CITY OF TROY
DEPARTMENT OF SAFETY AND SERVICE
CITY HALL TROY, OHIO
COPY OF LEGAL ADVERTISEMENT

Sealed proposals will be received until 12 o'clock noon on Thursday, July 30, 2026 by electronic bid only for the Troy Aquatic Park Maintenance Improvement Project in accordance with the specifications now on file in the office of the Director of Public Service and Safety, City of Troy, Ohio.

This project consists of maintenance improvements at the Troy Aquatic Park that are identified within the drawings and specifications. Bidders shall obtain complete sets of Bidding Documents from the City of Troy at the address www.bidexpress.com and within the guidelines designated within this advertisement.

The electronic bidding will be handled through the Bid Express service www.bidexpress.com. Bidder must register, set up to bid, and review each solicitation the bidder intends to bid electronically prior to bidding.

All Contractors and Subcontractors involved with the project will, to the extent practical, use Ohio products, materials, services, and labor in the implementation of this project.

Bidders must comply with the prevailing wage rates on Public Improvements in Miami County and the City of Troy, Ohio as determined by the Ohio Department of Industrial Relations.

A bid guaranty as follows is required to accompany each proposal as a guarantee that if the proposal is accepted a contract will be entered into:

- A bid bond in the amount of 100% payable to the City of Troy, or
- A certified check, a cashier's check, Official Bank Check, or a letter of credit in the amount of 10% payable to the City of Troy, Ohio

The City of Troy reserves the right to reject any or all bids, to waive any irregularities in the bids when to the advantage of the City and to select the best bid in its opinion. The City of Troy, Ohio is in compliance with ADA.

Patrick E. J. Titterington
Director of Public Service and Safety

Adv: 7-15-2026, 7-22-2026

MISSION STATEMENT FOR
CONSTRUCTION OF PUBLIC WORKS IN THE CITY OF TROY, OHIO

MISSION

It shall be the mission of the City of Troy and the Contractor to cause to be constructed a high-quality project for use by the citizens of Troy. We agree to cooperate, and communicate in all matters to ensure that the final product is both an asset to the Citizens of Troy and a tribute to the labors of the contractor.

GOALS

- Quality, Quality, Quality
- A safe and secure job site
- Respect for the concerns of the public
- Completion of the project early or by the project completion date.
- Completion of the project under budget.
- Establishment of a long-term positive relationship between the contractor and the City of Troy.

COMMUNICATION

- Open and honest communication is demanded and must occur in a timely manner.
- All requests for information responded to in a timely manner.
- Communicate ideas on methods to improve operations and contain costs.
- Follow formal communication channels with respect to challenges and changes.

ISSUE RESOLUTION

- Everyone is responsible for identifying potential contestable issues regardless of the issue or responsibility.
- Identify and notify affected parties as soon as possible.
- Seek alternative solutions
- Evaluate impact of alternative on project (cost, time, end result)
- Resolve issues in a timely manner and which is agreeable to all parties.

IMPLEMENTATION AND EVALUATION

- Review and discuss the viability and working status of the above at any time. At the end of construction, review and discuss where implementation was most effective and where it could be improved.

INSTRUCTIONS TO BIDDERS AND GENERAL CONDITIONS

A. EXAMINATION OF DOCUMENTS AND SITE CONDITIONS

1. Bidders are advised to carefully review the work site, access, conditions affecting the delivery of materials, equipment and employees, and to make all necessary investigations as they feel necessary to adequately acquaint themselves with the site, project requirements, and the performance of the proposed work, its quality and quantity to be handled to the satisfaction of the City under this Contract.
2. The City of Troy does not attempt to advise the Bidders as to any of the conditions referred to within these specifications.
3. Bidders are cautioned to carefully review all parts of the Contract documents, and all other codes, specifications and orders contained or cited herein, or as may be necessary to perform this Contract in accordance with City of Troy and any other applicable regulatory agencies' oversight and/or approval.
4. No allowance will be made subsequently for any error, oversight or negligence of the Bidder.
5. Submission of a proposal represents that the Bidder has based his Bid upon materials, systems and equipment required by the Contract Documents without exception, AND the submission of a proposal shall constitute and incontrovertible representation by the Bidder that he has complied with every requirement of these "Instructions to Bidders", and that he will be able to perform to the satisfaction of the City of Troy in fulfilling this Contract.

B. BIDDING DOCUMENTS

1. Copies
    a. Bidders shall obtain complete sets of Bidding Documents from the City of Troy at the address www.bidexpress.com and within the guidelines designated in the Legal Advertisement.
    b. Bidders shall use complete sets of Bidding Documents in preparing Bid submittals. The City of Troy, Ohio does not assume any responsibility for errors or misrepresentations resulting from the use of incomplete sets of Bidding Documents.
2. Interpretations
    a. All questions about the meaning or intent of Bidding Documents or discovery of any ambiguities, inconsistencies, errors or omissions in the Bidding Documents, including plans, shall be submitted promptly in writing via Bid Express.
    b. Replies will be issued by Addendum electronically via Bid Express to all parties recorded by the City as having received the Bidding Documents.
    c. Questions received less than 72 hours prior to the time and date for opening Bids will not be answered.
    d. Only questions answered by formal written Addenda will be binding. Oral or other interpretations will be without legal effect.

C. **PREPARATION OF BIDS**

1. All Bids must be submitted on the "Form of Proposal" furnished with the Bid Documents and submitted with all required attachments.
2. All blank spaces shall be filled in, in ink or typewritten, in words and figures, or in figures only where no space is provided for words, and signed by the Bidder. The wording of the Form of Proposal shall be used without change, alteration, or addition.
3. Any change in the wording or any omission of specified requisite documents, may cause the proposal to be rejected. All corrections shall be crossed out, initialed and clearly re-written. No white-out or correction tape may be used.
4. Bidders shall note receipt of any and all Addenda in the appropriate place on the Form of Proposal.
5. Bids shall be handled electronically through Bid Express service at www.bidexpress.com
6. At a minimum, all Bids shall contain the following:
    a. The completed and executed Form of Proposal
    b. The Bid Guaranty
    c. Bid Bond
    d. Experience/Reference sheet
    e. Non-Collusion Affidavit
    f. ADA Compliance Certification
    g. Other required documents
    h. Other data that the Bidder feels important in the evaluation of him and his submittal by the City for this project.
7. The Bidder shall take the following precautions in preparing Proposals:
    a. Sign the Proposal and check to ensure that all blank spaces have been filled in with requested information and that the accompanying documents described within the Specifications have been included in the submittal.
    b. Where the Form of Proposal provides for quoting a unit price, the Bidder shall insert the unit price and for the appropriate unit quantity.
    c. When applicable, make sure the Bid Guaranty is for the proper amount and is properly executed and signed on all lines where signatures are required by: (1) The Bidder, and (2) the Surety or Sureties.
    d. Bids by Corporations must be executed in the corporate name by president or vice president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be as shown below the signature.
    e. Bids by partnerships must be executed in the partnership name and signed by a partner. His title must appear under his signature and the official address of the partnership must be shown below the signature.
    f. All names must be typed or printed below the signature.
8. Bonds and Guarantees
    a. Bid Guaranty: The Bidder shall furnish a Bid Guaranty as prescribed in Section 153.54, 153.57 and 153.571 of the Ohio Revised Code, in the form of either:

1) A bond for the full amount of the Bid in the form of a Bid Guaranty and Performance Bond, or a Bid Bond, included in the Contract Documents, or;
2) A Certified Check, Cashier's Check or Letter of Credit in an amount equal to 10% of the Bid.

b. If the successful Bidder submits a Bid Bond, Certified Check, Cashier's Check or Letter of Credit, then before a Contract is entered into he shall submit a Performance and Payment Bond in an amount equal to 100% of the Contract Price.
c. All bonds and guarantees shall be issued by a Surety Company or Corporation licensed in the State of Ohio to provide said surety and shall be to the satisfaction of the City. In determining whether a company is satisfactory, the City may consider the company's financial stability as indicated by publications and services reporting on its credit-worthiness.
d. All bonds shall be signed by an authorized agent of an acceptable Surety Bonding Company and by the Bidder. (Affix Corporate Seals to all copies)
e. Surety Bonding Company bonds shall be supported by credentials showing the Power of Attorney of agent and a certificate showing the legal right of the Bonding Company to do business in the State of Ohio, and a financial statement of the Surety.
f. The Bid Guaranty, as applicable, shall be in the name of or payable to the order of the City of Troy, Ohio.
g. The name and address of the Surety and the name and address of the Surety's Agent shall be typed or printed on each bond.
h. After a Contract is entered into by the successful Bidder, the certified checks or letters of credit of the unsuccessful Bidders will be returned. Bonds will be returned to unsuccessful Bidders upon demand.
i. If, at any time during the continuance of the work, any surety shall, in the opinion of the City become irresponsible or insolvent, the City shall have the right to require additional and sufficient surety or sureties which the Contractor shall furnish to the satisfaction of the City within ten (10) days after notice and, if in default thereof, the work may be suspended by the City with any payment due the Contractor adjusted to cover any expenses incurred by the City as a result of this matter.

9. Submission of Bid
   a. The Bidder shall assume full responsibility for timely delivery at the location designated for the receipt of Bids in the Legal Advertisement.
   b. Oral, telephonic, telegraphic, or facsimile Bids are invalid and will not receive consideration.
   c. Bids received after the time and date for receipt of Bids will be considered invalid and will be returned.
   d. Bids shall be submitted prior to the time and date listed, at the location designated in the advertisement.
10. Modification or Withdraw of Bid
   a. Prior to the time and date designated for receipt of Bids, any Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the

place designated for the receipt of Bids. Such notice shall be in writing with the signature of the Bidder.

b. 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.
c. Bid Guaranty shall be in an amount sufficient for the Bid as modified or resubmitted.

D. **METHOD OF AWARD**

1. Subject to the right of the City to reject any and all Bids and as provided herein, the City will award a contract deemed to be in its best interest.
2. The City will, when deemed in its best interest, award a single Contract for the Work.
3. Bidders must furnish all information requested on or to accompany the Form of Proposal. Failure to do so may result in disqualification of the Bid.
4. Not withstanding the right of the City to reject any and all Bids, determination of the Lowest and Best Bid shall be at the sole discretion of the City. In determining the Lowest and Best Bid, the City shall take into consideration not only the amount of the Bid, but such of the following criteria as it, in its sole discretion deems appropriate and may give such weight thereto as it, in its sole discretion deems appropriate:
    a. The Bidder's financial ability to complete the Contract successfully and on time without resort to its Surety;
    b. The Bidder's prior experience with comparable or more complex projects;
    c. The Bidder's prior work history and experience with the City of Troy;
    d. The Bidder's prior history for successful and timely completion of projects;
    e. The Bidder's equipment and facilities;
    f. The adequacy, in numbers and experience, of the Bidder's work force to complete the Contract successfully and on time.
    g. The Bidder's compliance with Federal, State and local laws, rules and regulations, including but not limited to the Occupational Safety and Health Act and ADA;
    h. The foregoing information with respect to each of the Subcontractors which the Contractor intends to use on the Project; and/or
    i. Depending on the type of work, other essential factors deemed relevant by the City.
4. The City reserves the right to reject any or all the Bids and to waive any formalities or irregularities in the Bids when determined by the City to be of advantage to the City.
5. If a Contract is awarded, the City will give the successful Bidder a "Notice of Award" within 30 days following the day of the Bid opening.
6. Simultaneously with delivery of executed counterparts of the Contract to the City, the successful Bidder shall deliver to the City the required Contract Bond, Hold Harmless Agreement, Delinquent Property Tax Affidavit, and other required documentation, including but not limited to, specific insurance documentation.
7. If the successful Bidder is a corporation, the secretary of said corporation shall execute an Affidavit, stating that the officer or agent of said corporation was authorized to do so by either provision of corporation bylaws or by the adoption of a resolution of the Board of Directors of the corporation, whichever the case may be.

8. If the Bidder to whom the award is made fails to enter into a Contract as herein provided, the award may be annulled and the Contract let to the next lowest and best Bidder in the opinion of the City; and such Bidder shall fulfill every stipulation embraced herein, as if he were the original party to whom the award was made.

E. EXECUTION OF CONTRACT

1. The successful Bidder shall execute and return to the City the signed Contract within ten (10) days (Saturdays, Sundays, and legal holidays excluded) after receipt of the Contract. The form of the Contract is included in these Bid Documents as an example, and is not to be completed as part of this bid.

F. UNIT PRICES

1. Where unit prices are requested in the Form of Proposal for a division of work on which the Bidder submits a Bid, the Bidder shall quote a unit price. Unless otherwise expressly provided in the Contract Documents, such unit prices shall include all labor, materials and services necessary for the storage, delivery and installation of the item and/or equipment, or service for which the unit prices are requested. The unit prices quoted in the Form of Proposal shall be the basis for any change orders entered into under the Contract except where they would cause substantial inequity to the City or the Contractor, in which case they shall be equitably adjusted by the City.

G. ADDENDA

1. Any explanation, interpretation, correction or modification of the Bid Documents will be issued in writing in the form of an Addendum, which shall be the only means considered binding. Explanations, interpretations, etc., made by any other means shall NOT be legally binding. All Addenda shall become a part of the Contract Documents, the receipt of which shall be indicated on the Form of Proposal by the Bidders.
2. Each Bidder shall carefully read and review the Bid Documents and immediately bring to the attention of the City and error, omission, inconsistency or ambiguity therein, and shall submit questions to the City in advance to allow sufficient time for the City to respond. An Addenda will be issued electronically via Bid Express. If any Addenda is issued within such seventy-two (72) hour period, then the time for opening Bids may be extended one (1) week with no further advertising of Bids required.
3. Copies of each Addendum will be sent only to Bidders to whom Bid Documents have been issued.

H. PROTECTION OF PROPERTY

1. Bidders are required to inform themselves fully of the conditions relating to the construction and labor under which the work will be performed. If awarded the Contract, they must also employ so far as possible such methods and means in carrying out this work as will cause the least amount of interruption or interference to traffic or to adjacent property owners.

I. **SUBCONTRACTORS**

1. The Contractor may utilize the services of specialty Subcontractors on those parts of work which, under normal construction practices, are not performed by a general Contractor, provided:
    a. The Contractor shall not award work to any Subcontractor without prior written approval of the City.
    b. The Contractor and /or his surety shall be fully responsible to the City for the act of his Subcontractors, and of persons either directly or indirectly employed by them.
    c. Nothing contained in these Contract documents shall create any contractual relation between the City and the Subcontractor.
    d. Any assignment of this Contract will not release the Contractor or his surety from the faithful performance of the Contract.
2. The Contractor shall also maintain the organization and structure of his staff and operations; plant and equipment; and sufficient operating resources to manage this Contract to the satisfaction of the City, and to the level that he proposed to use in his Bid submittal. Failure to do so, as determined by the City, without prior written request by the Contractor of the City and approval of the City in writing allowing any such modifications to the Contract or any deviation or degradation in service that may be attributed to such changes, may be cause for the City to declare the Contractor in default of the conditions of the Contract, and to remove the Contractor from further involvement with the execution of the Contract, and the City may seek whatever relief or assistance is needed to complete the functions of the Contract with the Contractor bearing the costs of same.

J. **PLANS**

1. After awarding of a Contract, a sufficient number of sets of working drawings and specifications will be supplied to the Contractor without charge. The Contractor shall furnish a Contractors Progress Schedule (Ghant Chart preferred) showing the percent of major components of the project to be completed per month.

K. **INSURANCE**

1. See the "Construction Contracts Insurance Requirements City of Troy, Ohio"

L. **NONPERFORMANCE**

1. If at any time the City, or the designated representative thereof, is of the opinion that the work to be done under this Contract is being improperly performed, and if the Contractor, upon notice, does not take the proper measures to remedy the situation, the City may proceed to place upon the project site the required tools, labor, equipment, and materials to complete the required work in accordance with the plans and specifications, which work and all cost incident thereto shall be charged to the Contractor and his bond.

M. **RELEASE OF LIEN**

1. Before final payment of this Contract is made, the City will require the Contractor to submit an affidavit from all Subcontractors and dealers in materials who have

furnished labor or materials for this Contract, showing that all claims and obligations arising in connection with the performance of their portion of the Contract have been satisfactorily settled.

N. **UTILITY NOTIFICATION**

1. The Contractor shall be responsible for all utility notification and coordinating his work with and around them.
2. The Contractor shall be responsible for all expenses relating to any damage to any utility as a result of actions taken in connection with this project.

O. **WORK SCHEDULE**

1. The Contractor shall prosecute the work in a vigorous and efficient manner, to ensure completion of the project within the time limit set and will keep the area of his operation in a neat and orderly condition. This shall include, but is not limited to, dust control, tarping over seats, and cleaning area below work.
2. The Pool will be closed and not utilized while work is being completed. However, the contractor is required to communicate and activities with the owner prior to any on a weekly basis to ensure. Methods for protection of existing conditions, clean-up, staging of materials, and work areas shall be outlined to the owner prior to the start of work.
3. All work associated with the project cannot start until August 25, 2026 and must be substantially completed and occupiable no later than May 1, 2027.
4. Work cannot commence until August 25th, 2026. However, it is anticipated the contract with the City will be complete well in advance of that allowing for any work that does not directly impact the project site or operations to commence as needed.
5. During construction, the Contractor shall provide weekly schedule updates to the owner.

P**. ACCEPTANCE**

1. No acceptance will be made of a portion of the project prior to final completion. The project will be accepted as a whole and it is the Contractors responsibility to maintain such portions completed until final acceptance.

Q. **SAFETY**

1. It shall be the duty of the Contractor to erect and maintain adequate lights, signs and barricades to insure the safety of the public during the progress of the work, and the same is to be maintained until final acceptance by the City.
2. It shall be the duty of the Contractor to follow, and have all persons on the job site follow, all applicable rules and regulations regarding worker safety including those as provided by the State of Ohio Occupation Safety and Health Administration (OSHA).

R. **LOCAL LABOR AND MATERIAL SUPPLIERS**

1. All Contractors and Subcontractors involved with this project will, to the extent practical, use local products, materials, services, and labor in the implementation of this Contract.

S. **AS-BUILT DRAWINGS**

1. Upon completion of each project, the Engineer is required to submit as-built drawings with the information provided by the Contractor's field note changes. The As-built drawings shall be in DWG or TIF4 format and all changes are to be crossed out and changed in red.

T. **ENGINEER'S ESTIMATE**

1. The Engineer's Estimate for the Troy Aquatic Park Improvements Project is $2,500,000.

U. **LIQUIDATED DAMAGES FOR DELAY IN COMPLETION**

If Contractor fails to achieve Substantial Completion of the Work by the Contract Completion Date set forth herein, Contractor shall pay to Owner, as liquidated damages and not as a penalty, the sum of **$1,000.00 per calendar day** for each and every day of delay beyond the Contract Completion Date until Substantial Completion is achieved.

The parties acknowledge and agree that: (i) Owner's actual damages resulting from delay would be difficult or impossible to ascertain with precision; (ii) the liquidated damages amount represents a reasonable estimate of the damages Owner would suffer as a result of such delay; and (iii) such amount is not intended to constitute a penalty.

Liquidated damages shall not apply to delays caused by: (a) acts of God, fire, flood, earthquake, or other natural disasters; (b) acts of war, terrorism, or civil unrest; (c) changes in the Work directed by Owner; (d) Owner's failure to provide timely access to the work site or required approvals; or (e) other events beyond Contractor's reasonable control, provided Contractor delivers written notice to Owner within 30 **days** of the commencement of any such delay event.

Owner may deduct any accrued liquidated damages from amounts otherwise due and owing to Contractor, or may demand payment of the same directly from Contractor. The assessment of liquidated damages shall not relieve Contractor of any other obligation under this Agreement, including the obligation to complete the Work.

V. **BUILDING PERMIT**

1. The City will submit for and pay for the overall building permit; any specific trade permits specific to the work being completed, is by the Contractor.

CITY OF TROY, OHIO INSURANCE REQUIREMENTS
CONSTRUCTION CONTRACTS

Insurance Requirements – Contractors shall procure and maintain for the duration of the contract, and for three years thereafter, 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 Contractor, their agents, representatives, employees or subcontractors.

Minimum Scope of Insurance - Coverage types shall include and be at least as broad as:

1. **Commercial General Liability (CGL)**: Insurance Services Office (ISO) Form CG 00 01 covering CGL on an "occurrence" basis, including products-completed operations, with limits no less than $2,000,000 per occurrence for bodily injury, property damage, personal & advertising injury. If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location (ISO form CG 25 03 or CG 25 04) or the general aggregate limit shall be twice the required occurrence limit.

2. **Automobile Liability**: Insurance Services Office Form Number CA 0001 covering Code 1 (any auto), or if Contractor has no owned autos, hired (Code 8), and non-owned autos (Code 9), with limit no less than $1,000,000 per accident for bodily injury and property damage.

3. **Workers' Compensation** insurance as required by the State of Ohio, and Employers' Liability insurance with a limit of no less than $1,000,000 per accident for bodily injury or disease. If coverage is through The Ohio Bureau of Workers' Compensation, Employers' Liability coverage must be endorsed on the Commercial General Liability policy.

Other Insurance Provisions - The policies are to contain or be endorsed to contain, the following provisions:

1. **Additional Insured:** The City of Troy, Ohio, its officials, agents, employees and volunteers are to be covered as Additional Insureds on the Commercial General Liability and Automobile Liability policies as respects liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts, or equipment furnished in connection with such work or operations and automobiles owned, leased, hired, or borrowed by or on behalf of the Contractor.
    a. To provide appropriate Additional Insured coverage for general liability, including liability arising out of the products-completed operations hazard, Contractor agrees to use the following endorsement(s), or similar endorsements providing equal or broader Additional Insured coverage:
        i. ISO Form CG 20 10 11 85, OR if later revisions are used;
        ii. ISO Form CG 20 10, CG 20 26, CG 20 33, or CG 20 38; AND ISO Form CG 20 37 10 01.

2. **Primary Coverage:** For claims related to this project, the Contractor's insurance coverage shall be primary as respects the City, its officials, agents, employees and volunteers. Any insurance or self-insurance maintained by the City, its officials, agents, employees and volunteers shall be excess of Contractor's insurance and shall not contribute with it.

Umbrella or Excess Liability – Contractor may satisfy the minimum liability limits required above for Commercial General Liability or Business Auto Liability under an Umbrella or Excess Liability policy. Contractor agrees to endorse the City as an Additional Insured on the Umbrella or Excess policy, unless the Umbrella or Excess policy provides coverage on a "Follow Form" basis and such fact is disclosed on the Certificate of Insurance.

Waiver of Subrogation – Contractor hereby agrees to waive rights of subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to secure endorsements necessary to effect this waiver of subrogation.

Acceptability of Insurers – Insurance is to be placed with insurers with a current A.M. Best rating of no less than A:VII, unless otherwise acceptable to the City.

Verification of Coverage - The Contractor shall furnish the City with **Certificates of Insurance** and amendatory endorsements (or copies of the applicable insurance language effecting coverage required herein) and a copy of the Declarations and Endorsements Page of the CGL policy listing all policy endorsements. All certificates and endorsements shall be received by the City before work commences. However, failure to obtain the required documents prior to the beginning of work shall not waive the Contractor's obligation to provide them. The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements, required by these specifications, at any time.

