract.

GP-68 LOUISIANA FIRST HIRING ACT

Contractor shall comply with the Louisiana First Hiring Act (La. R.S. 39:2201-2204), which requires that within ten (10) days of executing the Contract, Contractor shall

submit the following information to the Louisiana Workforce Commission:

1. The number and types of jobs anticipated for the Work.

2. The skill level of the jobs anticipated for the Work.

3. The wage or salary range for each job anticipated for the Work.

4. Methods, if any, that the Contractor will use to recruit unemployed persons or person employed in low wage jobs to fill job openings for the Work.

END OF PART I - GENERAL PROVISIONS

PART II SPECIAL PROVISIONS

SP-1 LOCATION OF WORK

The Work to be performed is located at 6001 Stars and Stripes Boulevard – New Orleans, LA

The Project Site is accessible via surface roads. A vicinity map and project map have been included in the Plans.

SP-2 PLACEHOLDER

END OF PART II – SPECIAL PROVISIONS

SECTION 03 10 00 - CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Formwork for cast-in place concrete.
   2. Shoring, bracing, and anchorage.
   3. Form accessories.
   4. Form stripping.

B. Related Sections:
   1. Section 03 20 00 - Concrete Reinforcing.
   2. Section 03 30 00 - Cast-In-Place Concrete.

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
   2. ACI 301 - Specifications for Structural Concrete.
   3. ACI 318 - Building Code Requirements for Structural Concrete.
   4. ACI 347 - Guide to Formwork for Concrete.

B. American Forest and Paper Association:
   1. AF&PA - National Design Specifications for Wood Construction.

C. The Engineered Wood Association:
   1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.

D. ASTM International:
   1. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
   2. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

1.3 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing in accordance with ACI 318 and ACI347 to conform to applicable code requirements to achieve concrete shape, line, dimension and exposed finish as indicated on Drawings and Specifications.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Signed and sealed by professional engineer.

1. Submit formwork, shoring, and reshoring shop drawings.
2. Indicate the following:
    a. Pertinent dimensions, openings, methods of construction, types of connections, materials, joint arrangement and details, ties and shores, location of framing, studding and bracing, and temporary supports.
    b. Means of leakage prevention for concrete exposed to view in finished construction.
    c. Sequence and timing of erection and stripping assumed compressive strength at time of stripping, height of lift and height of drop during placement.
    d. Vertical, horizontal and special loads in accordance with ACI 347, Section 2.2 and camber diagrams, when applicable.
    e. Notes to formwork erector showing size and location of conduits and piping embedded in concrete in accordance with ACI 318, Section 6.3.
    f. Procedure and schedule for removal of shores and installation and removal of reshores.

C. Design Data:
1. Indicate design data for formwork, shoring, and reshores.
2. Indicate loads transferred to structure during process of concreting, shoring and reshoring.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 347 and ACI 301.

B. For wood products furnished for work of this Section, comply with AF&PA.

1.6 QUALIFICATIONS

A. Design formwork under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Louisiana.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Products storage and handling requirements.

B. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.8 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

A. Plywood Forms:
1. Application: Use for exposed finish concrete.

2. Forms: Conform to PS 1; full size 4 x 8 feet panels; each panel labeled with grade trademark of APA/EWA.
3. Plywood for Surfaces to Receive Membrane Waterproofing: Minimum of 5/8 inch thick; APA/EWA "B-B Plyform Structural I Exterior" grade.
4. Plywood where "Smooth Finish" is required, as indicated on Drawings: APA/EWA "HD Overlay Plyform Structural I Exterior" grade, minimum of 3/4 inch thick.

2.2 PREFABRICATED FORMS

A. Prefabricated Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

B. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

C. Pan Type: Steel of size and profile required.

D. Tubular Column Type: Round, spirally wound laminated fiber glass fiber material, surface treated with release agent, non-reusable, sizes as indicated on Drawings.

E. Steel Forms: Sheet steel, suitably reinforced, and designed for particular use indicated on Drawings.

F. Form Liners: Smooth, durable, grainless and non-staining hardboard, unless otherwise indicated on Drawings.

G. Framing, Studding and Bracing: Stud or No. 3 structural light framing grade.

2.3 FORMWORK ACCESSORIES

A. Form Ties: Snap-off type, galvanized metal, adjustable length, cone type, free of defects capable of leaving holes larger than 1 inch in concrete surface.

B. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face. Wire ties, wood spreaders or through bolts are not permitted.

C. Form Anchors and Hangers:
1. Do not use anchors and hangers exposed concrete leaving exposed metal at concrete surface.
2. Symmetrically arrange hangers supporting forms from structural steel members to minimize twisting or rotation of member.
3. Penetration of structural steel members is not permitted.

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

E. Corners: Chamfer, wood strip type; 3/4 inch size; maximum possible lengths.

F. Bituminous Joint Filler: ASTM D1751.

G. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.

C. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

3.2 INSTALLATION

A. Formwork - General:
1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
5. Complete wedging and bracing before placing concrete.

B. Forms for Smooth Finish Exposed Concrete:
1. Use steel, plywood or lined board forms.
2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
3. Install form lining with close-fitting square joints between separate sheets without springing into place.
4. Use full size sheets of form lines and plywood wherever possible.
5. Tape joints to prevent protrusions in concrete.
6. Use care in forming and stripping wood forms to protect corners and edges.
7. Level and continue horizontal joints.
8. Keep wood forms wet until stripped.

3.3 APPLICATION - FORM RELEASE AGENT

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

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

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

D. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish". Apply form coatings before placing reinforcing steel.

3.4 INSTALLATION - INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Install formed openings for items to be embedded in or passing through concrete work.

B. Locate and set in place items required to be cast directly into concrete.

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

D. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.

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

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

G. Form Ties:
1. Use sufficient strength and sufficient quantity to prevent spreading of forms.
2. Place ties at least 1 inch away from finished surface of concrete.
3. Leave inner rods in concrete when forms are stripped.
4. Space form ties equidistant, symmetrical and aligned vertically and horizontally unless otherwise shown on Drawings.

H. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.

I. Construction Joints:
1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
3. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
4. Arrange joints in continuous line straight, true and sharp.

J. Embedded Items:
   1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
   2. Do not embed wood or uncoated aluminum in concrete.
   3. Obtain installation and setting information for embedded items furnished under other Specification sections.
   4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
   5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.

K. Openings for Items Passing Through Concrete:
   1. Frame openings in concrete where indicated on Drawings. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
   2. Coordinate work to avoid cutting and patching of concrete after placement.
   3. Perform cutting and repairing of concrete required as result of failure to provide required openings.

L. Screeds:
   1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
   2. Slope slabs to drain where required or as shown on Drawings.
   3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.

M. Screed Supports:
   1. For concrete over waterproof membranes and vapor retarder membranes, use cradle, pad or base type screed supports which will not puncture membrane.
   2. Staking through membrane is not be permitted.

N. Cleanouts and Access Panels:
   1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material.
   2. Clean forms and surfaces against which concrete is to be placed. Remove chips, saw dust and other debris. Thoroughly blow out forms with compressed air just before concrete is placed.

3.5 FORM CLEANING

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

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

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

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

3.6 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Architect/Engineer.

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

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

D. Leave forms in place for minimum number of days as specified in ACI 347.

3.7 ERECTION TOLERANCES

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

3.8 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements, 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. The Owner’s designated Special Inspector shall provide special inspection and verification of formwork in accordance with Section 1705.3 of the 2012 International Building Code.

C. In addition to the special inspections above, the Contractor shall inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

D. Notify Architect/Engineer after placement of reinforcing steel in forms, but prior to placing concrete.

E. Schedule concrete placement to permit formwork inspection before placing concrete.

END OF SECTION

SECTION 03 20 00 - CONCRETE REINFORCING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Reinforcing bars.
2. Welded wire fabric.
3. Reinforcement accessories.

B. Related Sections:
1. Section 03 10 00 - Concrete Forming and Accessories.
2. Section 03 30 00 - Cast-In-Place Concrete.
3. Section 03 45 00 – Precast Architectural Concrete: Reinforcement for Precast Concrete Panels.
4. Section 04 20 16 – Reinforcing Unit Masonry
5. Section 31 62 14 – Prestressed Concrete Piles

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 301 - Specifications for Structural Concrete.
2. ACI 318 - Building Code Requirements for Structural Concrete.
3. ACI 530.1 – Specifications for Masonry Structures
4. ACI SP-66 - ACI Detailing Manual.

B. ASTM International:
1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A184 - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
3. A185-07 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
4. ASTM A496 - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
5. ASTM A497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
6. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
7. ASTM A704 - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
8. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
9. ASTM A767 - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
10. ASTM A996 - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.

C. American Welding Society:
   1. AWS D1.4 – Structural Welding Code – Reinforcing Steel.

D. Concrete Reinforcing Steel Institute:
   1. CRSI - Manual of Standard Practice.
   2. CRSI - Placing Reinforcing Bars.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

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

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.
   1. Submit certified copies of mill test report of reinforcement materials analysis.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.

B. Prepare shop drawings in accordance with ACI SP-66.

C. Perform work in accordance with IBC standards.

D. Maintain one copy of each document on site.

1.5 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate with placement of formwork, formed openings, plumbing, electrical conduits and other Work. Do not bunch electrical conduits in slabs, maintain a minimum of 6” clear between adjacent conduits or plumbing runs.

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A615, 60 ksi yield grade, deformed billet bars, uncoated finish.

B. Deformed Wire: ASTM A496; unfinished.

C. Welded Deformed Wire Fabric: ASTM A497; in flat sheets; unfinished.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor retarder puncture.

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Stainless steel type; size and shape to meet Project conditions.

D. Reinforcing Splicing Devices: Exothermic welding type; full tension and compression; sized to fit joined reinforcing.

E. Reinforcing Splicing Devices: Mechanical swaged, threaded type; full tension and compression; sized to fit joined reinforcing.

2.3 FABRICATION

A. Fabricate concrete reinforcement in accordance with CRSI Manual of Practice and ACI 318.

B. Form standard hooks for 180 degree bends, 90 degree bend, stirrup and tie hooks, and seismic hooks as indicated on Drawings.

C. Form reinforcement bends with minimum diameters in accordance with ACI 318.

D. Fabricate column reinforcement with offset bends at reinforcement splices.

E. Form spiral column reinforcement from minimum 3/8 inch diameter continuous deformed bar or wire.

F. Locate reinforcement splices not indicated on Drawings, at point of minimum stress. Review location of splices with Architect/Engineer.

G. Welding of reinforcing bars is not allowed.

2.4 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

B. Make completed reinforcement available for inspection at manufacturer’s factory prior to packaging for shipment. Notify Architect/Engineer at least seven days before inspection is allowed.

PART 3 EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
   1. Do not weld reinforcement bars for assembly. Welding of reinforcing is NOT allowed.

B. Do not displace or damage vapor retarder.

C. Accommodate placement of formed openings.

D. Space reinforcement bars with minimum clear spacing in accordance with ACI 318 unless indicated otherwise in drawings.
   1. Where bars are indicated in multiple layers, place upper bars directly above lower bars.

Reinforcement Location		Minimum Concrete Cover
Footings and Concrete Formed Against Earth		3 inches
Concrete exposed to earth or weather	No. 6 bars and larger	2 inches
	No. 5 bars and smaller	1-1/2 inches
Supported Slabs, Walls, and Joists	No. 14 bars and larger	1-1/2 inches
	No. 11 bars and smaller	3/4 inches
Beams and Columns		1-1/2 inches
Shell and Folded Plate Members	No. 6 bars and larger	3/4 inches
	No. 5 bars and smaller	1/2 inches

E. Splice reinforcing where indicated on Drawings in accordance with splicing device manufacturer's instructions.

3.2 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Install reinforcement within the following tolerances for flexural members, walls, and compression members:

Reinforcement Depth	Depth Tolerance	Concrete Cover Tolerance
Greater than 8 inches	plus or minus 3/8 inch	minus 3/8 inch
Less than 8 inches	plus or minus 1/2 inch	minus 1/2 inch

C. Install reinforcement within the tolerances specified in ACI 530.1 for foundation walls.

3.3 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements, 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. The Owner's designated Special Inspector shall provide special inspection and verification of concrete reinforcing in accordance with Section 1705.3 of the 2012 International Building Code.

C. In addition to the Special Inspections above, the contractor shall perform field inspection and testing in accordance with ACI 318.

D. Provide free access to Work and cooperate with appointed firm.

E. Reinforcement Inspection:
   1. Placement Acceptance: Specified and ACI 318 material requirements and specified placement tolerances.
   2. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

END OF SECTION

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 DESCRITION OF WORK

A. The extent of concrete work required is shown on drawings and includes but is not limited to:
   1. Formwork.
   2. Reinforcing.
   3. Placing concrete.
   4. Finishing.

B. Examine the Drawings and the Structural General Notes in particular, for details which describe the extent of concrete work.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division – 1 Specification sections, apply to work of this section.

1.3 RELATED SECTIONS

1. Section 03 10 00 – Concrete Forming and Accessories
2. Section 03 20 00 – Concrete Reinforcing

1.4 REFERENCES

A. American Concrete Institute:
   1. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials.
   2. ACI 301 - Specifications for Structural Concrete.
   3. ACI 304 – Guide for Measuring, Mixing, Transporting, and Placing Concrete.
   4. ACI 304.2 – Placing Concrete by Pumping Methods.
   5. ACI 305 – Hot Weather Concreting.
   6. ACI 306.1 – Standard Specification for Cold Weather Concreting.
   7. ACI 308.1 - Standard Specification for Curing Concrete.
   8. ACI 318 - Building Code Requirements for Structural Concrete.
   9. ACI SP-15 – Field Reference Manual: Standard Specifications for Structural Concrete
   10. ACI SP-66 – Detailing Manual

B. ASTM International:
   1. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   2. ASTM C33 – Standard Specification for Concrete Aggregates.
   3. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   4. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
   5. ASTM C143 – Standard Test Method for Slump of Hydraulic Cement Concrete.
   6. ASTM C150 - Standard Specification for Portland Cement.
   7. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete.

8. ASTM A615 – Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
9. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
10. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
11. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
12. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
13. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
14. ASTM C685/C685M - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.
15. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
16. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
17. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
18. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
19. ASTM C1157 - Standard Performance Specification for Hydraulic Cement.
20. ASTM C1218/C1218M - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
21. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
22. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data for materials and all proprietary items, including reinforcement and forming accessories, admixtures and, patching compounds, joint systems, curing compounds, including dry-shake finish materials and others as requested by Architect/Engineer.

C. Submit concrete mix designs for each strength of concrete. Submit separate mix designs when admixtures are required for Hot or Cold weather concrete work, or air entrained concrete work.

D. Shop Drawings:
1. Meet requirements of applicable portions of “Details and Detailing of Concrete Reinforcement” by ACI 315, latest edition, and of Division 1 thereof.
2. Show bending, assembly, splicing, sizes, bar lengths and markings of bars. Indicate bar spacing by dimension.
3. Locate sleeves, holes, accessories and anchors by dimensions.
4. Furnish prints of approved shop drawings to trades that have items to be embedded in, or connected to concrete work.
5. Reproduction of the Contract Drawings for use in producing shop drawings is prohibited.

E. Samples: Submit samples of materials as requested by Architect/Engineer, including names, sources and descriptions.

F. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test.

G. Materials Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Architect/Engineer. Materials certificates shall be signed by Manufacturer and Contractor, certifying that each material item complies with, or exceeds specified requirements. Provide certificates from admixture manufacturers that chloride content complies with specification requirements.

1.6 QUALITY ASSURANCE

A. Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
   1. ACI 301 "Specifications for Structural Concrete for Buildings."
   2. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."
   3. ACI SP – 15 "Field Reference Manual: Standard Specifications for Structural Concrete ACI 301-10 with Selected ACI and ASTM References."

   Maintain one copy of each document on site.

B. Concrete Testing Service: Employ, at Contractor's expense a testing Laboratory acceptable to Architect to perform material evaluation tests and to design concrete mixes.
   1. The following tests will be required.
      a. Sampling: Per ASTM C 172
      b. Slump: Per ASTM C 143, one (1) test for each load at point of discharge.

C. Air Content: Per ASTM C 173, one (1) test for each set of compressive strength specimens.

D. Compressive Strength: Per ASTM C 39, one set for each 10 cu. yds. or fraction thereof of each class of concrete; test two (2) specimens at 7 days, test three (3) specimens at 28 days, retain one (1) for later testing if required.

E. If total quantity for a given class of concrete is less than 50 cu. yds, strength tests may be waived at the Architect's discretion.

F. Test results will be reported in writing to the Architect, Contractor, and concrete producer on the same day tests are made.

G. Defective concrete may require additional tests. Additional tests will be at the Contractor's expense.

1.7 PROJECT CONDITIONS

A. Comply with applicable requirements of "Cold Weather Concreting", ACI 306, and "Hot Weather Concreting", ACI 305.

B. Do not place concrete if temperature is below 40 degrees F except with specific approval by the Architect/Engineers, and then be prepared to maintain concrete temperature as recommended in ACI 306.1.

C. Reduce concrete temperatures to prevent rapid evaporation of water in hot weather.

D. Protect persons from injury and property from damage. Repair or remove and replace work that has been damaged by the Contractor's operations to the satisfaction of the Architect/Engineer at no additional cost to the Owner.

1.8 DELIVERING AND STORING

A. Deliver unopened, packaged materials to site in manufacturer's original labeled containers. Schedule deliveries to avoid delays and to prevent greater accumulations than can be suitably stored at site.

B. Arrange deliveries to provide sufficient quantities to permit continuity of placing for phase of work. Do not change suppliers or brands for any phase of work, without specific approval from Architect/Engineer.

C. Store materials to prevent damage to other materials or to structure. Store cementitious material in dry, weather-tight, ventilated spaces. Store aggregates to exclude foreign matter and to maintain gradation. Do not store reinforcing in contact with the ground.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or I/II. Use one brand of cement throughout project.

B. Normal weight Aggregates: ASTM C 33, and as herein specified. Provide ¾" maximum size aggregate from a single source for exposed concrete

C. Water: Potable.

D. Air-Entraining Admixture: ASTM C 260, use in all concrete. Add at batch plant only.

E. Water Reducing Admixture: ANSI/ASTM C 494, Type A and contain no more than 1% chloride ions.
   1. Available Products: Subject to compliance with requirements, products, which may be incorporated in the work include, but are not limited to, the following:
      a. "Pozzolith 322N"; Master Builders
      b. "Plastocrete 161"; Sika Chemical Corporation
      c. "Chemtard"; Chem-Masters Corporation

F. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F of the sulfonated melamine formaldehyde condensate based materials type and contain no more than 1% chloride ions.

G. Water-Reducing, Retarding Admixture: ASTM C 494, Type D and contain no more than 1% chloride ions.

H. Calcium Chloride not permitted.

I. Fly Ash up to 15% by weight of cement shall be allowed. Type C or F, ASTM C 618.

J. Ground Granulated Blast-Furnace Slag up to 25% by weight of cement shall be allowed. ASTM C 989.

K. A maximum combined total of 30% by weight of cement of Fly Ash and Ground Granulated Blast-Furnace slag shall be allowed.

2.2 RELATED MATERIALS

A. Sealer & Hardener-Aqueous acrylic non-yellowing coating, 30% solids, compliance with TT-C800A, 5yr warranty against Dusting. Minimum coverage of 300 sq. ft. per gal. Products: L&M Dress & Seal, Kure-N-Seal 30 by Sonneborn and Thoroglaze H by Thoro System Products:

B. Non-Corrosive, Non-Stain, Non-Shrink precision grout compliant with CRD-C-621. Acceptable products Crystex/Duragrout by L&M, Master-Flow713 by Master Builders, 5 Star by U.S. Grout.

C. Bonding Compound – Non-Reversible Acrylic. Everbond by L&M, Acryl set by Master Builders, Sika Latex by Sika.

D. Epoxy Joint Filler – T-250LCS by Permagile, Epoflex by L&M. Two part, 100% solids flexibilized compound meeting ASTM D2240 shore hardness 80 + 10.

E. Epoxy Bonding Adhesive – Bond-1 by Permagile, Sika-Dur 32 Hi-Mod by Sika, Epobond by L&M. Adhesive shall be used to eliminate cold joints, 2 part, 100% solids for use on DAMP or DRY surfaces.

F. Form Release Agent – Shall be non-transferring, non-staining, and 100% chemically active. “Debond” by L&M, “Magic Coat” by Nox-Crete, and “Pro-Cote” by Protex.

G. Patching & Repair Mortar – One component, fiber-reinforced, rapid setting and non-shrinking. Shall be non-corrosive and resist sulfate attack. Durapatch Industrial by L&M, Set 45 by Master Builders, and Patch by Sonneborn.

H. Curing:
   1. Moisture-Retaining Cover: Waterproof paper or polyethylene film complying with ANSI/ASTM C 171.
   2. Liquid Membrane-Forming Curing Compound: Liquid type membrane-forming compound complying with ANSI/ASTM C 309, Type I, Class A with minimum 30% solids content unless other type acceptable to Architect.
      a. Products: Subject to compliance with requirements, provide one of the following:
         “Masterkure” by Master Builders
         “Kure-N-Seal” by Sonneborn-Contech
         “L&M Cure R” Construction Chemicals

2.3 PROPORTIONING AND DESIGN OF MIXES

A. Mix designs for each concrete strength required shall be prepared by an independent testing laboratory and submitted to the Architect for his approval. No concrete shall be poured until architects approval has been received. Select proportions for normal weight concrete in accordance with ACI 301 Method 1 and as prescribed herein.

B. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:
   1. 4000psi 28-day compressive strength; 564lbs. minimum cement per cu. yd. Minimum; W/C ratio, 0.50 maximum non-air entrained, 0.45 maximum air entrained.

C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

D. Admixtures: Include admixture types and quantities indicated in concrete mix designs only when approved by Architect/Engineer.
   1. Use air-entraining admixtures in all concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content of not more than 4%.

E. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
   1. Ramps and Sloping Surfaces: Not more than 4".
   2. Reinforced Foundation Systems: Not less than 2" and not more than 4".
   3. Concrete containing HRWR admixture (super plasticizer): Not more than 8".
   4. Other Concrete: Not less than 2" and not more than 4".

F. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C 94.

2.4 CONCRETE MIXING

A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.
   1. **Do not add additional water to the batch at the job site above the amount shown in the approved mix design without the approval of the Engineer**.

B. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.
   1. When air temperature is between 85 degrees F (30 degrees C) and 90 degrees F (32 degrees C) reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F (30 degrees C) reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.1 FORMS

A. Design, erect, support, brace and maintain formwork to support all vertical and lateral loads that might be applied until such loads can be supported by concrete structures.

B. Construct forms complying with ACI 347, to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages, inserts and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide tab forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyless, reglets recesses to prevent swelling and for easy removal.

D. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete. Locate temporary openings at inconspicuous locations.

E. Chamfer exposed corners and edges as indicated, using wood, metal PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

F. Provide ½" radius tooled edge at exposed edges of slabs on grade.

G. Form Ties: Factory – fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.
   1. Provide ties so portion remaining within concrete after removal is at least 1-1/2" inside concrete and which will not leave holes larger than 1" diameter in concrete surfaces.

H. Provisions for other trades: Provide openings in concrete formwork to accommodate work of other trades. Accurately place and securely support items built into forms.

I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed.

3.2 PLACING REINFORCEMENT

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

B. Clean reinforcement of loose rust and mill scale, earth, ice and other materials which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.

D. Place reinforcement to obtain at least minimum coverage for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

F. Conform to ACI 318 for concrete cover over reinforcement.

3.3 JOINTS

A. Construction Joints: Locate and install construction joints, which are not shown on drawings, so as not to impair strength and appearance of the structure, as acceptable to Architect. Place joints perpendicular to the main reinforcement. Continue reinforcing across construction joints unless noted on drawings to the contrary.

B. Provide Keyways at least 1-1/2” deep in construction joints in slabs.

C. Construct Isolation Joints in slabs on ground at points of contact between slabs on ground and vertical surfaces such as grade beams and elsewhere as indicated.

D. Joint filler and sealant materials are specified in Division 7 of these specifications.

E. Form contraction joints by inserting pre-molded hardboard or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. After concrete has cured, remove inserts and clean groove of loose debris.

F. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

3.4 INSTALLATION OF EMBEDDED ITEMS:

A. Set and build into forms anchorage devices and other embedded items required for other work that is attached to or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.

B. Edge Forms, Screed Strips and Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure

units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.5 PREPARATION OF FORM SURFACES

A. Coat contact surfaces of forms with a form-coating compound before placing reinforcement.
   1. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions.
   2. Do not allow excess form-coating materials to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

B. Coat steel forms with non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.6 CONCRETE PLACEMENT

A. Pre-placement Inspection, inspect formwork installation, and reinforcing steel for completeness. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.

B. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

C. General: Comply with ACI 304, ACI 304.2 and as herein specified.

D. Deposit continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit as nearly as practicable to its final location to avoid segregation.

E. Place Concrete in Forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

F. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

G. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

H. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

I. Consolidate concrete during placing operation so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

J. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

K. Maintain Reinforcing in proper position during concrete placement operations.

L. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306.
   1. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperature, in compliance with ACI 306 R-78 and as herein specified.
   2. When air temperature has fallen to or is expected to fall below 40 degrees F (4 degrees C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C) and not more than 80 degrees F (27 degrees C) at point of placement.
   3. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   4. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

M. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 R-77.

N. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F (32 degrees C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing.

O. Cover reinforcing steel with water-soaked retarding admixture (Type D) when required by high temperatures, low humidity or other adverse placing conditions.

3.7 FINISH OF FORMED SURFACES

A. Rough Form Finish (RfFm-Fn): For formed concrete surfaces not exposed-to-view in the finish work of other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fin and other projections exceeding 1/4" in height rubbed down or chipped off.

B. Smooth Form Finish (SmFm-Fn): For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

D. Provide ½" radius tooled edge at exposed edges of slabs on grade.

3.8 MONOLITHIC SLAB FINISHES

A. After placing slabs, plane surface to tolerances for floor flatness (F) of 20 and floor levelness of 15. After leveling, roughen surface before final set, with stiff brushes, brooms or rakes. Slope surfaces uniformly to drains where required.

B. Float Finish (Flt-Fn): Apply float finish to monolithic slab surfaces that are to receive trowel finish and as otherwise indicated.
   1. After screening, consolidating and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to tolerances of F20-F15. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture. Cut down high spots and fill low spots.

C. Trowel Finish(Tr-Fn): Apply trowel finish to monolithic slab surfaces to be exposed-to-view and slab surfaces.
   1. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand troweling operation, free of trowel, marks uniform in texture and appearance and with a surface plane tolerances F20-F17. Grind smooth surface defects which would telegraph through applied floor covering system.

D. Non-Slip Broom Finish (NSBrm-Fn): Apply non-slip broom finish to exterior concrete platforms, steps and rams, elsewhere as indicated.
   1. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordination required final finish with Architect before application.

3.9 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
   1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting; keep continuously moist for not less than 72 hours.
   2. Continue final curing for at least seven (7) days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period

B. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover or by membrane curing.

C. Provide moisture curing by following methods.
   1. Continuous water-fog spray.
   2. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges with 4" lap over adjacent absorptive covers.

D. Provide curing compound to slabs as follows:
   1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
   2. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring, painting and other coatings and finish materials, unless otherwise acceptable to Architect.

E. Curing Formed Surfaces: Cure formed concrete surfaces, such as slabs, floor topping and other flat surfaces by application of appropriate curing compound.
   1. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

F. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.

G. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

H. Sealer and Dustproofer: Apply a second coat of specified curing and sealing compound only to surfaces given a first coat.

3.10 REMOVAL OF FORMS

A. Formwork not supporting weight of concrete, such as sides of beams and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F (10 degrees C) for 24 hours after placing concrete, provide concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28-days. Determine potential compressive strength of in-place concrete by testing field-cured specimen representative of concrete location or members.

C. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.11 RE-USE OF FORMS

A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

3.12 MISCELLANEOUS CONCRETE ITEMS

A. Filling-In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

D. Grout base plates and foundations indicated, using specified non-shrink, non-metallic grout.

3.13 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect/Engineer.
   1. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.

B. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

C. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect/Engineer. Surface defects cannot be repaired to satisfaction of Architect/Engineer. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form

tie hoes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

D. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

E. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.

F. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, included crazing, cracks in excess of 0.001" wide or which penetrate to reinforcement or completely through non-reinforced section regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

G. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.

H. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect/ Engineer.

I. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place compact and finish blending with adjacent finished concrete. Cure in the same manner as adjacent concrete.

J. Repair isolated random cracks and single holes not over 1" diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen concrete surfaces in contact with patching concrete of same materials to provide concrete of same type or class as original concrete. Place compact and finish blending with adjacent finish to blend with adjacent finish concrete.

K. Use the following specified applicable methods for conditions A through J for COATING, PATCHING and REPAIRING.
   1. Injection Applications -Contractor to have five (5) years experience and job references. PERM-INJECT by Permagile Ind., Sikadur 52 Injection System by Sika are acceptable. Others require written approval by Architect/ Engineer.
   2. Epoxy grouting where shown or as required shall equal or exceed MMM-G¬650a. Acceptable products include 1-270 Epoxy Grout by Permagile, Ind. and approval by Architect/ Engineer.
   3. Epoxy Bonding Agents -Shall be moisture insensitive, 100% reactive solids, waterproof complying with ASTM C-881. Manufacturer shall offer all grades and types. 1-215 HM bond 1 by Permagile, Ind. and Sika-Dur-32-Hi-Mod are acceptable Products. Others require written approval by Architect/ Engineer.

4. Epoxy Decorative, Protective & Waterproof Coatings -100% solids, solvent free, flexibilized Epoxy Coating which equal or exceeds ASTM D 638 (tensile strength), ASTM D 695 (Compressive strength) and ASTM D 790. Shall be offered in all grades, types, and colors. CAT COAT by Permagile, Ind., Sikagard-62 by Sika and Duraltex by Dural are acceptable. Other Products require written approval by Architect/ Engineer.
5. Epoxy Acid Resistant coating & Resurfacing System where shown or as required will be 100% solids, have superior resistance to ORGANIC AND MINERAL ACIDS, ALKALIES, SUGAR SOLUTIONS, FATTY ACIDS, ANIMAL & VEGETABLE OILS, SOAPS AND DETERGENTS. Product shall equal or exceed ASTM D-695-61 (compressive) ASTM D-638-61 (tensile), ASTM D¬790-61 (flexural) and Shore D. ASTM D-2240 (hardness) and shall be offered in all grades, types, and colors. PG-2112-2 by Permagile, Ind., #1305 by Concressive Products and Dural 313 by Dural is acceptable. Other Products require written approval by Architect/ Engineer.

3.14 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. The owner will employ a testing laboratory to perform other tests and to submit test reports. The Owner's designated Special Inspector shall provide special inspection and verification of concrete construction in accordance with Section 1705.3 of the 2012 International Building Code.

B. Sampling and testing for quality control during placement of concrete include the following, as directed by Architect/Engineer.

C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C94.
1. Slump: ASTM C 143; one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.
2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure for normal weight concrete; one for each set of compressive strength test specimens.
3. Concrete Temperature: Test hourly when air temperature is 40 degrees F (4 degrees C) and below, and when 80 degrees F (27 degrees C), and above; and each time a set of compression test specimens made.
4. Compression Test Specimen: ASTM C 31; one set of 5 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
5. Compressive Strength Tests: ASTM C 39; one set for each 10 cu. yds. or fraction thereof, or 2500 sq. ft. of slab, of each concrete class placed in any one day; 2 specimens tested at 7 days, 2 specimens tested at 28 days, and 1 specimen retained in reserve for later testing if required.
6. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
7. When strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
8. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive by more than 500 psi.

D. Test results will be reported in writing to Architect and Contractor on same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.

E. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect/Engineer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

END OF SECTION

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Structural shapes.
2. Channels and angles.
3. Hollow structural sections.
4. Structural pipe.
5. Structural plates.
6. Bolts, connectors, and anchors.
7. Grout.

B. Related Requirements:
1. Section 03 60 00 - Grouting: Grout for setting base plates.
2. Section 05 21 00 - Steel Joist Framing.
3. Section 05 31 13 - Steel Floor Decking: Support framing for small openings in floor deck.
4. Section 05 31 23 - Steel Roof Decking: Support framing for small openings in roof deck.
5. Section 05 50 00 - Metal Fabrications: Steel fabrications affecting structural steel work.
6. Section 03 30 00 - Cast-In-Place Concrete: Supply of anchors for casting into concrete.
7. Section 03 45 00 – Precast Architectural Concrete: Placement of precast concrete anchorage devices to structural steel.

1.2 REFERENCE STANDARDS

A. American Institute of Steel Construction:
1. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges.
2. AISC 341 - Seismic Provisions for Structural Steel Buildings.
3. AISC 360 - Specification for Structural Steel Buildings.

B. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
4. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
5. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
6. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

7. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
8. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
9. ASTM A449 - Standard Specification for Quenched and Tempered Steel Bolts and Studs.
10. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
11. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
12. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
13. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding.
14. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
15. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
16. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
17. ASTM A588/A588M - Standard Specification for High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4-in. (100-mm) Thick.
18. ASTM A618/A618M - Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing.
19. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
20. ASTM A847/A847M - Standard Specification for Cold-Formed Welded and Seamless High Strength, Low Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance.
21. ASTM A852/A852M - Standard Specification for Quenched and Tempered Low-Alloy Structural Steel Plate with 70 ksi (485 MPa) Minimum Yield Strength to 4 in. (100 mm) Thick.
22. ASTM A913/A913M - Standard Specification for High-Strength Low-Alloy Steel Shapes of Structural Quality, Produced by Quenching and Self-Tempering Process (QST).
23. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
24. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
25. ASTM E94 - Standard Guide for Radiographic Examination.
26. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments.
27. ASTM E165 - Standard Test Method for Liquid Penetrant Examination.
28. ASTM E709 - Standard Guide for Magnetic Particle Examination.
29. ASTM F436 - Standard Specification for Hardened Steel Washers.
30. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.
31. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

32. ASTM F1852 - Standard Specification for Twist Off Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
33. ASTM F2329 - Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.

C. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
2. AWS D1.1 - Structural Welding Code - Steel.

D. Research Council on Structural Connections:
1. RCSC - Specification for Structural Joints Using ASTM A325Bolts.

E. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.
2. SSPC Paint 15 - Steel Joist Shop Paint.
3. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
4. SSPC SP 3 - Power Tool Cleaning.
5. SSPC SP 6 - Commercial Blast Cleaning.
6. SSPC SP 10 - Near-White Blast Cleaning.

1.3 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate work with the following:
1. Section 05 50 00 for miscellaneous steel supports other than structural steel.

1.4 SUBMITTALS FOR REVIEW

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Submit shop drawings prepared under supervision of a registered professional engineer, and including complete details and schedules for fabrication and assembly, procedures and diagrams.
1. Indicate sizes, spacing, and locations of structural members, openings, attachments, and bolts. Include details of cuts, connections, camber, holes, and other pertinent data.
2. Provide setting drawings, templates and directions for installation of anchor bolts or other anchorages.
3. Indicate welded connections with AWS A2.4 welding symbols. Indicate size, type and net weld lengths.
4. Direct reproduction of the Contract Drawings for use as Shop Drawings is not allowed.
5. All shop drawings used in the field must bear the Architect/Engineer shop drawing review stamp with “Approved” indicated.

C. Test Reports: Assist independent testing agency in submitting reports of inspections and testing of structural steel.
   1. Submit test reports conducted on shop and field bolted and welded connections. Include data on type(s) of tests conducted and test result.

1.5 SUBMITTALS FOR INFORMATION

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

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

C. Welders Certificates: Certify welders employed on the Work for all positions, verifying AWS qualification within previous 3 months.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with the following:
   1. American Institute of Steel Construction (AISC) 360-10, “Specifications for Structural Steel Buildings,” including “Commentary.”
   2. (AISC) 303 -10 Code of Standard Practice.
   3. “Specification for Structural Joints Using High-Strength Bolts” Approved by the Research Council on Structural Connections.
   4. American Welding Society (AWS) D1.1 “Structural Welding Code – Steel.”
   5. Plaquemines Parish Standards.

1.7 QUALIFICATIONS

A. Fabricator: Company specializing in performing Work of this section with minimum 5 years documented experience with the following current AISC Certification:
   1. Standard Steel Building Structures (STD).

B. Erector: Company specializing in performing Work of this section with minimum 5 years documented experience with the following current AISC Certification:
   1. Certified Steel Erector (CSE).

C. Shop Painter: Company specializing in performing Work of this section with minimum 5 years documented experience.

D. Welders and Welding Procedures: AWS D1.1 qualified within previous 3 months.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL

A. Structural W-Shapes: ASTM A992.

B. Structural M-Shapes: ASTM A36.

C. Structural S-Shapes: ASTM A36.

D. Structural T-Shapes: Cut from structural W-shapes.

E. Channels and Angles: ASTM A36.

F. Round Hollow Structural Sections: ASTM A500, Grade B (F_y = 42ksi).

G. Rectangular Hollow Structural Sections: ASTM A500, Grade B (F_y = 46ksi).

H. Structural Pipe: ASTM A53, Grade B.

I. Structural Plates and Bars: ASTM A36.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. Bolts: Heavy hex, structural type.
   1. ASTM A325; Type 1or 3.
   2. ASTM A490 ; Type 1 or 3.

B. Nuts: ASTM A563 Grade DH; heavy hex type.

C. Washers: ASTM F436; Type 1.

D. Shear Connectors: ASTM A108; Grade 1010-1020, headed, unfinished and in accordance with AWS D1.1; Type B.

E. Anchor Rods and Bolts: ASTM F1554; Grade 55, weldable.
   1. Plate Washers: ASTM A36/A36M.

F. Threaded Rods (Other than Anchor Rods) and Bolts: ASTM A36.

G. Forged Structural Steel Hardware:
   1. Clevises and Turnbuckles: ASTM A108; Grade 1085.
   2. Eye Nuts and Eye Bolts: ASTM A108; Grade 1030.
   3. Sleeve Nuts: ASTM A108; Grade 1018.
   4. Rod Ends, Yoke Ends and Pins, Cotter Pins, and Coupling Nuts: Carbon steel.

2.3 WELDING MATERIALS

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

2.4 FABRICATION

A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings.

1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

B. Weld or bolt shop connections as indicated.
   1. Bolt field connections, except where welded connections or other connections are indicated.

C. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

D. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of work through steel framing members, as shown on the final shop drawings.
   1. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work.
   2. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame-cut holes by burning. Drill holes in bearing plates.

2.5 FINISHES

A. Prepare structural component surfaces in accordance with SSPC SP 3.

B. Shop prime structural steel members (unless noted otherwise on the drawings). Do not prime surfaces that will be field welded, in contact with concrete or high strength bolted.

C. Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils. Use painting methods that result in full coverage of joint, corners, edges, and exposed surfaces.

D. Paint embedded steel that is partially exposed on exposed portions and initial 2 inches of embedded areas only.

E. Galvanizing: ASTM A123/A123M; hot dip galvanize after fabrication members exposed to the weather or as indicated on the drawings as galvanized.

F. Galvanizing for Bolts, Connectors, and Anchors where indicated on the drawings:
   1. Hot-Dipped Galvanizing:
      a. Bolts, Nuts, and Washers: ASTM F2329.
      b. Connectors and Anchors: ASTM A153/A153M.
   2. Mechanical Galvanizing: ASTM B695; Class 50 minimum.

2.6 ACCESSORIES

A. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing minimum compressive strength of 8,000 psi at 28 days.

B. Shop Primer: SSPC Paint 15, Type 1, red oxide.

C. Touch-Up Primer: Match shop primer.

D. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type II Organic.

2.7 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

B. Shop test bolted and welded connections as specified for field quality control tests.

C. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
   1. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify bearing surfaces are at correct elevation.

C. Verify anchors rods are set in correct locations and arrangements with correct exposure for steel attachment.

3.2 PREPARATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Furnish templates for installation of anchor rods and embedments in concrete and masonry work.

3.3 ERECTION

A. Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guide lines to achieve proper alignment of structures as erection proceeds.

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

C. Provide temporary planking and working platforms as necessary to effectively complete work.

D. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

E. Level and plumb individual members of structure within specified AISC tolerances.

F. Splice members only where indicated and accepted on shop drawings.

G. Field weld components indicated on shop drawings.

H. On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.

I. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint surfaces adjacent to field welds.

J. Do not enlarge unfair holes in members by burning or using drift pins. When approved by engineer, ream holes that must be enlarged to admit bolts.

K. Field connect members with threaded fasteners; torque to required resistance tighten to snug tight for bearing type connections.

L. Do not field cut or alter structural members without approval of Architect/Engineer.

M. Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to the engineer. Finish gas-cut sections equal to a sheared appearance when permitted.

N. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Touch up using same material to match shop finishes. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

3.4 GROUT INSTALLATION

A. Shim bearing plates and equipment supports to proper elevation, snug tighten anchor bolts.

B. Fill void under bearing surface with grout. Install and pack grout to remove air pockets.

C. Moist cure grout.

D. Remove forms after grout is set. Trim grout edges to form smooth surface, splayed 45 degrees.

E. Tighten anchor bolts after grout has cured for a minimum of 3 days.

3.5 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

3.6 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Requirements for inspecting, testing.

B. Section 01 70 00 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

C. The owner will engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform test and prepare test reports.

D. Special inspection and verification of Structural Steel construction is required in accordance with Section 1705.2.1 of the 2012 International Building Code. The owner will employ a testing laboratory to perform Special Inspections and testing and to submit test reports. Contractor is responsible for notifying the owner's inspection agency in sufficient time for scheduling personnel to perform required inspections.

E. Testing agency shall conduct and interpret tests, state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.

F. Contractor shall provide access for testing agency to places where structural work is being fabricated or produced so that required inspection and testing can be accomplished.

G. Testing agency may inspect steel at plant before shipment.

H. Bolted Connections: Inspect in accordance with AISC Specifications.
   1. Visually inspect all bolted connections.
   2. Perform torque samplings at the rate of one sampling within each 30 foot grid.

I. Welding: Inspect welds in accordance with AWS D1.1.
   1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
   2. Visually inspect all welds.
   3. Ultrasonic Inspection: ASTM E164; perform on all full penetration welds.

J. Correct deficiencies in structural steel work, bolted, and welded connections which inspections and test reports have indicated to be not in compliance with requirements.
   1. Perform additional test(s) at Contractor's expense and at no additional cost to the Owner, as necessary to reconfirm any noncompliance of original work and to show compliance of corrected work.

END OF SECTION

SECTION 211316 - DRY-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipes, fittings, and specialties.
2. Fire-protection valves.
3. Sprinkler specialty pipe fittings.
4. Sprinklers.
5. Alarm devices.
6. Pressure gages.

1.2 SYSTEM DESCRIPTIONS

A. Dry-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing compressed air. Opening of sprinklers releases compressed air and permits water pressure to open dry-pipe valve. Water then flows into piping and discharges from sprinklers that are open.

1.3 PERFORMANCE REQUIREMENTS

A. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.

B. Delegated Design: Design sprinkler system(s), including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Sprinkler system design shall be approved by Authority Having Jurisdiction.

1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.

2. Sprinkler Occupancy Hazard Classifications shall be in accordance with NFPA 13 and approved by the Authority Having Jurisdiction.

3. Maximum Protection Area per Sprinkler: Per UL listing and NFPA 13.

4. Total Combined Hose-Stream Demand Requirement: According to NFPA 13.

D. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13 and ASCE/SEI 7.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For dry-pipe sprinkler systems. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

C. Delegated-Design Submittal: For sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.

C. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."

D. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.

a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. NFPA 13, "Installation of Sprinkler Systems."
2. NFPA 14, “Standard for the Installation of Standpipe and Hose Systems.”
3. NFPA 20, “Standard for the Installation of Stationary Pumps for Fire Protection.”
4. NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances."
5. NFPA 303, " Fire Protection Standard for Marinas and Boatyards."

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 STEEL PIPE AND FITTINGS

A. Standard Weight, Galvanized-Steel Pipe: ASTM A 53/A 53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining method.

B. Schedule 30, Galvanized-Steel Pipe: ASTM A 135; ASTM A 795/A 795M, Type E; or ASME B36.10M, wrought steel; with wall thickness not less than Schedule 30 and not more than Schedule 40. Pipe ends may be factory or field formed to match joining method.

C. Thinwall Galvanized-Steel Pipe: ASTM A 135 or ASTM A 795/A 795M, threadable, with wall thickness less than Schedule 30 and equal to or greater than Schedule 10. Pipe ends may be factory or field formed to match joining method.

D. Galvanized-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends.

E. Galvanized, Steel Couplings: ASTM A 865, threaded.

F. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.

G. Malleable- or Ductile-Iron Unions: UL 860.

H. Cast-Iron Flanges: ASME B16.1, Class 125.

I. Plain-End-Pipe Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn or screwed retainer pin to secure pipe in fitting.

J. Grooved-Joint, Steel-Pipe Appurtenances:

1. Pressure Rating: 175 psig minimum.
2. Galvanized, Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe.
3. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

2.3 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick or ASME B16.21, nonmetallic and asbestos free.