The Contractor and all Subcontractors shall furnish the City one (1) unaltered copy of the official certificate of the Ohio Industrial Commission indicating that he has paid the premiums required under the Ohio Workers' Compensation Act evidencing that these workers are covered by Workers' Compensation during the Contract term. If the Contractor is legally permitted and qualified to be a self-insurer, such self-insurer shall furnish proof of such status to the City.

Non-renewal, Cancellation, or Material Change of Coverage. Each insurance policy required above shall state that coverage shall not be cancelled, except with notice to the City**.** If the Contractor receives a non-renewal or cancellation notice from an insurance carrier providing coverage required herein, or receives notice that coverage no longer complies with the requirements herein, **Contractor agrees to notify the City** by fax or email within five (5) business days with a copy of the non-renewal or cancellation notice, or written explanation of how coverage is no longer in compliance. The Contractor shall cease operations on the occurrence of any such non-renewal, cancellation, or material change and shall not resume operations until insurance is in force that complies with these requirements.

Subcontractor's Insurance - The Contractor shall require and verify that all Subcontractors maintain insurance meeting all the requirements stated herein, and the Contractor shall ensure that the City additional insured on insurance required from subcontractors. For CGL coverage, subcontractors shall provide coverage with a format at least as broad as that provided by the Contractor.

Special Risks or Circumstances – City reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other circumstances.

1-2021
(As provided by MVRMA)

GENERAL CONSTRUCTION PROVISIONS

A. GENERAL CONSTRUCTION SPECIFICATIONS

1. The General Conditions for the work for this project shall be the AIA A201 "General Conditions of the Contract for Construction as modified elsewhere in these specifications, and incorporated herein. If the specifications are found to be in conflict, the City of Troy or its designated representative shall determine which shall be followed.

D. PAYMENTS

1. Pay estimates shall be submitted monthly at intervals to provide for expedient handling and processing by the City. The method of payment or retention shall follow sections 153.12, 153.13, and 153.14, of the Ohio Revised Code.
2. The unit or lump sum prices stated in the Contract shall be used to determine the amount to be paid and shall constitute full and final compensation for the work. Payment shall be based upon plan quantities unless otherwise approved by the City.
3. The City reserves the right to increase or decrease quantities or to non-perform all or any portion of the items Bid and at the unit price Bid.

E. MAINTENANCE BOND

1. Prior to final payment, the Contractor shall furnish a maintenance and guarantee bond in an amount equal to Ten (10) percent of the total Contract price. This bond shall be retained for a period on one year after acceptance of the project.

BID FORMS
FORM OF PROPOSAL

Submitted By:

_____ this _____day of _____,20____
Contracting Firm

To: The City of Troy, Ohio
Director of Public Service and Safety
100 South Market Street
Troy, Ohio 45373-7303

Having read and examined the specifications and drawings for:

TROY AQUATIC PARK IMPROVEMENTS

and having also received, read and taken into account Addenda through number _____ and likewise having inspected the site and the conditions affecting and governing this Project, the undersigned hereby proposes to furnish all materials and to perform all labor, as specified and described in the said Specifications and/or shown on said Drawings for all work necessary to complete the Project in a timely manner and in accordance with the Contract Documents regardless of whether expressly provided for in such Specifications and Drawings.

Before completing the Form of Proposal, the Undersigned represents that it has carefully reviewed the Notice to Bidders, Instructions to Bidders and General Conditions, General and Additional Construction Provisions, Supplementary Construction Specifications, and all other documentation related to this Project. The Undersigned further agrees that if this proposal is accepted such undersigned will comply with all such documents and the requirements therein. Failure to comply with provisions of the Bid Documents may be cause for disqualification of Bid.

The Undersigned agrees that, if the Proposal is accepted, such undersigned will furnish the required Bonds, Insurance Certificates, and other Contract Documents as will be required and as is noted in the Instructions to Bidders and General Conditions.

In Submitting this Bid, the undersigned agrees to execute and complete the Contract in the form included in the Contract Documents and to complete its work within a period of _____ consecutive calendar days after the receipt of the "Notice to Proceed" or for lack of a written "Notice to Proceed", the receipt of this executed contract shall constitute a "Notice to Proceed".

We the undersigned, submit this Bid, for materials and labor to complete all work associated with the Troy Aquatic Park Improvements as outlined on the drawings and specifications to be

$_____ **FOR BASE BID**

Sum in words: _____

Check one of the following:
_____The Undersigned is signing as sole proprietor or is his authorized representative. The name of the sole proprietor must be shown below.
_____The Undersigned is signing as a partner in a partnership or is his authorized representative.
_____The Undersigned is signing for a corporation and is the president, vice president or other authorized representative; or he must show his authority, by affidavit, to bind the corporation.
_____The Undersigned is signing for some other legal entity and shows, by affidavit, his authority to bind such entity.

Name of Contracting Firm: _____

Address of Contracting Firm: _____

_____

_____

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Phone: _____ Fax: _____

If the Bidder is a partnership or Joint Venture, state the Name and Address of each Partner or Participant in the Joint Venture below:

_____

BID GUARANTY AND PERFORMANCE BOND
(Sections 153.54 and 153.571 Ohio Revised Code)

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned:

_____ _____
(Contractor) (Surety)

as principal and as sureties, are hereby held and firmly bound unto the City of Troy, Ohio and ODOT, as obligee in the penal sum of the dollar amount of the Bid submitted by the principal to the obligee on this ___day of _____, 20____, to undertake the project known as:

TROY AQUATIC PARK IMPROVEMENTS

the penal sum referred to herein shall be the dollar amount of the principal's Bid to the obligee, incorporating any additive or deductive alternate proposals made by the principal on the date referred to above to the obligee, which are accepted by the obligee. In no case shall the penal sum exceed the amount of $_____._____ (_____) Dollars. (If the foregoing blank is not filled in, the penal sum will be the full amount of the principal's Bid, including alternates. Alternatively, if the blank is filled in, the amount stated must not be less than the full amount of the Bid including all add alternates, in dollars and cents. A percentage is not acceptable.) For the payment of the penal sum well and truly to be made we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

THE CONDITIONS OF THE ABOVE OBLIGATION IS SUCH, that whereas the above named principal has submitted a Bid for work on the above named project.

Now, therefore, if the obligee accepts the Bid of the principal and the principal fails to enter into a proper Contract in accordance with the Bid, plans, details, specifications, and bills of material; and in the event the principal pays to the obligee the difference not exceed ten percent (10%) of the penalty hereof between the amount specified in the Bid and such larger amount for which the obligee may in good faith Contract with the next lowest Bidder to perform the work covered by the Bid; or in the event the obligee does not award the Contract to the next lowest Bidder and resubmits the project for Bidding, the principal pays to the obligee the difference not to exceed ten percent (10%) of the penalty hereof between the amount specified in the Bid, or the costs, in connection with their resubmission, or printing new Contract documents, required advertising, and printing and mailing notices to prospective Bidders, whichever is less, then this obligation shall be null and void, otherwise to remain in full force and effect; if the obligee accepts the Bid of the principal and the principal within ten (10) days after the awarding of the Contract enters into a proper Contract in accordance with the Bid, plans, details, specifications, and bills of material, which said Contract is made a part of this bond the same as thought set forth herein;
Now also, if the said principal shall well and faithfully do and perform the things agreed by Contract to be done and performed according to the terms of said Contract; and shall pay all lawful claims of Subcontractors, materialmen, and laborers, for labor performed and materials furnished in the carrying forward, performing, or completing of said Contract; we agreeing and assenting that this undertaking shall be for the benefit of any materialman or laborer having a just

claim, as well as for the obligee herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The said surety hereby stipulates and agrees that no modifications, omissions, or additions, in or to the terms of said Contract or in or to the plans or specifications therefor shall in any way affect the obligations of said surety on its bond.

Sealed and signed this _____ day of _____, 20_____.

PRINCIPAL:

Name of Contracting Firm: _____

Address of Contracting Firm: _____

_____

_____

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Phone: _____ Fax: _____

Witness to Signature: _____

SURETY

Name of Surety Company: _____

Address of Surety Company: _____

_____

_____

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Phone: _____ Fax: _____

Witness to Signature: _____

BID BOND FORM

KNOW MEN BY THESE PRESENTS, that we, the undersigned, are firmly bound unto the City of Troy, State of Ohio, in the sum of_____
_____Dollars
for the payment of which well and truly to be made, we hereby, jointly and severally, bind ourselves, our heirs, successors, executors, and administrators.

The condition of this obligation is such that if the bid or proposal contained herein for furnishing the materials, supplies or equipment or for performing the work necessary to complete in good, substantial and workmanlike manner, ready for use, the items set forth in this proposal, submitted to the **Director of Public Service and Safety** of the City of Troy, State of Ohio, is accepted and the contract awarded to the above named bidder, and the said bidder shall within three (3) days after the notice of said award enter into a contract with the said City of Troy, State of Ohio, for the work or the material bid upon, and shall secure the performance of the same by bond or otherwise as may be required, to the satisfaction of the Director of Public Service and Safety of said City, then this obligation shall be null and void; otherwise to be in full force and virtue.

Signed and sealed by us this _____ day of _____, 20_____
Witnessed by:

Bidder _____

_____

_____
Witness

Surety _____
or
Sureties _____

_____
Witness

CERTIFIED CHECK

A Certified Check in the sum of _____

_____Dollars

on_____Bank

of _____, Check No. _____
is herewith submitted and deposited in lieu of bond under the same terms and conditions as set forth in the above bond.

_____
Bidder

INSTRUCTIONS FOR FILLING OUT ABOVE BOND FORM

SURETY REQUIRED

Bond must be executed by authorized surety, guaranty or trust company. The amount will be determined by the City and set forth in the legal advertisement for bids. The City shall determine the sufficiency of all sureties.

CORPORATE SURETY

If corporate surety is given, the surety or guaranty company should indicate in the bond the State in which it is incorporated. A certificate of authority authorizing the "attorney-in-fact" to sign the bond, should accompany the same, unless the certificate is on file in the office of the Director of Public Service and Safety, Troy, Ohio.

MISCELLANEOUS REQUIREMENTS

If the bidder is a "partnership" the names of the partners composing the same must be given and the bond signed by one or more of the partners in the following manner: "John Jones and James Smith, d.b.a., Smith-Jones Company, by John Jones, a partner."

All signatures must be in full.

The bond must be witnessed.

A certified check may be submitted in lieu of bond, made payable to the City of Troy and drawn on a solvent bank.

EXPERIENCE SHEET/REFERENCES

The Bidder shall submit, to the City, references, in the form of current or former employers, who can attest that he has the equipment, knowledge, skill, and manpower to complete the project as set forth in the plans and specifications. The Bidder shall submit a list of at least three (3) references projects of equal or greater complexity that can attest to the ability of the Bidder to perform such work.

1. Exemption:

_____ I have, within the past five years, performed work of similar size and scope for the City of Troy, Ohio and wish to let my record in that case stand as my reference. I understand, however, that upon request, I shall furnish a list as referenced above.

2. References:

Name Reference: _____

Project Name: _____

Contact Person: _____

Title: _____

Type of Work: _____

_____

Approximate Contract Amount: _____

Date: _____

Phone: _____ Fax: _____

Name Reference: _____

Project Name: _____

Contact Person: _____

Title: _____

Type of Work: _____

_____

Approximate Contract Amount: _____

Date: _____

Phone: _____ Fax: _____

Name Reference: _____

Project Name: _____

Contact Person: _____

Title: _____

Type of Work: _____

_____

Approximate Contract Amount: _____

Date: _____

Phone: _____ Fax: _____

Name Reference: _____

Project Name: _____

Contact Person: _____

Title: _____

Type of Work: _____

_____

Approximate Contract Amount: _____

Date: _____

Phone: _____ Fax: _____

NON-COLLUSION AFFIDAVIT

State of _____

County of _____ ss:

_____, being first duly sworn, deposes and says

that he is _____ of _____,
(Title) (Company)

the party making the foregoing proposal or Bid; that such Bid is not made in the interest of or on behalf of any undisclosed person, partnership, company, association, organization, or corporation; that such Bid is genuine and not collusive or sham; that said Bidder has not colluded, conspired, connived, or agreed, directly or indirectly, with any Bidder or person, to put in a sham Bid, or that such other person shall refrain from Bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the Bid price of affiant or any other Bidder, or to fix any overhead, profit or cost element of said Bid price, or of that of any other Bidder, or to secure any advantage against the owner, any company or any person or persons interested in the proposed Contract; and that all statements contained in said proposal or Bid are true; and further that such Bidder has not, directly or indirectly, submitted this Bid, or the contents thereof, or divulged information or data relative thereto to any corporation, partnership, company, association or organization, or to any member or agent thereof.

_____ _____
Affiant Signature Affiant Print or Type

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

_____ _____
Notary Signature Notary Print or Type

A Notary Public in and for _____ County in the State of Ohio.

My commission expires: _____

(Seal)

AMERICANS WITH DISABILITIES ACT COMPLIANCE CERTIFICATION

As an authorized officer, I, _____,
(Name of Authorized Officer)
having the title of _____
(Title)
of _____ with
(Name of Contractor)
offices located at _____,
(Address)

and as its duly authorized representative, state that effective this _____ day of _____, 20 ____ (date of submission of Bid) that said Contractor and his company is in compliance with the Americans with Disabilities Act.

Name of Contracting Firm: _____
Address of Contracting Firm: _____
_____
_____

Signature: _____
Printed Name: _____
Title: _____
Date: _____
Phone: _____ Fax: _____

CONTRACT FORMS

The following forms are included as a ***sample*** only. Contract forms will be completed and signed by the successful Bidder.

CONTRACT

THIS CONTRACT, made and entered into this _____ day of _____, 20____ by the between the City of Troy, Ohio hereinafter designated as the City and _____ of _____
(Name of Contractor) (City and State of Contractor)
hereinafter designated as the Contractor:

WITNESSETH: That the parties of these presents, each in consideration of the undertakings, promises and agreements, on the part of the other herein contained, have undertaken, promised and agreed and do hereby undertake, promise and agree, the City for itself, its successors and assigns, and the Contractor his heirs, executors, administrators, successors and assigns as follows:

That the Contractor in consideration for sums of money herein specified (said base Contract amount being $ _____.____) to be paid by said City, shall and will at his own cost and expense, furnish all labor, materials, tools and equipment for and build for the City the:

TROY AQUATIC PARK IMPROVEMENTS

in accordance with the Bid Documents (including Addenda No.(s) _____) hereto attached and therein mentioned, which Bid Documents are hereby made a part of this Contract, all of said work to be fully completed to the satisfaction and acceptance of the City.

The City agrees to pay the Contractor for performance of work in accordance with these Contract Documents, a sum of money equal to the amount of the actual work done and materials furnished, as determined by the City, under each item listed in the Bid multiplied by the unit price applicable to each such item as set forth in the Bid attached hereto.

The Contractor agrees to accept the payment referenced to above as full compensation satisfaction and discharge for all work done and material furnished, (whether mentioned in the Estimated Quantities or not) and also for all costs and expenses incurred and loss or damage sustained by reason of action of elements, or because of the nature of the work, or because of any unforeseen obstruction or expense incurred by or in consequence of the suspension of the work as herein specified, and also for well and faithfully completing the work, and the whole thereof, in accordance with the terms conditions and provisions of this Agreement and the instructions, orders or directions of the City thereunder, and also for maintaining the work in good condition until final payment is made and for (1) year after the date of substantial completion, except as in this Agreement otherwise specifically provided.

This Agreement will be considered null and void unless accompanied by a properly endorsed “Fiscal Officer’s Statement - Certificate of Available Funds” in an amount to meet the above cost of the Contract.

IN WITNESS THEREOF, the said parties have hereunder set their hands and seals, and have executed this Agreement in quintuplicate the day and year first above written.

CONTRACTOR:

Name of Contracting Firm: _____

Address of Contracting Firm: _____

_____

_____

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Phone: _____ Fax: _____

Witness Signature: _____, Witness Print: _____

CITY:

Name of City: City of Troy, Ohio_____

Address of City: 100 South Market Street Troy, Ohio 45373-7303_____

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Phone: _____ Fax: _____

Witness Signature: _____, Witness Print: _____

"I hereby approve the form of the forgoing Contract"

_____ _____

City of Troy, Director of Law Date

FISCAL OFFICER'S STATEMENT
CERTIFICATE OF AVAILABLE FUNDS
(Section 5705.41 Ohio Revised Code)

I, _____, do hereby certify that I am Auditor of the City of Troy, Ohio, and that the amount of money and funds to wit: $_____._____ (_____ Dollars) required to meet the obligation of this contract, namely the project known as:

TROY AQUATIC PARK IMPROVEMENTS

have been lawfully appropriated for such purpose and is in the treasury, or in process of collection to credit of an appropriate fund free from any previous encumbrances.

Signature: _____
Printed Name: _____ (Seal)
Date: _____
Account No. _____
Auditor's Contract No. _____

CONTRACT AFFIDAVIT

(To be filled in and executed if the Contractor is a Corporation)

State of _____

County of _____ ss.

_____, being duly sworn, deposes and says that as

Secretary of _____, a Corporation

organized and existing under and by virtue of the laws of the State of _____, and

having its principal office at_____.

Affiant further says that he is familiar with the records, minute books and by-laws of said corporation.

Affiant further says that _____ is _____, of the Corporation, and as such is duly authorized to sign the Form of Proposal contained herein.

_____ _____

Affiant Signature Affiant Print or Type

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

_____ _____

Notary Signature Notary Print or Type

A Notary Public in and for _____ County in the State of Ohio.

My commission expires: _____ (Seal)

AFFIDAVIT OF CONTRACTOR OR SUPPLIER OF NON-DELINQUENCY OF PERSONAL PROPERTY TAXES

(Section 5719.042 Ohio Revised Code)

STATE OF OHIO, COUNTY OF SS:

(1)_____, being first duly sworn, deposes and says as follows:

1. He/She is the (2)_____of (3)_____, which has a contract with the City of Troy for (4)_____, which contract was competitively bid.

2. (3)_____ was not charged at the time the bid was submitted with any delinquent personal taxes on the general tax list of personal property in Miami County.

or

2. (3)_____ was charged at the time the bid was submitted with delinquent personal property taxes on the general tax list of personal property in Miami County in the amount of (5) $_____for due and unpaid delinquent taxes and (6) $_____for due and unpaid penalties and interest thereon.

3. (3)_____ understands and agrees that, as required by Section 5719.042 of the Ohio Revised Code, this statement indicates that if this contractor is charged with any delinquent personal property taxes, the Auditor of the City of Troy will transmit a copy of this statement to the County Treasurer, and that a copy of this statement will also be incorporated into the contract, and no payment shall be made with the respect to any contract unless this statement has been so incorporated as a part thereof.

_____

Sworn to before me and subscribed in my presence this _____ day of _____, 20_____.

_____

NOTARY PUBLIC

INSTRUCTIONS FOR FILLING OUT ABOVE AFFIDAVIT

1. Insert name of person making statement.
2. Insert title (President, Secretary, etc.).
3. Insert name of Contractor.
4. Insert nature of contract or public improvement rendered.
5. Insert principle amount of delinquent personal property taxes, if any.
6. Insert penalties and interest owed for delinquent personal property taxes, if any.

CROSS OUT PARAGRAPH 2 WHICH DOES NOT APPLY.

PERFORMANCE AND PAYMENT BOND

(Sections 153.54 and 153.57 Ohio Revised Code)

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned:

_____ _____

(Contractor) (Surety)

as principal and as sureties, are hereby held and firmly bound unto the City of Troy, Ohio, in the penal sum of $_____._____ (_____) Dollars, .for the payment of which well and truly to be made we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns in connection with the project known as:

TROY AQUATIC PARK IMPROVEMENTS

Signed this ___day of _____, 20____.

THE CONDITIONS OF THE ABOVE OBLIGATION IS SUCH, that whereas the above named principal did on the _____ day of _____, 20_____, enter into a Contract with the City of Troy, Ohio, which said Contract is made a part of this bond the same as though set forth herein.

Now, if the said principal shall well and faithfully do and perform the things agreed by Contract to be done and performed according to the terms of said Contract; and shall pay all lawful claims of Subcontractors, materialmen, and laborers, for labor performed and materials furnished in the carrying forward, performing, or completing of said Contract; we agreeing and assenting that this undertaking shall be for the benefit of any materialman or laborer having a just claim, as well as for the obligee herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The said surety hereby stipulates and agrees that no modifications, omissions, or additions, in or to the terms of said Contract or in or to the plans or specifications therefor shall in any wise affect the obligations of said surety on its bond.

Sealed and signed this _____ day of _____, 20_____.

PRINCIPAL:

Name of Contracting Firm: _____

Address of Contracting Firm: _____

_____

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Phone: _____ Fax: _____

Witness to Signature: _____

SURETY

Name of Surety Company: _____

Address of Surety Company: _____

_____

_____

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Phone: _____ Fax: _____

Witness to Signature: _____

HOLD HARMLESS AGREEMENT

The Contractor shall hold harmless, defend and indemnify the City of Troy, Ohio, its elected and appointed officials, all employees and volunteers, all boards, commissions and/or authorities and board members, including employees and volunteers thereof against all claims, suits, actions, costs, counsel fees, expenses, damages, judgments, or decrees, of every name and description, by reason of any person or persons or property being damaged or injured by the Contractor or any of his Subcontractors, or any person employed under said Contractor, or under any of his Subcontractors, or in any capacity during the progress or arising or growing out of the work, whether by negligence or otherwise.

Sealed and signed this _____ day of _____, 20_____.

Name of Contractor or Company: _____

Address of Contractor or Company: _____

_____

_____

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Phone: _____ Fax: _____

Witness to Signature: _____

DRUG-FREE WORK.PLACE COMPLIANCE AFFIDAVIT FORM

(O.R.C. - 153.03- 153.031)

I, _____, the _____ of _____
(name) (title) (company name)

On behalf of said corporation/company and in accordance with O,R.C. - 153.0 I –153.031,

hereby swear and certify that _____ is enrolled and in good standing with
(company name)

the Ohio Bureau of Workers' Compensation Drug-Free Workplace Program, or in a comparable program, called_____, which has been approved by
(name of comparable program)

the Bureau of Workers' Compensation.

I further certify and acknowledge that _____ understands
(company name)

That this compliance form shall be incorporated into and become a part of the contract between the public contracting authority and _____contractor if the said
(company name)

corporation/company is the successful bidder on the _____Project.
(name of project)

The contractor hereby additionally certifies, agrees and acknowledged that it is hereby contractually responsible to the public contracting authority for taking whatever measures are legally necessary to ensure that it's subcontractors, and any subsequent tier of contractors, are also enrolled and in good standing with the Ohio Bureau of Workers' Compensation Drug-Free workplace Program, or with a comparable Bureau approved program, prior to provision of any labor on the_____

_____(name of project)

Project by any subcontractor of any tier. Affiant further sayeth naught.

By _____
(Signature)

Title _____

SWORN TO BEFORE ME and subscribed in my presence this _____day of _____, 20 _____.

_____
Notary Public

SEAL My commission expires: _____

AFFIDAVIT

OF COMPLIANCE WITH OHIO REVISED CODE SECTION 3517.13
(POLITICAL CONTRIBUTIONS)

State of _____
County of _____, ss:

I, _____, being duly sworn, depose and state as follows:
(Name)

1. I am duly authorized to make the statement contained herein on behalf

   . _____ ("The Contracting Party")

2. The Contracting Party is a/an (select one):

   - ☐ Individual, partnership, or other unincorporated business association (including, without limitation, a professional association organized under Ohio Revised Code Chapter 1785), estate, or trust.
   - ☐ Corporation organized and existing under the laws of the State of _____.
   - ☐ Labor organization

3. I hereby affirm that the Contracting Party and each of the individuals specified in R.C. 3517.13(I)(3) (with respect to non-corporate entities and labor organizations) or R.C. 3517.13 (J)(3) (with respect to corporations) are in full compliance with the political contribution limitations set forth in R.C. 3517.13(I) and (J), as applicable.

4. I understand that a false representation on this certification constitutes a felony of the fifth degree pursuant to R.C. 3517.13 (AA) and 3517.992(R)(3).

Affiant further sayeth naught.

By _____
(Signature)

Title _____

SWORN TO BEFORE ME and subscribed in my presence this _____day of
. _____, 20 _____.

_____
Notary Public

SEAL

My commission expires: _____

PREVAILING WAGE RATES

Troy Aquatic Park Improvements

For “Construction” projects as defined in Section 4115.03 of the Ohio Revised Code, the successful bidder and all of its subcontractors, regardless of tier, will strictly comply with its obligation to pay a rate of wages on the Project not less than the rate of wages fixed for this Project under Section4115.04 of the Ohio Revised Code. Additionally, for such “Construction Projects,” the successful bidder will comply with all other provisions of Chapter 4115 of the Ohio Revised Code.

SUPPLEMENTARY CONDITIONS

A. GENERAL

1. The General Conditions for the work of this project shall be the AIA A201 "General Conditions of the Contract for Construction as modified elsewhere in these specifications, and incorporated herein. If the specifications are found to be in conflict, the City of Troy or its designated representative shall determine which shall be followed.

D. PAYMENTS

1. Pay estimates shall be submitted monthly at intervals to provide for expedient handling and processing by the City. The method of payment or retention shall follow sections 153.12, 153.13, and 153.14, of the Ohio Revised Code. The general procedure for payment shall be as follows:
    a. Payments will be made at ninety-two percent (92%) of the completed work until the project is fifty percent (50%) complete; after which payments will be made in full for work completed. These payments shall not be considered release by the City of any obligations of this Contract.
    b. In addition to all other payments on account of work performed, there shall be allowed by the City and paid to the Contractor, a sum at the rate of ninety-two percent (92%) of the invoice costs, not to exceed the Bid price in a unit price Contract, for material delivered to the job site of the work or other approved storage site, provided such materials have been inspected and approved by the City . When such an estimate is allowed, the material on which it is allowed shall therefore become the property of the City. However, in the case that such material is stolen, damaged or destroyed before being used, or for any reason becomes unfit for use, the Contractor shall replace it at his own expense.
2. The unit or lump sum prices stated in the Contract shall be used to determine the amount to be paid and shall constitute full and final compensation for the work. Payment shall be based upon plan quantities unless otherwise approved by the City.
3. The City reserves the right to increase or decrease quantities or to non-perform all or any portion of the items Bid and at the unit price Bid.

E. MAINTENANCE BOND

1. Prior to final payment, the Contractor shall furnish a maintenance and guarantee bond in an amount equal to Ten (10) percent of the total Contract price. This bond shall be retained for a period on one year after acceptance of the project.

DRAFT

AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

THE OWNER:

THE ARCHITECT:

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 OWNER

3 CONTRACTOR

4 ARCHITECT

5 SUBCONTRACTORS

6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

7 CHANGES IN THE WORK

8 TIME

9 PAYMENTS AND COMPLETION

10 PROTECTION OF PERSONS AND PROPERTY

11 INSURANCE AND BONDS

12 UNCOVERING AND CORRECTION OF WORK

13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

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

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

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INDEX
(Topics and numbers in bold are section headings.)

Acceptance of Nonconforming Work
9.6.6, 9.9.3, **12.3**
Acceptance of Work
9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3
Access to Work
3.16, 6.2.1, 12.1
Accident Prevention
10
Acts and Omissions
3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5, 10.2.8, 13.4.2, 13.7, 14.1, 15.2
Addenda
1.1.1, 3.11.1
Additional Costs, Claims for
3.7.4, 3.7.5, 6.1.1, 7.3.7.5, 10.3, 15.1.4
Additional Inspections and Testing
9.4.2, 9.8.3, 12.2.1, **13.5**
Additional Insured
11.1.4
Additional Time, Claims for
3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.5**
Administration of the Contract
3.1.3, **4.2**, 9.4, 9.5
Advertisement or Invitation to Bid
1.1.1
Aesthetic Effect
4.2.13
Allowances
3.8, 7.3.8
All-risk Insurance
11.3.1, 11.3.1.1
Applications for Payment
4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.6.3, 9.7, 9.10, 11.1.3
Approvals
2.1.1, 2.2.2, 2.4, 3.1.3, 3.10.2, 3.12.8, 3.12.9, 3.12.10, 4.2.7, 9.3.2, 13.5.1
Arbitration
8.3.1, 11.3.10, 13.1.1, 15.3.2, **15.4**
ARCHITECT
4
Architect, Definition of
4.1.1
Architect, Extent of Authority
2.4.1, 3.12.7, 4.1, 4.2, 5.2, 6.3, 7.1.2, 7.3.7, 7.4, 9.2, 9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1, 13.5.1, 13.5.2, 14.2.2, 14.2.4, 15.1.3, 15.2.1
Architect, Limitations of Authority and Responsibility
2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2, 9.5.3, 9.6.4, 15.1.3, 15.2
Architect's Additional Services and Expenses
2.4.1, 11.3.1.1, 12.2.1, 13.5.2, 13.5.3, 14.2.4
Architect's Administration of the Contract
3.1.3, 4.2, 3.7.4, 15.2, 9.4.1, 9.5
Architect's Approvals
2.4.1, 3.1.3, 3.5, 3.10.2, 4.2.7
Architect's Authority to Reject Work
3.5, 4.2.6, 12.1.2, 12.2.1
Architect's Copyright
1.1.7, 1.5
Architect's Decisions
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3, 7.3.7, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1, 13.5.2, 15.2, 15.3
Architect's Inspections
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.5
Architect's Instructions
3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.5.2
Architect's Interpretations
4.2.11, 4.2.12
Architect's Project Representative
4.2.10
Architect's Relationship with Contractor
1.1.2, 1.5, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.2, 4.1.3, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3.7, 12, 13.4.2, 13.5, 15.2
Architect's Relationship with Subcontractors
1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3.7
Architect's Representations
9.4.2, 9.5.1, 9.10.1
Architect's Site Visits
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.5
Asbestos
10.3.1
Attorneys' Fees
3.18.1, 9.10.2, 10.3.3
Award of Separate Contracts
6.1.1, 6.1.2
Award of Subcontracts and Other Contracts for Portions of the Work
5.2
Basic Definitions
1.1
Bidding Requirements
1.1.1, 5.2.1, 11.4.1
Binding Dispute Resolution
9.7, 11.3.9, 11.3.10, 13.1.1, 15.2.5, 15.2.6.1, 15.3.1, 15.3.2, 15.4.1
Boiler and Machinery Insurance
11.3.2
Bonds, Lien
7.3.7.4, 9.10.2, 9.10.3
Bonds, Performance, and Payment
7.3.7.4, 9.6.7, 9.10.3, 11.3.9, **11.4**

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Building Permit
3.7.1
Capitalization
1.3
Certificate of Substantial Completion
9.8.3, 9.8.4, 9.8.5
Certificates for Payment
4.2.1, 4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.3
Certificates of Inspection, Testing or Approval
13.5.4
Certificates of Insurance
9.10.2, 11.1.3
Change Orders
1.1.1, 2.4.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11.1, 3.12.8, 4.2.8, 5.2.3, 7.1.2, 7.1.3, **7.2**, 7.3.2, 7.3.6, 7.3.9, 7.3.10, 8.3.1, 9.3.1.1, 9.10.3, 10.3.2, 11.3.1.2, 11.3.4, 11.3.9, 12.1.2, 15.1.3
Change Orders, Definition of
7.2.1
CHANGES IN THE WORK
2.2.1, 3.11, 4.2.8, **7**, 7.2.1, 7.3.1, 7.4, 7.4.1, 8.3.1, 9.3.1.1, 11.3.9
Claims, Definition of
15.1.1
CLAIMS AND DISPUTES
3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, **15**, 15.4
Claims and Timely Assertion of Claims
15.4.1
Claims for Additional Cost
3.2.4, 3.7.4, 6.1.1, 7.3.9, 10.3.2, **15.1.4**
Claims for Additional Time
3.2.4, 3.7.46.1.1, 8.3.2, 10.3.2, **15.1.5**
Concealed or Unknown Conditions, Claims for
3.7.4
Claims for Damages
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.1.1, 11.3.5, 11.3.7, 14.1.3, 14.2.4, 15.1.6
Claims Subject to Arbitration
15.3.1, 15.4.1
Cleaning Up
3.15, 6.3
Commencement of the Work, Conditions Relating to
2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3, 6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.3.1, 11.3.6, 11.4.1, 15.1.4
Commencement of the Work, Definition of
8.1.2
Communications Facilitating Contract Administration
3.9.1, **4.2.4**
Completion, Conditions Relating to
3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1, 9.10, 12.2, 13.7, 14.1.2
COMPLETION, PAYMENTS AND
9
Completion, Substantial
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2, 13.7
Compliance with Laws
1.6.1, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 4.1.1, 9.6.4, 10.2.2, 11.1, 11.3, 13.1, 13.4, 13.5.1, 13.5.2, 13.6, 14.1.1, 14.2.1.3, 15.2.8, 15.4.2, 15.4.3
Concealed or Unknown Conditions
3.7.4, 4.2.8, 8.3.1, 10.3
Conditions of the Contract
1.1.1, 6.1.1, 6.1.4
Consent, Written
3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 11.3.1, 13.2, 13.4.2, 15.4.4.2
Consolidation or Joinder
15.4.4
CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
1.1.4, **6**
Construction Change Directive, Definition of
7.3.1
Construction Change Directives
1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3, **7.3**, 9.3.1.1
Construction Schedules, Contractor's
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.5.2
Contingent Assignment of Subcontracts
5.4, 14.2.2.2
Continuing Contract Performance
15.1.3
Contract, Definition of
1.1.2
CONTRACT, TERMINATION OR SUSPENSION OF THE
5.4.1.1, 11.3.9, **14**
Contract Administration
3.1.3, 4, 9.4, 9.5
Contract Award and Execution, Conditions Relating to
3.7.1, 3.10, 5.2, 6.1, 11.1.3, 11.3.6, 11.4.1
Contract Documents, Copies Furnished and Use of
1.5.2, 2.2.5, 5.3
Contract Documents, Definition of
1.1.1
Contract Sum
3.7.4, 3.8, 5.2.3, 7.2, 7.3, 7.4, **9.1**, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.3.1, 14.2.4, 14.3.2, 15.1.4, 15.2.5
Contract Sum, Definition of
9.1
Contract Time
3.7.4, 3.7.5, 3.10.2, 5.2.3, 7.2.1.3, 7.3.1, 7.3.5, 7.4, 8.1.1, 8.2.1, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 14.3.2, 15.1.5.1, 15.2.5
Contract Time, Definition of
8.1.1
CONTRACTOR
3

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Contractor, Definition of
3.1, 6.1.2
Contractor's Construction Schedules
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.5.2
Contractor's Employees
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3, 11.1.1, 11.3.7, 14.1, 14.2.1.1,
Contractor's Liability Insurance
11.1
Contractor's Relationship with Separate Contractors and Owner's Forces
3.12.5, 3.14.2, 4.2.4, 6, 11.3.7, 12.1.2, 12.2.4
Contractor's Relationship with Subcontractors
1.2.2, 3.3.2, 3.18.1, 3.18.2, 5, 9.6.2, 9.6.7, 9.10.2, 11.3.1.2, 11.3.7, 11.3.8
Contractor's Relationship with the Architect
1.1.2, 1.5, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.3, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3.7, 12, 13.5, 15.1.2, 15.2.1
Contractor's Representations
3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2
Contractor's Responsibility for Those Performing the Work
3.3.2, 3.18, 5.3.1, 6.1.3, 6.2, 9.5.1, 10.2.8
Contractor's Review of Contract Documents
3.2
Contractor's Right to Stop the Work
9.7
Contractor's Right to Terminate the Contract
14.1, 15.1.6
Contractor's Submittals
3.10, 3.11, 3.12.4, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3, 11.1.3, 11.4.2
Contractor's Superintendent
3.9, 10.2.6
Contractor's Supervision and Construction Procedures
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.5, 7.3.7, 8.2, 10, 12, 14, 15.1.3
Contractual Liability Insurance
11.1.1.8, 11.2
Coordination and Correlation
1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1
Copies Furnished of Drawings and Specifications
1.5, 2.2.5, 3.11
Copyrights
1.5, **3.17**
Correction of Work
2.3, 2.4, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**
Correlation and Intent of the Contract Documents
1.2
Cost, Definition of
7.3.7
Costs
2.4.1, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.7, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.3, 12.1.2, 12.2.1, 12.2.4, 13.5, 14
Cutting and Patching
3.14, 6.2.5
Damage to Construction of Owner or Separate Contractors
3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 11.1.1, 11.3, 12.2.4
Damage to the Work
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4.1, 11.3.1, 12.2.4
Damages, Claims for
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.1.1, 11.3.5, 11.3.7, 14.1.3, 14.2.4, 15.1.6
Damages for Delay
6.1.1, 8.3.3, 9.5.1.6, 9.7, 10.3.2
Date of Commencement of the Work, Definition of
8.1.2
Date of Substantial Completion, Definition of
8.1.3
Day, Definition of
8.1.4
Decisions of the Architect
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 15.2, 6.3, 7.3.7, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.5.2, 14.2.2, 14.2.4, 15.1, 15.2
Decisions to Withhold Certification
9.4.1, **9.5**, 9.7, 14.1.1.3
Defective or Nonconforming Work, Acceptance, Rejection and Correction of
2.3.1, 2.4.1, 3.5, 4.2.6, 6.2.5, 9.5.1, 9.5.2, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1
Definitions
1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 15.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1
Delays and Extensions of Time
3.2, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4.1, 14.3.2, 15.1.5, 15.2.5
Disputes
6.3, 7.3.9, 15.1, 15.2
Documents and Samples at the Site
3.11
Drawings, Definition of
1.1.5
Drawings and Specifications, Use and Ownership of
3.11
Effective Date of Insurance
8.2.2, 11.1.2
Emergencies
10.4, 14.1.1.2, 15.1.4
Employees, Contractor's
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.1.1, 11.3.7, 14.1, 14.2.1.1
Equipment, Labor, Materials or
1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13.1, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Execution and Progress of the Work
1.1.3, 1.2.1, 1.2.2, 2.2.3, 2.2.5, 3.1, 3.3.1, 3.4.1, 3.5, 3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.5, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.2, 14.2, 14.3.1, 15.1.3

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Extensions of Time
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2, 10.4.1, 14.3, 15.1.5, 15.2.5
Failure of Payment
9.5.1.3, **9.7**, 9.10.2, 13.6, 14.1.1.3, 14.2.1.2
Faulty Work
(See Defective or Nonconforming Work)
Final Completion and Final Payment
4.2.1, 4.2.9, 9.8.2, **9.10**, 11.1.2, 11.1.3, 11.3.1, 11.3.5, 12.3.1, 14.2.4, 14.4.3
Financial Arrangements, Owner's
2.2.1, 13.2.2, 14.1.1.4
Fire and Extended Coverage Insurance
11.3.1.1
GENERAL PROVISIONS
1
Governing Law
13.1
Guarantees (See Warranty)
Hazardous Materials
10.2.4, **10.3**
Identification of Subcontractors and Suppliers
5.2.1
Indemnification
3.17, **3.18**, 9.10.2, 10.3.3, 10.3.5, 10.3.6, 11.3.1.2, 11.3.7
Information and Services Required of the Owner
2.1.2, **2.2**, 3.2.2, 3.12.4, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 11.4, 13.5.1, 13.5.2, 14.1.1.4, 14.1.4, 15.1.3
Initial Decision
15.2
Initial Decision Maker, Definition of
1.1.8
Initial Decision Maker, Decisions
14.2.2, 14.2.4, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Initial Decision Maker, Extent of Authority
14.2.2, 14.2.4, 15.1.3, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Injury or Damage to Person or Property
10.2.8, 10.4.1
Inspections
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 12.2.1, 13.5
Instructions to Bidders
1.1.1
Instructions to the Contractor
3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.5.2
Instruments of Service, Definition of
1.1.7
Insurance
3.18.1, 6.1.1, 7.3.7, 9.3.2, 9.8.4, 9.9.1, 9.10.2, **11**
Insurance, Boiler and Machinery
11.3.2
Insurance, Contractor's Liability
11.1
Insurance, Effective Date of
8.2.2, 11.1.2
Insurance, Loss of Use
11.3.3
Insurance, Owner's Liability
11.2
Insurance, Property
10.2.5, **11.3**
Insurance, Stored Materials
9.3.2
INSURANCE AND BONDS
11
Insurance Companies, Consent to Partial Occupancy
9.9.1
Intent of the Contract Documents
1.2.1, 4.2.7, 4.2.12, 4.2.13, 7.4
Interest
13.6
Interpretation
1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1
Interpretations, Written
4.2.11, 4.2.12, 15.1.4
Judgment on Final Award
15.4.2
Labor and Materials, Equipment
1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Labor Disputes
8.3.1
Laws and Regulations
1.5, 3.2.3, 3.6, 3.7, 3.12.10, 3.13.1, 4.1.1, 9.6.4, 9.9.1, 10.2.2, 11.1.1, 11.3, 13.1.1, 13.4, 13.5.1, 13.5.2, 13.6.1, 14, 15.2.8, 15.4
Liens
2.1.2, 9.3.3, 9.10.2, 9.10.4, 15.2.8
Limitations, Statutes of
12.2.5, 13.7, 15.4.1.1
Limitations of Liability
2.3.1, 3.2.2, 3.5, 3.12.10, 3.17, 3.18.1, 4.2.6, 4.2.7, 4.2.12, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 10.2.5, 10.3.3, 11.1.2, 11.2, 11.3.7, 12.2.5, 13.4.2
Limitations of Time
2.1.2, 2.2, 2.4, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7, 5.2, 5.3.1, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 11.1.3, 11.3.1.5, 11.3.6, 11.3.10, 12.2, 13.5, 13.7, 14, 15
Loss of Use Insurance
11.3.3
Material Suppliers
1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.6, 9.10.5
Materials, Hazardous
10.2.4, **10.3**
Materials, Labor, Equipment and
1.1.3, 1.1.6, 1.5.1, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13.1, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2

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Means, Methods, Techniques, Sequences and Procedures of Construction
3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2
Mechanic's Lien
2.1.2, 15.2.8
Mediation
8.3.1, 10.3.5, 10.3.6, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1
Minor Changes in the Work
1.1.1, 3.12.8, 4.2.8, 7.1, **7.4**
MISCELLANEOUS PROVISIONS
13
Modifications, Definition of
1.1.1
Modifications to the Contract
1.1.1, 1.1.2, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2, 11.3.1
Mutual Responsibility
6.2
Nonconforming Work, Acceptance of
9.6.6, 9.9.3, **12.3**
Nonconforming Work, Rejection and Correction of
2.3.1, 2.4.1, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4, 12.2.1
Notice
2.2.1, 2.3.1, 2.4.1, 3.2.4, 3.3.1, 3.7.2, 3.12.9, 5.2.1, 9.7, 9.10, 10.2.2, 11.1.3, 12.2.2.1, 13.3, 13.5.1, 13.5.2, 14.1, 14.2, 15.2.8, 15.4.1
Notice, Written
2.3.1, 2.4.1, 3.3.1, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 9.7, 9.10, 10.2.2, 10.3, 11.1.3, 11.3.6, 12.2.2.1, **13.3**, 14, 15.2.8, 15.4.1
Notice of Claims
3.7.4, 10.2.8, **15.1.2**, 15.4
Notice of Testing and Inspections
13.5.1, 13.5.2
Observations, Contractor's
3.2, 3.7.4
Occupancy
2.2.2, 9.6.6, 9.8, 11.3.1.5
Orders, Written
1.1.1, 2.3, 3.9.2, 7, 8.2.2, 11.3.9, 12.1, 12.2.2.1, 13.5.2, 14.3.1
OWNER
2
Owner, Definition of
2.1.1
Owner, Information and Services Required of the
2.1.2, **2.2**, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 11.3, 13.5.1, 13.5.2, 14.1.1.4, 14.1.4, 15.1.3
Owner's Authority
1.5, 2.1.1, 2.3.1, 2.4.1, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2, 4.1.3, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1, 7.3.1, 8.2.2, 8.3.1, 9.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2, 11.1.3, 11.3.3, 11.3.10, 12.2.2, 12.3.1, 13.2.2, 14.3, 14.4, 15.2.7
Owner's Financial Capability
2.2.1, 13.2.2, 14.1.1.4
Owner's Liability Insurance
11.2
Owner's Relationship with Subcontractors
1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2
Owner's Right to Carry Out the Work
2.4, 14.2.2
Owner's Right to Clean Up
6.3
Owner's Right to Perform Construction and to Award Separate Contracts
6.1
Owner's Right to Stop the Work
2.3
Owner's Right to Suspend the Work
14.3
Owner's Right to Terminate the Contract
14.2
Ownership and Use of Drawings, Specifications and Other Instruments of Service
1.1.1, 1.1.6, 1.1.7, **1.5**, 2.2.5, 3.2.2, 3.11.1, 3.17, 4.2.12, 5.3.1
Partial Occupancy or Use
9.6.6, **9.9**, 11.3.1.5
Patching, Cutting and
3.14, 6.2.5
Patents
3.17
Payment, Applications for
4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1, 14.2.3, 14.2.4, 14.4.3
Payment, Certificates for
4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 13.7, 14.1.1.3, 14.2.4
Payment, Failure of
9.5.1.3, **9.7**, 9.10.2, 13.6, 14.1.1.3, 14.2.1.2
Payment, Final
4.2.1, 4.2.9, 9.8.2, 9.10, 11.1.2, 11.1.3, 11.4.1, 12.3.1, 13.7, 14.2.4, 14.4.3
Payment Bond, Performance Bond and
7.3.7.4, 9.6.7, 9.10.3, **11.4**
Payments, Progress
9.3, **9.6**, 9.8.5, 9.10.3, 13.6, 14.2.3, 15.1.3
PAYMENTS AND COMPLETION
9
Payments to Subcontractors
5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2
PCB
10.3.1
Performance Bond and Payment Bond
7.3.7.4, 9.6.7, 9.10.3, **11.4**
Permits, Fees, Notices and Compliance with Laws
2.2.2, **3.7**, 3.13, 7.3.7.4, 10.2.2
PERSONS AND PROPERTY, PROTECTION OF
10