1. Class 125, Cast-Iron Flat-Face Flanges: Full-face gaskets.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

2.4 LISTED FIRE-PROTECTION VALVES

A. General Requirements:

1. Valves shall be UL listed or FM approved.
2. Minimum Pressure Rating: 175 psig.

B. Check Valves:

1. Standard: UL 312
2. Pressure Rating: 250 psig minimum.
3. Type: Swing check.
4. Body Material: Cast iron.
5. End Connections: Flanged or grooved.

C. Bronze OS&Y Gate Valves:

1. Standard: UL 262.
2. Pressure Rating: 175 psig.
3. Body Material: Bronze.
4. End Connections: Threaded.

D. Iron OS&Y Gate Valves:

1. Standard: UL 262.
2. Pressure Rating: 250 psig minimum.
3. Body Material: Cast or ductile iron.
4. End Connections: Flanged or grooved.

E. Indicating-Type Butterfly Valves:

1. Standard: UL 1091.

2. Pressure Rating: 175 psig minimum.
3. Valves NPS 2 and Smaller:

    a. Valve Type: Ball or butterfly.
    b. Body Material: Bronze.
    c. End Connections: Threaded.

4. Valves NPS 2-1/2 and Larger:

    a. Valve Type: Butterfly.
    b. Body Material: Cast or ductile iron.
    c. End Connections: Flanged, grooved, or wafer.

5. Valve Operation: Integral electrical, 115-V ac, prewired, single-circuit, supervisory switch indicating device.

2.5 TRIM AND DRAIN VALVES

A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Minimum Pressure Rating: 175 psig.

2.6 SPECIALTY VALVES

A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Minimum Pressure Rating: 175 psig.
3. Body Material: Cast or ductile iron.
4. Size: Same as connected piping.
5. End Connections: Flanged or grooved.

B. Dry-Pipe Valves:

1. Standard: UL 260
2. Design: Differential-pressure type.
3. Include UL 1486, quick-opening devices, trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.
4. Air Compressor:

    a. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
    b. Motor Horsepower: Fractional.
    c. Power: 120-V ac, 60 Hz, single phase.

2.7 SPRINKLER SPECIALTY PIPE FITTINGS

A. General Requirements for Dry-Pipe-System Fittings: UL listed for dry-pipe service.

B. Branch Outlet Fittings:

1. Standard: UL 213.
2. Pressure Rating: 175 psig minimum.
3. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
4. Type: Mechanical-T and -cross fittings.
5. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
6. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
7. Branch Outlets: Grooved, plain-end pipe, or threaded.

C. Flow Detection and Test Assemblies:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating: 175 psig minimum.
3. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
4. Size: Same as connected piping.
5. Inlet and Outlet: Threaded.

D. Branch Line Testers:

1. Standard: UL 199.
2. Pressure Rating: 175 psig minimum.
3. Body Material: Brass.
4. Size: Same as connected piping.
5. Inlet: Threaded.
6. Drain Outlet: Threaded and capped.
7. Branch Outlet: Threaded, for sprinkler.

E. Sprinkler Inspector's Test Fittings:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating: 175 psig minimum.
3. Body Material: Cast- or ductile-iron housing with sight glass.
4. Size: Same as connected piping.
5. Inlet and Outlet: Threaded.

F. Adjustable Drop Nipples:

1. Standard: UL 1474.
2. Pressure Rating: 250 psig minimum.

3. Body Material: Steel pipe with EPDM O-ring seals.
4. Size: Same as connected piping.
5. Length: Adjustable.
6. Inlet and Outlet: Threaded.

G. Flexible, Sprinkler Hose Fittings:

1. Standard: UL 1474.
2. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
3. Pressure Rating: 175 psig minimum.
4. Size: Same as connected piping, for sprinkler.

2.8 SPRINKLERS

A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating for Residential Sprinklers: 175 psig maximum.
3. Pressure Rating for Automatic Sprinklers: 175 psig minimum.
4. Pressure Rating for High-Pressure Automatic Sprinklers: 250 psig minimum.

B. Automatic Sprinklers with Heat-Responsive Element:

1. Nonresidential Applications: UL 199.
2. Characteristics: Nominal 1/2-inch orifice with discharge coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.

C. Sprinkler Finishes:

1. Chrome plated.
2. Bronze.
3. Painted.

D. Special Coatings:

1. Wax.
2. Lead.
3. Corrosion-resistant paint.

E. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

1. Ceiling Mounting: Chrome-plated steel, one piece, flat.
2. Sidewall Mounting: Chrome-plated steel, one piece, flat.

F. Sprinkler Guards:

1. Standard: UL 199.
2. Type: Wire cage with fastening device for attaching to sprinkler.

2.9 ALARM DEVICES

A. Alarm-device types shall match piping and equipment connections.

B. Water-Motor-Operated Alarm:

1. Standard: UL 753.
2. Type: Mechanically operated, with Pelton wheel.
3. Alarm Gong: Cast aluminum with red-enamel factory finish.
4. Size: 10-inch diameter.
5. Components: Shaft length, bearings, and sleeve to suit wall construction.
6. Inlet: NPS 3/4.
7. Outlet: NPS 1 drain connection.

C. Valve Supervisory Switches:

1. Standard: UL 346.
2. Type: Electrically supervised.
3. Components: Single-pole, double-throw switch with normally closed contacts.
4. Design: Signals that controlled valve is in other than fully open position.

2.10 PRESSURE GAGES

A. Standard: UL 393.

B. Dial Size: 3-1/2- to 4-1/2-inch diameter.

C. Pressure Gage Range: 0 to 250 psig minimum.

D. Water System Piping Gage: Include "WATER" or "AIR/WATER" label on dial face.

E. Air System Piping Gage: Include retard feature and "AIR" or "AIR/WATER" label on dial face.

PART 3 - EXECUTION

3.1 SERVICE-ENTRANCE PIPING

A. Connect sprinkler piping to water-service piping for service entrance to building. Comply with requirements in Section 211100 "Facility Fire-Suppression Water-Service Piping" for exterior piping.

B. Install shutoff valve, pressure gage, drain, and other accessories indicated at connection to

water-service piping.

C. Install shutoff valve, check valve, pressure gage, and drain at connection to water service.

3.2 WATER-SUPPLY CONNECTIONS

A. Connect sprinkler piping to building's interior water-distribution piping.

B. Install shutoff valve, pressure gage, drain, and other accessories indicated at connection to water-distribution piping.

C. Install shutoff valve, check valve, pressure gage, and drain at connection to water supply.

3.3 PIPING INSTALLATION

A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.

B. Piping Standard: Comply with requirements in NFPA 13 for installation of sprinkler piping.

C. Install seismic restraints on piping. Comply with requirements in NFPA 13 for seismic-restraint device materials and installation.

D. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

E. Install unions adjacent to each valve in pipes NPS 2 and smaller.

F. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.

G. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.

H. Install sprinkler piping with drains for complete system drainage.

I. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.

J. Install automatic (ball drip) drain valves to drain piping between fire-department connections and check valves. Drain to floor drain or to outside building.

K. Install alarm devices in piping systems.

L. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with

requirements in NFPA 13 for hanger materials.

M. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.

N. Drain dry-pipe sprinkler piping.

O. Pressurize and check dry-pipe sprinkler system piping and air compressors.

P. Install sleeves for piping penetrations of walls, ceilings, and floors.

Q. Install sleeve seals for piping penetrations of concrete walls and slabs.

R. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.4 JOINT CONSTRUCTION

A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.

B. Install unions adjacent to each valve in pipes NPS 2 and smaller.

C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.

D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.

G. 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.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

H. Twist-Locked Joints: Insert plain end of steel pipe into plain-end-pipe fitting. Rotate retainer lugs one-quarter turn or tighten retainer pin.

I. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.

J. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.5 VALVE AND SPECIALTIES INSTALLATION

A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.

D. Specialty Valves:

1. General Requirements: Install in vertical position for proper direction of flow, in main supply to system.
2. Dry-Pipe Valves: Install trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.

    a. Install air compressor and compressed-air supply piping.

3.6 SPRINKLER INSTALLATION

A. Install dry-type sprinklers with water supply from heated space. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing.

B. Install sprinklers into flexible, sprinkler hose fittings and install hose into bracket on ceiling grid.

3.7 IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

B. Identify system components, wiring, cabling, and terminals.

3.8 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
4. Energize circuits to electrical equipment and devices.
5. Start and run air compressors.
6. Coordinate with fire-alarm tests. Operate as required.
7. Coordinate with fire-pump tests. Operate as required.
8. Verify that equipment hose threads are same as local fire-department equipment.

C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.9 CLEANING

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

3.10 PIPING SCHEDULE

A. Piping between Fire-Department Connections and Check Valves: Galvanized, standard-weight steel pipe with threaded ends; cast-iron threaded fittings; and threaded or grooved ends; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.

B. Sprinkler specialty fittings may be used, downstream of control valves, instead of specified fittings.

C. Dry-pipe sprinkler system, NPS 2 and smaller, shall be one of the following:

1. Standard-weight, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
2. Standard-weight, galvanized-steel pipe with plain ends; plain-end-pipe fittings; and twist-locked joints.
3. Standard-weight, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

D. Dry-pipe sprinkler system, NPS 2-1/2 to NPS 6, shall be one of the following:

1. Standard-weight or Schedule 30, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.

2. Standard-weight or Schedule 30, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

END OF SECTION 211316

SECTION 21 23 00 - FIRE PROTECTION FOR MARINAS AND BOATYARDS

PART 1 - GENERAL

1.1 SCOPE

A. Requirements of Section 01 including, but not limited to, General Requirements, Submittal Procedures, Quality Requirements, Product Requirements, Substitution Procedures, Operation and Maintenance Data, Demonstration and Training shall apply to all work under this section.

B. Provide labor and materials, tools and appliances, and miscellaneous accessories to provide a complete and fully functional automatic fire-extinguishing system throughout the building in accordance with NFPA 303 Standard, as well as local adopted codes and standards including, but not limited to, the International Building Code, the International Fire Code, the National Fire Protection Association (NFPA) Standards etc.

C. Automatic Sprinkler System Design Provisions

Boats vary widely in size and degree of compartmentation (i.e., cabin, engine spaces). Fishing and ski boats may be on the order of 20 feet in length with an open top design, whereas onboard cruisers may be 40 or more feet in length with enclosed quarters for sleeping, cooking, and restroom facilities. Based on variations in boat types and boat storage methods provided by the Owner/End-User, the Contractor shall determine the applicable fire protection criteria, in accordance with currently adopted Codes and Standards, relative to the type of boats and storage configuration that may exist in a worst-case scenario. Fire protection system shall be based on an unheated, semi-open, covered building. Provide heat tracing for fire-suppression piping as necessary and coordinate with Division 26. Refer to drawings for building details.

D. Coordinate all tamper switches, flow switches, pull stations, smoke detector, etc., with fire alarm contractor. Refer to Section 28 3111 for electrical work associated with this Section.

E. All fire-extinguishing system components shall be protected from damage and freezing conditions. If a dry system, pre-action system, etc. is proposed, the contractor shall provide all necessary power, control conduits, wiring, components, and accessories for a fully functional system.

1.2 SYSTEM DESCRIPTION

A. The fire-extinguishing system shall provide coverage for the entire building with means to notify the fire department rapidly in the event of an emergency.

B. The building(s), within the scope of work of this project, shall be protected by a fire-extinguishing system as follows:

1. Light Hazard Areas: provide a density of 0.10 gpm/sq.ft. over the hydraulically most remote 1,500 sq.ft. of floor area plus hose allowance and coverage per sprinkler based on NFPA 13 requirements.

2. Ordinary Hazard Group 1 Areas: provide a density of 0.15 gpm/sq.ft. over the hydraulically most remote 1,500 sq.ft. of floor area plus hose allowance and coverage per sprinkler based on NFPA 13 requirements.

3. Ordinary Hazard Group 2 Areas: provide a density of 0.20 gpm/sq.ft. over the hydraulically most remote 1,500 sq.ft. of floor area plus hose allowance and coverage per sprinkler based on NFPA 13 requirements.

4. Extra Hazard Group 1 Areas: provide a density of 0.35 GPM/Sq. Ft. over 3000 square feet plus hose allowance and coverage per sprinkler based on NFPA 13 requirements.

5. Extra Hazard Group 2 Areas: provide a density of 0.30 GPM/Sq. Ft. over 5000 square feet plus hose allowance and coverage per sprinkler based on NFPA 13 requirements.

6. Storage Areas: provide a density/area coverage plus hose allowance for areas including, but not limited to, low-pile, high-pile, high-rack, etc., in accordance with NFPA 13 requirements.

C. The Contractor shall conduct a fire hydrant flow test as a basis for hydraulically calculated systems. The test shall be within 12 months from date of fire protection system submittal submission. The Contractor shall request the flow test requirements from the Architect/Engineer.

D. For hydraulically calculated systems, the Contractor shall include a fire pump system. Preliminary fire pump performance shall be 500 gpm @ 95 PSI based on Ordinary Hazard/Group 2 classification per NFPA 13 (0.30 gpm/sq.ft. x 5,000 sq.ft. + 200 gpm hose allowance). Contractor may adjust pump performance requirements in accordance with local AHJ and NFPA requirements based on final flow test results and approved hazard classification. Contractor shall obtain final approval from the State Fire Marshal for proposed hazard classification and system design.

E. ELECTRICAL

1. Electrical valves, flow detectors, monitoring switches and other electrical devices provided under this section shall be connected to power sources as indicated under Section 28 3100. The electrical contractor shall furnish, install and tie-in the fire-extinguishing system devices and accessories to provide a complete operating system and assure the integrity of the complete system.

1.3 QUALITY ASSURANCE

A. Drawings are diagrammatic. Obtain approval of the reviewing authority having jurisdiction (AHJ) before installing any part of the fire protection system. Contractor's bid shall be based on the contract documents and submission to the State Fire Marshal. Comply with all currently adopted codes, standards and regulations including:

1. City and State Fire Marshal.
2. National Fire Protection Association (NFPA) including, but not limited to,
   a. Life Safety Code - NFPA 101
   b. Sprinkler Systems: Conform to NFPA 13.
   c. Standpipe Systems: Conform to NFPA 14.

d. Fire Pump: Conform to NFPA 20.
e. Fire Main: Conform to NFPA 24.
f. Fire Protection System: Conform to NFPA 303

3. International Building Code.
4. International Fire Code
5. Local Fire Rating Bureau.

B. Equipment and Components: Bear UL and FM label or markings as required.

C. Specialist Firm: Company specializing in fire-extinguishing system design whose supervisory personnel have a minimum of five (5) years' experience.

D. Design: Under direct supervision of a NICET Level III designer.

1.4 SUBMITTALS

A. Contractor shall submit shop drawings, product data and hydraulic calculations to Architect/Engineer (A/E) for review and approval prior to issuing submittal to the Authority Having Jurisdiction and/or the Office of State Fire Marshal (OSFM) for approval. The State Fire Marshal Information Management System (OSFM-IMS) website shall only be used to upload submittals that have the POR final review stamp with no additional comments or exceptions taken.

B. Refer to Division 01 - Submittal Procedures for submittal requirements. The following paragraphs are an extension of Division 01 - Submittal Procedures.

C. Review of shop drawings shall in no way modify the contract or relieve the Contractor from compliance with the contract.

D. When electronic submittals are allowed, the Contractor shall also provide to the Architect a minimum of 3 hard copies of the submittal for all submittals that are greater than 25 pages or have a single sheet that is larger than 11" by 17".

E. Names of manufacturers or catalog numbers are listed in the Specification to establish a standard for the type, general design and quality of the product required. Where "or approved equal" is indicated, other products similar in design and of equal quality and complying with the Drawings and Specifications will be considered for acceptance. See Division 01 – Substitution Procedures.

F. Shop Drawings: Indicate detailed pipe layout, supports, components, accessories, sizes and hydraulic calculations.

G. Product Data: Provide data for pipe materials used, valves, manufacturer's catalogue sheet for equipment, indicating rough-in-size, finish, accessories, pump type, capacity, power requirements, certified pump curves and NPSH.

H. Operation and Maintenance Instructions: Include components of system, servicing requirements, Record Drawings, inspection data and parts lists.

I. Extra Materials: Provide extra materials per NFPA requirements for each type of fire-extinguishing system.

J. Manufacturer's Certificate: Certify that system has been tested and meets or exceeds specified requirements.

K. Any permits for the installation or construction of all work included in this section which are required by any of the authorities and/or agencies having jurisdiction shall be obtained and paid for by the Contractor.

1.5 PRODUCT HANDLING

A. Protection: Use all means necessary to protect fire sprinkler system materials before, during and after installation and protect the installation work of all other trades.

B. Suitable storage space as required shall be provided by the Owner to the Contractor. This space shall be agreed upon by the Owner and the Contractor prior to storage thereon.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 PIPE AND TUBE

A. Steel Pipe: ASTM A53, ASTM A120, ANSI/ASTM A135, or ANSI/ASME B36.10, Schedule 40 black or galvanized.

1. Steel Fittings:

a. ANSI/ASME B16.9, wrought steel, butt welded; ANSI/ASME B16025, 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.

2. Cast Iron Fittings:

a. ANSI/ASME B16.1, flanges and fittings; ANSI/ASME16.4, screwed fittings.

3. Malleable Iron Fittings: ANSI/ASME B16.3, screwed type; ANSI/ASTM A47.

4. Mechanical Grooved Couplings:

a. Malleable iron housing, “C” shaped composition sealing gasket, steel bolts, nuts and washers; galvanized for galvanized pipe.

B. All piping shall be securely fastened with UL approved hangers and hangers shall be in no case greater than twelve (12) feet apart. Every branch line length of pipe, except lengths less than

eighteen (18) inches, shall have at least one hanger. Pipes shall be hung as follows: 1-1/4" @ 8'-0" on center, 1-1/2" to 3" @ 10'-0" on center, 4" to 8" @ 12'-0" center, and/or as required by NFPA 13.

C. All black steel, sprinkler system piping and fittings located outdoors or exposed to ambient conditions shall be properly cleaned, primed, and painted red. All surfaces shall be cleaned with soap and water, rinsed, and let dry. All surface loose paint and rust shall be removed with a wire brush or sandpaper. Surface primer shall be Rust-Oleum 7769, High Performance, Metal Primer, or prior approved equivalent. Paint shall be Rust-Oleum 7564, Safety Red, High Performance Protective Enamel paint or prior approved equivalent. Apply primer and paint in accordance with manufacturer's instructions. Apply an additional coat of paint after 24-hours from initial coat application.

2.2 GATE VALVES

A. Up to and Including 2 Inches: Bronze body, body trim, rising stem, handwheel, inside screw, solid wedge or disc, solder or threaded ends.

B. Over 2 inches: Iron body, bronze trim, rising stem, handwheel, OS&Y, solid wedge, flanged or grooved ends.

2.3 BUTTERFLY VALVES

A. Bronze body, stainless steel disc, resilient replaceable seat, threaded ends, extended neck, handwheel and gear drive and integral indicating device and built-in tamper proof switch.

B. Cast or ductile iron body, chrome plated ductile iron disc, resilient replaceable EPDM seat, wafer or lug ends, extended neck, handwheel and gear drive and integral indicating device and built-in tamper proof switch.

2.4 CHECK VALVES

A. Up to and including 2 inches: Bronze swing disc, solder or screwed ends.

B. Over 2 inches: Iron body, bronze trim, swing disc, renewable disc and seat, flanged ends.

C. Iron body, bronze trim, stainless steel spring, renewable composition disc, screwed, wafer or flanged ends.

2.5 DRAIN VALVES

A. Bronze compression stop with nipple and cap or hose thread.

B. Brass ball valve.

2.6 SPRINKLER HEADS

A. Manufacturers:

1. Tyco Fire Protection Products.

2. Viking Sprinklers.

3. Reliable Automatic Sprinkler.

4. Or prior approved equivalent.

B. Suspended Ceiling Type: Pendant type Tyco Model TY-FRl, Quick Response, Concealed Pendent Type Tyco Model RFII, Quick Response - or prior approved equal.

C. Gypsum Ceiling Type: Concealed Pendent Type Tyco Model RFII, Quick Response - or prior approved equal.

D. Exposed Area Type: Upright type Tyco Model TY-FRB, Quick Response, - or prior approved equal.

2.7 PIPING SPECIALTIES

A. Wet Pipe Sprinkler Alarm Valve: Check type valve with electrically or hydraulically operated alarms, with pressure retarded chamber and variable pressure trim and pressure gauges, Grinnell Model F200/F211, Star Model F or prior approved equal.

B. Riser Control Valves: Riser control valve shall be equal to Grinnell Corp. Series 8000FP (2'-12" pipe), Star Model #380 or prior approved equal butterfly valve with integral supervisory switch.

C. Water Gong: Water motor gong shall be equal to Grinnell Corp. Model F630 mechanical alarm or Star Model CD or prior approved equal.

D. Flow Switches: Flow switches shall be vane type with retard, equal to Grinnell Corp. Model VSR-F (2"-8" pipe) or Star Part No. 1925-XS. Install to sound an audible alarm.

E. Zone Control Valves: Sprinkler sectional or zone control valves shall be equal to Grinnell Corp. Model BB-SCS01 (2" and 2-1/2" pipe) with integral tamper switch or Central Butterfly Valve Model A-BFV-For larger pipe sizes use Grinnell Corp. Series 8000 FP butterfly valve with integral supervisory switch, Kennedy Fig. 93G1 or prior approved equal.

F. Main Shut-Off valves: Main shut-off valves shall be gate iron body, bronzed trim solid wedge O.S. & Y, UL and FM, equal to Grinnell Fig. A-2073-6 or Kennedy Fig. 4068.

G. Tamper Switches: switch for O.S.&Y valve shall be Grinnell Corp., OSYSU-2, Star Model No. OSY2 or prior approved equal, with contacts as required. Install to sound an audible alarm.

H. Pressure Gauges: Approved 2-1/2" bronze Bourdon tube, Polycarbonate glass window in black steel case with brass cock. Select so normal pressure reads at center scale.

I. Hangers and Supports:

1. Individual hangers - Adjustable swivel ring, steel, zinc plated with rod secured to bracket screwed to beam.
2. Riser clamps, 2-part steel, secured with 2 bolts, sized to clamp tight to pipe, wall supports, steel angle bracket secured to wall with hangers as above.
3. All hangers and supports shall be UL approved.

2.8 FIRE DEPARTMENT CONNECTION

A. Type: Flush mounted wall type with brass finish.

B. Outlets: Two way thread size to suit fire department hardware; threaded dust cap and chain of matching material and finish.

C. Drain: inch automatic drip, to outside.

D. Labels: Fire Department Connection for Sprinkler System.

PART 3 - EXECUTION

3.1 HYDRAULIC CALCULATIONS

A. Contractor shall hydraulically calculate the sprinkler system using the format of NFPA 13. Necessary flow test shall be made on the City water supply prior to calculation. All variables and constants used shall be clearly defined. Shop drawings shall show the most remote area used in the calculations. Calculation should be submitted at the same time as the shop drawings. System sizing shall be based on an occupancy classification and required coverage per NFPA 13.