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Polychlorinated Biphenyl
10.3.1
Product Data, Definition of
3.12.2
Product Data and Samples, Shop Drawings
3.11, **3.12**, 4.2.7
Progress and Completion
4.2.2, **8.2**, 9.8, 9.9.1, 14.1.4, 15.1.3
Progress Payments
9.3, **9.6**, 9.8.5, 9.10.3, 13.6, 14.2.3, 15.1.3
Project, Definition of
1.1.4
Project Representatives
4.2.10
Property Insurance
10.2.5, **11.3**
PROTECTION OF PERSONS AND PROPERTY
10
Regulations and Laws
1.5, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 4.1.1, 9.6.4, 9.9.1, 10.2.2, 11.1, 11.4, 13.1, 13.4, 13.5.1, 13.5.2, 13.6, 14, 15.2.8, 15.4
Rejection of Work
3.5, 4.2.6, 12.2.1
Releases and Waivers of Liens
9.10.2
Representations
3.2.1, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.8.2, 9.10.1
Representatives
2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.1, 4.2.2, 4.2.10, 5.1.1, 5.1.2, 13.2.1
Responsibility for Those Performing the Work
3.3.2, 3.18, 4.2.3, 5.3.1, 6.1.3, 6.2, 6.3, 9.5.1, 10
Retainage
9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3
Review of Contract Documents and Field Conditions by Contractor
3.2, 3.12.7, 6.1.3
Review of Contractor's Submittals by Owner and Architect
3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2
Review of Shop Drawings, Product Data and Samples by Contractor
3.12
Rights and Remedies
1.1.2, 2.3, 2.4, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1, 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.2, 12.2.4, **13.4**, 14, 15.4
Royalties, Patents and Copyrights
3.17
Rules and Notices for Arbitration
15.4.1
Safety of Persons and Property
10.2, 10.4
Safety Precautions and Programs
3.3.1, 4.2.2, 4.2.7, 5.3.1, **10.1**, 10.2, 10.4
Samples, Definition of
3.12.3
Samples, Shop Drawings, Product Data and
3.11, **3.12**, 4.2.7
Samples at the Site, Documents and
3.11
Schedule of Values
9.2, 9.3.1
Schedules, Construction
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.5.2
Separate Contracts and Contractors
1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2
Shop Drawings, Definition of
3.12.1
Shop Drawings, Product Data and Samples
3.11, **3.12**, 4.2.7
Site, Use of
3.13, 6.1.1, 6.2.1
Site Inspections
3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.4.2, 9.10.1, 13.5
Site Visits, Architect's
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.5
Special Inspections and Testing
4.2.6, 12.2.1, 13.5
Specifications, Definition of
1.1.6
Specifications
1.1.1, **1.1.6**, 1.2.2, 1.5, 3.11, 3.12.10, 3.17, 4.2.14
Statute of Limitations
13.7, 15.4.1.1
Stopping the Work
2.3, 9.7, 10.3, 14.1
Stored Materials
6.2.1, 9.3.2, 10.2.1.2, 10.2.4
Subcontractor, Definition of
5.1.1
SUBCONTRACTORS
5
Subcontractors, Work by
1.2.2, 3.3.2, 3.12.1, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2, 9.6.7
Subcontractual Relations
5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1
Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.7, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3, 11.1.3
Submittal Schedule
3.10.2, 3.12.5, 4.2.7
Subrogation, Waivers of
6.1.1, **11.3.7**
Substantial Completion
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, **9.8**, 9.9.1, 9.10.3, 12.2, 13.7
Substantial Completion, Definition of
9.8.1
Substitution of Subcontractors
5.2.3, 5.2.4

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Substitution of Architect
4.1.3
Substitutions of Materials
3.4.2, 3.5, 7.3.8
Sub-subcontractor, Definition of
5.1.2
Subsurface Conditions
3.7.4
Successors and Assigns
13.2
Superintendent
3.9, 10.2.6
Supervision and Construction Procedures
1.2.2, **3.3**, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.7, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.3
Surety
5.4.1.2, 9.8.5, 9.10.2, 9.10.3, 14.2.2, 15.2.7
Surety, Consent of
9.10.2, 9.10.3
Surveys
2.2.3
Suspension by the Owner for Convenience
14.3
Suspension of the Work
5.4.2, 14.3
Suspension or Termination of the Contract
5.4.1.1, 14
Taxes
3.6, 3.8.2.1, 7.3.7.4
Termination by the Contractor
14.1, 15.1.6
Termination by the Owner for Cause
5.4.1.1, **14.2,** 15.1.6
Termination by the Owner for Convenience
14.4
Termination of the Architect
4.1.3
Termination of the Contractor
14.2.2
TERMINATION OR SUSPENSION OF THE CONTRACT
14
Tests and Inspections
3.1.3, 3.3.3, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 11.4.1.1, 12.2.1, **13.5**
TIME
8
Time, Delays and Extensions of
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4.1, 14.3.2, 15.1.5, 15.2.5
Time Limits
2.1.2, 2.2, 2.4, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 11.1.3, 12.2, 13.5, 13.7, 14, 15.1.2, 15.4
Time Limits on Claims
3.7.4, 10.2.8, **13.7**, 15.1.2
Title to Work
9.3.2, 9.3.3
Transmission of Data in Digital Form
1.6
UNCOVERING AND CORRECTION OF WORK
12
Uncovering of Work
12.1
Unforeseen Conditions, Concealed or Unknown
3.7.4, 8.3.1, 10.3
Unit Prices
7.3.3.2, 7.3.4
Use of Documents
1.1.1, 1.5, 2.2.5, 3.12.6, 5.3
Use of Site
3.13, 6.1.1, 6.2.1
Values, Schedule of
9.2, 9.3.1
Waiver of Claims by the Architect
13.4.2
Waiver of Claims by the Contractor
9.10.5, 13.4.2, 15.1.6
Waiver of Claims by the Owner
9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.4.2, 14.2.4, 15.1.6
Waiver of Consequential Damages
14.2.4, 15.1.6
Waiver of Liens
9.10.2, 9.10.4
Waivers of Subrogation
6.1.1, **11.3.7**
Warranty
3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.4, 12.2.2, 13.7.1
Weather Delays
15.1.5.2
Work, Definition of
1.1.3
Written Consent
1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 11.4.1, 13.2, 13.4.2, 15.4.4.2
Written Interpretations
4.2.11, 4.2.12
Written Notice
2.3, 2.4, 3.3.1, 3.9, 3.12.9, 3.12.10, 5.2.1, 8.2.2, 9.7, 9.10, 10.2.2, 10.3, 11.1.3, 12.2.2, 12.2.4, **13.3**, 14, 15.4.1
Written Orders
1.1.1, 2.3, 3.9, 7, 8.2.2, 12.1, 12.2, 13.5.2, 14.3.1, 15.1.2

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

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

§ 1.1.2 THE CONTRACT

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

§ 1.1.3 THE WORK

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

§ 1.1.4 THE PROJECT

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

§ 1.1.5 THE DRAWINGS

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

§ 1.1.6 THE SPECIFICATIONS

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

§ 1.1.7 INSTRUMENTS OF SERVICE

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

§ 1.1.8 INITIAL DECISION MAKER

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

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

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

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

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

§ 1.3 CAPITALIZATION

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

§ 1.4 INTERPRETATION

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

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

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

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

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

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

ARTICLE 2 OWNER

§ 2.1 GENERAL

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

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

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

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

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

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

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

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

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

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

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

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

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

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

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

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

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

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

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

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

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

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

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

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

§ 3.4 LABOR AND MATERIALS

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

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

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

§ 3.5 WARRANTY

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

§ 3.6 TAXES

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

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

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

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

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

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

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct,

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but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

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

§ 3.9 SUPERINTENDENT

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

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

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

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

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

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

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

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

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§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

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

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

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

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

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

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

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

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to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

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

§ 3.14 CUTTING AND PATCHING

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

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

§ 3.15 CLEANING UP

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

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

§ 3.16 ACCESS TO WORK

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

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

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

§ 3.18 INDEMNIFICATION

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

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other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

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

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

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

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

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

§ 4.2 ADMINISTRATION OF THE CONTRACT

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

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

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

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

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

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

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the

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Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

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

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

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

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

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

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

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

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

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

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

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

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

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

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

§ 5.3 SUBCONTRACTUAL RELATIONS

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

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

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

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

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

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

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

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

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

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

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

§ 6.2 MUTUAL RESPONSIBILITY

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

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

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

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

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

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§ 6.3 OWNER'S RIGHT TO CLEAN UP

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

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

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

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

§ 7.2 CHANGE ORDERS

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

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

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 7.4 MINOR CHANGES IN THE WORK

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

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

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

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

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

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

§ 8.2 PROGRESS AND COMPLETION

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

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

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furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

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

§ 8.3 DELAYS AND EXTENSIONS OF TIME

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

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

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

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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

§ 9.2 SCHEDULE OF VALUES

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

§ 9.3 APPLICATIONS FOR PAYMENT

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

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

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

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

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the

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Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

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

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

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

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

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

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

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

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

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

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

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

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

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

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

§ 9.7 FAILURE OF PAYMENT

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

§ 9.8 SUBSTANTIAL COMPLETION

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

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

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

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

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

§ 9.9 PARTIAL OCCUPANCY OR USE

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

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

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

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

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

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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

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

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

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

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

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

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

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

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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

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

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

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

§ 10.3 HAZARDOUS MATERIALS

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

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

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

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

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

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

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§ 10.4 EMERGENCIES

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

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

.1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;

.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

.4 Claims for damages insured by usual personal injury liability coverage;

.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

.7 Claims for bodily injury or property damage arising out of completed operations; and

.8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

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

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

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

§ 11.2 OWNER'S LIABILITY INSURANCE

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

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's

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

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

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

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

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

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

§ 11.3.2 BOILER AND MACHINERY INSURANCE

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

§ 11.3.3 LOSS OF USE INSURANCE

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

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

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

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

§ 11.3.7 WAIVERS OF SUBROGATION

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

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

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

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

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

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

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

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

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

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

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

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

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

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

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

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

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

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

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

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ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

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

§ 13.2 SUCCESSORS AND ASSIGNS

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

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

§ 13.3 WRITTEN NOTICE

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

§ 13.4 RIGHTS AND REMEDIES

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

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

§ 13.5 TESTS AND INSPECTIONS

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

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

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

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

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

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

§ 13.6 INTEREST

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

§ 13.7 TIME LIMITS ON CLAIMS

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

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

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

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

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

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

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

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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

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.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

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

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

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

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

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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

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

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

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

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

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

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

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 15.3 MEDIATION

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

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

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

§ 15.4 ARBITRATION

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

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party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

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

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

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

§ 15.4.4 CONSOLIDATION OR JOINDER

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

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

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

DRAFT

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See Digital IDs vs. electronic signatures to understand bidding methods. If a Digital ID is required, Create your Digital ID.

General Info

Actions

Digital ID required

Deadline

07/30/2026 12:00 PM EDT

Advertised

07/15/2026 09:02 AM EDT

Business Name

City of Troy, OH

Location(s)

460 Staunton Rd, Troy, Ohio, 45373



Number

Troy Aquatic Park Maintenance Improvements (Re-Bid)

Description

Troy Aquatic Park Maintenance Improvements (Re-Bid)

This project consists of maintenance improvements at the Troy Aquatic Park that are identified within the drawings and specifications.

Engineers Estimate - $2,500,000.00

Pre-Bid Meeting - N/A

State Prevailing Wages

Allows zero unit prices and labor
Yes

Allows negative unit prices and labor
Yes

Solicitation Summary

AI generated | Quality may vary

This is an aquatic park renovation project involving pool equipment upgrades, structural repairs, and building improvements. May require pool construction experience, bonding, and specialized aquatic systems knowledge.

Work Types

Maintenance Landscape & Vegetation

Q & A

Deadline
Same as solicitation deadline.

Remarks

PROCUREMENT DOCUMENTS

Troy Aquatic Park Maintenance Improvements - Front End Document and Specifications (16.2 MB)

Troy Aquatic Park Maintenance Improvements - Drawings (20.3 MB)

Prevailing Wages (3.84 MB)

REQUIRED DOCUMENTS FOR DOWNLOAD

Guaranty and Performance Bond (319 KB)

Non-Collusion Affidavit (51.5 KB)

Experience Sheet and References (13.1 KB)

FORM OF PROPOSAL

Submitted By:* **this:*** **of:***

To: The City of Troy, Ohio
Director of Public Service and Safety
100 South Market Street
Troy, Ohio 45373-7303

Having read and examined the specifications and drawings for:

Troy Aquatic Park Maintenance Improvements

and likewise having inspected the site and the conditions affecting and governing this Project, the undersigned hereby proposes to furnish all materials and to perform all labor, as specified and described in the said Specifications and/or shown on said Drawings for all work necessary to complete the Project in a timely manner and in accordance with the Contract Documents regardless of whether expressly provided for in such Specifications and Drawings.

Before completing the Form of Proposal, the Undersigned represents that it has carefully reviewed the Notice to Bidders, Instructions to Bidders and General Conditions, General and Additional Construction Provisions, Supplementary Construction Specifications, and all other documentation related to this Project. The Undersigned further agrees that if this proposal is accepted such undersigned will comply with all such documents and the requirements therein. Failure to comply with provisions of the Bid Documents may be cause for disqualification of Bid.

The Undersigned agrees that, if the Proposal is accepted, such undersigned will furnish the required Bonds, Insurance Certificates, and other Contract Documents as will be required and as is noted in the Instructions to Bidders and General Conditions.

In Submitting this Bid, the undersigned agrees to execute and complete the Contract in the form included in the Contract Documents and to complete its work after the receipt of the “Notice to Proceed”, or for lack of a written “Notice to Proceed”, the receipt of this executed contract shall constitute a “Notice to Proceed”.

Select one of the following:*

Choices...

Name of Contracting Firm:*

Address of Contracting Firm:*

Signature:*

Printed Name:*

Date:*

Phone:* **Fax:**

If the Bidder is a partnership or Joint Venture, state the Name and Address of each Partner or Participant in the Joint Venture below (click the "+" to add entries. Type "N/A" if not applicable):

Name:* **Address:***

ADDENDA ACKNOWLEDGEMENT

Any addenda issued 72 hours prior to the bid due date shall include a provision extending the bid due date.

Addenda Acknowledgement (click "+" to add an addendum or type "N/A" if no addenda have been issued):

Addendum #* **Addendum Date:***

Base Bid (Lump Sum)

Description	Lump Sum	Lump Sum In Words

Alternates are not included in bid total.

We the undersigned, submit this Bid, for materials and labor to complete all work associated with the Troy Aquatic Park Improvements as outlined on the drawings and specifications to be:

PROJECT SCHEDULE

Bidder acknowledges the project schedule agrees to complete the work within the contract period scheduled or as outlined below.

Final Completion Date

Start Date:*

Calendar Days from Start Date to Completion:*

BID GUARANTY

Please choose one of the bid guaranty options below:

Paper Bid Bond, Certified Check, Cashier's Check or Offiical Bank Check

Confirmation*

Choices...

AMERICANS WITH DISABILITIES ACT COMPLIANCE CERTIFICATION

As an authorized officer, I,*

Having the title of:*

of*

with offices located at:*

and as its duly authorized representative, state that effective this:*

of:* **20_____:***

(date of submission of Bid) that said Contractor and his company is in compliance with the Americans with Disabilities Act.

Name of Contracting Firm:*

Address of Contracting Firm:*

Signature:*

Printed Name:*

Title:*

Date:*

Phone:* **Fax:**

REQUIRED DOCUMENTS LIST

Name	Omission Terms
Experience Sheet/References The Bidder shall submit, to the City, at least three references of projects that can attest to the …	I have, within the past five years, performed work of similar size and scope for the City of Troy, Ohio and wish to let my record in that case stand as my reference. I understand,

6 Required Documents

Name	Omission Terms
	however, that upon request, I shall furnish a list as referenced above.
Paper Bid Bond, Certified Check, Cashier's Check, or Official Bank Check Please upload a copy of ONE of the FOUR. The original, wet-ink must be provided to the City…	
Non-Collusion Affidavit The original, wet-ink must be provided to the City of Troy 72-hours after the solicitation deadline.	
Additional Document Upload Upload any additional documents you wish to include with your bid.	I do not have additional document to provide.
Additional Document Upload Upload any additional documents you wish to include with your bid.	I do not have additional document to provide.
Additional Document Upload Upload any additional documents you wish to include with your bid.	I do not have additional document to provide.

6 Required Documents

Legal Releases Support Knowledge Center

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Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Asbestos Local 207	LCN01-2026ib	Asbestos Worker	07/08/2026	07/08/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
Classification	BHR		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Asbestos Abatement	$35.25		$11.20	$7.50	$1.00	$4.00	$0.00	$0.05	$0.00	$0.00	$59.00	$76.63
Trainee	Percent	BHR										
Trainee 1 Year - 600 Hrs	70.920000	$25.00	$11.20	$1.90	$1.00	$1.00	$0.00	$0.05	$0.00	$0.00	$40.15	$52.65

Special Calculation Note

Other: Drug Testing

Ratio

3 Journeymen to 1 Trainee

Jurisdiction (* denotes special jurisdictional note)

Adams, Ashland, Ashtabula*, Athens, Auglaize, Brown, Butler*, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Erie*, Fairfield, Fayette, Franklin, Geauga, Greene, Guernsey, Hamilton, Hardin, Harrison, Highland, Hocking, Holmes, Huron, Knox, Lake, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Miami, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Portage, Preble, Richland, Ross, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren*, Wayne

Special Jurisdictional Note

Ashtabula County: (post offices & townships of Ashtabula, Austinburg, Geneva, Harperfield, Jefferson, Plymouth & Saybrook) (townships of Andover, Cherry Valley, Colbrook, Canneaut, Denmark, Dorset, East Orwell, Hartsgrove, Kingville, Lenox, Monroe,Morgan,New Lyme,North Kingsville, Orwell, Pierpoint, Richmond Rock Creek, Rome, Shefield, Trumbull, Wayne, Williamsfield & Windsor)

Butler County: (townships of Fairfield, Hanover, Liberty, Milford, Morgan, Oxford, Ripley, Ross, St. Clair, Union & Wayne) (Lemon & Madison)

Erie County: (post offices & townships of Berlin, Berlin Heights,Birmingham,Florence, Huron, Milan, Shinrock & Vermilion)

Warren County: (townships of: Deerfield, Hamilton, Harlan, Salem, Union & Washington) (Clear Creek, Franklin, Mossie, Turtle Creek & Wayne)

Details

An Abatement Journeyman is anyone who has more than 600 hours in the Asbestos Abatement field.

Asbestos & lead paint abatement including, but not limited to the removal or encapsulation of asbestos & lead paint, all work in conjunction with the preparation of the removal of same & all work in conjunction with the clean up after said removal. The removal of all insulation materials, whether they contain asbestos or not, from mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) is recognized as being the exclusive work of the Asbestos Abatement Workers.

On all mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) that are going to be demolished, the removal of all insulating materials whether they contain asbestos or not shall be the exclusive work of the Laborers.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Asbestos Local 50 Heat & Frost Insulators

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN02-2025ib	Asbestos Worker	7/30/2025	7/30/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Asbestos Insulation Mechanic	$40.56		$9.55	$9.60	$0.55	$0.00	$4.75	$0.00	$0.00	$0.00	$65.01	$85.29
Firestop Technician	$40.56		$9.55	$9.60	$0.55	$0.00	$4.75	$0.00	$0.00	$0.00	$65.01	$85.29
Apprentice	BHR	Percent										
1st year	$25.81	$63.63	$9.55	$4.52	$0.50	$0.00	$0.50	$0.00	$0.00	$0.00	$40.88	$53.78
2nd year	$30.11	$74.23	$9.55	$4.52	$0.50	$0.00	$0.85	$0.00	$0.00	$0.00	$45.53	$60.59
3rd year	$34.41	$84.83	$9.55	$6.76	$0.50	$0.00	$1.25	$0.00	$0.00	$0.00	$52.47	$69.67
4th year	$36.56	$90.13	$9.55	$6.76	$0.50	$0.00	$1.50	$0.00	$0.00	$0.00	$54.87	$73.15

(*)Special Calculation Note :

Ratio :

1 Journeymen to 1 Apprentice
4 Journeymen to 1 Apprentice thereafter

Jurisdiction (* denotes special jurisdictional note) :

Athens, Auglaize, Butler*, Champaign, Clark, Clinton, Crawford, Darke, Delaware, Fairfield, Fayette, Franklin, Greene, Guernsey, Hardin, Hocking, Knox, Licking, Logan, Madison, Marion, Miami, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Preble, Ross, Shelby, Union, Vinton, Warren*

Special Jurisdictional Note :

Butler County: Townships of Lemon and Madison.
Warren County: Township of Clear Creek, Franklin, Massie, Turtle Creek and Wayne

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Boilermaker Local 105

Type of Rate: Commercial

Change #: LCN02-2013fb

Craft: Boilermaker

Effective Date: 10/1/2013

Effective Date: 10/1/2013

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Boilermaker	$35.26		$7.07	$13.28	$0.89	$0.00	$3.00	$0.55	$0.00	$0.00	$60.05	$77.68
Apprentice	BHR	Percent										
1st 6 months	$24.69	$70.03	$7.07	$11.30	$0.89	$0.00	$2.10	$0.55	$0.00	$0.00	$46.60	$58.95
2nd 6 months	$26.45	$75.02	$7.07	$11.30	$0.89	$0.00	$2.25	$0.55	$0.00	$0.00	$48.51	$61.74
3rd 6 months	$28.21	$80.00	$7.07	$11.30	$0.89	$0.00	$2.40	$0.55	$0.00	$0.00	$50.42	$64.52
4th 6 months	$29.98	$85.02	$7.07	$11.30	$0.89	$0.00	$2.55	$0.55	$0.00	$0.00	$52.34	$67.33
5th 6 months	$30.86	$87.52	$7.07	$13.28	$0.89	$0.00	$2.63	$0.55	$0.00	$0.00	$55.28	$70.71
6th 6 months	$31.74	$90.03	$7.07	$13.28	$0.89	$0.00	$2.70	$0.55	$0.00	$0.00	$56.23	$72.11
7th 6 months	$32.62	$92.50	$7.07	$13.28	$0.89	$0.00	$2.78	$0.55	$0.00	$0.00	$57.19	$73.49
8th 6 months	$33.50	$95.00	$7.07	$13.28	$0.89	$0.00	$2.85	$0.55	$0.00	$0.00	$58.14	$74.89

(*)Special Calculation Note :

Other is Supplemental Health and Welfare

Ratio :

5 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Athens, Brown, Butler, Champaign, Clark, Clermont, Clinton, Fairfield, Fayette, Franklin, Gallia, Greene, Guernsey, Hamilton, Highland, Hocking, Jackson, Lawrence, Licking, Madison, Meigs, Miami, Montgomery, Morgan, Muskingum, Noble, Perry, Pickaway, Pike, Preble, Ross, Scioto, Vinton, Warren

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Bricklayer Local 23 (Dayton Tile Finisher)

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2024ib	Bricklayer	7/1/2024	7/1/2024

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Bricklayer Tile Marble Terrazzo Finisher	$27.78		$3.70	$6.86	$0.49	$0.00	$0.00	$0.00	$0.00	$0.00	$38.83	$52.72
Base Machine	$28.28		$3.70	$6.86	$0.49	$0.00	$0.00	$0.00	$0.00	$0.00	$39.33	$53.47
Apprentice	BHR	Percent										
1st 6 months 0-600 hrs	$16.67	$60.00	$3.70	$0.00	$0.49	$0.00	$0.00	$0.00	$0.00	$0.00	$20.86	$29.19
2nd 6 months 601-1200 hrs	$18.06	$65.00	$3.70	$0.00	$0.49	$0.00	$0.00	$0.00	$0.00	$0.00	$22.25	$31.28
3rd 6 months 1201-1800 hrs	$19.45	$70.00	$3.70	$6.86	$0.49	$0.00	$0.00	$0.00	$0.00	$0.00	$30.50	$40.22
4th 6 months 1801-2400	$20.84	$75.02	$3.70	$6.86	$0.49	$0.00	$0.00	$0.00	$0.00	$0.00	$31.89	$42.31
5th 6 months 2401-3000 hrs	$22.22	$80.00	$3.70	$6.86	$0.49	$0.00	$0.00	$0.00	$0.00	$0.00	$33.27	$44.39
6th 6 months 3001-3600 hrs	$25.00	$90.00	$3.70	$6.86	$0.49	$0.00	$0.00	$0.00	$0.00	$0.00	$36.05	$48.55
TMT Helper - May enter Apprentice Program after 90 day completion	$	$	$	$	$	$	$	$	$	$	$	$
First 90 Days	$12.50	$45.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$12.50	$18.75

(*)Special Calculation Note :

Classification title contains "Bricklayer" because contract originates within the Bricklayer Local. Note that the classification description is clarified after the local union number at the top of the page. ***Medical Savings Account***: The Medical Savings Account can only be deducted providing employee shows proof voluntary enrollment in the program. Minimum contribution of $1.00 per hourworked with no maximum.