B. The head locations shown on the drawings are diagrammatic and show the minimum number of heads anticipated. Should the contractor discover during the preparation of field measured shop drawings that any sprinkler heads require relocation, these changes should be made and incorporated into the shop drawings. Should it be determined because of obstructions, ceiling furring or partitions not shown, that additional heads are required for Code compliance, these shall be incorporated at no additional cost to the Owner.

3.2 SURFACE CONDITIONS

A. Inspection:

1. Prior to commencement of each stage of the fire sprinkler system installation, carefully inspect the installed work of all other trades and verify that all such work is completed and correct to the point where this installation may properly commence.
2. Avoid interferences with air conditioning ducts, lights, and mechanical and electrical piping and equipment. It is not the intent of drawings to show clearances.

3.3 INSTALLATION

A. Install equipment in accordance with manufacturer's instructions and in strict accordance with all pertinent codes and regulations of the Fire Rating Bureau having jurisdiction.

B. Ream pipe and tube ends to full inside diameter. Remove burrs and bevel plain end ferrous pipe.

C. Remove scale and foreign material, inside and outside, before assembly.

D. Provide sleeves when penetrating footings and floors. Seal pipe and sleeve penetrations to maintain fire resistance equivalent to fire separation required. An approved fire-resistant compound, Dow-Corning Fire Stopper 2000, ProSet Fire Stop Systems or prior approved equal shall be used.

E. Where any pipe or riser passes through walls, partitions, floors or ceilings, use chrome plated escutcheon plates. Plates shall be large enough to completely close the hole around the pipes and shall be round with the least dimension not less than 1-1/2" larger than the diameter of the pipe; caulk and secure in a manner approved by the Architect.

F. Place pipe runs to minimize obstruction to other work. Place piping in concealed spaces above finished ceilings.

G. Provide valves for shut-off or isolating service. Where approved, use butterfly valves instead of gate valves.

H. Install main drains on main risers and auxiliary drains at low points in the system. Install inspector's test drains on each sprinkler system near to the outer end of the system. Five or fewer heads will not require a drain valve but may be drained through a plugged fitting. Drain valves to be of the angle type. Install in accordance with NFPA 13. Pipe drain valves to a safe place of discharge, visible either by open end drain pipe or sight drain fitting.

I. Install on each system an inspector's test connection for the purpose of allowing an inspector to open inspector's test valve and prove that sprinkler system is operating correctly.

J. Coordinate final location of Fire Department Connection, Standpipes, Hose Valves, etc. with the local authority having jurisdiction.

K. Permanently marked, weatherproof, metal identification signs shall be provided for all control, drain, venting, and test connection valves and other components as required by NFPA Standards. These signs shall identify use and/or purpose of each component. The sign for the siamese connection shall read: "Auto-sprinkle". The control valve signs shall identify the portion of the building being served. Each system shall be given a numerical designation which will be displayed at the riser serving same and all signs for components on each system shall indicate system number.

Systems that have more than one control valve that must be closed to work on a system or space shall have a sign referring to the existence and location of other valves.

L. Upon completion of the sprinkler system installation, furnish all personnel and equipment required to test and re-test the complete system. However, isolate existing sprinklers being reused from pressure test. Make all adjustments necessary to secure the approval of the Fire Rating Bureau and Fire Marshal having jurisdiction. All piping to sprinkler heads shall be tested hydrostatically at the pressure of 200 psi for two (2) hours and proved tight. Notify Architect at least twenty-four (24) hours prior to the time of the test. Test shall be witnessed by Owner's Representative.

3.4 CLEANING

A. When all work has been finally tested, Contractor shall clean all areas and spaces affected by his work.

B. All finished, exposed products shall be thoroughly cleaned and/or polished.

C. All piping shall be free from all obstructions.

D. All crates, rubbish, etc., that is a result from this work shall be removed from the area on a daily basis.

3.5 ACCEPTANCE

A. After the fire sprinkler system has been completely approved, secure a letter of final acceptance from the Fire Rating Bureau having jurisdiction and deliver three (3) copies of the letter to the Architect.

3.6 GUARANTEE

A. Guarantee all materials and work for one year from the date of substantial completion. See "General Conditions".

END OF SECTION 211350

SECTION 21 3150 - ELECTRIC-DRIVEN, VERTICAL IN-LINE, PACKAGED FIRE PUMP HOUSE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes electric-drive, centrifugal fire pumps and the following:

1. Full-service fire-pump controllers and automatic transfer switches.
2. Fire-pump accessories and specialties.
3. Pressure-maintenance pumps, controllers, accessories, and specialties.
4. Alarm panels.

1.03 PERFORMANCE REQUIREMENTS

A. Pump, Equipment, Accessory, Specialty, and Piping Pressure Rating: 175-psig minimum working-pressure rating, unless otherwise indicated.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, certified pump performance curves with each selection point indicated, operating characteristics, and furnished accessories and specialties for each fire pump and pressure-maintenance pump.

B. Shop Drawings: For fire pumps and drivers, fire-pump controllers, fire-pump accessories and specialties, pressure-maintenance pumps, pressure-maintenance-pump controllers, and pressure-maintenance-pump accessories and specialties. Include plans, elevations, sections, details, and attachments to other work.

1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
2. Wiring Diagrams: Power, signal, and control wiring.

C. Manufacturer Seismic Qualification Certification: Submit certification that fire pumps and drivers and fire-pump controllers, pressure-maintenance pumps, accessories, and specialties will withstand seismic forces defined in Division 15 Section "Mechanical Vibration and Seismic Controls." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
   a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
   b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Product Certificates: For each type of fire pump and fire-pump controller, signed by product manufacturer.

E. Source quality-control test reports.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For fire pumps and drivers, pressure-maintenance pumps, controllers, accessories and specialties, alarm panels, and flowmeter systems to include in emergency, operation, and maintenance manuals.

1.05 QUALITY ASSURANCE

A. Source Limitations: Obtain fire pumps, pressure-maintenance pumps, and controllers through one source from a single manufacturer for each type of equipment.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of fire pumps, pressure-maintenance pumps, and controllers and are based on specific systems indicated. Refer to Division 1 Section "Product Requirements."

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with standards of authorities having jurisdiction pertaining to materials, hose threads, and installation.

E. Comply with NFPA 20, "Stationary Pumps for Fire Protection," for fire pumps, drivers, controllers, accessories, and their installation.

1.06 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

PART 2 – PRODUCTS

2.01 FIRE PUMP

A. Furnish and install a Geo-Systems engineered, pre-packaged fire pump system with environmental enclosure or prior approved equal. Contact Geo-Systems at (866) 522-0396 for additional information.

B. The pump shall be a UL Listed, FM approved vertical inline, electric driven, centrifugal fire pump. Unit shall include the pump & base flange, coupling, coupling guard, electric motor, minimum fittings, and automatic controller. The fire pump shall be rated for 500 gpm at 95 psi. The unit shall be designed to deliver not more than 120% of rated head at shutoff, and not less than 150% of rated capacity at 65% of rated head. Pump speed shall be 3500 rpm. Final pump shall be determined by the Level 3, fire protection system designer.

2.02 PUMP CONSTRUCTION

A. The pump shall have cast iron casing with a bronze impeller, non-corrosive shaft sleeve suitable for packing gland with external flush line to the lantern ring suitable for 125 psi suction pressure. Pump accessories shall include 3-1/2" diameter suction and discharge gauges, 1/4" gauge cocks and nipples and 3/4" circulation relief valve.

2.03 ELECTRIC MOTOR

A. The fire pump shall be driven by a 50 hp, 3500 rpm, 3/60/460v, ODP motor minimum. The motor shall be UL listed with a maximum 1.15 service factor. The motor shall be suitable for across-the-line starting. THE FINAL MOTOR HP SHALL BE DETERMINED BY THE P LEVEL 3 FIRE PROTECTION DESIGNER.

2.04 ELECTRIC FIRE PUMP CONTROLLER

A. The fire pump package shall also include an electric fire pump controller. The controller shall be UL listed, FM approved and wired for full voltage, across-the-line starting.

B. The fire pump controller shall meet the requirements per NFPA 20 and shall incorporate the following criteria:

1. NEMA Type 2 drip proof metal freestanding enclosure
2. Auto, manual, test & off mode buttons illuminated with colored LED's for controller mode operation
3. Operator interface device (OID) with 4 lines by 20 character display with large character backlit lcd capable of being read in both direct sunlight or dark lighting conditions.
4. 12 push-buttons for easy screen navigation, system mode changes, alarm reset and horn silencing
5. Multi-colored LED's for alarm and mode annunciation
6. LED's shall be labeled with removable labels to allow for easy field modifications if additional alarms and/or language changes
7. All controller settings shall be programmable through the OID and shall be protected by two password levels
8. All features shall be enabled or disabled through the OID. No jumpers or external wires shall be needed or allowed to activate or de-activate a feature
9. The system status data shall be displayed on the OID. The displayed items shall include: system pressure; phase to phase (AB, BC, AC) voltage; phase current (A, B, C); current time and date; number of starts; total motor run hours; displayed countdown timers for sequential motor start and motor stop.
10. Audible horn with silence feature for alarms
11. Lamp test feature
12. English or Spanish languages selectable through the OID
13. Microprocessor based logic with real time/date clock capable of running a minimum of 14 days without ac power connected to the controller and non-volatile flash memory to permanently store the continuous pressure log, event log, alarm log and

all user changeable set points and system data. Battery back-up of any kind is not allowed

14. Input and output status LED's to provide visual indication of each discrete input's or output's on/off status
15. One RS232 serial port
16. One USB 1.0 port
17. One RS485 serial port
18. All wiring terminals on PCB's shall be removable type

2.05 AUXILIARY ALARMS:

A. As standard, the controller shall include 6 discrete auxiliary inputs and 9 form "C" auxiliary relay outputs. These auxiliary inputs and outputs are in addition to those mandated by NFPA 20. All inputs, outputs & OID LED's shall be field programmable through the OID.

1. A seven-day pressure recorder and space heater with thermostat shall be provided.

B. A central annunciator and operator control panel shall be provided inside the controller but visible and accessible through a breakable glass panel on the enclosure door. This control panel shall incorporate all alarm status pilot light indicators, voltmeters, and ammeters for the battery chargers, the 4 positions main switch manual start push-buttons and the combination lamp-test / charger reset push-button.

1. Supply power to the controller shall be 3/60/480v.

2.06 JOCKEY PUMP

A. The jockey pump shall be a Grundfos, cast iron, stainless steel fitted, mechanical seal, vertical multi-stage centrifugal pump, rigid-coupled to a 1/2 hp, 3450 rpm, 3 phase, 60 hertz, 480 volt, ODP motor. The jockey pump shall be rated for 5 gpm at 115 psi. It shall be supplied with a circulation relief valve to prevent short cycling and a discharge pressure gauge.

2.07 JOCKEY PUMP CONTROLLER

A. The jockey pump controller shall be housed in a NEMA 2 enclosure, complete with a fusible disconnect, H-O-A selector switch, overload relay, diaphragm pressure switch and control power transformer.

2.08 VALVES

A. Provide:

- UL/FM OS&Y suction flanged gate valve with tamper switch
- UL/FM discharge check valve
- UL/FM discharge butterfly valve with tamper switch
- UL/FM test header butterfly valve with tamper switch
- UL/FM butterfly valves with tamper switches for city water bypass
- UL/FM check valve for city water bypass

- UL/FM check valve for fire department connection inlet.
- Double check backflow preventer with detector check and OS&Y valves

2.09 ACCESSORIES

A. 4" cast hose valve header with (3) 2 ½" NPT x NHT hose valves, caps and chains.

2.10 FACTORY PREFABRICATION

A. Provide the geo-systems fire pump system as a completely prepackaged system on a structural steel mounting frame, complete with all necessary pipe supports, wiring and sensing lines. The unit shall be factory primed and painted with a machine grade finish coat. All welding shall be performed by ASME section 9 certified welders.

1. 6" suction pipe, OS&Y valve and fittings. Backflow preventer installed vertically.
2. 6" discharge pipe, valves, fittings, check and butterfly valves
3. 6" city water bypass with pipe, valves and fittings
4. 4" test header valved outlet. Valve is butterfly.
5. 4" FDC inlet with check valve & ball drip.
6. Jockey pump suction & discharge pipe, valves and fittings.
7. Controllers are mounted, piped and wired.
8. Casing relief, air release and gauges are installed.
9. Tamper switches included (wired by others).
10. Hydrostatically tested and painted.

B. Prefabricated environmental building enclosure complete with:

1. double door access with passage latchset
2. mini-power zone with transformer and circuit breakers
3. 5kw unit heater and thermostat
4. ventilation/exhaust fan with damper and thermostat
5. intake louver
6. GFCI convenience receptacles
7. LED light fixtures and bulbs
8. exterior light with photo cell
9. pump house sprinkler system
10. * wall penetration sleeves as required
11. * steel perimeter skid base with all necessary hard copper sensing lines, pipe supports, and wiring for a complete packaged system
12. * two power connections to pump house – one to fire pump controller from utility transformer and one to panel board from utility transformer. See load calcs for sizing.
13. *all equipment supplied and complete installation in accordance with NFPA 20 and UL/FM.
14. *the package shall also meet NFPA 70 (national electric code) article 90.7.
15. *All finishes for enclosure shall be submitted and approved by the Architect.

2.11 FACTORY TEST

A. The package shall be electrically and hydrostatically tested per NFPA requirements before shipment. The package shall include suction and discharge piping for the fire pump, jockey pump, test header piping, sensing lines and wiring of the controllers to the motors.

2.12 START-UP

A. The factory authorized local representative shall provide start-up and acceptance testing in accordance with NFPA requirements and the local authority having jurisdiction.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine areas, concrete bases, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of fire pumps.

B. Examine roughing-in for fire-suppression piping to verify actual locations of piping connections before fire-pump installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform field tests for fire pump when installation is complete. Comply with operating instructions and procedures in NFPA 20 to demonstrate compliance with requirements. Where possible, field correct malfunctioning equipment, then retest to demonstrate compliance. Replace equipment that cannot be satisfactorily corrected or that does not perform as indicated, then retest to demonstrate compliance. Verify that each fire pump performs as indicated.

C. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Final Checks before Startup: Perform the following preventive-maintenance operations and checks:
   a. Lubricate oil-lubrication-type bearings.
   b. Remove grease-lubrication-type bearing covers, flush bearings with kerosene, and clean thoroughly. Fill with new lubricant according to manufacturer's written instructions.
   c. Disconnect coupling and check electric motor for proper rotation. Rotation shall match direction of rotation marked on pump casing.
   d. Verify that pump is free to rotate by hand. If pump is bound or if it drags even slightly, do not operate until cause of trouble is determined and corrected.
3. Starting procedure for pumps is as follows:

a. Prime pump by opening suction valve and closing drains, and prepare pump for operation.
b. Open sealing-liquid supply valves if pump is so fitted.
c. Start motor.
d. Open discharge valve slowly.
e. Observe leakage from stuffing boxes and adjust sealing-liquid valve for proper flow to ensure lubrication of packing. Do not tighten gland immediately, but let packing run in before reducing leakage through stuffing boxes.
f. Check general mechanical operation of pump and motor.

4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
5. Furnish fire hoses in number, size, and length required to reach storm drain or other acceptable location to dispose of fire-pump test water. Fire hoses are for field-acceptance tests only and are not property of Owner.

3.03 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire pumps, drivers, controllers, and pressure-maintenance pumps.

END OF SECTION

SECTION 22 0500 - COMMON WORK FOR HVAC, PLUMBING, AND FIRE PROTECTION

PART 1 GENERAL

1.01 PROVISIONS

A. Requirements of Section 01 including, but not limited to, General Requirements, Submittal Procedures, Quality Requirements, Product Requirements, Substitution Procedures, Operation and Maintenance Data, Demonstration and Training shall apply to all work under this section.

B. Contents of this section shall be considered part of Section 01, Section 21, Section 22, and Section 23.

1.02 DESCRIPTION

A. Work covered by this Section includes furnishing of and paying for all materials, labor, services, equipment, licenses, permits, taxes, other items, and appliances necessary for the execution, installation and completion of all work specified herein and/or shown on the drawings.

B. The Work described in this section of the specifications includes, but is not limited to, the following:

1. Installation of chillers, air handling units, exhaust fans, VAV terminal units, centrifugal pumps, heating hot water boilers, ductwork, controls and devices required by drawings and specifications and required for a complete operable system.
2. Chilled water piping and connections.
3. Relevant to Condensation Piping and connections.
4. Preparation for testing and balancing of mechanical systems and correcting deficiencies.
5. Preparation and submittal of maintenance manuals, shop drawings, product data, and samples.
6. Maintaining a record set of bond paper prints and marking them to indicate locations of concealed items, and deviations made to suit conditions and production of mechanical as-built (record) drawings.
7. Bracing and anchoring equipment, sheet metal ducts, and piping systems.

1.03 RELATED WORK

A. The following items of related work are specified and included in other sections of these specifications:

1. Section 21 - Fire Suppression
2. Section 22 - Plumbing
3. Section 23 - Mechanical
4. Section 26 - Electrical

1.04 JOB CONDITIONS

A. Submittal of bid implies bidder has read applicable paragraphs of the specifications and will be bound by their conditions.

B. Contractor Qualifications: Experience installing commercial cooling and heating systems, plumbing and piping systems similar to those described in these specifications.

C. Contractor must be licensed and hold a current contracting license.

D. Contractor must be able to bond work for performance of work being bid as stated in the Advertisement for Bids.

1.05 INTENT

A. The contract documents (drawings, plans and specifications) describe the mechanical work of this project. Any item mentioned in one part shall be as binding as though mentioned in both.

B. The contract documents form a guide for a complete and operable mechanical installation. Where an item is reasonably necessary but not specifically mentioned, such as duct hangers or transitions, piping offsets, drains, etc., for a complete system, provide same.

C. Mechanical layouts indicated on drawings are diagrammatical only. Exact locations of ducts, pipes, and equipment shall be governed by the drawings of related trades.

1.06 DEVIATIONS

A. No deviations from specifications and drawings shall be made without full knowledge and written consent of the Professional of Record (POR).

B. During progress of work, existing conditions which dictate a modification of any particular requirement shall be promptly reported for a decision or instructions from the POR.

1.07 QUALITY ASSURANCE

A. Contractor(s) shall comply with all applicable local, state, federal and municipal codes and regulations to protect the safety and health of employees and the public during construction.

B. Comply with applicable requirements of recognized industry associations which promulgate standards for the various trades.

C. Employ only qualified journeymen for this work. Employ competent, qualified mechanics to supervise the work.

1.08 CODES AND STANDARDS

A. Perform work in accordance with codes and standards listed below, and such standards that may be specified in other sections. When these specifications are more stringent, they take precedence. In case of conflict, obtain a decision from the POR.

1. NFPA: National Fire Protection Association
2. 2015 International Mechanical Code
3. 2015 International Building Code
4. 2015 International Fuel Gas Code
5. 2015 International Plumbing Code.
6. ANSI Handicapped Code-A117.1.
7. ANSI: American National Standards Institute.
8. ARI: American Refrigeration Institute.
9. ASHRAE: American Society of Heating Refrigeration and Air Conditioning.
10. ASME: American Society for Mechanical Engineers.
11. ASTM: American Society for Testing and Materials.
12. MSS: Manufacturer's Standardization Society of the Valve and Fitting Industry
13. NEMA: National Electrical Manufacturers' Association
14. FPA: National Fire Protection Association.

15. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association
16. UL: Underwriters' Laboratories, Inc
17. CISPI: Cast Iron Soil Pipe Institute
18. Fire Marshal of the State of Louisiana
19. Louisiana State Department of Health Services and Environmental Quality
20. American Water Works Association (AWWA)
21. OSHA: Occupational Safety and Health Administration
22. EPA: Environmental Protection Agency

1.09 COORDINATION

A. Carefully examine specifications and drawings to be thoroughly familiar with items which require plumbing or HVAC connections and coordination.

B. Coordinate with other building trades to leave proper chases and openings. Place outlets, anchors, sleeves, and supports prior to pouring concrete or installation of masonry work.

1.10 SUBMITTALS

A. Submit items to the POR. Submittals are only required for specific items of equipment or material listed in individual sections of these specifications and for equipment and devices scheduled on drawings.

B. For specified manufacturers and model number equipment and devices, substitutions will be allowed by prior approval in accordance with Article 3.3 of the Instructions to Bidders.

C. Refer to Division 01 - Submittal Procedures for submittal requirements. The following paragraphs are an extension of Division 01 - Submittal Procedures.

D. Review of shop drawings shall in no way modify the contract or relieve the Contractor from compliance with the contract.

E. When electronic submittals are allowed, the Contractor shall also provide to the Architect a minimum of 3 hard copies of the submittal for all submittals that are greater than 25 pages or have a single sheet that is larger than 11” by 17”.

F. Names of manufacturers or catalog numbers are listed in the Specification in order to establish a standard for the type, general design and quality of the product required. Where "or approved equal" is indicated, other products similar in design and of equal quality and complying with the Drawings and Specifications will be considered for acceptance. See Division 01 – Substitution Procedures.

G. Shop Drawings: Submit shop drawings, including:

1. Automatic temperature control system.
2. Concrete pads and foundations including anchor bolt and sleeve locations.
3. All new air handling units, hydronic heaters, fans and constant volume boxes.
4. All new chilled water, hot water and condensate drain piping with valves, fittings, radiant heat panel and accessories.
5. Brochures: Submit seven copies of manufacturer's brochures including:
   a. Complete descriptions
   b. Illustrations
   c. Specifications data of materials, and operating rates, etc

d. Where items other than those proposed for use are illustrated and/or described on the same brochure pages, clearly indicate the items proposed for use

e. Samples: Generally, samples will not be required, but if there is doubt on the part of the POR as to unit prepared for use, he may call for a sample. In that case, pay for packaging and transportation both ways. Item will remain the property of the submitter and may, if approved, be incorporated in the work.

1.11 OPERATING AND MAINTENANCE MANUALS

A. Three sets of the following data are required:

1. Operating and maintenance instructions
2. Spare parts lists
3. Copies of approved submittal data
4. Equipment warranties
5. Air balance report
6. Arrange each set of data in an orderly way, and bind each set in a separate three-ring, hard cover binder in accordance with Section 01 requirements.
7. As soon as data begins to accumulate, prepare one of the sets and deliver it to the POR. Continuously update that set as additional data is obtained.
8. At completion of work, deliver two complete sets (in addition to set in A.3 above) to POR.