Ratio :

1 Journeyman 1 Apprentice 5 Journeyman 1 Apprentice 10 Journeyman 2 Apprentice 15Journeyman 3 Apprentice 20 Journeyman 4 Apprentice 25 Journeyman 5 Apprentice 8 Employees 1 Helper

Jurisdiction (* denotes special jurisdictional note) :

Auglaize, Champaign, Clark, Clinton, Darke, Greene, Hardin, Highland, Logan, Mercer, Miami, Montgomery, Preble*, Shelby

Special Jurisdictional Note :

In Preble County the following townships are included: (Jackson, Monroe, Harrison, Twin and Washington)

Details :

Tile Layer Finishers shall do mixing of mortars & adhesives,cleaning & grouting of tile,unloading of all trucks,unpacking & handling of all tile & materials such as sand,lime,cement,tile,& all types of tile panels, prefabricated on job site.
Marble Setter Finishers shall do all cleaning,waxing & polishing,grouting and pointing.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Bricklayer Local 23 (Dayton Tile Mechanic)

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Bricklayer	7/1/2025	7/1/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Bricklayer Tile Marble Terrazzo Mechanics	$33.34		$9.42	$6.99	$0.60	$0.00	$0.00	$0.00	$0.00	$0.00	$50.35	$67.02
Terrazzo Worker	$33.34		$9.42	$6.99	$0.60	$0.00	$0.00	$0.00	$0.00	$0.00	$50.35	$67.02
Apprentice	BHR	Percent										
1st 6 Months	$20.00	$60.00	$9.42	$0.00	$0.60	$0.00	$0.00	$0.00	$0.00	$0.00	$30.02	$40.03
2nd 6 Months	$21.67	$65.00	$9.42	$0.00	$0.60	$0.00	$0.00	$0.00	$0.00	$0.00	$31.69	$42.53
3rd 6 Months	$23.34	$70.00	$9.42	$6.99	$0.60	$0.00	$0.00	$0.00	$0.00	$0.00	$40.35	$52.02
4th 6 Months	$25.01	$75.00	$9.42	$6.99	$0.60	$0.00	$0.00	$0.00	$0.00	$0.00	$42.02	$54.52
5th 6 months	$26.67	$80.00	$9.42	$6.99	$0.60	$0.00	$0.00	$0.00	$0.00	$0.00	$43.68	$57.02
6th 6 months	$28.34	$85.00	$9.42	$6.99	$0.60	$0.00	$0.00	$0.00	$0.00	$0.00	$45.35	$59.52
7th 6 months	$30.01	$90.00	$9.42	$6.99	$0.60	$0.00	$0.00	$0.00	$0.00	$0.00	$47.02	$62.02
8th 6 months	$31.67	$95.00	$9.42	$6.99	$0.60	$0.00	$0.00	$0.00	$0.00	$0.00	$48.68	$64.52

(*)Special Calculation Note :

Ratio :

5 Journeymen to 1 Apprentice 10 Journeymen to 2 Apprentice 15 Journeymen to 3 Apprentice 20 Journeymen to 4 Apprentice 25 Journeymen to 5 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Champaign, Clark, Clinton, Darke, Greene, Highland, Logan, Miami, Montgomery, Preble*, Shelby

Special Jurisdictional Note :

In Preble County the following townships are included: (Jackson, Jefferson, Monroe, Harrison, Twin and Washington)

Details :

**(Tile layers work)the laying,cutting or setting of all tile where used for floors,walls, ceilings, walks, promenade roofs,stair treads,stair risers,facings,hearths,fireplaces & decorative inserts together with any marble plinths, thresholds or window stools used in connection with any tile work.the building, shaping forming construction or repairing of all fireplace work, whether in connection with a mantel hearth facing or not, & the setting & preparing of all material such as cement,plaster,mortar,brickwork,iron work or other materials necessary for the proper,safe construction & completion of such work:except that a mantel made exclusively of brick, marble or stone shall be conceded to be bricklayers,marble setters or stonemasons' work respectively. **Marble,mosaic,venetian enamel & terrazzo. Cutting and assembling of mosaics.all rolling of terrazzo work. **Caulking of all expansion,perimeter & angle joints shall be the exclusive work of the tile mechanic. **Marble masons shall consist of carving,cutting & setting of all marble,slate (including blackboards) stone, albereen, carrara, sanionyx, vitrolite & similar opaque glass, scagliola, what ever thickness or dimension.

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Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Bricklayer Local 23 (Dayton)	LCN01-2026ib	Bricklayer	06/17/2026	06/17/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Bricklayer Stone Mason Refractory	$35.85		$11.00	$8.09	$0.72	$0.00	$0.50	$0.00	$0.00	$0.00	$56.16	$74.09
Pointer/ Caulker/ Cleaner	$35.85		$11.00	$8.09	$0.72	$0.00	$0.50	$0.00	$0.00	$0.00	$56.16	$74.09
Improver Apprentices 25 day probationary period then												
1st 6 months	$23.30		$11.00	$0.00	$0.57	$0.00	$0.50	$0.00	$0.00	$0.00	$35.37	$47.02
2nd 6 months	$26.89		$11.00	$0.00	$0.57	$0.00	$0.50	$0.00	$0.00	$0.00	$38.96	$52.41
3rd 6 months	$30.47		$11.00	$6.49	$0.57	$0.00	$0.50	$0.00	$0.00	$0.00	$49.03	$64.27
4th 6 months	$34.06		$11.00	$6.49	$0.57	$0.00	$0.50	$0.00	$0.00	$0.00	$52.62	$69.65
Bricklayer Stone Mason Refractory and PCC Apprecntice	**Percent**	**BHR**										
1st 6 months	70.020000	$25.10	$11.00	$0.00	$0.62	$0.00	$0.50	$0.00	$0.00	$0.00	$37.22	$49.77
2nd 6 months	74.000000	$26.53	$11.00	$0.00	$0.62	$0.00	$0.50	$0.00	$0.00	$0.00	$38.65	$51.91
3rd 6 months	78.000000	$27.96	$11.00	$6.79	$0.62	$0.00	$0.50	$0.00	$0.00	$0.00	$46.87	$60.85

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
4th 6 months	82.000000	$29.40	$11.00	$6.79	$0.62	$0.00	$0.50	$0.00	$0.00	$0.00	$48.31	$63.01
5th 6 months	86.000000	$30.83	$11.00	$6.79	$0.62	$0.00	$0.50	$0.00	$0.00	$0.00	$49.74	$65.16
6th 6 months	90.000000	$32.27	$11.00	$6.79	$0.62	$0.00	$0.50	$0.00	$0.00	$0.00	$51.18	$67.31
7th 6 months	94.000000	$33.70	$11.00	$6.79	$0.62	$0.00	$0.50	$0.00	$0.00	$0.00	$52.61	$69.46
8th 6 months	98.000000	$35.13	$11.00	$6.79	$0.62	$0.00	$0.50	$0.00	$0.00	$0.00	$54.04	$71.61
Mason Trainee 1-90 Days	45.000000	$16.13	$0.00	$0.00	$0.00	$0.00	$0.50	$0.00	$0.00	$0.00	$16.63	$24.70
91-365 Days	45.000000	$16.13	$11.00	$0.00	$0.00	$0.00	$0.50	$0.00	$0.00	$0.00	$27.63	$35.70
2nd Year	50.000000	$17.93	$11.00	$0.00	$0.00	$0.00	$0.50	$0.00	$0.00	$0.00	$29.43	$38.39

Special Calculation Note

Apprentice and Apprentice Improver - Health and Welfare after 30 days
Mason Trainees - Health and Welfare after 90 days

Ratio

Bricklayer Stone Mason Refractory Worker:
1-2 Journeymen to 1 Apprentice
3-4 Journeymen to 2 Apprentice
5-6 Journeymen to 2 Apprentice
7-10 Journeymen to 3 Apprentice

Mason Trainee Ratio:
1 Apprentice permits 1 Mason Trainee
2 Apprentice permits 1 Mason Trainee
3 Apprentice permits 2 Mason Trainee
4 Apprentice permits 2 Mason Trainee

In order to utilize a Pre-Apprentice, you must have 1 registered apprentice in your employ.
Ratio of Improver Apprentices to Journeymen in no case shall their be no more than 1 Improver Apprentice to 6 Journeymen

Jurisdiction (* denotes special jurisdictional note)

Champaign, Clark, Clinton, Darke, Greene, Highland, Logan, Miami, Montgomery, Preble*, Shelby

Special Jurisdictional Note

In Preble County the following townships are included: Jackson, Monroe, Harrison, Twin, Jefferson and Washington

Details

Apprentice Ratio's covers: Bricklayer, Stone Mason, Refractory worker and Pointer, Cleaner, Caulker

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Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Bricklayer Local 23 Heavy Hwy (A)	LCN02-2026ib	Bricklayer	06/10/2026	06/10/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Cement Mason Bricklayer Sewer Water Works A	$35.31		$10.71	$10.14	$0.59	$0.00	$1.80	$0.00	$0.00	$0.00	$58.55	$76.21
Apprentice	**Percent**	**BHR**										
1st year	70.000000	$24.72	$10.71	$10.14	$0.59	$0.00	$1.80	$0.00	$0.00	$0.00	$47.96	$60.32
2nd year	80.000000	$28.25	$10.71	$10.14	$0.59	$0.00	$1.80	$0.00	$0.00	$0.00	$51.49	$65.62
3rd year	90.000000	$31.78	$10.71	$10.14	$0.59	$0.00	$1.80	$0.00	$0.00	$0.00	$55.02	$70.91

Special Calculation Note

This rate is not for building construction.

This rate applies only to the Cement Masons. All other Bricklaying, PCC, Stone, Tile, Marble, Refractory, Industrial and all other applicable work performed will be performed under the applicable rates for those contracts.

Ratio

3 Journeymen to 1 Apprentice
6 Journeymen to 2 Apprentice
9 Journeymen to 3 Apprentice

12 Journeymen to 4 Apprentice
15 Journeymen to 5 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Geauga, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note

Details

Bricklayer Local 23 Heavy Hwy (A): Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.

Bricklayer Local 23 Heavy Hwy (B): Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control, Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

An Official State of Ohio site. Here's how you know

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Bricklayer Local 23 Heavy Hwy (B)	LCN02-2026ib	Bricklayer	06/10/2026	06/10/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Cement Mason Bricklayer Power Plants Tunnels Amusement Parks B	$36.31		$10.71	$10.14	$0.60	$0.00	$1.80	$0.00	$0.00	$0.00	$59.56	$77.72
Apprentice	**Percent**	**BHR**										
1st year	70.000000	$25.42	$10.71	$10.14	$0.60	$0.00	$1.80	$0.00	$0.00	$0.00	$48.67	$61.38
2nd year	80.000000	$29.05	$10.71	$10.14	$0.60	$0.00	$1.80	$0.00	$0.00	$0.00	$52.30	$66.83
3rd year	90.000000	$32.68	$10.71	$10.14	$0.60	$0.00	$1.80	$0.00	$0.00	$0.00	$55.93	$72.27

Special Calculation Note

This rate is not for building construction.

This rate applies only to the Cement Masons. All other Bricklaying, PCC, Stone, Tile, Marble, Refractory, Industrial and all other applicable work performed will be performed under the applicable rates for those contracts.

Ratio

3 Journeymen to 1 Apprentice
6 Journeymen to 2 Apprentice

9 Journeymen to 3 Apprentice
12 Journeymen to 4 Apprentice
15 Journeymen to 5 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Geauga, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note

Details

Bricklayer Local 23 Heavy Hwy (A): Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.

Bricklayer Local 23 Heavy Hwy (B): Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control, Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

An Official State of Ohio site. Here's how you know

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Carpenter & Pile Driver SW District HevHwy	LCN01-2026ib	Carpenter	05/01/2026	04/29/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Journeyman	$37.49		$10.31	$6.95	$0.80	$0.00	$6.87	$0.15	$0.00	$0.00	$62.57	$81.31
Apprentice	**Percent**	**BHR**										
1st 6 Months	70.000000	$26.24	$10.31	$6.95	$0.80	$0.00	$6.87	$0.15	$0.00	$0.00	$51.32	$64.44
2nd 6 Months	70.000000	$26.24	$10.31	$6.95	$0.80	$0.00	$6.87	$0.15	$0.00	$0.00	$51.32	$64.44
3rd 6 Months	80.000000	$29.99	$10.31	$6.95	$0.80	$0.00	$6.87	$0.15	$0.00	$0.00	$55.07	$70.06
4th 6 Months	80.000000	$29.99	$10.31	$6.95	$0.80	$0.00	$6.87	$0.15	$0.00	$0.00	$55.07	$70.06
5th 6 Months	90.000000	$33.74	$10.31	$6.95	$0.80	$0.00	$6.87	$0.15	$0.00	$0.00	$58.82	$75.69
6th 6 Months	90.000000	$33.74	$10.31	$6.95	$0.80	$0.00	$6.87	$0.15	$0.00	$0.00	$58.82	$75.69
7th 6 Months	95.000000	$35.62	$10.31	$6.95	$0.80	$0.00	$6.87	$0.15	$0.00	$0.00	$60.70	$78.51
8th 6 Months	95.000000	$35.62	$10.31	$6.95	$0.80	$0.00	$6.87	$0.15	$0.00	$0.00	$60.70	$78.51

Special Calculation Note

Other: UBC National Fund

When the Contractor furnishes the necessary underwater gear for the Diver, the Diver shall be paid one and one half (1 & 1/2) times the journeyman rate for the time spent in the water.

Ratio

1 Journeymen to 1 Apprentice

An employer shall have the right to employ one (1) Apprentice for one (1) Journeyman Carpenter in its employment for the first Apprentice employed, and 1 (1) Apprentice for two (2) Journeyman Carpenter for additional Apprentices employed. Thereafter, every third additional carpenter hired shall be an apprentice, if available, and if practical for the type of work being performed.

Jurisdiction (* denotes special jurisdictional note)

Brown, Butler, Champaign, Clark, Clermont, Clinton, Darke, Greene, Hamilton, Logan, Miami, Montgomery, Preble, Shelby, Warren

Special Jurisdictional Note

Details

Highway Construction, Airport Construction, Heavy Construction but not limited to: (tunnels, subways, drainage projects, flood control, reservoirs).
Railroad Construction, Sewer Waterworks & Utility Construction but not limited to: (storm sewers, waterlines, gas lines).
Industrial & Building Site, Power Plant, Amusement Park, Athletic Stadium Site, Sewer and Water Plants.

An Official State of Ohio site. Here's how you know

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Carpenter & Pile Driver SW Zone 1	LCN01-2026ib	Carpenter	06/10/2026	06/10/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Carpenter & Piledriver	$34.59		$10.03	$6.95	$0.80	$0.00	$4.28	$0.17	$0.00	$0.00	$56.82	$74.12
Apprentice	**Percent**	**BHR**										
1st 6 Months	70.000000	$24.21	$10.03	$2.00	$0.80	$0.00	$4.28	$0.17	$0.00	$0.00	$41.49	$53.59
2nd 6 Months	70.000000	$24.21	$10.03	$2.00	$0.80	$0.00	$4.28	$0.17	$0.00	$0.00	$41.49	$53.59
3rd 6 Months	80.000000	$27.67	$10.03	$5.56	$0.80	$0.00	$4.28	$0.17	$0.00	$0.00	$48.51	$62.35
4th 6 Months	80.000000	$27.67	$10.03	$5.56	$0.80	$0.00	$4.28	$0.17	$0.00	$0.00	$48.51	$62.35
5th 6 Months	90.000000	$31.13	$10.03	$6.26	$0.80	$0.00	$4.28	$0.17	$0.00	$0.00	$52.67	$68.23
6th 6 Months	90.000000	$31.13	$10.03	$6.26	$0.80	$0.00	$4.28	$0.17	$0.00	$0.00	$52.67	$68.23
7th 6 Months	95.000000	$32.86	$10.03	$6.60	$0.80	$0.00	$4.28	$0.17	$0.00	$0.00	$54.74	$71.17
8th 6 Months	95.000000	$32.86	$10.03	$6.60	$0.80	$0.00	$4.28	$0.17	$0.00	$0.00	$54.74	$71.17

Special Calculation Note

Other is for UBC National Fund

Ratio

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Champaign, Clark, Darke, Greene, Logan, Miami, Montgomery, Preble, Shelby

Special Jurisdictional Note

Details

Carpenter duties shall include but not limited to: Pile driving, milling, fashioning, joining, assembling, erecting, fastening, or dismantling of all material of wood, plastic, metal, fiber, cork, and composition, and all other substitute materials: pile driving, cutting, fitting, and placing of lagging, and the handling, cleaning, erecting, installing, and dismantling of machinery, equipment, and erecting pre-engineered metal buildings.

Pile Drivers work but not limited to: unloading, assembling, erection, repairs, operation, signaling, dismantling, and reloading all equipment that is used for pile driving including pile butts. pile butts is defined as sheeting or scrap piling. Underwater work that may be required in connection with the installation of piling. The diver and his tender work as a team and shall arrive at their own financial arrangements with the contractor. Any configuration of wood, steel, concrete, or composite that is jetted, driven, or vibrated onto the ground by conventional pile driving equipment for the purpose of supporting a future load that may be permanent or temporary. Driving bracing, plumbing, cutting off and capping of all piling whether wood, metal, pipe piling or composite. loading, unloading, erecting, framing, dismantling, moving, and handling of pile driving equipment. piling used in the construction and repair of all wharves, docks, piers, trestles, caissons, cofferdams, and the erection of all sea walls and breakwaters. All underwater and marine work on bulkheads, wharves, docks, shipyards, caissons, piers, bridges, pipeline work, viaducts, marine cable and trestles, as well as salvage and reclamation work where divers are employed. Rate shall include carpenters, acoustic, and ceiling installers, drywall installers, pile drivers, and floorlayers.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Carpenter Locals 2 & 136 Floorlayer SW

Type of Rate: Commercial

Change #: LCN02-2025sks

Craft: Carpenter

Effective Date: 9/17/2025

Effective Date: 9/17/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter Floorlayer	$31.74		$9.24	$6.95	$0.70	$0.00	$3.27	$0.16	$0.00	$0.00	$52.06	$67.93
Apprentice	BHR	Percent										
1st 6 months	$22.22	$70.00	$9.24	$2.00	$0.70	$0.00	$3.27	$0.16	$0.00	$0.00	$37.59	$48.70
2nd 6 months	$22.22	$70.00	$9.24	$2.00	$0.70	$0.00	$3.27	$0.16	$0.00	$0.00	$37.59	$48.70
3rd 6 months	$25.39	$80.00	$9.24	$5.56	$0.70	$0.00	$3.27	$0.16	$0.00	$0.00	$44.32	$57.02
4th 6 months	$25.39	$80.00	$9.24	$5.56	$0.70	$0.00	$3.27	$0.16	$0.00	$0.00	$44.32	$57.02
5th 6 months	$28.57	$90.00	$9.24	$6.26	$0.70	$0.00	$3.27	$0.16	$0.00	$0.00	$48.20	$62.48
6th 6 months	$28.57	$90.00	$9.24	$6.26	$0.70	$0.00	$3.27	$0.16	$0.00	$0.00	$48.20	$62.48
7th 6 months	$30.15	$95.00	$9.24	$6.60	$0.70	$0.00	$3.27	$0.16	$0.00	$0.00	$50.12	$65.19
8th 6 months	$30.15	$95.00	$9.24	$6.60	$0.70	$0.00	$3.27	$0.16	$0.00	$0.00	$50.12	$65.19

(*)Special Calculation Note :

Other: UBC National Fund and Install

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Brown, Butler, Champaign, Clark, Clermont, Clinton, Darke, Greene, Hamilton, Logan, Miami, Montgomery, Preble, Shelby, Warren

Special Jurisdictional Note :

Details :

Scope of work shall include, but not be limited to: receiving,unloading,handling,distribution and installation of all carpeting materials,carpet padding or matting materials and all resilient materials whether for use on walls, floors,counter, sink,table and all preparation work necessary in connection therewith, including sanding work. the installation of nonstructural under-layment and the work of removing, cleaning waxing of any of the above. Carpeting shall include any floor covering composed of either natural or synthetic fibers that are made in breadths to be sewed, fastened or directly glued to floors or over cushioning sound-proofing materials.Resilient Floors shall consist of and include the laying of all special designs of wood,wood block, wood composition, cork, linoleum, asphalt, mastic, plastic, rubber tile,whether nailed or glued.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Carpenter Millwright Local 1090 SW Zone II

Type of Rate: Commercial

Change #: LCN01-2025ib

Craft: Carpenter

Effective Date: 9/10/2025

Effective Date: 9/10/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter Millwright	$36.42		$9.18	$6.95	$0.72	$0.00	$8.24	$0.19	$0.00	$0.00	$61.70	$79.91
Apprentice	BHR	Percent										
1st 6 months	$25.49	$70.00	$9.18	$4.87	$0.72	$0.00	$5.77	$0.19	$0.00	$0.00	$46.22	$58.97
2nd 6 months	$25.49	$70.00	$9.18	$4.87	$0.72	$0.00	$5.77	$0.19	$0.00	$0.00	$46.22	$58.97
3rd 6 months	$29.14	$80.00	$9.18	$5.56	$0.72	$0.00	$6.59	$0.19	$0.00	$0.00	$51.38	$65.95
4th 6 months	$29.14	$80.00	$9.18	$5.56	$0.72	$0.00	$6.59	$0.19	$0.00	$0.00	$51.38	$65.95
5th 6 months	$32.78	$90.00	$9.18	$6.26	$0.72	$0.00	$7.42	$0.19	$0.00	$0.00	$56.55	$72.94
6th 6 months	$32.78	$90.00	$9.18	$6.26	$0.72	$0.00	$7.42	$0.19	$0.00	$0.00	$56.55	$72.94
7th 6 months	$34.60	$95.00	$9.18	$6.60	$0.72	$0.00	$7.83	$0.19	$0.00	$0.00	$59.12	$76.42
8th 6 months	$34.60	$95.00	$9.18	$6.60	$0.72	$0.00	$7.83	$0.19	$0.00	$0.00	$59.12	$76.42

(*)Special Calculation Note :

Other ($0.19) $0.14 National Fund and $0.05 for National Millwright Fund.

Ratio :

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Champaign, Clark, Darke, Greene, Logan, Miami, Montgomery, Preble, Shelby

Special Jurisdictional Note :

Details :

An Official State of Ohio site. Here's how you know

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Cement Mason Local 132 (Dayton)	LCN01-2026ib	Cement Mason	06/01/2026	05/27/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Cement Mason	$35.15		$8.95	$7.35	$0.85	$0.00	$2.35	$0.06	$0.00	$0.00	$54.71	$72.28
Apprentice	**Percent**	**BHR**										
1st Year	70.020000	$24.61	$8.95	$7.35	$0.85	$0.00	$2.35	$0.06	$0.00	$0.00	$44.17	$56.47
2nd Year	80.000000	$28.12	$8.95	$7.35	$0.85	$0.00	$2.35	$0.06	$0.00	$0.00	$47.68	$61.74
3rd Year	90.020000	$31.64	$8.95	$7.35	$0.85	$0.00	$2.35	$0.06	$0.00	$0.00	$51.20	$67.02

Special Calculation Note

Other: International Training Fund

Cement Masons on outrigger, swing or hanging scaffolds, manlifts:
$0.75 per hour above scale up to twenty-five (25) feet and $0.75 per hour for each additional twenty-five (25) feet or part of same.

Cement Mason operating a grinder: $0.30 per hour above the journeyman scale.

Ratio

2 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Champaign, Clark, Clinton, Darke, Greene, Miami, Montgomery, Preble, Shelby

Special Jurisdictional Note

Details

An Official State of Ohio site. Here's how you know

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Cement Mason Local 132 Hev Hwy (Dayton)	LCN01-2026ib	Cement Mason	05/01/2026	04/29/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Cement Mason	$39.18		$9.30	$7.65	$0.75	$0.00	$2.45	$0.08	$0.00	$0.00	$59.41	$79.00
Apprentice	**Percent**	**BHR**										
1st Year	70.000000	$27.43	$9.30	$7.65	$0.75	$0.00	$2.45	$0.08	$0.00	$0.00	$47.66	$61.38
2nd Year	80.000000	$31.34	$9.30	$7.65	$0.75	$0.00	$2.45	$0.08	$0.00	$0.00	$51.57	$67.24
3rd Year	90.000000	$35.26	$9.30	$7.65	$0.75	$0.00	$2.45	$0.08	$0.00	$0.00	$55.49	$73.12

Special Calculation Note

Other: International Training Fund

Ratio

1 Journeyman to 1 Apprentice
2 Journeymen to 1 Apprentice thereafter

Jurisdiction (* denotes special jurisdictional note)

Champaign, Clark, Clinton, Darke, Greene, Miami, Montgomery, Preble, Shelby

Special Jurisdictional Note

Details

Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site, Heavy Construction, Airport Construction Or Railroad Construction Work, Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work, Pollution Control, Sewer Plant, Waste & Water Plant, Water Treatment Facilities Construction.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 71 DOT Traffic Signal Highway Lighting American Line Builders

Type of Rate: Commercial

Change #: LCN01-2025ib

Craft: Electrical

Effective Date: 6/4/2025

Effective Date: 6/4/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrical Lineman	$46.03		$7.50	$1.38	$0.46	$0.00	$9.20	$0.50	$0.00	$0.00	$65.07	$88.09
Traffic Signal & Lighting Journeyman	$44.43		$7.50	$1.33	$0.44	$0.00	$8.89	$0.50	$0.00	$0.00	$63.09	$85.31
Equipment Operator	$40.44		$7.50	$1.21	$0.40	$0.00	$8.09	$0.50	$0.00	$0.00	$58.14	$78.36
Groundman 0 to 12 months (W/O CDL)	$24.52		$7.50	$0.74	$0.25	$0.00	$4.90	$0.50	$0.00	$0.00	$38.41	$50.67
Groundman 0 to 12 Months (W CDL)	$26.78		$7.50	$0.80	$0.27	$0.00	$5.36	$0.50	$0.00	$0.00	$41.21	$54.60
Groundman greater than 1 year (W CDL)	$29.07		$7.50	$0.87	$0.29	$0.00	$5.81	$0.50	$0.00	$0.00	$44.04	$58.58
Traffic Apprentice	$		$	$	$	$	$	$	$	$	$	$
1st 1000 hrs	$26.66		$7.50	$0.80	$0.27	$0.00	$5.33	$0.50	$0.00	$0.00	$41.06	$54.39
2nd 1000 hrs	$28.88		$7.50	$0.87	$0.29	$0.00	$5.78	$0.50	$0.00	$0.00	$43.82	$58.26
3rd 1000 hrs	$31.10		$7.50	$0.93	$0.31	$0.00	$6.22	$0.50	$0.00	$0.00	$46.56	$62.11
4th 1000 hrs	$33.32		$7.50	$1.00	$0.33	$0.00	$6.66	$0.50	$0.00	$0.00	$49.31	$65.97
5th 1000 hrs	$35.54		$7.50	$1.07	$0.36	$0.00	$7.11	$0.50	$0.00	$0.00	$52.08	$69.85
6th 1000 hrs	$39.99		$7.50	$1.20	$0.40	$0.00	$8.00	$0.50	$0.00	$0.00	$57.59	$77.59
Apprentice	BHR	Percent										
1st 1,000 Hours	$27.62	$60.00	$7.50	$0.83	$0.28	$0.00	$5.52	$0.50	$0.00	$0.00	$42.25	$56.06
2nd 1,000 Hours	$29.92	$65.00	$7.50	$0.90	$0.30	$0.00	$5.98	$0.50	$0.00	$0.00	$45.10	$60.06
3rd 1,000 Hours	$32.22	$70.00	$7.50	$0.97	$0.32	$0.00	$6.44	$0.50	$0.00	$0.00	$47.95	$64.06
4th 1,000 Hours	$34.52	$75.00	$7.50	$1.04	$0.35	$0.00	$6.90	$0.50	$0.00	$0.00	$50.81	$68.07
5th 1,000 Hours	$36.82	$80.00	$7.50	$1.10	$0.37	$0.00	$7.36	$0.50	$0.00	$0.00	$53.65	$72.07

6th 1,000 Hours	$39.13	$85.00	$7.50	$1.17	$0.39	$0.00	$7.82	$0.50	$0.00	$0.00	$56.51	$76.07
7th 1,000 Hours	$41.43	$90.00	$7.50	$1.24	$0.41	$0.00	$8.28	$0.50	$0.00	$0.00	$59.36	$80.07

(*)Special Calculation Note :

Other: Health Reimbursement Account

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Auglaize, Champaign, Clark, Clinton, Darke, Greene, Logan, Mercer, Miami, Montgomery, Preble, Shelby

Special Jurisdictional Note :

Details :

A groundman when directed shall assist a Journeymen in the performance of his/her work on the ground, including the use of hand tools. Under no circumstances shall this classification climb poles, towers, ladders, or work from an elevated platform or bucket truck. This classification shall not perform work normally assigned to an apprentice lineman. No more than three (3) Groundmen shall work alone. Jobs with more that three Groundmen shall be supervised by a Groundcrew Foreman, Journeyman Lineman, Journeyman Traffic Signal Technician or an Equipment Operator.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 71 High Tension Pipe Type Cable

Type of Rate: Commercial

Change #: LCN01-2026ib

Craft: Electrical

Effective Date: 1/7/2026

Effective Date: 1/7/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrical Lineman	$54.94		$7.50	$1.65	$0.55	$0.00	$13.19	$1.00	$0.00	$0.00	$78.83	$106.30
Certified Lineman Welder	$54.94		$7.50	$1.65	$0.55	$0.00	$13.19	$1.00	$0.00	$0.00	$78.83	$106.30
Certified Cable Splicer	$54.94		$7.50	$1.65	$0.55	$0.00	$13.19	$1.00	$0.00	$0.00	$78.83	$106.30
Operator A	$49.20		$7.50	$1.48	$0.49	$0.00	$11.81	$1.00	$0.00	$0.00	$71.48	$96.08
Operator B	$43.52		$7.50	$1.31	$0.44	$0.00	$10.44	$1.00	$0.00	$0.00	$64.21	$85.97
Operator C	$34.93		$7.50	$1.05	$0.35	$0.00	$8.38	$1.00	$0.00	$0.00	$53.21	$70.67
Groundman 0-12 months Exp	$27.47		$7.50	$0.82	$0.27	$0.00	$6.59	$1.00	$0.00	$0.00	$43.65	$57.38
Groundman 0-12 months Exp w/CDL	$30.22		$7.50	$0.91	$0.30	$0.00	$7.25	$1.00	$0.00	$0.00	$47.18	$62.29
Groundman 1 yr or more	$30.22		$7.50	$0.91	$0.30	$0.00	$7.25	$1.00	$0.00	$0.00	$47.18	$62.29
Groundman 1 yr or more w/CDL	$35.71		$7.50	$1.07	$0.36	$0.00	$8.57	$1.00	$0.00	$0.00	$54.21	$72.06
Equipment Mechanic A	$43.52		$7.50	$1.31	$0.44	$0.00	$10.44	$1.00	$0.00	$0.00	$64.21	$85.97
Equipment Mechanic B	$39.22		$7.50	$1.18	$0.39	$0.00	$9.41	$1.00	$0.00	$0.00	$58.70	$78.31
Equipment Mechanic C	$34.92		$7.50	$1.05	$0.35	$0.00	$8.38	$1.00	$0.00	$0.00	$53.20	$70.66
X-Ray Technician	$54.94		$7.50	$1.65	$0.55	$0.00	$13.19	$1.00	$0.00	$0.00	$78.83	$106.30
Apprentice	BHR	Percent										
1st 1000 hrs	$32.96	$60.00	$7.50	$0.99	$0.33	$0.00	$7.91	$1.00	$0.00	$0.00	$50.69	$67.17
2nd 1000 hrs	$35.71	$65.00	$7.50	$1.07	$0.36	$0.00	$8.57	$1.00	$0.00	$0.00	$54.21	$72.06
3rd 1000 hrs	$38.46	$70.00	$7.50	$1.15	$0.38	$0.00	$9.23	$1.00	$0.00	$0.00	$57.72	$76.95

4th 1000 hrs	$41.20	$75.00	$7.50	$1.24	$0.41	$0.00	$9.89	$1.00	$0.00	$0.00	$61.24	$81.84
5th 1000 hrs	$43.95	$80.00	$7.50	$1.32	$0.44	$0.00	$10.55	$1.00	$0.00	$0.00	$64.76	$86.74
6th 1000 hrs	$46.70	$85.00	$7.50	$1.39	$0.47	$0.00	$11.21	$1.00	$0.00	$0.00	$68.27	$91.62
7th 1000 hrs	$49.45	$90.00	$7.50	$1.48	$0.49	$0.00	$11.87	$1.00	$0.00	$0.00	$71.79	$96.52

(*)Special Calculation Note :

Other is Health Reimbursement Account

Ratio :

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note :

Details :

Operator "A": John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater then 25 tons and less than 45 tons).
Operator "B": Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger- wheeled or tracked, all Tension wire Stringing equipment.
Operator "C": Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer Loaders, Material Handler.

Special Notes:

When Cable Splicer helpers are used, they must be a Journeyman Lineman.

Pipe installation, holiday testing, welding, cable splicing operation of vacuum pumps and cable pulling equipment and all work requiring the use of hand tools shall be done by Journeymen and Apprentices. Pipe coating, manhole preparations and conditioning, nitrogen connections and flowmeter installation shall be done by or under the direct supervision of a Journeyman.

At least two (2) Journeyman Linemen in addition to certified lineman welders shall be employed to install high voltage pipe.

When pulling cable, at least six (6) of the workmen shall be no less than Journeyman classifications. When pumping oil, only Journeyman Lineman or equipment operators shall be permitted to operate degasifying and oil pumping equipment

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 71 Outside Utility Power

Type of Rate: Commercial

Change #: LCN01-2026ib

Craft: Electrical

Effective Date: 1/7/2026

Effective Date: 1/7/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrical Lineman	$52.03		$7.50	$1.56	$0.52	$0.00	$12.49	$1.00	$0.00	$0.00	$75.10	$101.1
Substation Technician	$52.03		$7.50	$1.56	$0.50	$0.00	$12.49	$1.00	$0.00	$0.00	$75.08	$101.09
Cable Splicer	$54.50		$7.50	$1.64	$0.55	$0.00	$13.08	$1.00	$0.00	$0.00	$78.27	$105.5
Operator A	$46.61		$7.50	$1.40	$0.47	$0.00	$11.19	$1.00	$0.00	$0.00	$68.17	$91.47
Operator B	$41.17		$7.50	$1.23	$0.41	$0.00	$9.87	$1.00	$0.00	$0.00	$61.18	$81.77
Operator C	$33.00		$7.50	$0.99	$0.33	$0.00	$7.92	$1.00	$0.00	$0.00	$50.74	$67.24
Groundman 0-12 months Exp	$26.02		$7.50	$0.78	$0.26	$0.00	$6.24	$1.00	$0.00	$0.00	$41.80	$54.81
Groundman 0-12 months Exp w/CDL	$28.62		$7.50	$0.86	$0.29	$0.00	$6.87	$1.00	$0.00	$0.00	$45.14	$59.45
Groundman 1 yr or more	$28.62		$7.50	$0.86	$0.29	$0.00	$6.87	$1.00	$0.00	$0.00	$45.14	$59.45
Groundman 1 yr or more w/CDL	$33.82		$7.50	$1.01	$0.34	$0.00	$8.12	$1.00	$0.00	$0.00	$51.79	$68.70
Equipment Mechanic A	$41.17		$7.50	$1.23	$0.41	$0.00	$9.87	$1.00	$0.00	$0.00	$61.18	$81.77
Equipment Mechanic B	$37.09		$7.50	$1.11	$0.37	$0.00	$8.90	$1.00	$0.00	$0.00	$55.97	$74.52
Equipment Mechanic C	$33.00		$7.50	$0.99	$0.33	$0.00	$7.92	$1.00	$0.00	$0.00	$50.74	$67.24
Line Truck w/auger	$36.40		$7.50	$1.09	$0.36	$0.00	$8.71	$1.00	$0.00	$0.00	$55.06	$73.26
Apprentice	BHR	Percent										
1st 1000 hrs	$31.22	$60.00	$7.50	$0.94	$0.31	$0.00	$7.49	$1.00	$0.00	$0.00	$48.46	$64.07
2nd 1000 hrs	$33.82	$65.00	$7.50	$1.01	$0.34	$0.00	$8.12	$1.00	$0.00	$0.00	$51.79	$68.70
3rd 1000 hrs	$36.42	$70.00	$7.50	$1.09	$0.36	$0.00	$8.74	$1.00	$0.00	$0.00	$55.11	$73.32

4th 1000 hrs	$39.02	$75.00	$7.50	$1.17	$0.39	$0.00	$9.37	$1.00	$0.00	$0.00	$58.45	$77.96
5th 1000 hrs	$41.62	$80.00	$7.50	$1.25	$0.44	$0.00	$9.99	$1.00	$0.00	$0.00	$61.80	$82.61
6th 1000 hrs	$44.23	$85.00	$7.50	$1.33	$0.44	$0.00	$10.61	$1.00	$0.00	$0.00	$65.11	$87.22
7th 1000 hrs	$46.83	$90.00	$7.50	$1.40	$0.47	$0.00	$11.24	$1.00	$0.00	$0.00	$68.44	$91.86

(*)Special Calculation Note :

Other: Health Reimbursement Account

Ratio :

(1) Journeyman Lineman to (1) Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note :

Details :

Operator "A": John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater then 25 tons and less than 45 tons).
Operator "B": Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger- wheeled or tracked, all Tension wire Stringing equipment.
Operator "C": Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer Loaders, Material Handler.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 71 Underground Residential Distribution

Type of Rate: Commercial

Change #: LCN01-2026ib

Craft: Electrical

Effective Date: 1/7/2026

Effective Date: 1/7/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
URD Electrican	$39.42		$7.50	$1.18	$0.39	$0.00	$9.43	$1.00	$0.00	$0.00	$58.92	$78.63
Equipment Operator A	$35.24		$7.50	$1.06	$0.35	$0.00	$8.46	$1.00	$0.00	$0.00	$53.61	$71.23
Equipment Operator B	$32.34		$7.50	$0.97	$0.32	$0.00	$7.76	$1.00	$0.00	$0.00	$49.89	$66.06
Directional Drill Locator	$35.24		$7.50	$1.06	$0.35	$0.00	$8.46	$1.00	$0.00	$0.00	$53.61	$71.23
Directional Drill Operator	$32.34		$7.50	$0.97	$0.32	$0.00	$7.76	$1.00	$0.00	$0.00	$49.89	$66.06
Groundman 0-12 months Exp	$25.50		$7.50	$0.77	$0.26	$0.00	$6.12	$1.00	$0.00	$0.00	$41.15	$53.90
Groundman 0-12 months Exp w/CDL	$28.15		$7.50	$0.84	$0.28	$0.00	$6.76	$1.00	$0.00	$0.00	$44.53	$58.60
Groundman 1 yr or more	$28.15		$7.50	$0.84	$0.28	$0.00	$6.76	$1.00	$0.00	$0.00	$44.53	$58.60
Groundman 1 yr or more w/CDL	$33.47		$7.50	$1.00	$0.33	$0.00	$8.03	$1.00	$0.00	$0.00	$51.33	$68.06
Apprentice	BHR	Percent										
1st 1000 hrs	$31.54	$80.00	$7.50	$0.95	$0.32	$0.00	$7.57	$1.00	$0.00	$0.00	$48.88	$64.65
2nd 1000 hrs	$33.51	$85.00	$7.50	$1.01	$0.34	$0.00	$8.04	$1.00	$0.00	$0.00	$51.40	$68.16
3rd 1000 hrs	$35.48	$90.00	$7.50	$1.06	$0.35	$0.00	$8.51	$1.00	$0.00	$0.00	$53.90	$71.64
4th 1000 hrs	$37.45	$95.00	$7.50	$1.12	$0.37	$0.00	$8.99	$1.00	$0.00	$0.00	$56.43	$75.16

(*)Special Calculation Note :

Other: Health Reimburstment Account

Ratio :

(1) Journeyman Lineman to (1) Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note :

Details :

This work applies to projects designated for any outside Underground Residential Distribution construction work for electrical utilities, municipalities and rural electrification projects.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 71 Voice Data Video Outside

Type of Rate: Commercial

Change #: LCN02-2024ib

Craft: Electrical

Effective Date: 3/6/2024

Effective Date: 3/6/2024

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrical Installer Technician I	$35.39		$7.25	$1.06	$0.00	$0.00	$1.77	$0.00	$0.00	$0.00	$45.47	$63.17
Installer Technician II	$33.37		$7.25	$1.00	$0.00	$0.00	$1.67	$0.00	$0.00	$0.00	$43.29	$59.98
Installer Repairman	$33.37		$7.25	$1.00	$0.00	$0.00	$1.67	$0.00	$0.00	$0.00	$43.29	$59.98
Equipment Operator II	$24.98		$7.25	$0.75	$0.00	$0.00	$1.25	$0.00	$0.00	$0.00	$34.23	$46.72
Cable Splicer	$35.39		$7.25	$1.06	$0.00	$0.00	$1.77	$0.00	$0.00	$0.00	$45.47	$63.17
Ground Driver W/CDL	$16.69		$7.25	$0.50	$0.00	$0.00	$0.83	$0.00	$0.00	$0.00	$25.27	$33.62
Groundman	$14.57		$7.25	$0.44	$0.00	$0.00	$0.73	$0.00	$0.00	$0.00	$22.99	$30.28
Apprentice	BHR	Percent										
Trainee F	$17.70	$50.01	$7.25	$0.53	$0.00	$0.89	$0.00	$0.00	$0.00	$0.00	$26.37	$35.22
Trainee E	$20.53	$58.00	$7.25	$0.62	$0.00	$1.03	$0.00	$0.00	$0.00	$0.00	$29.43	$39.69
Trainee D	$23.36	$66.00	$7.25	$0.70	$0.00	$1.17	$0.00	$0.00	$0.00	$0.00	$32.48	$44.16
Trainee C	$26.19	$74.00	$7.25	$0.79	$0.00	$1.31	$0.00	$0.00	$0.00	$0.00	$35.54	$48.63
Trainee B	$29.02	$82.00	$7.25	$0.87	$0.00	$1.45	$0.00	$0.00	$0.00	$0.00	$38.59	$53.10
Trainee A	$31.85	$90.00	$7.25	$0.96	$0.00	$1.59	$0.00	$0.00	$0.00	$0.00	$41.65	$57.58

(*)Special Calculation Note :

Ratio :

1Trainee to 1 Journeyman

Jurisdiction (* denotes special jurisdictional note) :

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note :

Details :

Cable Splicer: Inspect and test lines or cables, analyze results, and evaluate transmission characteristics. Cover conductors with insulation or seal splices with moisture-proof covering. Install, splice, test, and repair cables using tools or mechanical equipment. This will include the splicing of fiber. Installer Technician I: Must know all aspects of telephone and cable work. This is to include aerial, underground, and manhole work. Must know how to climb and run bucket. Must have all the tools required to perform these tasks. Must be able to be responsible for the safety of the crew at all times. Must also have CDL license and have at least 5 years experience. Installer Repairman: Perform tasks of repairing, installing, and testing phone and CATV services. Installer Technician II: Have at least three years of telephone and CATV experience. Must have the knowledge of underground, aerial, and manhole work. Must be able to climb and operate bucket. Must have CDL. Must have all tools needed to perform these tasks. Equipment Operator II: Able to operate a digger derrick or bucket truck. Have at least 3 years of experience and must have a valid CDL license. Groundman W/CDL: Must have a valid CDL license and be able to perform tasks such as: climbing poles, pulling down guys, making up material, and getting appropriate tools for the job. Must have at least 5 year's experience. Groundman: Perform tasks such as: climbing poles, pulling down guys, making up material, and getting appropriate tools for the job. Experience 0-5 years.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 82 Inside

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Electrical	12/10/2025	12/10/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrician	$39.40		$8.35	$10.23	$0.67	$0.00	$4.30	$0.00	$0.00	$0.00	$62.95	$82.65
Apprentice	BHR	Percent										
1st Period 0-1000 hrs	$18.12	$46.00	$4.78	$0.74	$0.31	$0.00	$0.00	$0.00	$0.00	$0.00	$23.95	$33.01
2nd Period 1001-2000 hrs	$18.12	$46.00	$4.78	$0.74	$0.31	$0.00	$0.00	$0.00	$0.00	$0.00	$23.95	$33.01
3rd Period 2001-3500 hrs	$19.70	$50.00	$7.73	$5.12	$0.33	$0.00	$2.15	$0.00	$0.00	$0.00	$35.03	$44.88
4th Period 3501-5000 hrs	$20.49	$52.00	$7.75	$5.32	$0.35	$0.00	$2.24	$0.00	$0.00	$0.00	$36.15	$46.39
5th Period 5001-6500 hrs	$24.43	$62.00	$7.88	$6.34	$0.42	$0.00	$2.67	$0.00	$0.00	$0.00	$41.74	$53.95
6th Period 6501-8000 hrs	$30.34	$77.00	$8.06	$7.88	$0.52	$0.00	$3.31	$0.00	$0.00	$0.00	$50.11	$65.28