1.12 DELIVERY AND STORAGE

A. Insofar as possible, deliver items in manufacturer's original unopened packaging. Where that is not practical, cover items with protective materials to keep them from being damaged. Use care in loading, transport, unloading, and storage to keep items from being damaged.

B. Store items in a clean, dry place, and protect from damage.

1.13 GUARANTEE

A. Guarantee all material, equipment, and workmanship for all sections under Sections 21, 22 and 23 in writing to be free from defects of material and workmanship for one year from date of final acceptance by the POR or substantial completion. Replace without charge any material or equipment proving defective during this period. The guarantee shall include performance of the equipment under all conditions of load, installing any additional items of control and/or protective devices as required and the replacing of any refrigerant lost.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Within the Contract Documents relating to mechanical work, manufacturers' names, catalog numbers, and other proprietary references to materials and equipment are made. Such references are made to establish the standards of quality and type required, and not to limit competition. Most known or acceptable manufacturers of competitive products are listed in applicable sections as "approved equals". Reasonable requests for substitution or additions to "approved equals" will be considered, but the POR will be the sole judge of acceptability of items proposed as substitutes.

B. Materials and equipment used in carrying out these specifications shall bear UL or other recognized testing laboratory label when such labels are available.

2.02 BASIC MATERIALS/METHOD

A. Access doors, panels and frames: Style and type as required for material in which installed.
   1. Size: 18" x 18" minimum, as indicated, or as required to allow for maintenance service.
   2. Fourteen gauge minimum sheet metal for doors, 16 gauge frames of cadmium-plated or galvanized construction. Doors shall have expanded plaster rings where located in plaster walls or flanged finish where located in drywall or block construction.
   3. Panels shall have spring hinges with screwdriver locks in non-public areas. Key lock, keyed alike, for panels in public areas.
   4. Prime painted or rust inhibitive paint finish.
   5. UL labeled when in fire-rated construction, one and one half (1-1/2) hour rating.
   6. Provide in walls, floors, and ceilings to permit access to all equipment and piping requiring service or adjustment. Examples of such equipment needing access are dampers, mechanical system valves, and equipment needing periodic or replacement maintenance.
   7. Furnish and locate access panels under this Section. Coordinate with other trades who are responsible for building system in which panels are to be installed.
   8. Manufacturers shall be Inland-Milcor, Bilco, Miami Carey, or approved equal. Use panels equal to Milcor Style M for masonry and drywall construction and equal to Milcor Style K for plastered masonry walls and ceilings. Stainless steel panels shall be used in ceramic tile or glazed structural tile.

PART 3 EXECUTION

3.01 LOCATIONS

A. Mechanical layouts indicated on drawings are diagrammatical. Exact locations of ducts, pipes, and equipment may vary because of conflicts with work of other trades. Work out conflicts where relocations will not affect operation or appearance of systems.

B. Locate equipment requiring periodic servicing so that it is readily accessible. Do not back up service sides to walls, nor place it too close to other equipment to make service impractical.

3.02 CUTTING AND PATCHING

A. No structural members shall be cut without approval from the Structural Engineer.

B. Repair or replace routine damage caused by cutting in performance of contract.

C. Correct damage caused due to installation of mechanical work.

D. Perform repairs with materials which match existing and install in accordance with the appropriate section of these specifications.

3.03 CONNECTION TO EQUIPMENT

A. Connect or install equipment shown on mechanical drawings that requires plumbing and/or mechanical hookups.

B. Rough-in piping and connect equipment.

C. Provide piping, shutoff valves, and unions required for a complete and operable installation.

3.04 SERVICE OF SYSTEMS

A. If equipment is placed in service prior to acceptance of the project by Owner, operate equipment strictly in accordance with manufacturer’s instructions.
   1. Employ competent, qualified personnel in operation of the equipment.

2. Provide for proper operation and cleanliness.
3. Provide maintenance and repair of equipment, as required per manufacturer's recommendations, as necessary to maintain equipment warranty.

B. Lubricate equipment and perform such other maintenance as required to place it in like-new operating condition.

3.05 ACCEPTANCE OF SYSTEMS

A. Complete the following before requesting a final punch:

1. Work required under this division of specifications except as permitted. Special attention shall be paid to completion of work required under Section 23 0630 – Cleaning Mechanical Systems.
2. System balancing. Provide for “Substantial Completion” field observations.
3. Control system checkout.
4. Furnish required operating instructions, wiring diagrams, and electronic “project record document” control diagrams in accordance with Section 01 and provide one copy of each in the equipment rooms as specified elsewhere.
5. POR will accept job on basis of tests and field observations. A representative of firm that performed test and balance work is to be in attendance to assist; and furnish necessary mechanics to operate system, make any necessary adjustments, and assist with close-out field observations and punch list.

3.06 TRAINING

A. At a time agreed between the Owner and Contractor, provide training of the Owner's HVAC system operating personnel. This training shall be for a minimum 4 hour training sessions excluding travel time. The training shall be by a factory authorized and trained agent of the controls manufacturer. The training shall include, as a minimum, start-up, normal operation, set point adjusting, start-up after a power failure, and troubleshooting. Contractor shall provide establishment of Owner/Manufacturer interface for future system operation and maintenance support.

END OF SECTION

SECTION 22 0529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 PROVISIONS

A. Requirements of Section 01 including, but not limited to, General Requirements, Submittal Procedures, Quality Requirements, Product Requirements, Substitution Procedures, Operation and Maintenance Data, Demonstration and Training shall apply to all work under this section.

B. Throughout the specifications, types of materials may be specified by manufacturer’s name and catalogue number to establish standards of quality and performance and not for the purpose of limiting competition.

1.2 DESCRIPTIONS

A. Work covered by this Section includes furnishing of and paying for all materials, labor, services, equipment, licenses, taxes, other items, and appliances necessary for the execution, installation and completion of all work specified herein and/or shown on the drawings.

B. The work described in this section of the specifications includes but is not limited to the following:

1. Pipe hangers for various types of pipes installed as set forth in this section and related sections.
2. All intermediate support steel attached to building structure for piping systems as necessary for support of all piping systems.

C. Piping shall be isolated from hanger material supports and different piping material shall be suitably isolated to prevent galvanic corrosion or deterioration resulting from contact of dissimilar metals.

1.3 RELATED WORK

A. The following items of related work are specified and included in other sections of these operations from contact of dissimilar metals:

1. Section 21 2300 - Fire Protection for Marinas and Boatyards

1.4 SUBMITTALS

A. Submit seven copies of manufacturer's product data for review by the Engineer.

PART 2 - PRODUCTS

2.1 APPLICABLE PUBLICATION

A. Manufacturers Standardization Society (MSS) of the Valve and Fitting Industry, Inc. Publication are referenced in the text by the basic designation only.

1. SP-58-93: Pipe Hangers and Supports - Materials, Design and Manufacturer.
2. SP-69-91: Pipe Hangers and Supports - Selection and Application.

2.2 HANGERS

A. Pipe hangers and supports. Adjustable clevis hangers for:

1. Non-insulated pipe 2" through 24" diameter.

B. Pipe hangers and supports. Adjustable wrought clevis hangers, with SP-58, MSS Type 40 galvanized insulation protection shields (sized for supporting insulation having a compressive strength of 4 psi, at 8-foot intervals). Support piping on outside of insulation. Size hangers so that pipe insulation passes through them without interruption. Use these for:

1. Insulated steel pipe 1/2" through 24" diameter.
2. Insulated copper pipe 1/2" through 8" O.D.

C. MSS SP-58 Type 6, with adjustable swivel ring, split ring type for:

1. Non-insulated steel pipe, copper pipe 1/2" through 1-1/2" diameter.

D. MSS SP-58 Type 9, with adjustable wrought tubing ring hanger, either plastic covered or copper plated for non-insulated copper tubing with no longitudinal movement.

E. MSS SP-58 Type 41 with pipe roller and MSS SP-58 Type 40 galvanized insulation protection shields (sized for supporting insulation having a compressive strength of 4 psi, at 8-foot intervals). Support piping on outside of insulation. Size hangers so that pipe insulation passes through them without interruption. Use these for:

1. Insulated copper pipe, 1/2" through 2" diameter, having longitudinal movement.
2. Insulated steel pipe, 1" through 30" diameter, having longitudinal movement.

F. MSS SP-58 Type 8, riser clamps (at floor slab penetrations) to support copper pipe risers.

G. MSS SP-58 Type 8, riser clamps (at floor slab penetrations) to support steel pipe risers.

H. Where three or more lines of pipe run parallel, support them with trapeze hangers.

PART 3 - EXECUTION

3.1 PIPE HANGERS

A. Support pipes on specified hangers so that equipment, pumps, and fittings do not bear weight of pipe.
   1. Support pipe risers at regular intervals in pipe shafts in accordance with good practice.
   2. Do not use perforated metal, strap iron, or band iron.
   3. Do not make offsets in hangers.

B. Maximum allowable spacing of pipe hangers is listed below. Space hangers and brackets at close intervals where necessary to maintain levels, slopes, and drainage, or to prevent sagging.

C. Steel Pipe:
   1. 1/4" to 3/4" - 6'-0" o.c.
   2. 1" to 12" - 10'-0" o.c.
   3. 3/8 to 1 ¼" – 7'-0" o.c.
   4. 1 ½ to 2" – 9'-0" o.c.
   5. 2 ½ to 3" – 11' –0" o.c.
   6. 4" - 14'-0" o.c.
   7. 5" to 6" – 16'-0" o.c.
   8. 8" – 19'-0" o.c.
   9. 10" - 22"-0"o.c.

D. Copper Pipe:
   1. 1/2" to 3/4" - 5'-0" o.c.
   2. 1" to 1-1/4" - 6'-0" o.c.
   3. 1 ½" to 2" – 8'-0" o.c.
   4. 2 ½ - 9'-0" o.c.
   5. 3" – 10'-0" o.c.
   6. 4" – 12'-0" o.c.
   7. 6" – 14'-0" o.c.
   8. 8" – 16'-0" o.c.

END OF SECTION 22 0529

SECTION 260500 - COMMON WORK FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. This section is an extension of the General Requirements (Division 01 of these Specifications) and certain items of a common or administrative nature that pertain to all electrical work.

B. The work of this section consists of furnishing materials, equipment, constant competent supervision, special tools, test equipment, technicians, and labor necessary for installation of a complete working electrical system as indicated herein and on the Drawings.

C. The work shall include but not necessarily be limited to the following:
1. Service entrances and mounting of metering equipment as required by the utility company
2. Connections to service from points of termination by utility company
3. Power Distribution Systems: feeder circuits, branch circuits, panels, wiring, transformers, devices, etc.
4. Installation of motor control and variable frequency drive equipment
5. Electrical work incidental to the requirements of the mechanical system.
6. Wiring and connections to equipment furnished and installed under other Divisions of these specifications
7. Raceways and fittings
8. Grounding
9. All required sleeves, thimbles, anchors, hangers, bolts, miscellaneous structural steel, cutting, etc., for the complete installation of the electrical systems serving the building
10. Temporary electrical service for construction and maintenance of occupied portions of the building’s electrical systems

1.2 SUBMITTALS

A. Refer to Division 01 - Submittal Procedures for submittal requirements. The following paragraphs are an extension of Division 01 - Submittal Procedures.

B. Review of shop drawings shall in no way modify the contract or relieve the Contractor from compliance with the contract.

C. When electronic submittals are allowed, the Contractor shall also provide to the Architect a minimum of 3 hard copies of the submittal for all submittals that are greater than 25 pages or have a single sheet that is larger than 11” by 17”.

D. Names of manufacturers or catalog numbers are listed in the Specification in order to establish a standard for the type, general design and quality of the product required. Where "or approved equal" is indicated, other products similar in design and of equal quality and complying with the

Drawings and Specifications will be considered for acceptance. See Division 01 – Substitution Procedures.

E. Any item not specified herein, but submitted as a substitute for the specified item, shall be submitted in accordance with Division 01 – Substitution Procedures and accompanied by manufacturer's documentation stating/illustrating the following applicable information in addition to the specific information requested in other sections:
   1. Dimensions and weight
   2. Electrical Ratings: voltage, amperage, short circuit rating, etc.
   3. Construction - gauge of steel/aluminum, paint finish/application method, color, NEMA type, etc.
   4. Warranty
   5. Local manufacturer's representative or nearest stocking distributor
   6. Any deviations

F. Equipment Requiring Submittals: The following items and equipment require submittals for transmittal. Refer to Phasing Plan for scheduling of submittals. No time delays will be allowed for failure to be so informed.
   1. Conductors
   2. Cables
   3. Hangers & Supports
   4. Raceway & Boxes
   5. Fuses
   6. Circuit Breakers
   7. Safety Switches

G. Further descriptions or information required with shop drawings shall be included with the description of materials specified herein as follows:
   1. Fire Alarm Components: Include shop Drawings showing fire alarm system riser, wiring diagrams and dimensioned Drawings of Fire Alarm Control Panel. Include certification that this Division has fully coordinated all fire alarm system signal and control connections to work of the other Divisions, including but not limited to, automatic temperature controls, fire pump, fire sprinkler system, and elevators.
   2. Housekeeping Pads: Include location and dimensions of housekeeping pads, including blockouts and anchor bolts.
   3. Firestops: Include all firestop materials for the project, indicating intended use and UL fire rating where applicable.
   4. Detailed, dimensioned shop Drawings for the installation of the work in the electrical equipment rooms shall be prepared and submitted for review. These Drawings shall be new Drawings prepared by the Contractor and shall not be reproductions or tracings of the Drawings. In preparing shop Drawings, establish lines and levels for the work specified and check the Drawings to avoid interference with structural features and the work of other trades. Immediately call to the attention of the Architect in writing any interference for clarification.
   5. Detailed, dimensioned shop drawing for the installation of the conduits to be installed in the floor slab. These shop drawings shall be new drawings prepared by the contractor and shall show all conduit rating, locations where conduits are exiting slab. All junction boxes and concrete rings shall have dimensioned locations. Coordinate conduit “turn-up” or turn downs” with architect. Drawings to insure all conduits will be concealed either in the slab or in the walls.

H. Corrections or comments made on shop Drawings during the review do not relieve the Contractor from compliance with requirements of the contract documents. Shop Drawings will be checked for general conformance with the design concept of the project and general compliance with information given in the contract documents.

I. Review of the shop Drawings shall not relieve the Contractor from responsibility for confirming and correlating all quantities and dimensions, coordinating work with that of all other trades, and performing work in a safe and satisfactory manner. Review of shop Drawings shall not permit any deviation from Drawings and Specifications. Shop Drawings must be accompanied by signed statement from contractor, stating that he has reviewed the submittal and checked it for compliance.

J. Panelboard and switchboard submittals shall be submitted after the major mechanical equipment submittals have been submitted such that general coordination between Divisions can be verified.

1.3 QUALITY ASSURANCE

A. The electrical installation shall conform to the requirements of the 2017 edition of the National Electrical Code (NEC). Notify Architect of any conflicts prior to installation.

B. Electrical material shall be built and tested in accordance with the applicable standards of the National Electrical Manufacturers' Association (NEMA), the American National Standards Institute (ANSI) the American Society for Testing and Materials (ASTM), and the Institute of Electrical and Electronic Engineers (IEEE)

C. Electrical materials shall be new and unused and shall be listed and labeled for the service intended by Underwriters' Laboratories, Inc., where such labeling service is available.

D. Applicable sections of the following codes and standards shall also be followed:
1. NFPA - National Fire Protection Association including NFPA-101, Life Safety Code.
2. OSHA Code of Federal Regulations
3. IBC - International Building Code as adopted by the local authority having jurisdiction.
4. Applicable state and local codes and ordinances
5. ETL - Electrical Testing Laboratories
6. IES - Illuminating Engineering Society
7. NECA – National Electrical Contractors Association
8. UL – Underwriters Laboratories

E. Include all items of labor and materials required to comply with the above referenced codes and standards. Where quantities, sizes, or other requirements indicated on Drawings or herein specified are in excess of the requirements of the standards and codes, the Specifications or Drawings shall govern.

1.4 REGULATORY REQUIREMENTS

A. Permits: Obtain and pay for all necessary permits, inspections, connection charges, fees, insurance, bond, licenses, and comply with all governing laws, ordinances, rules and regulations including those of the NFPA and all municipal, state or other authority having jurisdiction over the work.

B. Certificates of Inspection: Upon completion and before the date of substantial completion of each designated Phase, furnish a certificate of inspection issued by the proper authorities to the effect that the installation is in full conformity with all local and state requirements.

1.5 COORDINATION

A. Layout the work and be responsible for its correctness. Take such measurements as may be necessary to assure approved fitting and proper installation of work, and all other work depending thereon.

B. Arrange work in a neat, well organized manner with exposed conduit and similar services running parallel with primary lines of the building construction, high as possible with a minimum of 8'-0" overhead clearance or as directed by the Architect.

C. Perform all work in the best and most substantial manner by workmen skilled in the work to be done. Provide adequate supervision at all times.

D. Cooperate with other contractors to avoid complications between the installation of the various items of equipment. Advise other trades of openings required in their work for the subsequent move-in of large units of electrical equipment.

E. Locate operating and control equipment properly to provide easy access, and arrange entire electrical work with adequate access for operation and maintenance.

F. Where the method of installation is not certain, ask for details. Lack of details, not requested, will not be an excuse for improper installation, and any such work must be corrected.

G. Coordination Drawings: For locations where several elements of electrical or combined mechanical and electrical work must be sequenced and positioned with precision in order to fit into the available space, prepare coordination drawings showing the actual physical dimensions (at accurate scale, minimum 1/4") required for the installation. Prepare and submit coordination drawings prior to purchase-fabrication-installation of any of the elements involved in the coordination.

H. All Bidders shall be responsible to insure that equipment selected: switchboards, panelboards, etc., fit in spaces selected, and meet all NEC 110.26 requirements. If standard equipment does not fit, Contractor shall be required to utilize custom equipment as required.

1.6 DRAWINGS AND SPECIFICATIONS

A. Contract Documents (Drawings and Specifications) are intended to convey the scope of work and indicate general arrangements of equipment, fixtures and piping, and approximate sizes and

locations of equipment and outlets. Follow these documents in laying out the work, check all Drawings to become familiar with all conditions affecting the work, and verify spaces in which the work will be installed.

B. The contract documents are diagrammatic in showing certain but not all, physical relationships which must be established within the electrical work. Its interface with other work including plumbing, fire protection and mechanical work is the exclusive responsibility of the Contractor.

C. The Drawings show approximate locations only of selected feeders, branch circuits, outlets, etc., except where specific routing or dimensions are indicated. The Architect reserves the right to make reasonable changes in locations indicated before roughing-in without additional cost to the Owner. The Contractor, at a minimum, should allow all feeders, branch circuits, and outlets shown to be relocated 10 feet in any direction without additional cost to the Owner.

D. Because of the small scale of the Drawings, it is not possible to indicate all of the offsets, fittings, and accessories required. Contractor shall investigate the structural and finish conditions affecting Division 26, Electrical work and shall arrange such work accordingly, furnishing fittings, bends, junction boxes, pull boxes, access panels, and accessories required to meet such conditions.

E. These Specifications, together with the accompanying Drawings, contemplate apparatus fully erected, and in satisfactory operating condition with the Contractor furnishing and installing everything that may be necessary to complete the job.

1.7 PROJECT/SITE CONDITIONS

A. Visit the site before bidding to become familiar with conditions under which the work will be performed.

B. No additional compensation will be allowed for failure to be so informed.

1.8 RECORD DRAWINGS

A. Prepare Record Drawings in accordance with the requirements in Division 01 - Closeout Procedures. The following paragraphs are in addition to Division 01 - Closeout Procedures.

B. In addition to the requirements specified in Division 01 - Closeout Procedures, indicate the following installed conditions:
   1. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
   2. Approved substitutions, Contract Modifications, and actual equipment and materials installed.
   3. Contract Modification, actual equipment and materials installed.
   4. Complete As-Built Drawings of Division 26, Electrical work shown and not shown on the contract drawings in the new and existing facilities.

C. Equipment Manuals:

1. Before the date of substantial completion, Contractor shall furnish to the Architect three (3) bound sets of descriptive, dimensional and parts data on all major items of electrical equipment and material including those items listed above under "Shop Drawings:".
2. Each set of this literature shall be bound in a permanent type hard cover ring binder and shall be suitably indexed.
3. This submittal shall be accompanied by final Electrical Inspection Certificate from the authority having jurisdiction and Statement of Inspection from State Fire Marshal's Office.

1.9 WARRANTY

A. Except where longer periods of warranty are specified, guarantee all labor and materials for a period of twelve (12) months from the date of substantial completion of the particular phase of the work. Repair all defective materials and work; replace with new materials and/or equipment, any material and/or equipment failing to give satisfactory service.

B. During the period of guarantee, promptly correct any defects in equipment, materials or workmanship without cost to the Owner.

C. Guarantee includes equipment capacity and performance ratings specified without excessive noise levels. Any deficiencies in equipment specified shall be promptly corrected.

D. Contractor's warranty shall include an inspection of the system one (1) week before the end of the one (1) year warranty period. Replace or repair any items found to be defective at this time.

1.10 TESTS AND BALANCING

A. At such times as the Architect directs, conduct operating tests to demonstrate that the electrical systems are installed and will operate properly and in accordance with the requirements of this Specification. Tests shall be performed in the presence of the Architect's representative. Furnish instruments and personnel required for such tests.

B. All power and lighting loads shall be tested by Contractor prior to final approval.

C. Any work and materials tested and found varying from the requirements of the Drawings and Specifications shall be replaced without additional cost to the Owner.

D. This section does not relieve the Contractor from testing equipment installed under this Division but not listed in this section. Contractor is required to test all equipment, feeders, etc., installed under this Division.

PART 2 - PRODUCTS

2.1 GENERAL

A. Refer to Division 01 sections for general requirements on products, materials and equipment. The provisions outlined below expand or modify the requirements as applicable to electrical work. Refer to other Division 26, Electrical sections for additional requirements.

B. Materials and equipment shall conform in all respects to the requirements set forth in these Specifications and the accompanying Drawings.

C. Provide products which are compatible with other products of the electrical work, and with other work requiring interface with the electrical work, including electrical connections and control devices. For exposed electrical work, coordinate colors and finishes with the Architect and as referenced in Section 09 91 23. Determine in advance of purchase that equipment and materials proposed for installation will fit into the confines indicated, leaving adequate clearance as required by applicable codes, and for adjustment, repair, or replacement.

2.2 FIREPROOFING:

A. Where conduit and/or cables penetrate fire-resistant/rated walls, partitions, ceilings, or floors, adequate fire seals using approved UL methods to maintain the fire-resistance rating shall be provided and installed in accordance with Division 07, Section “Firestopping”.

B. Approved methods constitute providing a minimum of one-inch (1") depth of Scotch Putty 303 or Caulk CP25.3 surrounding metal conduit penetrations. Larger square or circular penetrations shall require construction of fire-rated barrier utilizing Scotch Series 7903/7904 barrier sheets.

C. Plastic sleeves/pipe shall not be used within the building when penetrating a fire-resistant-rated wall, ceiling, partition, or floor.

D. All fire proofing to be certified.

2.3 INSERTS AND THIMBLES

A. Set in place as form work progresses, all necessary inserts and thimbles as may be required. Cutting of beams or of concrete floors or walls will not be permitted.

B. All thimbles set in concrete shall be of standard pipe, plain ends, and shall be of proper size to allow for freedom around piping passing through thimble.

C. Thimbles set in the walls, partitions or in chases where structural requirements will allow, shall be of rigid galvanized steel conduit.

D. Inserts shall be nailed to form work and shall be of size to allow for installation of hangers for the particular pipe served.

2.4 MANUFACTURERS' NAMEPLATES

A. Each major component of the equipment shall have the manufacturer's name, address, model number, and rating on a plate securely affixed in a conspicuous place. The nameplate of a distributing agent will not be acceptable. NEMA Code ratings, or other data which are die-stamped into the surface of the equipment shall be stamped in an easily visible location.

PART 3 - EXECUTION

3.1 GENERAL

A. Visit the building site before bidding to determine existing conditions and assume all responsibility and bear all expenses in allowing for these conditions in the bid.

B. No work shall be concealed until approved by the local inspector and all local regulations are adhered to.

C. Upon completion, a certificate of approval from the appropriate regulatory agency shall be furnished to the Architect.

D. Study all sections of the Specifications and Drawings. Notify Architect of conflict between Drawings and Specifications before bidding.

E. Electrical Drawings are diagrammatic except where dimensioned. Do not scale. Follow manufacturers certified shop drawings for accuracy. Unless noted as fixed, dimensions are based on the product of one (1) manufacturer. Verify dimensions with certified shop Drawings of the materials actually approved and purchased.

3.2 PROTECTION OF APPARATUS

A. At all times the Contractor shall take precautions necessary to protect his apparatus from damage. Failure on the part of the Contractor to comply with the above to the Architect's satisfaction shall be sufficient cause for the rejection of the particular piece of apparatus in question.

3.3 CUTTING AND PATCHING

A. Do all cutting, fitting, and all other work that may be required to make the several parts come together and fit. Cutting for equipment entry shall be under other Divisions. Do not endanger any work by cutting, digging, or otherwise, and do not cut or alter the work of any other Divisions, except with the consent of the Architect. Cutting shall be done under the supervision of the Project Superintendent. Patching, including patching of bonded roofing, shall be performed under Division 02.

B. Provide, properly located and sized, all required chases, shafts, openings, furred spaces, etc., required for the work or to conceal any of the work, in any part of the structure.

C. It is the responsibility of this Division to coordinate with other responsible Divisions for required cutting and patching.

3.4 TEMPORARY WIRING, LIGHTING AND POWER AT THE SITE

A. Furnish and install provisions for temporary electrical service and construction light and power during the construction period conforming to the contract documents, all local code and State labor law requirements.

B. Arrange for temporary service with the Utility Company.

C. Furnish, install, and maintain all temporary service equipment as required until permanent service is installed switch-over of temporary systems on the permanent service when latter is ready for same.

D. Furnish, install, maintain, and switch on and off on all regular work days a complete temporary light system, for the building while under construction.

E. Provide any and/or all relocations of temporary electric facilities as necessary to clear the permanent installations of all trades.

3.5 WIRING FOR EQUIPMENT BY OTHERS

A. Electrical service for all equipment furnished under this Specification and/or indicated on the Drawings shall be roughed-in and connected under this Section. It is the responsibility of the Contractor to obtain correct roughing-in dimensions and requirements for this equipment.

B. Raceways, outlets, backboards, cabinets, grounding connections, handholes, underground distribution system, and other roughing-in indicated shall be provided as work of this division for telephone system, security system and data system.

3.6 MECHANICAL EQUIPMENT

A. All power wiring associated with Division 21, Fire Suppression, Division 22, Plumbing, and/or Division 23, HVAC shall be done as work under Division 26, Electrical. All power disconnect switches and single speed manual starting switches shall be furnished and installed under Division 26. Multi-speed manual starters, magnetic starters, variable frequency drives shall be furnished under Division 21, Fire Suppression, Division 22, Plumbing, and/or Division 23, HVAC and installed under Division 26, Electrical.

B. Except as may be indicated on the Drawings and/or hereinafter noted, all control wiring, including all temperature control wiring, interlocking, start-stop wiring, shall be furnished and installed under Division 21, Fire Suppression, Division 22, Plumbing, and/or Division 23, HVAC. This includes, but is not limited to, wiring to low voltage thermostats, damper motors, aquastats, firestats, pushbuttons, selector switches, and control panel(s). All disconnect switches for control shall be furnished and installed under Division 21, Fire Suppression,

Division 22, Plumbing, and/or Division 23, HVAC. Wiring, conduit, and control shall meet the requirements of Division 26, Electrical.

C. Work of other divisions will include furnishing and setting motors.

D. All magnetic starters and variable frequency drives will be furnished under Division 26, Electrical, except for packaged equipment that will be furnished under another division of the Specifications. Overload elements in all starters shall be selected according to actual motor nameplate full load current. Responsibility for this coordination shall lie with the division under which the particular starter was furnished.

E. Firestats for single phase exhaust fans with manual starting switches and wall mounted thermostats which interrupt line voltage power circuits to motors shall be furnished and set under Division 21, Fire Suppression, Division 22, Plumbing, and/or Division 23, HVAC, and electrically connected in the branch circuit wiring as work of Division 26, Electrical.

3.7 WORKMANSHIP

A. Install all materials and electrical components of the work in accordance with instructions of manufacturer following the best modern construction practices and conforming with the Contract Documents. Workmanship shall be first class, in both function and appearance, whether finally concealed or exposed and shall be performed by experienced workmen skilled in the type of work.

B. As practicable, the lines of all components of the system shall be perpendicular or parallel. In general, workmanship shall conform to guidelines set forth in N.E.C.A. manuals.

3.8 CLEANING UP

A. Remove once per week and at the completion of the work all empty cartons, scrap wire, raceways, rubbish, etc., accumulated on the project as a result of work performed.

B. Remove all marks, stains, fingerprints, bugs, dust and other foreign material from all electrical components. Refinish damaged surfaces and restore original finish to the satisfaction of the Architect.

3.9 SAFETY

A. It shall be the Contractor's responsibility to do all things necessary in the pursuit of the installation or testing to provide safe conditions in which to work.

END OF SECTION 265000

SECTION 26 05 01 - ELECTRICAL RELATED WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Extent of electrical related work required by this section is indicated on Drawings and/or specified in other Division 26, Electrical sections.

B. Types of electrical related work specified in this section include the following:
   1. Access to Electrical Work: Removable cover plate in walls, ceiling and floors
   2. Excavating, Trenching and Backfill for Electrical Work
   3. Foundations and Supports
   4. Cutting and patching
   5. Concrete for Electrical Work:
      a. Encasement of electrical work
      b. Underground structural concrete to accommodate electrical work
      c. Electrical equipment foundations and mounting pads
      d. Rough grouting in and around electrical work
      e. Patching concrete which has been cut to accommodate electrical work

1.2 PROJECT/SITE CONDITIONS

A. Protect property from damage which might result from excavating and backfilling.

B. Protect persons from injury at excavations by barricades, warnings and illumination.

C. Coordinate excavations with weather conditions, to minimize possibility of washouts, settlements and other damages and hazards.

1.3 ACCESS TO ELECTRICAL WORK

A. Access Doors: General: Where floors, walls and ceilings must be penetrated for access to electrical work, provide types of access doors indicated by project conditions, including floor doors if any. Furnish sizes indicated or, where not otherwise indicated by project conditions, furnish adequate size for intended and necessary access. Furnish manufacturer's complete units, of type recommended for application in indicated substrate construction, in each case, completes with anchorages and hardware.

B. Access Door Construction: Except as otherwise indicated, fabricate wall/ceiling door units of welded steel construction with welds ground smooth; 16-gage frames and 14-gage flush panel doors, 175 degree swing with concealed spring hinges; flush screw-driver-operated cam locks; factory-applied rust-inhibitive prime-coat paint finish.

C. Removable Access Plates: General: Where switches, control devices, pull boxes, and similar elements of electrical work are located within or behind wall or ceiling construction of finishes, or below grade, and are not (cannot be) provided with integral removable access plates as specified in other Division-26 Electrical, sections, provide removable access plates of types and sizes needed for access requirements. Provide manufacturer's complete units with anchorages, fasteners, and standard factory-applied finishes.

D. Wall/Ceiling Unit Construction: Except as otherwise indicated, and where adaptable to substrate, provide manufacturer's standard frameless round formed stainless steel or chrome-plated brass low-profile plate cover, with single exposed flush screw anchor, with bright polished finish.

E. Units Set at Grade: Except as otherwise indicated, provide manufacturer's standard round or square cast-iron units, complete with cast-iron pipe extension to protect electrical elements being accessed; designed to be set slightly above finish grade, and to be encased in concrete; secure plate to body with bronze screws; natural mill finish on plate and body.

1.4 EXCAVATING FOR ELECTRICAL WORK

A. Backfill Materials: Refer to Division 31 Section, Earth Moving.

B. Materials of Concrete Work: Refer to Division 03 Section, Concrete.

1.5 DUCT BANK COLORING

A. All underground and above grade concrete electrical duct banks shall be colored red.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 EXCAVATION, TRENCHING AND BACKFILLING

A. Perform all excavation of every description and of whatever substances encountered to the depths indicated on the Drawings or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or not suitable for backfill shall be removed and wasted or removed from jobsite as indicated on the Drawings or as directed by Architect at no additional cost to Owner.

B. Sheeting and shoring shall be done as necessary for the protection of the work and for the safety of personnel. Provide necessary pumping and/or well pointing at all times to maintain a dry working condition in all trenches. Unless otherwise indicated, excavations shall be by open cut except that short sections of a trench may be tunneled if, in the opinion of the Architect the

conduit can be safely and properly installed and backfill can be properly tamped in such tunneled sections.

C. No excavation or trenches shall be cut near or under footings without first consulting Architect.

D. Where open cut excavations/trenches are near tree root system, consult architect for directions prior to excavation. Contractor shall ultimately be responsible for installations of conduits by methods best suited to preserve tree root systems as per architect directions.

E. Bottom of trench shall be shaped to give substantially uniform circumferential support to lower third of each pipe. Each pipe shall be laid true to line and grade and in such manner as to form a close concentric joint with adjoining pipe and to prevent sudden offset to flow line. As work progresses, interior of pipe shall be cleared of dirt and superfluous materials of every description.

F. Wherever wet or otherwise unstable soil that is incapable of properly supporting the pipe, as determined by the Architect is encountered in the bottom of the trench, such soil shall be removed to the depth required and the trench backfilled to the proper grade with coarse sand, fine gravel, or other suitable material, and approved by the Architect.

G. Trenches for utilities shall be of a depth that will provide the following minimum depth of cover from existing grade or from indicated finish grade, whichever is lower, unless otherwise specifically shown:
   1. 30-inch minimum cover - electrical conduits/cables over 600 volts
   2. 24-inch minimum cover - electrical cables/conduits under 600 volts

H. Backfill shall be installed in layers 6" deep, adequately wetted and tamped using materials as noted above. The surface shall be graded to a reasonable uniformity and the mounding over trenches left in a uniform and neat condition as approved by the Architect. Refer to plans for compaction densities.

I. Restore all hard finished surfaces such as roadways, sidewalks, grass, shrubbery, etc., removed for installation of utilities (and not shown on Drawings or specified to be reworked under other sections of the work) to their original condition using the same type as original materials. Patching concrete roadways shall require doweling to tie-in matching reinforcement rods or highway mesh to existing roadway. Doweling shall occur every 18 inches on both sides of the trench. Restore to near original condition acceptable to Architect.

J. Carefully plan all work to avoid existing utilities and other interferences. The Drawings do not indicate all existing underground utilities. Existing utility lines to be retained that are shown on the Drawings or the locations of which are made known to the Contractor prior to excavation, as well as all utility lines uncovered during excavation operations, shall be protected from damage during excavation and backfilling and, if damaged, shall be repaired by Contractor at his expense. Prior to doing any excavation with power tools, carefully investigate and locate any exiting conduit, pipes, and other lines.

K. Install access units in accordance with manufacturer’s written instructions, in compliance with NEC and recognized industry practices.

L. Coordinate with other work, including substrate construction work, as necessary to interface installation of access units with other work.

M. Locate each removable access unit accurately in relation to electrical work requiring access.

N. Provide adequate temporary support or attachment to framing or form work so that units will not be dislocated during construction of substrates. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

O. Adjust hardware and panels after installation for proper operation.

P. Remove and replace panels or frames, which are warped, bowed or damaged.

3.2 PAINTING

A. Factory painted equipment shall have finish restored to Manufacturer's finish if scratched or damaged before acceptance or use by Owner.

END OF SECTION 260501

SECTION 260519 - LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes wires, cables, and connectors for power, lighting, signal, control and related systems rated 600 volts and less.

B. Related Sections include the following:
   1. Section 26 05 26 – Grounding & Bonding
   2. Section 26 05 29 – Hangars & Supports for Electrical Systems
   3. Section 26 05 33 – Raceways & Boxes for Electrical Systems

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with provisions of the NEC.

B. Conform to applicable Codes and regulations regarding toxicity of combustion products of insulating materials.

C. UL Compliance: Provide components which are listed and labeled by UL under the following standards.
   1. UL 4
   2. UL 83
   3. UL 486

D. NEMA/ICEA Compliance: Provide components which comply with the following standards:
   1. WC-5 Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy IEEE Compliance: Provide components which comply with the following standard.
   2. Std. 82 Test procedures for Impulse Voltage Tests on Insulated Conductors.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver wire and cable according to NEMA WC-26

1.5 COORDINATION

1.6 Coordinate layout and installation of cable with other installations. Revise locations and elevations from those indicated as required to suit field conditions and as approved by the Architect.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. General: Provide wire and cable suitable for the temperature, conditions and location where indicated.

B. Conductors: Provide stranded conductors for power and lighting circuits #12 AWG minimum size. Provide stranded conductors for size #14 AWG for control circuits.

C. Conductor Material: copper for all wires and cables.

D. Aluminum conductors shall not be used.

E. Insulation: Provide 600 volt THHN/THWN insulation for all conductors unless otherwise noted.

F. Color Coding for phase identification in accordance with Table 1 in Part 3 below.

G. Jackets: Factory-applied nylon or PVC external jacketed wires and cables for pulls in raceways over 100-feet in length, for pulls in raceways with more than three equivalent 90 deg. bends, for pulls in conduits underground or under slabs on grade, and where indicated.

H. Cables: Provide the following type(s) of cables in NEC approved locations and applications where indicated. Provide cable UL listed for particular application:
1. Armored Cable.
2. Factory manufactured and listed fixture whips.

2.2 ACCESSORIES

A. Provide UL-listed factory-fabricated, solderless metal connectors of sizes, ampacity ratings, materials, types and classes for applications and for services indicated. Use connectors with temperature ratings equal to or greater than those of the wires upon which used.

B. For conductors larger than #6 AWG use compression type connectors only for splices and terminations to equipment where possible.

C. At cable size transition splices use compression connectors, with bolted connection if necessary. Use bolted compression or tee connections where the number of connections exceed two.

D. Split bolts and mechanical connectors may only be used if a compression method is not feasible.

E. Push-in wire connector shall not be used.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Service Entrance: Type THWN, copper conductor, in raceway.

B. Feeder and Branch Circuits: Type THHN/THWN, copper conductor, in raceway.

C. Class 1 Control Circuits: Type THHN/THWN, copper conductor in raceway.

D. Class 2 Control Circuits: Type THHN/THWN, copper conductor in raceway.

3.2 INSTALLATION

A. Install all power wire in raceway as indicated in Section 26 05 33.

B. General: Install electrical cables, wires, and connectors in compliance with NEC.

C. Coordinate cable installation with other Work.

D. Pull conductors simultaneously where more than one is being installed in same raceway. Use UL listed pulling compound or lubricant, where necessary.

E. Use pulling means including, fish tape, cable, rope, and basket weave wire/cable grips which will not damage cables or raceways. Do not use rope hitches for pulling attachment to wire or cable.

F. Conceal all cable in finished spaces.

G. Install exposed cable parallel and perpendicular to surfaces or exposed structural members, and follow surface contours, where possible.

H. Keep conductor splices to minimum.

I. TAPS and splices of #6 AWG and larger shall use compression bolted connectors. Splices in #8 AWG and smaller shall be made using preinsulated wing-nut spring tension connectors manufactured by 3-M Scotch, Ideal, or approved equal.

J. Install splice and tap connectors which possess equivalent or better mechanical strength and insulation rating than conductors being spliced.

K. Use splice and tap connectors which are compatible with conductor material.

L. Provide adequate length of conductors within electrical enclosures and train the conductors m terminal points with no excess. Bundle multiple conductors, with conductors larger than #10 AWG cabled in individual circuits. Make terminations so there is no bare conductor at the terminal.

M. Wiring at Outlets: Install with at least 9 inches of slack conductor at each outlet.

N. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals to comply with tightening torque's specified in UL 486A and UL 486B.

O. Minimum size power and lighting wiring shall be #12 AWG.

P. Motor control circuits may be #14 AWG.

Q. Use #10 AWG conductor for 20 amp. 120 volt branch circuit home runs longer than 100 ft., and for a 277 volt branch circuit home runs longer than 200 ft.

R. Conductor derating: Derate conductor ampacity in accordance with NEC raceway fill requirements. Do not fill raceways so that conductor derating will exceed 50 percent. Harmonic loading shall be considered for circuits serving office and/or classroom spaces.

S. Power Branch circuit neutrals: Provide separate grounded conductor (neutral) for each receptacle circuit 15 and/or 20 amps, that serves office and/or classroom spaces. Harmonic's shall be assumed in these areas.

T. Power branch circuits for receptacles in mechanical spaces, rooftop, outside convenience outlets, and other similar locations may use shared grounded conductors.

U. Identify phases on at all termination and splice points, by a following method and as required by the NEC:
   1. For conductors #6 AWG and larger use color tape, at least 4 inches at each required location.
   2. For conductors smaller than #6 AWG, marking shall be completed with continuous insulation color. These conductors shall not be color taped.

3.3 FIELD QUALITY CONTROL

A. Prior to energizing, check installed wires and cables with mega-ohm meter to determine insulation resistance levels to assure requirements are fulfilled.

B. Prior to energizing, test wires and cables for electrical continuity and for short-circuits.

C. Subsequent to wire and cable hook-ups, energize circuits and demonstrate proper functioning. Correct malfunctioning units, and retest to demonstrate compliance.

D. Color code secondary service, feeder, and branch circuit conductors with factory applied color as follows:

208Y/120 Volts	Phase	480Y/277 Volts
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray
Green	Ground	Green
Green with Yellow Stripe	Isolated Ground	

END OF SECTION 260519

SECTION 26 05 26 - GROUNDING & BONDING

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this section consists of providing labor, materials, tools, appliances and miscellaneous accessories associated with grounding of the electrical system as required by and as is indicated herein and/or on the Drawings.

1.2 SCOPE OF WORK

A. Main electric service equipment, raceways, motors, panelboards and other electrical equipment shall be effectively and permanently grounded to a grounding electrode. This electrode shall be the nearest available effectively grounded structural metal member of the structure or the nearest available effectively grounded metal water pipe and also a driven rod. Grounding connections and conductor sizes shall be in accordance with requirements of the NEC, Article 250, and local ordinances, and as described herein.

B. A separate grounding conductor, sized in accordance with NEC shall be provided in the conduit with the circuit conductors for all feeder and branch circuits. The grounding conductor may be bare or insulated copper; however, if this conductor is insulated, the insulating covering shall be a green color. Conduit runs shall be increased in size where necessary to accommodate the grounding conductor in addition to circuit conductors. The electrical continuity of all conduit runs shall be verified and corrected where necessary.

C. Isolated Ground Connectors shall be insulated. Additional grounding conductors and conduit shall be provided as specified herein or shown on the drawings. All conduit for grounding system conductors, not run in conduit with circuit conductors, shall be rigid steel conduit.

D. All electrical equipment enclosures and conductor enclosures shall be grounded. This includes but is not limited to metal raceways, outlet boxes, cabinets, switch boxes, motor frames, transformer cases and metallic enclosure for all electrical equipment.

E. Under no circumstances shall neutral conductors again be grounded after they have been grounded once at the transformer secondary.

F. Panelboards shall be equipped with a neutral bar which is insulated from the enclosure, and a grounding bar which is bonded to the enclosure. The grounding bar shall provide for terminating the green equipment grounding conductors in the panelboard or motor control center cabinets. The grounding bar shall be bonded to the cabinet. Neutral busses shall be isolated from ground except at the transformer ground connection.

G. Types of grounding in this section include the following:
   1. Underground metal water piping

2. Grounding electrodes
3. Service equipment
4. Enclosures
5. Systems
6. Equipment

H. Requirements of this section apply to electrical grounding work specified elsewhere in these specifications.

I. Provide Bonding Jumper across water meter.

PART 2 - PRODUCTS

2.1 MATERIALS AND COMPONENTS

A. General: Except as otherwise indicated, provide electrical grounding and bonding systems indicated, with assembly of materials including, but not necessarily limited to, cables/wires, connectors, terminals (solderless lugs), grounding rods/electrodes, bonding jumper braid, surge arrestors and other items and accessories needed for complete installation. Where more than one type meets indicated requirements, selection is Installer's option. Where materials or components are not otherwise indicated, comply with NEC, UL and IEEE requirements and with established industry standards for applications indicated.

B. Bonding Jumper Braid: Copper braided tape, constructed of 30-gage bare copper wires and properly sized for indicated applications.

C. Flexible Jumper Strap: Flexible flat conductor, 480 strands of 30-gage bare copper wire, 3/4" wide, 9-1/2" long, 48, 250 CM. Protect braid with copper bolt hole ends with holes sized for 3/8" dia. bolts.

D. Grounding Conductors: Unless otherwise indicated, provide electrical grounding conductors for grounding connections matching power supply wiring materials and sized according to NEC.

E. Connectors, Terminals and Clamps: Provide electrical bonding plates, connectors terminals and clamps as recommended by bonding plate, connector, terminal and clamp manufacturers for indicated applications.

F. Ground Electrodes: Ground Rods: Steel with copper clad welded exterior, 5/8" dia. X 10'. Copper flashed rods shall not be used.

G. Electrical Grounding Connection Accessories: Provide electrical insulating tape, heat-shrinkable insulating tubing, solder, soldering flux, bonding straps, as recommended by accessories manufacturers for type services indicated.