(*)Special Calculation Note :

Ratio :

1-3 Journeymen to 4 Apprentices
4-6 Journeymen to 8 Apprentices
7-9 Journeymen to 12 Apprentices

Jurisdiction (* denotes special jurisdictional note) :

Clinton, Darke, Greene, Miami, Montgomery, Preble, Warren*

Special Jurisdictional Note :

The following townships in Warren County are included: Clearcreek, Franklin and Wayne

Details :

An Official State of Ohio site. Here's how you know

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Electrical Local 82 Inside Lt Commercial South West	LCN01-2026ib	Electrical	05/20/2026	05/20/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Electrician	$39.40		$8.35	$10.23	$0.67	$0.00	$4.30	$0.00	$0.00	$0.00	$62.95	$82.65
CE-3 10,001-12,000	$30.35		$6.99	$0.91	$0.96	$0.00	$0.91	$0.00	$0.00	$0.10	$40.22	$55.40
CE-2 9,001-10,000 Hrs	$24.28		$6.99	$0.73	$0.96	$0.00	$0.73	$0.00	$0.00	$0.10	$33.79	$45.93
CE-1 8,001-9,000 Hrs	$22.25		$6.99	$0.67	$0.96	$0.00	$0.67	$0.00	$0.00	$0.10	$31.64	$42.77
CW-4 6,001-8,000 Hrs	$20.23		$6.99	$0.61	$0.96	$0.00	$0.61	$0.00	$0.00	$0.10	$29.50	$39.61
CW-3 4,001-6,000 Hrs	$18.21		$6.99	$0.55	$0.96	$0.00	$0.55	$0.00	$0.00	$0.10	$27.36	$36.47
CW-2 2,001-4,000 Hrs	$17.20		$6.99	$0.52	$0.96	$0.00	$0.52	$0.00	$0.00	$0.10	$26.29	$34.89
CW-1 0-2,000 Hrs	$16.18		$6.99	$0.49	$0.96	$0.00	$0.49	$0.00	$0.00	$0.10	$25.21	$33.30
Apprentice	**Percent**	**BHR**										
1st period 0 - 1000 hrs	46.000000	$18.12	$4.78	$0.74	$0.31	$0.00	$0.00	$0.00	$0.00	$0.00	$23.95	$33.01
2nd period 1001-2000 hrs	46.000000	$18.12	$4.78	$0.74	$0.31	$0.00	$0.00	$0.00	$0.00	$0.00	$23.95	$33.01

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
3rd period 2001-3500 hrs	50.000000	$19.70	$7.73	$5.12	$0.33	$0.00	$2.15	$0.00	$0.00	$0.00	$35.03	$44.88
4th period 3501-5000 hrs	52.000000	$20.49	$7.75	$5.32	$0.35	$0.00	$2.24	$0.00	$0.00	$0.00	$36.15	$46.39
5th period 5001-6500 hrs	62.000000	$24.43	$7.88	$6.34	$0.42	$0.00	$2.67	$0.00	$0.00	$0.00	$41.74	$53.95
6th period 6501-8000 hrs	77.000000	$30.34	$8.06	$7.88	$0.52	$0.00	$3.31	$0.00	$0.00	$0.00	$50.11	$65.28

Special Calculation Note

Misc: Administrative Fees

Ratio

1 to 3 Journeymen to 4 Apprentices
4 to 6 Journeymen to 8 Apprentices

Construction Electrician and Construction Wireman Ratio There shall be a minimum ratio of one inside Journeyman to every (4) employees of different classification per jobsite. An inside Journeyman Wireman is required on the project as the fifth (5th) worker or when apprentices are used.

Jurisdiction (* denotes special jurisdictional note)

Clinton, Darke, Greene, Miami, Montgomery, Preble, Warren*

Special Jurisdictional Note

The following townships in Warren County are included: Clearcreek, Franklin and Wayne.

Details

The scope of work for the light commercial agreement shall apply to the following facilities not to exceed 200,000 square feet; office buildings, shopping centers, auto sales agencies and garages, churches, funeral homes, nursing homes, hotels, retail and wholesale facilities, small stand-alone manufacturing facilities when free standing and not part of a larger facility (not to exceed 50,000 square fee), solar projects (500 panels or less) unless otherwise covered under the agreement, lighting retrofits (when not associated with remodels involving branch re-circuiting) lighting retrofits shall be defined as the changing of lamps and ballasts in existing light fixtures and shall also include the one for one replacement of existing

fixtures, warehouses, gas stations, food service centers, restaurants, entertainment facilities, hospitals, clinics, motels, residential buildings.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 82 Lightning Rod

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Electrical	12/10/2025	12/10/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrical Lightning Rod Technician	$37.34		$8.35	$9.05	$0.00	$0.00	$4.05	$0.00	$0.00	$0.00	$58.79	$77.46
Apprentice	BHR	Percent										
	$	$	$	$	$	$	$	$	$	$	$	$

(*)Special Calculation Note :

No Apprentice approved by OSAC.

Ratio :

Jurisdiction (* denotes special jurisdictional note) :

Clinton, Darke, Greene, Miami, Montgomery, Preble, Warren*

Special Jurisdictional Note :

The following townships in Warren County are included: Clearcreek, Franklin and Wayne

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 82 Voice Data Video

Type of Rate: Commercial

Change #: LCN01-2025ib

Craft: Electrical

Effective Date: 12/10/2025

Effective Date: 12/10/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrical Installer Technician A	$29.20		$7.60	$9.13	$0.55	$0.00	$0.00	$0.00	$0.00	$0.00	$46.48	$61.08
Cable Puller	$16.06		$4.20	$0.48	$0.31	$0.00	$0.25	$0.00	$0.00	$0.00	$21.30	$29.33
Apprentice	BHR	Percent										
1st 0-1000 hours	$17.52	$60.00	$4.50	$5.48	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$27.83	$36.59
2nd 1001-2000 hours	$17.52	$60.00	$4.50	$5.48	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$27.83	$36.59
3rd 2001-3000 hours	$18.98	$65.00	$7.43	$5.93	$0.36	$0.00	$0.00	$0.00	$0.00	$0.00	$32.70	$42.19
4th 3001-4000 hours	$18.98	$65.00	$7.43	$5.93	$0.36	$0.00	$0.00	$0.00	$0.00	$0.00	$32.70	$42.19
5th 4001-5000 hours	$20.44	$70.00	$7.45	$6.39	$0.39	$0.00	$0.00	$0.00	$0.00	$0.00	$34.67	$44.89
6th 5001-6000 hours	$21.90	$75.00	$7.48	$6.85	$0.42	$0.00	$0.00	$0.00	$0.00	$0.00	$36.65	$47.60
7th 6001-7000 hours	$23.36	$80.00	$7.50	$7.30	$0.44	$0.00	$0.00	$0.00	$0.00	$0.00	$38.60	$50.28
8th 7001 hours	$24.82	$85.00	$7.53	$7.75	$0.47	$0.00	$0.00	$0.00	$0.00	$0.00	$40.57	$52.98

(*)Special Calculation Note :

Ratio :

1-3 Journeymen to 3 Apprentices
4-6 Journeymen to 6 Apprentices
7-9 Journeymen to 9 Apprentices

Jurisdiction (* denotes special jurisdictional note) :

Clinton, Darke, Greene, Miami, Montgomery, Preble, Warren*

Special Jurisdictional Note :

The following townships in Warren County are included: Clearcreek, Franklin and Wayne

Details :

Work covered but not limited to: installation which utilize transmission and/or transference of voice, sound, vision or digital for commercial, education, security and entertainment purposes for the following: TV monitoring and surveillance, background-foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multimedia, multiplex, nurse call system, radio page, school intercom, sound and low voltage master clock systems.

Fire Alarm work is excluded on all new construction sites or wherever the fire alarm system is installed in conduit.

All HVAC control work is not covered by this wage rate but by the Inside Electrical wage rate.

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Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Elevator Local 11	LCN01-2026ib	Elevator	03/18/2026	03/18/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Elevator Mechanic	$59.92		$16.37	$11.06	$0.85	$4.79	$10.70	$2.26	$0.00	$0.00	$105.95	$135.91
Apprentice	**Percent**	**BHR**										
Probationary Apprentice	50.000000	$29.96	$0.00	$0.00	$0.00	$1.80	$0.00	$0.00	$0.00	$0.00	$31.76	$46.74
1st year	55.000000	$32.96	$16.37	$11.06	$0.85	$1.98	$10.70	$1.24	$0.00	$0.00	$75.16	$91.64
2nd year	65.000000	$38.95	$16.37	$11.06	$0.85	$2.34	$10.70	$1.47	$0.00	$0.00	$81.74	$101.22
3rd year	70.000000	$41.94	$16.37	$11.06	$0.85	$2.52	$10.70	$1.58	$0.00	$0.00	$85.02	$105.99
4th year	80.000000	$47.94	$16.37	$11.06	$0.85	$2.88	$10.70	$1.80	$0.00	$0.00	$91.60	$115.57
Helper	70.000000	$41.94	$16.37	$11.06	$0.85	$3.36	$10.70	$1.58	$0.00	$0.00	$85.86	$106.83
Assistant Mechanic	80.000000	$47.94	$16.37	$11.06	$0.85	$3.82	$10.70	$1.80	$0.00	$0.00	$92.54	$116.51

Special Calculation Note

Other: Holiday Pay

Ratio

1 Journeyman to 1 Apprentice
1 Journeyman to 1 Helper

1 Journeyman to 1 Assistant Mechanic

Jurisdiction (* denotes special jurisdictional note)

Adams, Brown, Butler, Clermont, Clinton, Darke, Greene, Hamilton, Highland, Miami, Montgomery, Preble, Scioto, Shelby, Warren

Special Jurisdictional Note

Details

Prevailing Wage Rate
Skilled Crafts

Name of Union: Glazier Local 387

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Glazier	11/19/2025	11/19/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Glazier	$35.85		$6.80	$12.30	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$55.40	$73.33
Apprentice	BHR	Percent										
1st Year	$23.30	$65.00	$6.80	$8.85	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$39.40	$51.05
2nd Year	$26.89	$75.00	$6.80	$9.84	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$43.98	$57.42
3rd Year	$30.47	$85.00	$6.80	$10.82	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$48.54	$63.77
4th Year	$34.06	$95.00	$6.80	$11.81	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$53.12	$70.15

(*)Special Calculation Note :

No special calculations for this skilled craft wage rate are required at this time.

Ratio :

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Brown, Butler, Champaign, Clark, Clermont, Clinton, Darke, Fayette*, Greene, Hamilton, Highland, Miami, Montgomery, Preble, Warren

Special Jurisdictional Note :

Fayette County: Eastern portion of route #41 being the dividing line between locals 372 and 387. Local 387 has jurisdiction of projects built on property which borders route #41 East.

Details :

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Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Ironworker Local 290	LCN01-2026ib	Ironworker	06/01/2026	05/27/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Ironworker	$40.00		$9.80	$9.50	$0.85	$0.00	$5.59	$0.00	$0.00	$0.00	$65.74	$85.74
Structural, Welder, Fence Erector, Reinforcing Rods, Machinery Mover, Sheeter, Metal Building Erector, Rigger & Erector	$40.00		$9.80	$9.50	$0.85	$0.00	$5.59	$0.00	$0.00	$0.00	$65.74	$85.74
Apprentice	**Percent**	**BHR**										
1st Year	63.750000	$25.50	$9.80	$9.50	$0.85	$0.00	$4.09	$0.00	$0.00	$0.00	$49.74	$62.49
2nd Year	73.750000	$29.50	$9.80	$9.50	$0.85	$0.00	$4.09	$0.00	$0.00	$0.00	$53.74	$68.49
3rd Year	83.750000	$33.50	$9.80	$9.50	$0.85	$0.00	$4.09	$0.00	$0.00	$0.00	$57.74	$74.49
4th Year	93.750000	$37.50	$9.80	$9.50	$0.85	$0.00	$4.09	$0.00	$0.00	$0.00	$61.74	$80.49

Special Calculation Note

Ratio

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Allen*, Auglaize, Butler*, Champaign*, Clark*, Clinton, Darke, Fayette*, Greene, Hardin*, Highland*, Logan*, Madison*, Mercer*, Miami, Montgomery, Preble, Shelby, Van Wert*, Warren*

Special Jurisdictional Note

Allen County Twps included are: Auglaize, Perry, Shawnee, Amanda, Spencer, Marion, Sugar Creek, American, Bath, Jackson.
Butler County Twps included are: Milford, Wayne, Madison, Lemon.
Champaign County Twps included are: Union, Urbana, Jackson, Concord, Salem, Mad River, Johnson, Harrison, Adams.
Clark County Twps included are: Bethel, German, Green, Mad River, Moorefield, Pike, Springfield and potions of Harmony, Madison, and Pleasant
Fayette County Twps included are: Green, Jasper, Concord, Jefferson.
Hardin County Twps included are: Round Head, Marion, Liberty.
Highland County Twps included are: Fairfield, Penn, Union, Marshall, Liberty, Paint, Brush Creek.
Logan County Twps included are: Richland, Stokes, Bloomfield, Washington, Harrison, McArthur, Lake, Liberty, Pleasant, Miami.
Madison County Twps included are: Stokes.
Mercer County Twps included are: Dublin, Washington, Jefferson, Recovery, Gibson, Union, Liberty, Butler, Granville, Center, Hopewell, Franklin, Marion.
VanWert County Twps included are: Jennings.
Warren County Twps included are: Franklin, Clear Creek, Turtle Creek, Wayne, Massie, Washington, Salem, Union.

Details

Structural Iron Work but not limited to: field fabrication, all loading to and including the erecting, rigging, assembly, dismantling, placing, temporary and permanent securing by any means of all structural iron, steel, ornamental lead, bronze, brass, copper, aluminum, glass all ferrous and non ferrous metal and composite material, precast prestressed and post-stressed concrete structures. Bridges and bridge rails, bridge viaducts, bucks bulkheads, bumper and bumper post, canopies and unistrut canopies, corrugated ferrous and non ferrous sheets when attached to steel frames, columns, beams, bar-joists, trusses, grinders, roof decking, electrical supports, elevator cars, elevator fronts and enclosures, erection of steel towers, flag poles, gymnasium equipment, stadium and arena seating, jail cell work, jail cell beds, benches, bunks, chairs, tables, mirrors, jail cell access doors, rigging and installation of machinery and equipment(erecting, aligning, anchoring and dismantling, erection and dismantling of tower cranes, derrick monorail systems, Chicago booms, overhead cranes, gantries, material and personnel hoists, tanks, hoppers and conveyors. All pre-engineered metal buildings and their entirety including siding, roofing, gutters, downspouts and erection of all.

Ornamental Iron Work but not limited to: all work in connection with field fabrication, handling including loading/off loading, sorting, cutting, fastening, anchoring, bending, hoisting, placing, burning, welding, and tying, dismantling of all materials used in miscellaneous iron or steel, for stairs, hand railings, rolling doors, rolling gates, rolling shutters, fence, windows, curtain wall, erection and welding of all metal, sash, architectural and ornamental treatments, but not necessarily limited to all sizes and types of ornamental, steel iron, lead, bronze, brass, copper, aluminum, all ferrous and non ferrous metals and composite materials .

Fence Erector Iron Worker but not limited to: All work in connection with the field fabrication and erection of chain link fence, which includes but not limited to the loading and of the fence fabric and posts also the installation of the above.

Reinforcing Iron Worker but not limited to: work in connection with field fabrication, handling, racking, sorting, cutting, bending, hoisting, placing, burning, welding and tying all materials used to reinforce concrete construction, except loading and unloading by hand. Re-aligning of the reinforced iron, wire mesh placing, bricking, pulling and similar reinforcing materials, placing steel dowels, as well as re-fasten. Reinforcing steel and wire mesh in roadways and sidewalks in connection with building construction. Also, erection and fabrication of pre-connection with building construction, also erection and fabrication of pre-stressed and precast joists, beams, columns, slabs; walls, roofs, tanks, manholes, trenches and covers. Handling of "J" or jack bars on slip forms. Metal decking similar to "corruform" when used for floor forms over metal or concrete supports either welded or clipped. Post tension, all loading and unloading, hoisting, placing and tying of all post tensioning cables. Placing and tying of all duct work in bonded post tension. All of the wrecking of cones, wedging of the tendons, stressing, cutting, repairing and grouting of bonded post tension.

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Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Labor HevHwy 3	LCN01-2026ib	Laborer	05/01/2026	04/29/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Laborer Group 1	$38.77		$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$55.87	$75.25
Group 2	$38.94		$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$56.04	$75.51
Group 3	$39.27		$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$56.37	$76.00
Group 4	$39.72		$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$56.82	$76.68
Watch Person	$33.50		$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$50.60	$67.35
Apprentice	**Percent**	**BHR**										
0-1000 hrs	80.000000	$31.02	$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$48.12	$63.63
1001-2000 hrs	85.000000	$32.95	$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$50.05	$66.53
2001-3000 hrs	90.000000	$34.89	$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$51.99	$69.44
3001-4000 hrs	95.000000	$36.83	$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$53.93	$72.34
More than 4000 hrs	100.000000	$38.77	$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$55.87	$75.25

Special Calculation Note

Tunnel Laborer rate with air-pressurized add $1.00 to the above wage rate.

Commercial Driver's License – Any Laborer required to utilize a valid Commercial Driver's License (CDL), are in compliance with necessary FMCSA regulations and approved by the Contractor to operate a Commercial Motor Vehicle (CMV), shall be paid one dollar ($1.00) per hour above the base rate for the entirety of their working shift.

Ratio

1 Journeyman to 1 Apprentice
3 Journeymen to 1 Apprentice thereafter

Watchmen have no Apprentices

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Madison, Marion, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Scioto, Seneca, Shelby, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wyandot

Special Jurisdictional Note

Hod Carriers and Common Laborers - Heavy, Highway, Sewer, Waterworks, Utility, Airport, Railroad, Industrial and Building Site, Sewer Plant, Waste Water Treatment Facilities Construction

Details

Group 1 Laborer (Construction); Plant Laborer or Yardman, Right-of-way Laborer, Landscape Laborer, Highway Lighting Worker, Signalization Worker, (Swimming) Pool Construction Laborer, Utility Man, *Bridge Man, Handyman, Joint Setter, Flagperson, Carpenter Helper, Waterproofing Laborer, Slurry Seal, Seal Coating, Surface Treatment or Road Mix Laborer, Riprap Laborer & Grouter, Asphalt Laborer, Dump Man (batch trucks), Guardrail & Fence Installer, Mesh Handler & Placer, Concrete Curing Applicator, Scaffold Erector, Sign Installer, Hazardous Waste (level D), Diver Helper, Zone Person and Traffic Control. *Bridge Man will perform work as per the October 31, 1949, memorandum on concrete forms, by and between the United Brotherhood of Carpenters and Joiners of America and the Laborers' International Union of North America, which states in; "the moving, cleaning, oiling and carrying to the next point of erection, and the stripping of forms which are not to be re-used, and forms on all flat arch work shall be done by members of the Laborers' International Union of North America."

Group 2 Asphalt Raker, Screwman or Paver, Concrete Puddler, Kettle Man (pipeline), All Machine-Driven Tools (Gas, Electric, Air), Mason Tender, Brick Paver, Mortar Mixer, Skid Steer, Sheeting & Shoring Person, Surface Grinder Person, Screedperson, Water Blast, Hand Held Wand, Power Buggy or Power Wheelbarrow, Paint Striper, Plastic fusing Machine Operator, Rodding Machine Operator, Pug Mill Operator, Operator of All Vacuum Devices Wet or Dry, Handling of all Pumps 4 inches and under (gas, air or electric), Diver, Form Setter, Bottom Person, Welder Helper (pipeline), Concrete Saw Person, Cutting with Burning Torch, Pipe Layer, Hand Spiker (railroad), Underground Person (working in sewer and waterline, cleaning, repairing and reconditioning). Tunnel Laborer (without air),Caisson, Cofferdam (below 25 feet deep), Air Track and Wagon Drill, Sandblaster Nozzle Person, Hazardous Waste (level B), ***Lead Abatement, Hazardous Waste (level C) ***Includes the erecting of structures for the removal, including the encapsulation and containment of Lead abatement process.

Group 3 Blast and Powder Person, Muckers will be defined as shovel men working directly with the miners, Wrencher (mechanical joints & utility pipeline), Yarner, Top Lander, Hazardous Waste (level A), Concrete Specialist, Curb Setter and Cutter, Grade Checker, Concrete Crew in Tunnels. Utility pipeline Tappers, Waterline, Caulker, Signal Person will receive the

rate equal to the rate paid the Laborer classification for which the Laborer is signaling.

Group 4 Miner, Welder, Gunite Nozzle Person A.) The Watchperson shall be responsible to patrol and maintain a safe traffic zone including but not limited to barrels, cones, signs, arrow boards, message boards etc. The responsibility of a watchperson is to see that the equipment, job and office trailer etc. are secure.

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Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Labor Local 1410 Building	LCN01-2026ib	Laborer	05/01/2026	04/29/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Laborer Group 1	$33.40		$9.45	$4.60	$0.40	$0.00	$1.25	$0.00	$0.10	$0.00	$49.20	$65.90
Group 2	$34.00		$9.45	$4.60	$0.40	$0.00	$1.25	$0.00	$0.10	$0.00	$49.80	$66.80
Group 3	$34.50		$9.45	$4.60	$0.40	$0.00	$1.25	$0.00	$0.10	$0.00	$50.30	$67.55
Apprentice	**Percent**	**BHR**										
Building Laborer 1-1000 hrs	80.000000	$26.72	$9.45	$4.60	$0.40	$0.00	$1.25	$0.00	$0.10	$0.00	$42.52	$55.88
1001-2000	85.000000	$28.39	$9.45	$4.60	$0.40	$0.00	$1.25	$0.00	$0.10	$0.00	$44.19	$58.38
2001-3000	90.000000	$30.06	$9.45	$4.60	$0.40	$0.00	$1.25	$0.00	$0.10	$0.00	$45.86	$60.89
3001-4000	95.000000	$31.73	$9.45	$4.60	$0.40	$0.00	$1.25	$0.00	$0.10	$0.00	$47.53	$63.39
More than 4000 hrs	100.000000	$33.40	$9.45	$4.60	$0.40	$0.00	$1.25	$0.00	$0.10	$0.00	$49.20	$65.90

Special Calculation Note

$0.10 LECET is for Labor Management.