H. Field Welding: Comply with AWS code for procedures, appearance, and quality of welds and methods used in connecting welding work. Provide welded connections where grounding conductors connect to underground grounding rods/electrodes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install electrical grounding and bonding systems as indicated, in accordance with manufacturer's written instructions and with recognized industry practices to ensure grounding and ground-fault protection devices comply with requirements. Comply with requirements of NEC, and NECA's "Standard of Installation".

B. Coordinate with other electrical work as necessary to interface installation of grounding system and ground fault protection devices with other work.

C. Cadweld grounding conductors to underground grounding electrodes. The building equipment grounding system shall consist of the ground wire, and electrically continuous metallic conduit system. Every item of equipment served by the electrical system shall be bonded to the building equipment ground.

D. Portions of metallic piping and duct systems which are electrically isolated shall be bonded to the equipment grounding system with a flexible bonding jumper.

E. The neutral shall be grounded to the grounding electrode system at the service entrance only, and shall be kept isolated from the building grounding system throughout the building. The neutral of separately derived systems shall be grounded at one point.

F. Provide bonding and grounding wires run in conduit and sized per the NEC in accordance with the local electrical inspection department and the NEC. Metallic piping and duct systems which enter the building shall be grounded at the point of entry to the building, in accordance with the NEC.

G. Continuity of the building equipment grounding system shall be maintained throughout the project. Grounding jumpers shall be installed across conduit expansion fittings, all liquid-tight flexible metal and flexible metal conduit, light fixture pigtails in excess of 6', and all other nonelectrically continuous raceway fittings.

H. All main grounding conductors shall be stranded copper conductors, sized as shown and/or required, and run in a suitable raceway. All main grounding conductors shall be continuous without joints or splices over their entire length.

I. Bond the case and neutral of each transformer directly to the nearest available effectively grounded structural metal member of the structure, the nearest available effectively grounded metal water pipe, or in accordance with the local electrical inspection department. Flexible conduit shall not be used as a ground path to a transformer.

J. Provide a #6 ground conductor from the telephone service equipment to the building grounding system as required by the local Telephone Company.

K. Carefully and securely ground all fluorescent fixture bodies to the conduit grounding system. Flexible conduit longer than 6' shall not be considered a ground path.

L. Ground all grounding-type receptacles with a separate ground wire.

M. Grounding of all motors or equipment connected to terminal box with flexible conduit shall be made with separate grounding conductor between motor frame or equipment cabinet and rigid conduit system. Grounding conductor shall be sized in accordance with NEC Table 250.122.

N. All grounding conductors shall be amply protected from mechanical injury and shall be supported in an approved manner. Where conductors are located in concrete, they shall be installed in conduit. Where ground conductors enter or emerge from slabs bearing directly on fill or soil, the voids between the conductor and surrounding conduit shall be filled with compound to provide an effective water seal.

O. Grounding conductors shall be not smaller than #12 AWG. Conductors shall be high conductivity copper, and sizes larger than #10 AWG shall be stranded.

P. Insulated bushings shall be installed on all raceways at transformers, switchboards, motor-control centers, dry-type transformers, as well as switches used as service equipment.

Q. Install braided type bonding jumpers with clamps on water meter piping to electrically bypass water meter.

R. Install clamp-on connectors only on thoroughly cleaned metal contact surfaces, to ensure electrical conductivity and circuit integrity.

S. For all motor circuit and all circuits serving multi-outlet assemblies provide a separate grounding conductor in addition to any conduit ground. Conduit runs shall be increased in size where necessary to accommodate the grounding conductor in addition to circuit conductors.

3.2 FIELD QUALITY CONTROL

A. Upon completion of installation of electrical grounding system, test ground resistance with ground resistance tester. Where tests show resistance-to-ground is over 3 ohms, take appropriate action to reduce resistance to 3 ohms or less by driving additional ground rods and/or by chemically treating soil encircling ground rods with sodium chloride, calcium chloride, copper sulphate, or magnesium. Then retest to demonstrate compliance.

END OF SECTION 26 0526

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes secure support from the building structure for electrical items by means of hangers, supports, anchors, sleeves, inserts, seals, and associated fastenings.

1.2 SUBMITTALS

A. Product data for each type of product specified.

B. Hanger and support schedule showing manufacturer's figure number, size, spacing, features, and applications for each required type of support, hanger, sleeve, seal, and fastener to be used.

1.3 QUALITY ASSURANCE

A. Electrical Component Standard: Component and installation shall comply with NEC & NECA "Standard For Installation"

B. Electrical components shall be listed and labeled by UL, ETL, CSA, or other approved, nationally recognized testing and listing agency that provides third party certification follow-up services.

PART 2 - PRODUCTS

1.4 MANUFACTURED UNITS

A. Raceway Supports: Clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring steel clamps

B. Fasteners: Types, materials, and construction features as follows:

C. Expansion Anchors: Carbon steel wedge or sleeve type.

D. Toggle Bolts: All steel springhead type.

E. Powder-Driven Threaded Studs: Heat-treated steel, designed specifically for the intended service.

F. Conduit Sealing Bushings: Factory-fabricated watertight conduit sealing bushing assemblies suitable for sealing around conduit, or tubing passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps, and cap screws.

G. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for non armored electrical cables in riser conduits. Provide plugs with number and size of conductor gripping holes as required to suit individual risers. Construct body of malleable-iron casting with hot-dip galvanized finish.

H. U-Channel Systems: 16-gage steel channels, with 9/16-inch-diameter holes, at a minimum of 8 inches on center, in top surface. Provide fittings and accessories that mate and match with U-channel and are of the same manufacture.

1.5 FABRICATION

A. General: Shop- or field-fabricated supports or manufactured supports assembled from U-channel components.

B. Steel Brackets: Fabricated of angles, channels, and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.

C. Pipe Sleeves: Provide pipe sleeves of one of the following:

D. Sheet Metal: Fabricate from galvanized sheet metal; round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gage metal for sleeve diameter noted:
1. < 4”: 20-gage
2. 4” to 6”: 16-gage
3. > 6”: 14-gage
4. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe
5. Plastic Pipe: Fabricate from Schedule 80 PVC plastic pipe

1.6 FINISHES

A. Coating: Supports, support hardware, and fasteners shall be protected with zinc coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish, or inherent material characteristic. Products for use outdoors shall be hot-dip galvanized.

PART 3 - EXECUTION

1.7 INSTALLATION

A. Install supporting devices to fasten electric components securely and permanently in accordance with NEC requirements, NECA 1, NECA 101, and with support manufacturer instructions.

B. Coordinate with the building structural system and with other electrical installation.

C. Tie-wraps shall not be used.

D. Raceway Supports: Comply with the NEC and the following requirements:

1. Conform to manufacturer's recommendations for selection and installation of supports.
2. Strength of each support shall be adequate to carry present and future load multiplied by a safety factor of at least four. Where this determination results in a safety allowance of less than 200 lbs, provide additional strength until there is a minimum of 200 lbs safety allowance in the strength of each support.
3. Install individual and multiple (trapeze) raceway hangers and riser clamps as necessary to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assembly and for securing hanger rods and conduits.
4. Support parallel runs of horizontal raceways together on trapeze-type hangers.
5. Support individual horizontal raceways by separate pipe hangers. Spring steel fasteners may be used in lieu of hangers only for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings only. For hanger rods with spring steel fasteners, use 1/4-inch-diameter or larger threaded steel. Use spring steel fasteners that are specifically designed for supporting single conduits or tubing.
6. Space supports for raceway in accordance with NEC.
7. Support exposed and concealed raceway within 1 foot of an unsupported box and access fittings. In horizontal runs. support at the box and access fittings may be omitted where box or access fittings are independently supported and raceway terminals are not made with chase nipples or threadless box connectors.
8. In vertical runs, arrange support so the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports with no weight load on raceway terminals.

E. All hangers installed below the slab shall be stainless steel and attached to the building slab.

F. Vertical Conductor Supports: Install simultaneously with installation of conductors.

G. Miscellaneous Supports: Support miscellaneous electrical components as required to produce the same structural safety factors as specified for raceway supports. Install metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes, transformers, and other devices.

H. In open overhead spaces, cast boxes threaded to raceways need not be supported separately except where used for fixture support; support sheet metal boxes directly from the building structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an approved type of fastener not more than 24 inches from the box.

I. Sleeves: Install in concrete slabs and walls and all other fire-rated floors and walls for raceways and cable installations. For sleeves through fire-rated wall or floor construction, apply UL-listed firestopping sealant in gaps betweensleeves and enclosed conduits and cables in accordance with requirements of Division 7 Section "Joint Sealants."

J. Conduit Seals: Install seals for conduit penetrations of slabs on grade and exterior wails below grade and where indicated. Tighten sleeve seal screws until sealing grommets have expanded to form watertight seal.

K. Fastening: Unless otherwise indicated, fasten electrical items and their supporting hardware securely to the building structure, including but not limited to conduits, raceways, cables, cable

trays, busways, cabinets, panelboards, transformers, boxes, disconnect switches, and control components in accordance with the following:

1. Fasten by means of wood screws or screw-type nails on wood, toggle bolts on hollow masonry units, concrete inserts or expansion bolts on concrete or solid masonry, and machine screws, welded threaded studs, or spring-tension clamps on steel. Threaded studs driven by a powder charge and provided with lock washers and nuts may be used instead of expansion bolts and machine or wood screws. Do not weld conduit, pipe straps, or items other than threaded studs to steel structures. In partitions of light steel construction, use sheet metal screws.
2. Holes cut to depth of more than 1-1/2 inches in reinforced concrete beams or to depth of more than 3/4 inch in concrete shall not cut the main reinforcing bars. Fill holes that are not used.
3. Ensure that the load applied to any fastener does not exceed 25 percent of the proof test load. Use vibration- and shock-resistant fasteners for attachments to concrete slabs.

L. Test pull-out resistance of one of each type, size, and anchorage material for the following fastener types:
1. Expansion anchors.
2. Toggle bolts.
3. Powder-driven threaded studs.
4. E-Z type anchors.

M. Provide all jacks, jigs, fixtures, and calibrated indicating scales required for reliable testing. Obtain the Architects's approval before transmitting loads to the structure. Test to 90 percent of rated proof load for fastener. If fastening fails test, revise all similar fastener installations and retest until satisfactory results are achieved.

END OF SECTION 260529

SECTION 26 05 33 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes raceways and various types of electrical boxes, tubs, and enclosures for electrical wiring.

1.2 SUBMITTALS

A. Product data for conduit, surface raceways, and floor boxes.

B. Shop drawing for the installation of conduit in and under the slab.

1.3 QUALITY ASSURANCE

A. Comply with NEC for components and installation. Listing and Labeling: Provide products specified in this Section that are listed and labeled.

B. The Terms "Listed” and “Labeled" as defined by the NEC, Article 100.

C. Listing and Labeling Agency Qualifications: A “Nationally Recognized Testing Laboratory” as defined by OSHA Regulation 1910.7.

D. Comply with NECA "Standard of Installation."

E. Coordinate layout and installation of raceway with other construction elements to ensure adequate headroom, working clearance, and access.

F. Comply with UL 50, UL 514, and UL 886. Provide electrical boxes and fittings which are UL listed for that use.

PART 2 - PRODUCTS

2.1 CONDUITS AND TUBING

A. TYPES

1. Rigid Steel Conduit (RSC): Rigid steel conduit shall be heavy wall, hot-dipped galvanized or electro-galvanized. Conduit shall be in standard 10 foot lengths, threaded on both ends. Each length shall bear an UL label showing the manufacturer's name and/or trade mark. The label shall also designate the primary protective coating. The conduit shall have the inside and outside surfaces of each length thoroughly protected against

corrosion by an even coating of zinc. Zinc coating of the finished shall have an even, smooth appearance and be of uniform quality for the entire length. The zinc coating shall be protected by a coating of acid and alkali-resisting lacquer on the inside and outside of each length. Rigid steel conduit shall comply with ANSI C80.1 and UL 6. Minimum size of 3/4".

2. Intermediate Metal Conduit (IMC): Except for the wall thickness, the intermediate metal conduit shall comply with the requirements of Rigid Steel Conduit. Intermediate metal conduit shall comply with ANSI 80.6 and UL 1242. Minimum size of 3/4".
3. Electrical Metallic Tubing (EMT): Electrical metallic tubing shall be zinc coated steel tubing. The inside surface shall be coated with zinc or enamel. The coating on the inside and outside shall have an even and smooth appearance and be of uniform quality for the entire length. The tubing shall be in standard 10 foot lengths. Each length shall bear an UL label showing the manufacturer's name and/or trade mark. The label shall also designate the primary protective coating. Electrical metallic tubing shall comply with ANSI C80.3 and UL 797. Minimum size of 3/4".
4. Rigid Nonmetallic Conduit: Rigid nonmetallic conduit shall be schedule 40 or 80 polyvinyl chloride (PVC) rated for use with 90 degree C conductors and sunlight resistant. The conduit shall be in standard 10 foot lengths. Each length shall bear an UL label showing the manufacturer's name and/or trade mark. Rigid nonmetallic conduit shall comply with UL 651. Minimum size of 3/4".
5. Flexible Steel Conduit: Flexible steel conduit shall be continuous length of spirally wound, interlocked zinc-coated strip steel. Flexible steel conduit shall comply with UL 1. Install separate ground conductor across flexible connections. Minimum size of 1/2".
6. Liquid-tight Flexible Steel Conduit: Liquid-tight flexible steel conduit shall be continuous length of spirally wound, interlocked zinc-coated strip steel coated with flexible polyvinyl chloride. Liquid-tight flexible steel conduit shall comply with UL 360. Install separate ground conductor across flexible connections. Minimum size of 1/2".
7. Aluminum Conduit: Shall be rigid and in standard 10 foot lengths, threaded on both ends. Each shall bear an UL label showing the manufacturer’s name and/or trade mark. Aluminum conduit shall comply with UL 6A and ANSI C80.5. Minimum size of 3/4".
8. High-Density Polyethylene (HDPE) Conduit: Schedule 80 only, Meet requirements of NEMA Pub. No. TC 7-2000 for EPEC-80-HDPE and UL 651B and be UL listed for intended use. Minimum size of 3/4".

2.2 BOXES

A. DEVICE BOXES AND ACCESSORIES

1. Provide galvanized coated flat-rolled sheet-steel non-gangable device boxes, (2 1/8" deep minimum) of shapes, cubic inch capacities, and sizes, suitable for installation at respective locations.
2. Construct device boxes for flush mounting with mounting holes, and with cable-size knockout openings in bottom and ends, and with threaded screw holes in end plates for fastening devices.
3. Provide cable clamps and corrosion-resistant screws for fastening cable clamps, and for equipment type grounding.
4. Provide device box accessories as required for each installation, including mounting brackets, device box extensions, switch box supports, plaster ears, and plaster board expandable grip fasteners, which are compatible with device boxes being utilized to fulfill installation requirements for individual wiring situations.

5. Use appropriate box brackets and support to minimize box movement into wall.
6. Use wet location while in use covers for receptacles, where appropriate.

B. RAINTIGHT OUTLET BOXES
1. Provide corrosion-resistant cast-metal raintight outlet wiring boxes with threaded conduit holes for fastening electrical conduit, cast-metal face plates with spring-hinged watertight caps suitably configured for each application, including face plate gaskets and corrosion-resistant plugs and fasteners.

C. PANELBOARD TUBS
1. Tubs shall be provided by the panelboard manufacturer.

D. JUNCTION AND PULL BOXES
1. Provide galvanized code-gage sheet steel junction and pull boxes, with screw-on covers, welded seams and equipped with plated steel nuts, screws, and washers.
2. Provide junction and pull boxes where required to facilitate pulling of wire whether specified or not on drawings.
3. Maximum of 359 degrees of total turning radius shall be allowed between two pull points.

E. BUSHINGS, KNOCKOUT CLOSURES AND LOCKOUTS
1. Provide corrosion-resistant box knockout closures, conduit locknuts, and malleable iron conduit bushings, offset connectors, to suit respective installation requirements and applications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of the raceway system. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 RACEWAY APPLICATION

A. Rigid Steel or Intermediate Metal Conduit:

1. Install rigid steel conduit or intermediate metal conduit for the following conditions:
   a. Outdoor installations exposed or on rooftop
   b. Indoor conduit over 4”diameter
   c. Conduit subject to water or physical damage, unless otherwise specified
   d. Installations in hazardous-classified areas
   e. RGS elbows shall be used where conduit below the slab turns up to go above the slab and shall be extended to a minimum of 3” above the slab.

B. Electrical Metallic Tubing (EMT):

1. Install electrical metallic tubing for wiring less than 600 volts and in dry locations for the following conditions:
   a. Indoor branch circuits
   b. EMT shall not be used in concrete, direct burial, or in water softener areas or similar corrosive locations.

C. Rigid Nonmetallic Conduit:
1. Install rigid nonmetallic conduit (PVC) for the following conditions:
   a. Underground branch circuits and feeders.
   b. Underground signal, control, and communication circuits.
   c. Conduit installed in slab or other flat concrete.
2. When PVC is used at turn up above grade or above finished slab, only schedule 80 shall be used at the turn up location.

D. Liquid-Tight Flexible Steel Conduit:
1. Install liquid-tight flexible steel conduit for the following conditions:
   a. Connections to equipment subject to vibration, movement, or noise transmission such as motors, transformers, generators, dimmer banks.
   b. Exterior equipment connections
2. Maximum length is 6 feet.

E. Aluminum Conduit
1. Conduit subject to chemical reactions causing corrosion.
2. Conduit routed exterior to the building and within 50' of a cooling tower

F. High-Density Polyethylene (HDPE) Conduit
1. Install HDPE conduit for the following conditions
   a. All conduit requiring boring for installation
   b. Conduits between telecommunication hand holes and telecommunication man holes

3.3 INSTALLATION

A. Installation of electrical boxes, tubs and enclosures shall be coordinated with other trades.

B. Conduits shall not be encapsulated by fire proofing or any other material.

C. Provide labels and identification per NEC requirements and 26 05 53.

D. Additional expense incurred by the Contractor as a result of ill timed work will be born by the Contractor, at no additional charge to the Owner.

E. Install all electrical raceways and factory assemblies in accordance with manufacturer's written installation instructions, applicable requirements of NEC.

F. Complete installation of electrical raceways before starting installation of conductors within raceways.

G. Use approved conduit hangers and support conduit in a neat and orderly manner regardless of location.

H. Die cast conduit couplings and connectors are prohibited.

I. Keep raceways at least 6 inches away from parallel runs of flues or hot water pipes.

J. Install raceways level and square and at proper elevations.

K. Where possible, install horizontal raceway runs above water piping.

L. Prevent foreign matter from entering raceways by using temporary closure protection.

M. Make bends and offsets so the inside diameter is not effectively reduced. Keep the legs of a bend in the same plane and the straight legs of offsets parallel.

N. Run concealed raceways with a minimum of bends in the shortest practical distance considering the type of building construction and obstructions.

O. When conduit extends below the bottom of a slab on the ground, the slab shall be thickened in the area of the conduit so as to encase the conduit in concrete by at least 2 inches on all sides.

P. Where high voltage conduit or fiber duct is laid beneath the floor slab of a building, there shall be a minimum of 6 inches of sand fill between the outside of the concrete envelope around the conduit and the underside of the floor slab.

Q. RGS elbows shall be used where conduit below the slab turns up to go above the slab and shall be extended to a minimum of 3” above the slab.

R. Protect stub-ups from damage where conduits rise from floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

S. Raceways embedded in slabs: Install in middle third of the slab thickness where practical and leave at least 1 inch concrete cover. Tie raceways to reinforcing rods or otherwise secure them to prevent sagging or shifting during concrete placement. Place raceways laterally to prevent voids in concrete. Run conduit larger than one inch parallel with or at right angles to the main reinforcement; where at right angles to the reinforcement, the conduit shall be close to one of the supports of the slab.

T. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs and set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; flexible metal conduit may be used 6 inches above the floor where equipment connections are not to be made under this contract, install screwdriver-operated threaded flush plugs flush with floor.

U. Exposed raceways: Install parallel and perpendicular to nearby surfaces or structural members and follow the surface contours as much as practical.

V. Run exposed, parallel, or banked runs from the same centerline so that the bends are parallel. Factory elbows may be used in banked runs only where they can be installed parallel. This requires that there be a change in the plane of the run such as from wall to ceiling and that the raceways be of the same size. In other cases provide field bends for parallel raceways.

W. Join raceways with fittings designed and approved for the purpose and make joints wrench tight. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Make raceway terminations tight. Where terminations are subject to vibration, use bonding bushings or wedges to assure electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors.

X. Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely and install the locknuts with dished part against the box. Where terminations cannot be made secure with one locknut, use two locknuts, one inside and one outside the box. Bushings on all conduit 1 inch and larger shall be insulating type.

Y. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align the raceway so the coupling is square to the box, and tighten the chase nipple so no threads are exposed.

Z. Expansion fittings shall be used in all conduit runs crossing expansion joints, where required by NEC, or manufacturers recommendations.

AA. Install raceway sealing fittings in accordance with the manufacturer's written instructions. Locate fittings at suitable, approved, accessible locations and fill them with UL listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following locations:
1. Where conduits enter or leave hazardous locations.
2. Where conduits pass from warm locations to cold locations, such as the boundaries of refrigerated spaces and air conditioned spaces.
3. Where required by NEC.

BB. Install pull wires in all empty raceways. Use monofilament plastic line having not less than 100 lb tensile strength. Leave not less than 12 inches of slack at each end of the pull wire.

CC. Seal spare and empty conduits with a conduit cap or plug to which the pull wire is attached.

DD. Conduit fill: Do not exceed 30 percent conductor fill in conduits, containing branch circuit conductors. Do not exceed NEC requirements for all other conduits.

EE. Conductor derating: Derate conductor ampacity in accordance with NEC raceway fill requirements. Do not fill raceways so that conductor derating will exceed 50 percent.

FF. Provide boxes flush mounted in walls for switches, receptacles, telecommunications outlets, and manual motor starters.

GG. Provide rain-tight outlet boxes for interior and exterior locations exposed to weather or moisture.

HH. Install all boxes level and square.

II. Install switch boxes six inches from latch side of door openings.

JJ. Do not install aluminum products in concrete.

KK. Do not install boxes back-to-back or use through-the-wall boxes.

LL. Set floor boxes level and flush with finished flooring material.

MM. Fasten electrical boxes firmly and rigidly to substrates, or structural surfaces to which attached, or solidly embed boxes in concrete or masonry. Support boxes independently of conduit system.

NN. Install cover plates and plug unused openings in boxes, raceways, cabinets, and equipment cases to afford protection equivalent to the wall of the equipment.

END OF SECTION 260533

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this section consists of providing labor, materials, tools, appliances and miscellaneous accessories associated with electrical identification as indicated herein and on the Drawings.

B. Types of electrical identification specified in this section include the following:

1. Exposed conduit color banding
2. Cable/Conductor identification
3. Operational instructions and warnings
4. Danger signs
5. Equipment/system identification signs

1.2 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and ANSI C2.

B. Comply with NEC.

PART 2 - PRODUCTS

2.1 ELECTRICAL IDENTIFICATION MATERIALS

A. General: Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than one type is specified for an application, selection is Installer's option, but provide single selection for each application.

B. Provide identification and signage for all emergency systems, services, and other systems as required per NEC.

C. Cable/Conductor Identification Bands: General: Provide manufacturer's standard vinyl-cloth self-adhesive cable/conductor wire markers or wrap-around type, either pre-numbered plastic coated type, or write on type with clear plastic self-adhesive cover flap, numbered to show circuit identification.

D. Self-adhesive Plastic Signs: Provide manufacturer's standard, self-adhesive or pressure-sensitive, pre-printed, flexible vinyl signs for operational instructions or warnings, of sizes suitable for application areas and adequate for visibility, with proper wording for each

application (as examples: "208V", "EXHAUST FAN", "RECTIFIER"). Unless otherwise indicated or required by governing regulations, provide orange signs with black lettering.

E. Danger Signs: Provide Manufacturer's standard "DANGER" signs of baked enamel finish on 20-gage steel, of standard red, black and white graphics, 14" x 10" size except where 10" x 7" is the largest size which can be applied where needed and except where larger size is needed for adequate vision, and with recognized standard explanation wording (as examples: "HIGH VOLTAGE", "KEEP AWAY", "BURIED CABLE", "DO NOT TOUCH SWITCH").

F. Engraved Plastic-Laminate Signs: Provide engraved stock melamine plastic-laminate, complying with FS L-P-387, in sizes and thicknesses indicated, engraved with engraver's standard letter style of sizes and wording indicated, black and white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

1. Thickness: 1/16", for units up to 20 sq. in. or 8" length, 1/8" for larger units.
2. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate substrate.

2.2 LETTERING AND GRAPHICS

A. Coordinate names, abbreviations and other designations used in electrical identification work, with corresponding designations shown, specified for scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of electrical system and equipment.

PART 3 - EXECUTION

3.1 APPLICATION AND INSTALLATION

A. General Installation Requirements:

1. Coordination: Where identification to be applied to surfaces which require finish, install identification after completion of painting.
2. Regulations: Comply with governing regulations and requests of governing authorities for identification of electrical work.

B. Conduit Identification: Where electrical conduit is exposed in spaces with exposed mechanical piping which is identified by a color-coded method, apply color-coded identification on electrical conduit in a manner similar to piping identification. Except as otherwise indicated, use orange as coded color for conduit.

C. Cable Tray Identification: Label tray as required by NEC 392.18.

D. Cable/Conductor Identification:

1. Apply cable/conductor identification on each box/enclosure/cabinet where wires are present, Match identification with marking system used in panelboards, shop drawings, contract documents, and similar previously established identification for project electrical work.
2. Conductors shall be clearly and permanently identified.
3. All control circuit and instrument circuit terminations shall be identified. For conductors #6 and smaller, conductor color coding shall be color insulation. For conductor color coding of wire larger than #6, use self-adhesive wrap around tape markers. Use markers at all panelboards, boxes, outlets, switches, circuit breakers and control centers.
4. All ground conductors and these only: Green.
5. 208Y/120V: Phase Conductors: Black, red, blue. Neutral Conductor: White
6. 480y/277V: Phase conductors: Yellow, Orange, Brown Neutral, Conductor: Gray

E. Operational Instructions and Warnings: Wherever reasonably required to ensure safe and efficient operation and maintenance of electrical systems, and electrically connected mechanical systems and general systems and equipment, including prevention of misuse of electrical facilities by unauthorized personnel, install self-adhesive plastic signs or similar equivalent identification, instruction or warnings on switches, outlets and other controls devices and covers of electrical enclosures. Where detailed instructions or explanations are needed, provide plasticized tags with clearly written messages adequate for intended purposes.

F. Equipment/System Identification:

1. Install engraved plastic-laminate sign on each major unit of electrical equipment in building unless unit is specified with its own self-explanatory identification. Except as otherwise indicated, provide single line of text, 1/2" high lettering on 1-1/2" high sign (2" high where 2 lines are required), white lettering in black field.
2. Provide text matching terminology and numbering of the contract documents and shop drawings. Provide signs for the following categories of electrical work:
   a. Panelboards, electrical cabinets and enclosures
   b. Access panel/doors to electrical facilities
   c. Major electrical switchboard
   d. Disconnect Switches
   e. Transformers
   f. Telephone switching equipment
   g. Fire alarm master station
3. For all service equipment, provide nameplate stating available fault current at equipment. Verify available fault current with Architect.
4. Provide identification for all emergency system equipment, service equipment, and other systems per NEC requirements.
5. Install signs at locations indicated or, where not otherwise indicated, at location for best convenience of viewing without interference with operation and maintenance of equipment. Secure to substrate with fasteners, except use adhesive where fasteners should not or cannot penetrate the substrate.

END OF SECTION 260553

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this section consists of providing labor, materials, tools, appliances and miscellaneous accessories for wiring device work indicated by Drawings and schedules. Wiring devices are defined as single discrete units of electrical distribution systems which are intended to carry but not utilize electric energy.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Maintenance Manuals: Furnish maintenance manuals which contain equipment cuts, operating instructions, troubleshooting procedures and spare parts list for equipment. Ensure manual includes operating instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Subject to compliance with requirements, manufacturers offering devices which may be incorporated in the work include, but are not limited to the following:

1. Bryant Electric Co.
2. Harvey Hubbell, Inc.
3. Pass and Seymour, Inc.
4. Leviton Co.
5. Wiremold Company

2.2 FABRICATED WIRING DEVICES

A. General: Provide factory-fabricated wiring devices, in types, colors, and electrical ratings for applications indicated and complying with NEMA Stds. Pub. No. WD 1. Where types and grades are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements, and color devices and wallplates except as otherwise selected.

B. Receptacles:

1. Duplex: Provide duplex "specification grade" receptacles, 2-pole, 3-wire grounding, with green hexagonal equipment ground screw, ground terminals and poles internally connected to mounting yoke and mounting yoke provided with automatic grounding feature between mounting screws and yoke, 20-amperes, 125-volts, with metal plaster

ears, back and side wiring, NEMA configuration 5-2OR unless otherwise indicated. Pass & Seymour 5362 series (see below for color).

2. Simplex: Provide simplex "specification grade" receptacles, 2-pole, 3-wire grounding, with green hexagonal equipment ground screw, ground terminals and poles internally connected to mounting yoke and mounting yoke provided with automatic grounding feature between mounting screws and yoke, 20-amperes, 125 volts, with metal plate ears, (back and) side wiring, NEMA configuration 5-20R unless otherwise indicated. Pass & Seymour 5361 series (see below for color).
3. Ground-Fault Interrupter: Provide "specification grade" duplex receptacles, ground-fault circuit interrupters (GFCI), feed-thru type, capable of protecting connected downstream receptacles on single-circuit, grounding type UL-rated Class A, 20-amperes rating, 120-volts, 60 Hz, with solid-state ground-fault sensing and signaling, with 5 milliamperes ground-fault trip level; equip with 20-ampere plug configuration, NEMA 5-20R with local test/reset buttons and LED signal light to signify power is available. Pass & Seymour 2095 series (see below for color).

C. Plugs and Connectors: Refer to drawings.

D. Switches

1. Single Pole Toggle
   a. "Specification grade" flush, quiet, AC-type, single-pole toggle switches
   b. 20-amperes, 277/125 volts AC, with mounting yoke insulated from mechanism
   c. Plaster ears, switch handle, side-wired screw terminals (and backwiring with clamp type terminals).
   d. Pass & Seymour PS20AC1 series (see below for color).
2. Double-Pole Toggle
   a. "Specification grade" flush, quiet, AC type, double-pole toggle switches
   b. 20-amperes, 277/125 volts AC, with mounting yoke insulated from mechanism
   c. Plaster ears, switch handle, side-wired screw terminals (and backwiring with clamp type terminals) and ground screw.
   d. Pass & Seymour PS20AC2 series (see below for color).
3. Three-Way Toggle
   a. “Specification grade" flush, quiet, AC-type, three-way toggle switches
   b. 20-amperes, 277/125 volts AC, with mounting yoke insulated from mechanism
   c. Plaster ears, switch handle, side-wired screw terminals (and backwiring with clamp type terminals).
   d. Pass & Seymour series PS20AC3 (see below for color).
4. Four-Way Toggle
   a. “Specification grade" flush, quiet, AC-type, four-way toggle switches
   b. 20-amperes, 277/125 volts AC, with mounting yoke insulated from mechanism
   c. Plaster ears, switch handle, side-wired screw terminals (and backwiring with clamp type terminals)
   d. Pass & Seymour PS20AC4 series (see below for color).

2.3 WIRING DEVICE ACCESSORIES

A. Wall Plates: Provide wall plates for wiring devices, of types, sizes, and with ganging and cutouts as indicated on drawings (or schedules). Construct with metal screws with tamperproof heads for securing plates to devices, screw heads colored to match finish of plates. All

aluminum plates shall be made of solid anodized aluminum (not painted aluminum). All plastic plates shall be high-impact, smooth nylon.

2.4 WIRING DEVICE FINISHES

A. Provide device material and finish for outdoor locations, electrical rooms, mechanical rooms, work rooms, computer rooms, and equipment rooms according to the below list:

1. Switches: White
2. Switch Cover Plates: Nylon, White
3. Receptacles: White
4. Receptacle Cover Plates: Nylon, White
5. Ground-Fault Interrupter: White
6. Ground-Fault Interrupter Plates: Nylon, White

PART 3 - EXECUTION

3.1 INSTALLATION OF WIRING DEVICES/PLATES

A. Install wiring devices as indicated, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in accordance with recognized industry practices to fulfill project requirements.

B. Coordinate with other work, including painting, electrical box and wiring work, as necessary to interface installation of wiring devices with other work, furniture locations, and door swings.

C. Verify location of all devices with Architect before beginning construction.

D. Install wiring devices only in electrical boxes which are clean, free from excess building materials, dirt, and debris.

E. Install galvanized steel wall plates in unfinished spaces.

F. Install weatherproof covers at all damp or exposed locations, as indicated on drawings.

G. Delay installation of wiring devices until wiring work is completed.

H. Delay installation of wall plates until after painting work is completed.

I. Protect wiring devices during painting.

J. Plates shall be installed with all four edges in continuous contact with finished wall surfaces without the use of mats or similar devices. Plaster fillings will not be permitted. Plates shall be installed with an alignment tolerance of 1/16" from the vertical or horizontal.

K. All 20 amp and 15 amp, 3-wire receptacles shall be mounted with a “u” shaped grounding connection at the top, except for weatherproof receptacles and major appliance receptacles.

L. Provide monolithic cover plate for all switches and dimmer switches adjacent to each other.

3.2 PROTECTION OF WALL PLATES AND RECEPTACLES

A. Upon installation of wall plates and receptacles, advise Contractor regarding proper and cautious use of convenience outlets. At time of Substantial Completion, replace those items which have been damaged, including those burned and scored by faulty plugs.

3.3 GROUNDING

A. Provide electrically continuous, tight grounding connections for wiring devices, unless otherwise indicated. Tighten connections to comply with tightening torques specified in UL standard 486A to assure permanent and effective grounds.

3.4 TESTING

A. Prior to energizing circuitry, test wiring devices for electrical continuity and proper polarity connections. After energizing circuitry, test wiring devices to demonstrate compliance with requirements.

B. Sensitivity Test: After the sensor has been energized for at least 15 minutes, walk to the middle of the room (if conference room) or sit at the normal desk position (if and office). Make no motion for 20 seconds. Move one arm up and down slowly.

C. Time Delay Test: Set the time delay for 10 minutes. Walk into the room to activate the sensor then leave room. Sensor must turn lights off at approximately 10 minutes. Walk into the room again to reactivate the lights. Lights should activate within 1 second.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level (within 1/16”). Mark all conductors with the panel and circuit number serving the device, at the device. Mark the panel and circuit number serving the device on the backside of the device plate with a permanent marking system that does not show through the front of the plate.

3.6 MOUNTING HEIGHTS

A. Unless otherwise noted on the Drawings or required by the Architect, the following mounting heights shall apply:

Toggle switches	48" AFF	Vertical
Receptacles	18" AFF	Vertical
Over counter receptacles	6” Above Counter	Horizontal
Above back splashes	2” Above Splash Guard	Horizontal
Mechanical Room receptacles	18” AFF	Vertical

B. Upon approval of the Architect mounting heights may be adjusted.

END OF SECTION 262726

SECTION 26 28 13 - FUSES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Fuses

B. Related Sections include the following:
   1. Section 26 28 16 - Enclosed Switches and Circuit Breakers

1.2 SUBMITTALS

A. Submit the following according to the Conditions of the Contract and Division 01 Specification Sections.

B. Product data for each fuse type. Include the following:

C. Descriptive data and time-current curves.
   1. Let-through current curves for fuses with current limiting characteristics.
   2. Coordination charts and tables and related data.

1.3 QUALITY ASSURANCE

A. Comply with NEC for components and installation.

B. Listing and Labeling: Provide products specified in this Section that are listed and labeled.

C. The Terms "Listed" and "Labeled": As defined in the "National Electrical Code," Article 100.

D. Single-Source Responsibility: All fuses shall be the product of a single manufacturer.

PART 2 - PRODUCTS

2.1 CARTRIDGE FUSES

A. All fuses: 200,000 AIC at rated AC or DC voltage.

B. Fuses 1/10 through 600 A
   1. UL Class: RK- 1, time delay
   2. Maximum operating temperature: 300 deg. F
   3. Self protecting thermally
   4. Separate overload and short circuit element

5. Incorporate a spring-activated “snap-trigger” thermal overload element responsive to fuse temperatures exceeding 284 deg. F

C. Fuses 601 to 6,000 A
1. UL Class: L, time delay
2. Pure silver links
3. "O" ring seal
4. 600V or less AC
5. 250V or less DC

2.2 CONTROL CIRCUIT FUSES

A. UL Class CC

B. Dual element, time delay

2.3 PLUG FUSES

A. Type: UL 198F, Type S, dual element, time delay

B. Edison base fuses shall not be used

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fuses in fusible devices as indicated. Arrange fuses so that fuse ratings are readable without removing fuse.

END OF SECTION 262813

SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Feeder and equipment disconnects
2. Enclosed circuit breakers

B. Related Sections include the following:

1. Section 26 28 13 - Fuses

1.2 SUBMITTALS

A. Product data for switches, circuit breakers, and accessories specified in this Section.

B. Descriptive data and time-current curves for protective devices and let-through current curves for those devices with current-limiting characteristics. Include coordination charts and tables, and related data.

1.3 QUALITY ASSURANCE

A. Comply with NEC for components and installation.

B. Listing and Labeling: Provide products specified in this Section that are listed and labeled.

C. The Terms "Listed" and "Labeled": As defined in the "National Electrical Code," Article 100.

D. Single-Source Responsibility: All enclosed switches and circuit breakers shall be the product of a single manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Square D
2. Eaton

3. Siemens
4. GE

2.2 MATERIALS

A. ENCLOSED SWITCHES

1. Enclosed Non-fusible Switch: NEMA KS 1, Type HD, handle lockable with 2 padlocks.
2. Enclosed Fusible Switch, 800 Amperes and Smaller: NEMA KS 1, Type HD, clips to accommodate specified fuses, enclosure consistent with environment where located, handle lockable with 2 padlocks, and interlocked with cover in CLOSED position.
3. Switches serving fire pumps: Shall be lockable in closed position.
4. Enclosure: See plan.

B. ENCLOSED CIRCUIT BREAKERS

1. Enclosed Molded-Case Circuit Breaker: NEMA AB 1, handle lockable with 2 padlocks.
2. Characteristics: Frame size, trip rating, number of poles, and auxiliary devices as indicated; interrupting capacity rating to meet available fault current, 35,000 symmetrical RMS amperes minimum. With appropriate application listing when used for switching fluorescent lighting loads or heating, air conditioning, and refrigeration equipment.
3. Interchangeable Trips: Circuit breakers, 200 amperes and larger, with trip units interchangeable within frame size.
4. Lugs: Mechanical lugs and power-distribution connectors for number, size, and material of conductors indicated.
5. Shunt Trip: Where indicated, 120 volts, 60 Hz.
6. Enclosure: See plan

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install enclosed switches and circuit breakers in locations as indicated, according to manufacturer's written instructions.

B. Install enclosed switches and circuit breakers level and plumb.

C. Install wiring between enclosed switches and circuit breakers and control and indication devices.

D. Disconnects shall be mounted at 6’-6” AFF to top of enclosure in accessible areas, unless otherwise indicated.

E. Fusible disconnects shall not be mounted over 12 feet AFF. Unless otherwise indicated.

F. Disconnects mounted on equipment higher than 12 feet AFF, shall be non-fused. Fusing protection must be provided in a more readily accessible location.

G. All motors shall have a disconnecting means with in sight of, and not more than 20 feet from motor.

H. Provide a “Lock-Out” means at disconnect for all motors, at disconnect nearest motor or equipment.

I. Connect enclosed switches and circuit breakers and components to wiring system and to ground as indicated and instructed by manufacturer. Tighten connectors and terminals, including screws and bolts according to equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals according to tightening torques specified in UL Standard 486A.

3.2 FIELD QUALITY CONTROL

A. Testing: After installing enclosed switches and circuit breakers and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

B. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA Standard ATS, Section 7.5 for enclosed switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.

C. Verify all interlock devices (mechanical and electrical) are in place and working correctly.

D. Correct malfunctioning units at site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units, and retest.

3.3 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish including chips, scratches, and abrasions.

3.4 DEMONSTRATION

A. Review data in the "Operating and Maintenance Manual." Refer to Division 01 Section "Closeout Procedures."

END OF SECTION 262816

SECTION 31 62 19 – COMPOSITE TIMBER PILES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wood-Concrete Composite piles.

B. Related Sections:
   1. Section 03 30 00 - Cast-In-Place Concrete: Requirements for concrete fill.

1.2 REFERENCES

A. ASTM International:
   1. ASTM D25 - Standard Specification for Round Timber Piles.
   2. ASTM D245 - Standard Practice for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber.

B. Forest Stewardship Council:
   1. FSC Guidelines - Forest Stewardship Council Guidelines.

1.3 PERFORMANCE REQUIREMENTS

A. Drive piles to tip elevation shown on drawings or refusal of not more than 25 blows per foot.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Indicate details and schedule of pile installation sequence including a numbered pile plan and pile installation equipment.

C. Product Data: Submit details of pile components including shells, composite connector and untreated timber piles.

D. Material Inspection Reports: Submit reports of untreated timber pile and shell inspections.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Accurately record the following:
   1. Sizes, lengths, and locations of piles.
   2. Sequence of driving.
   3. Number of blows per foot for entire length of piles and measured set for last 10 blows.

4. Drilling: Hole diameters, start and tip elevations.
5. Final tip and head elevations.
6. Driving force of each hammer blow.
7. Type and size of equipment.
8. Alignment deviations.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with The International Building Code (2015 Edition).

1.7 QUALIFICATIONS

A. Installer: Company specializing in performing the Work of this section with minimum 5 years documented experience.

B. Monitor pile driving operations by Geotechnical Engineer experienced in this Work and licensed in State of Louisiana.

1.8 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing Work of this section.

1.9 SCHEDULING

A. Section 01 30 00 - Administrative Requirements: Requirements for scheduling.

B. Schedule installation of test piles.

PART 2 PRODUCTS

2.1 MATERIALS

A. Piles: ASTM D25 round timber, southern pine, clean peeled, friction type.

B. Dimensions:
1. Length: As indicated on Drawings.
2. Minimum Butt Diameter: 13 inches measured three feet from the butt.
3. Minimum Tip Diameter: 7 inches.

C. Splices, other than timber to steel shell connector, shall not be permitted.

D. Shell for Concrete Section: Shall be steel of sufficient strength to prevent distortion during driving of the pile or adjacent piles. The shell shall be a minimum of 11 inches inner diameter and sufficiently water tight to exclude water and foreign matter during the placing of concrete.

E. The composite connector shall be 12 gage minimum steel with cross wedges of ¼ inch minimum steel firmly attached to the steel casing. Connector shall conform to the requirements of the International Building Code.

F. Concrete: Concrete for cast-in-place upper section of composite piles shall be in accordance with section 03 30 00 - Cast-In-Place Concrete. Concrete shall have a minimum compressive strength of 3,000 psi at 28 days. Place concrete in clean and dry shell.

2.2 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

B. Grade piles in accordance with ASTM D245.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

3.2 PREPARATION

A. Obtain prior approval of hammer type to be used.

B. Use driving method which will not cause damage to nearby structures.

C. Notify adjacent and affected land owners and building occupants with 30 days and 5 day notice before proceeding with the Work.

D. Protect structures near the Work, from damage.

E. Prepare to place piles from existing site elevations.

3.3 PRE-DRILLING

A. Pre-Drilling is required for all piles.

B. Predrill holes using wet rotary methods to a depth of 10 feet below existing grade using a fishtail type or bladed bit with a diameter no larger than 7 inches. Engineer may direct contractor to predrill more than 10 feet, at no additional cost to the owner, if hard driving conditions warrant.

3.4 INSTALLATION

A. Drive piles with a Vulcan No.1 hammer having a rated driving energy of 15,000 ft. lbs. per blow.

B. Driving shall be performed with fixed leads that hold the pile firmly in position and in alignment with the hammer.

C. Protect pile head during driving using collar, with full bearing on pile butt for even distribution of hammer blow.

D. Deliver hammer blows to central axis of pile.

E. The upper portion of composite piles shall be driven with a mandrel.

F. Backfill voids between upper can section and surrounding earthwork with compacted granular fill.

G. When driving is interrupted before refusal, drive an additional 12 inches before resuming recording of performance data.

H. Re-drive piles which have lifted due to driving adjacent piles, or by soil uplift.

I. Do not damage piles during driving operations.

J. Immediately remove and replace any pile that is damaged, deflected, broken, or which cannot be driven to proper elevation due to interference by underground obstruction. Replace such pile with an acceptable substitute at the location determined by engineer of record. If removal of pile is not possible, cutoff five (5) feet below grade and replace with additional pile(s) in location as directed by engineer of record.

3.5 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation From Vertical For Plumb Piles: 1 in10.

C. Maximum Variation From Design Cut-off Elevation: 4 inches.

D. Maximum Out-of-Position: 3 inches.

3.6 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Request inspection of foundations in accordance with Plaquemines Parish Standards.

END OF SECTION