Ratio

1 Journeyman to 1 Apprentice

4 Journeymen to 1 Apprentice thereafter

Jurisdiction (* denotes special jurisdictional note)

Champaign, Clark, Darke, Greene, Logan, Miami, Montgomery, Preble

Special Jurisdictional Note

Details

Group 1 Building & Construction Laborer, Railroad Laborer, Asbestos & Hazardous Waste (Levels A,B,C, & D),Concrete Crew, Form Setter, Pipelayer, Bottom Man, Burner (Cutting Torch), Welder Helper, All Machine & Power Driven Tools, Sandblaster Yardman-Landscaping, Sewer Jet, Waterperson, Tool Cage Laborer, Unloading Furniture & Fixtures, Final Clean-Up Watchman, Residential Construction, Signal Men

Group 2 Mason Tender For Bricklayers, Flexcore, Firebrick Tender (Blast Furnaces, Soaking Pits, Stoves & Stacks), Plasterer Tenders & Lathers

Group 3 Tender Operator

Asbestos, Lead and Hazardous Material: The removal, abatement or encapsulation of asbestos, lead and/or toxic and hazardous waste or materials is defined as all work included in the erection, moving servicing and dismantling of all enclosures, scaffolding, barricades, etc. and the operation of all tools and equipment (including generators, compressors and vacuums) normally used in the removal or abatement or asbestos, lead and toxic and hazardous waste or materials; the labeling, bagging, cartoning, crating or otherwise packaging of materials for disposal; as well as the clean-up of the work site and all other work incidental to the removal, abatement or encapsulation of asbestos, lead or toxic and hazardous waste materials. Level A Protective equipment is required when the area has been determined to contain extremely toxic contaminants or contaminants unknown but may be expected to be extremely toxic and/or immediately dangerous to life and health. This ensemble includes a fully encapsulated chemical suit, self contained breathing apparatus (SCBA) or airline fed respirator, and various types and numbers of boots and gloves. Level B Protective equipment includes a chemically resistant splash suit and a SCBA or airline respirator. This ensemble is required when the situation is very hazardous, such as oxygen deficient atmospheres, IDLH atmospheres, or confined space entries. Level C Protective equipment includes a protective suit and an air purifying respirator (APR) with the appropriate filter canisters. Level D To be worn only in established "safe zones" may consist of, from normal work clothes to normal skin protection such as gloves, face shields goggles, coveralls and occasionally respiratory protection.

An Official State of Ohio site. Here's how you know

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Operating Engineers - Building Local 18 - Zone III	LCN01-2026ib	Operating Engineer	05/01/2026	04/29/2026

Wage Rates

		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**										
Operator Group A	$47.29	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$64.74	$88.39
Operator Group B	$47.17	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$64.62	$88.20
Operator Group C	$46.13	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$63.58	$86.65
Operator Group D	$44.95	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$62.40	$84.88
Operator Group E	$39.49	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$56.94	$76.69
Master Mechanic	$48.29	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.74	$89.89
Lift Director	$48.29	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.74	$89.89
Cranes & Mobile Concrete Pumps 150'-180'	$47.79	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.24	$89.14
Cranes & Mobile Concrete Pumps 180'-249'	$48.29	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.74	$89.89

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Cranes & Mobile Concrete Pumps 249' and over	$48.54		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.99	$90.26
Apprentice	**Percent**	**BHR**										
1st Year	50.020000	$23.65	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$41.10	$52.92
2nd Year	60.000000	$28.37	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$45.82	$60.00
3rd Year	70.000000	$33.10	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$50.55	$67.10
4th Year	80.000000	$37.83	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$55.28	$74.19
Field Mechanic Trainee												
1st Year	60.000000	$28.37	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$45.72	$59.91
2nd Year	70.000000	$33.10	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$50.45	$67.00
3rd Year	80.000000	$37.83	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$55.18	$74.09
4th Year	90.000000	$42.56	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$59.91	$81.19

Special Calculation Note

Other: Education & Safety
Misc: National Training

Note: There will be a 10% increase for the apprentices on top of the percentages listed above provided they are operating mobile equipment.

Ratio

For every (3) Operating Engineer Journeymen employed by the company there may be employed (1) Registered Apprentice or trainee Engineer through the referral when they are available. An apprenice, while employed as part of a crew per Article VIII, paragraph 77, will not be subject to the apprenticeship ratios in this collective bargaining agreement

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Coshocton, Crawford, Darke, Defiance, Delaware, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Madison, Marion, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington,

Wayne, Williams, Wyandot

Special Jurisdictional Note

Details

Group A- Barrier Moving Machines; Boiler Operators or Compressor Operators, when compressor or boiler is mounted on crane (Piggyback Operation); Boom Trucks (all types); Cableways Cherry Pickers; Combination - Concrete Mixers & Towers; All Concrete Pumps with Booms; Cranes (all types); Compact Cranes, track or rubber over 4,000 pounds capacity; Cranes self-erecting, stationary, track or truck (all configurations); Derricks (all types); Draglines; Dredges (dipper, clam or suction) 3-man crew; Elevating Graders or Euclid Loaders; Floating Equipment; Forklift (rough terrain with winch/hoist); Gradalls; Helicopter Operators, hoisting building materials; Helicopter Winch Operators, Hoisting building materials; Hoes (All types); Hoists (with two or more drums in use); Horizonal Directional Drill; Hydraulic Gantry (lift system); Laser Finishing Machines; Laser Screed and like equipment; Lift Slab or Panel Jack Operators; Locomotives (all types); Maintenance Operator/ Technician(Mechanic Operator/Technician and/or Welder); Mixers, paving (multiple drum); Mobile Concrete Pumps, with booms; Panelboards, (all types on site); Pile Drivers; Power Shovels; Prentice Loader; Rail Tamper (with automatic lifting and aligning device); Rotary Drills (all), used on caissons for foundations and sub-structure; Side Booms; Slip Form Pavers; Straddle Carriers (Building Construction on site); Trench Machines (over 24" wide); Tug Boats.

Group B - Articulating/end dumps (minus $4.00/hour from Group B rate); Asphalt Pavers; Bobcat-type and/or skid steer loader with hoe attachment greater than 7000 lbs.; Bulldozers; CMI type Equipment; Concrete Saw, Vermeer-type; Endloaders; Hydro Milling Machine; Kolman-type Loaders (Dirt Loading); Lead Greasemen; Mucking Machines; Pettibone-Rail Equipment; Power Graders; Power Scoops; Power Scrapers; Push Cats;, Rotomills (all), grinders and planers of all types.

Group C - A-Frames; Air Compressors, Pressurizing Shafts or Tunnels; All Asphalt Rollers; Bobcat-type and/or Skid Steer Loader with or without attachments; Boilers (15 lbs. pressure and over); All Concrete Pumps (without booms with 5 inch system); Fork Lifts (except masonry); Highway Drills - all types (with integral power); Hoists (with one drum); House Elevators (except those automatic call button controlled), Buck Hoists, Transport Platforms, Construction Elevators; Hydro Vac/ Excavator (when a second person is needed, the rate of pay will be "Class E"); Man Lifts; Material hoist/elevators; Mud Jacks; Pressure Grouting; Pump Operators (installing or operating Well Points or other types of Dewatering Systems); Pumps (4 inches and over discharge); Railroad Tie (Inserter/Remover); Rotovator (Lime-Soil Stabilizer); Submersible Pumps (4"and over discharge); Switch & Tie Tampers (without lifting and aligning device); Trench Machines (24" and under); Utility Operators.

Group D - Backfillers and Tampers; Ballast Re-locator; Batch Plant Operators; Bar and Joint Installing Machines; Bull Floats; Burlap and Curing Machines; Clefplanes; Compressors, on building construction; Concrete Mixers, more than one bag capacity; Concrete Mixers, one bag capacity (side loaders); All Concrete Pumps (without boom with 4" or smaller system); Concrete Spreader; Conveyors, used for handling building materials; Crushers; Deckhands; Drum Fireman (in asphalt plants); Farm type tractors pulling attachments; Finishing Machines; Form Trenchers; Generators: Gunite Machines; Hydro-seeders; Pavement Breakers (hydraulic or cable); Post Drivers; Post Hole Diggers; Pressure Pumps (over 1/2") discharge); Road Widening Trenchers; Rollers (except asphalt); Self-propelled sub-graders; Shotcrete Machines; Tire Repairmen; Tractors, pulling sheepsfoot post roller or grader; VAC/ALLS; Vibratory Compactors, with integral power; Welders.

Group E – Allen Screed Paver (concrete); Boilers (less than 15 lbs. pressure); Cranes-Compact, track or rubber (under 4,000 pounds capacity); Directional Drill "Locator"; Fueling and greasing +$3.00; Inboard/outboard Motor Boat Launches; Light Plant Operators; Masonry Fork Lifts; Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalperson, Submersible Pumps (under 4" discharge).

Master Mechanics - Master Mechanic

Cranes 150' – 180' - Boom & Jib 150 - 180 feet Cranes 180' – 249' - Boom & Jib 180 - 249 feet Cranes 250' and over - Boom & Jib 250 feet or over

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Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Operating Engineers - HevHwy Zone II	LCN01-2026ib	Operating Engineer	05/01/2026	04/29/2026

Wage Rates

		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR										
Operator Class A	$47.29	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$64.74	$88.39
Operator Class B	$47.17	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$64.62	$88.20
Operator Class C	$46.13	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$63.58	$86.65
Operator Class D	$44.95	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$62.40	$84.88
Operator Class E	$39.49	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$56.94	$76.69
Master Mechanic	$48.29	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.74	$89.89
Lift Director	$48.29	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.74	$89.89
Crane and Mobile Concrete Pump 150' - 179'	$47.79	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.24	$89.14
Crane and Mobile Concrete Pump 180' - 249'	$48.29	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.74	$89.89
Crane and Mobile Concrete Pump	$48.54	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.99	$90.26

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
250' and Ove												
Apprentice	**Percent**	**BHR**										
1st Year	50.000000	$23.64	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$41.09	$52.91
2nd Year	60.000000	$28.37	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$45.82	$60.00
3rd Year	70.000000	$33.10	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$50.55	$67.10
4th Year	80.000000	$37.83	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$55.28	$74.19
Field Mech Trainee												
1st year	60.000000	$28.37	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$45.72	$59.91
2nd year	70.000000	$33.10	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$50.45	$67.00
3rd year	80.000000	$37.83	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$55.18	$74.09
4th year	90.000000	$42.56	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$59.91	$81.19

Special Calculation Note

Other: Education & Safety Fund
Misc: National Training

**Apprentices wilt receive a 10% increase on top of the percentages listed above provided they are operating mobile equipment.

Ratio

For every (3) Operating Engineer Journeymen employed by the company, there may be employed (1) Registered Apprentice or Trainee Engineer through the referral when they are available. An Apprentice, while employed as part of a crew per Article VIII, paragraph 68 will not be subject to the apprenticeship ratios in this collective bargaining agreement

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Coshocton, Crawford, Darke, Defiance, Delaware, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lucas, Madison, Marion, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note

Details

Class A - Air Compressors on Steel Erection; Asphalt Plant Engineers (Cleveland District Only); Barrier Moving Machine; Boiler Operators, Compressor Operators, or Generators, when mounted on a rig; Boom Trucks (all types); Cableways; Cherry Pickers; Combination- Concrete Mixers & Towers; Concrete Plants (over 4 yd capacity); Concrete Pumps; Cranes (all types); Compact Cranes track or rubber over 4,000 pounds capacity; Cranes self-erecting stationary, track or truck; Derricks (all types); Draglines; Dredges dipper, clam or suction; Elevating Graders or Euclid Loaders; Floating Equipment (all types); Gradalls; Helicopter Crew (Operator- hoist or winch); Hoes (all types); Hoisting Engines; Hoisting Engines, on shaft or tunnel work; Hydraulic Gantry (lifting system); Industrial-type Tractors; Jet Engine Dryer (D8 or D9) diesel Tractors; Locomotives (standard gauge); Maintenance Operators/Technicians (class A); Mixers, paving (single or double drum); Mucking Machines; Multiple Scrapers; Piledriving Machines (all types); Power Shovels, Prentice Loader; Quad 9 (double pusher); Rail Tamper (with automatic lifting and aligning device); Refrigerating Machines (freezer operation); Rotary Drills, on caisson work; Rough Terrain Fork Lift with winch/hoist; Side Booms; Slip Form Pavers; Survey Crew Party Chiefs; Tower Derricks; Tree Shredders; Trench Machines (over 24" wide); Truck Mounted Concrete Pumps; Tug Boats; Tunnel Machines and /or Mining Machines; Wheel Excavators.

Class B - Asphalt Pavers; Automatic Subgrade Machines, self-propelled (CMI-type); Bobcat-type and /or Skid Steer Loader with hoe attachment greater than 7000 lbs.; Boring Machine Operators (more than 48 inches); Bulldozers; Concrete Saws, Vermeer type; Endloaders; Horizontal Directional Drill (50,000 ft. lbs. thrust and over); Hydro Milling Machine; Kolman-type Loaders (production type-dirt); Lead Greasemen; Lighting and Traffic Signal Installation Equipment includes all groups or classifications; Maintenance Operators/Technicians, Class B; Material Transfer Equipment (shuttle buggy) Asphalt; Pettibone-Rail Equipment; Power Graders; Power Scrapers; Push Cats; Rotomills (all), Grinders and Planners of all types, Groovers (excluding walk-behinds); Trench Machines (24 inch wide and under).

Class C - A-Frames; Air Compressors, on tunnel work (low Pressure); Articulating/straight bed end dumps if assigned (minus $4.00 per hour); Asphalt Plant Engineers (Portage and Summit Counties only); Bobcat-type and/or skid steer loader with or without attachments; Drones; Highway Drills (all types); HydroVac/Excavator (when a second person is needed, the rate of pay will be "Class E"); Locomotives (narrow gauge); Material Hoist/Elevators; Mixers, concrete (more than one bag capacity); Mixers, one bag capacity (side loader); Power Boilers (over 15 lbs. pressure); Pump Operators (installing or operating well Points); Pumps (4 inch and over discharge); Railroad Tie Inserter/Remover; Rollers, Asphalt; Rotovator (lime-soil Stabilizer); Switch & Tie Tampers (without lifting and aligning device); Utilities Operators, (small equipment); Welding Machines and Generators.

Class D – Backfillers and Tampers; Ballast Re-locator; Bar and Joint Installing Machines; Batch Plant Operators; Boring Machine Operators (48 inch or less); Bull Floats; Burlap and Curing Machines; Concrete Plants (capacity 4 yds. and under); Concrete Saws (multiple); Conveyors (highway); Crushers; Deckhands; Farm type tractors, with attachments (highway); Finishing Machines; Firemen, Floating Equipment (all types); Fork Lifts (highway), except masonry; Form Trenchers; Hydro Hammers; Hydro Seeders; Pavement Breakers (hydraulic or cable); Plant Mixers; Post Drivers; Post Hole Diggers; Power Brush Burners; Power Form Handling Equipment; Road Widening Trenchers; Rollers (brick, grade, macadam); Self-Propelled Power Spreaders; Self-Propelled Sub-Graders; Steam Firemen; Survey Instrument men; Tractors, pulling sheepsfoot rollers or graders; Vibratory Compactors, with integral power.

Class E - Compressors (portable, Sewer, Heavy and Highway); Cranes-Compact, track or rubber under 4,000 pound capacity; Drum Firemen (asphalt plant); Fueling and greasing (Primary Operator with Specialized CDL Endorsement Add $3.00/hr); Generators; Inboard-Outboard Motor Boat Launches; Masonry Fork Lifts; Oil Heaters (asphalt plant); Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalperson; Survey Rodmen

or Chairmen; Tire Repairmen; VAC/ALLS.

Master Mechanic - Master Mechanic

Cranes and Mobile Concrete Pumps 150' -179' - Boom & Jib 150 - 179 feet Cranes and Mobile Concrete Pumps 180' - 249' - Boom & Jib 180 - 249 feet Cranes and Mobile Concrete Pumps 250' and over - Boom & Jib 250 feet or over

Prevailing Wage Rate
Skilled Crafts

Name of Union: Painter Local 249

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Painter	6/24/2026	6/24/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Painter	$30.35		$7.30	$7.14	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$45.12	$60.30
Apprentice	BHR	Percent										
30 Day Probationary	$15.18	$50.00	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$23.26	$30.85
1st Year	$19.73	$65.00	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$27.81	$37.67
2nd Year	$22.76	$75.00	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$30.84	$42.22
3rd Year	$25.80	$85.00	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$33.88	$46.78
4th Year	$27.32	$90.02	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$35.40	$49.06

(*)Special Calculation Note :

A) $1.50 an hour premium shall be added to any base pay for spraying Coal Tar Products.
B) $ .75 an hour premium shall be added to any base pay for Sandblasting, Water Blasting or Lead Abatement.
C) $ .90 an hour premium shall be added to any base pay for Drywall Finishing.
D) $3.94 an hour premium shall be added to any base pay for Elevated Tanks.
E) $ .95 an hour premium shall be added to any base pay for Steeplejack Work.
F) $.75 premium shall be added to any base pay for lead abatement.

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Clark, Darke, Greene, Miami, Montgomery, Preble

Special Jurisdictional Note :

Details :

Industrial work but not limited to: work done on industrial plants, repair garages, processing plants, storage tanks, warehouses, skeleton structures, bridges, whether new or old construction, office buildings in industrial sites and interior of shopping malls.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Painter Local 249 Drywall

Type of Rate: Commercial

Change #: LCN01-2026ib

Craft: Painter

Effective Date: 6/24/2026

Effective Date: 6/24/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Painter Drywall Finisher	$30.35		$7.30	$7.14	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$45.12	$60.30
Apprentice	BHR	Percent										
30 Day Probation ary	$15.18	$50.00	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$23.26	$30.85
1st Year	$19.73	$65.00	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$27.81	$37.67
2nd Year	$22.76	$75.00	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$30.84	$42.22
3rd Year	$25.80	$85.00	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$33.88	$46.78
4th Year	$27.32	$90.00	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$35.40	$49.06

(*)Special Calculation Note :

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Clark, Darke, Greene, Miami, Montgomery, Preble

Special Jurisdictional Note :

Details :

Industrial work but not limited to: work done on industrial plants, repair garages, processing plants, storage tanks, warehouses, skeleton structures, bridges, whether new or old construction, office buildings in industrial sites and interior of shopping malls.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Painter Local 249 HevHwy

Type of Rate: Commercial

Change #: LCN01-2026ib

Craft: Painter

Effective Date: 6/24/2026

Effective Date: 6/24/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Painter Bridge Blaster - Class 1	$42.06		$7.30	$7.14	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$56.83	$77.86
Bridge Painter, Rigger, Containment Builder, Spot Blaster - Class 2	$39.06		$7.30	$7.14	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$53.83	$73.36
Equipment Operator/ Field Mechanic, Grit Reclamation, Paint Mixer, Traffic Control, Boat Person, Driver - Class 3	$37.06		$7.30	$7.14	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$51.83	$70.36
Concrete Sealing, Concrete Blasting/Power Washing/ Etc. - Class 4	$35.06		$7.30	$7.14	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$49.83	$67.36
Quality Control/Quality Assurance, Traffic safety, Competent Person - Class 5	$35.06		$7.30	$7.14	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$49.83	$67.36
Apprentice	BHR	Percent										
30 day Probationary	$21.03	$50.00	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$29.11	$39.63
1st Year	$27.34	$65.00	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$35.42	$49.09
2nd Year	$27.34	$65.00	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$35.42	$49.09
3rd Year	$31.55	$75.02	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$39.63	$55.41
4th Year	$35.75	$85.00	$7.30	$0.45	$0.33	$0.00	$0.00	$0.00	$0.00	$0.00	$43.83	$61.70

(*)Special Calculation Note :

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Clark, Darke, Greene, Miami, Montgomery, Preble

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Painter Local 639 Sign and Display

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Painter	6/18/2025	6/18/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Top Mechanic Class A	$27.53		$4.50	$0.00	$0.00	$0.00	$0.00	$1.45	$0.00	$0.00	$33.48	$47.25
Top Mechanic Class B	$27.53		$4.50	$0.75	$0.00	$0.53	$0.00	$1.45	$0.00	$0.00	$34.76	$48.53
Top Helper Class A	$22.33		$4.50	$0.00	$0.00	$0.00	$0.00	$1.20	$0.00	$0.00	$28.03	$39.20
Top Helper Class B	$22.33		$4.50	$0.75	$0.00	$0.43	$0.00	$1.20	$0.00	$0.00	$29.21	$40.38
Helper Class A	$17.19		$4.50	$0.00	$0.00	$0.00	$0.00	$0.90	$0.00	$0.00	$22.59	$31.19
Helper Class B	$17.19		$4.50	$0.75	$0.00	$0.30	$0.00	$0.90	$0.00	$0.00	$23.64	$32.24
New Hire (90 Days)	$15.75		$4.50	$0.00	$0.00	$0.00	$0.00	$0.55	$0.00	$0.00	$20.80	$28.68
Apprentice	BHR	Percent										

(*)Special Calculation Note :

Other: Sick, Personal & Holiday Pay Swing Stage Rate: Employees shall receive a differential of $1.50 per hour for all hours worked on scaffolds four sections or higher, including any boom lifts and swing stage scaffolds. In addition, the rigging and derigging of hanging/suspended swing stage systems and rappelling/bolson chair work of a single employee will qualify for $1.50 differential, will be paid to a single lead Top Mechanic or single lead Top Helper on any given swing stage job, even when it includes multiple running rigs on a single jobsite.

Ratio :

Jurisdiction (* denotes special jurisdictional note) :

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Geauga, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note :

Details :

The work performed by employees covered by this rate shall include cleaning and refinishing of architectural metals using chemicals, solvents, coatings and hand-applied lacquer thinner, removing scratches from mirror finished metals, burnishing of bronze, statuary finishes on exterior and interior surfaces during the course of the restoration and maintenance of architectural metals, and other specialty metal finishing work, and the use of all tools required to perform such work, including but not limited to polishes, spray equipment and scaffolding. Class A: Less Than 1 Year of Service Class B: More Than 1 Year of Service Top Mechanic: Top Mechanic shall be responsible for ensuring the highest quality of workmanship by Helpers, and be highly competent and knowledgeable in the following areas: coatings, both solvent and waterborne, spraying ability, stainless steel, aluminum and bronze finishing, scaffolding and swing stage work. The Top Mechanic shall also be responsible for providing necessary training of employees in lower classifications and for directing all employees in his/her crew to perform their responsibilities in a productive and efficient manner. Top Helper: For existing Top Helpers at the time of this Agreement shall, in addition to performing the responsibilities of a Helper, be responsible and accountable for the setup, breakdown, safety and quality of the Company's product. Helper: A Helper shall be responsible for performing tasks in refinishing, compliance with safety procedures, setting up and breaking down job sites, setting up and breaking down scaffolding and swing stages, preparing surfaces for refinishing, including but not limited to masking and stripping, cleaning, oxidizing, polishing and scratch removal on various finishes.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Painter Local 639 Zone 2 Sign

Type of Rate: Commercial

Change #: LCN01-2025ib

Craft: Painter

Effective Date: 5/28/2025

Effective Date: 5/28/2025

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Painter Sign Journeyman Tech/Team Leader Class A	$26.56	$3.36	$0.21	$0.00	$0.00	$0.00	$0.72	$0.00	$0.00	$30.85	$44.13
Painter Sign Journeyman Tech/Team Leader Class B	$26.56	$3.36	$0.21	$0.00	$0.51	$0.00	$0.72	$0.00	$0.00	$31.36	$44.64
Painter Sign Journeyman Tech/Team Leader Class C	$26.56	$3.36	$0.21	$0.00	$1.02	$0.00	$0.72	$0.00	$0.00	$31.87	$45.15
Painter Sign Journeyman Tech/Team Leader Class D	$26.56	$3.36	$0.21	$0.00	$1.53	$0.00	$0.72	$0.00	$0.00	$32.38	$45.66
Sign Journeyman Class A	$26.27	$3.36	$0.21	$0.00	$0.00	$0.00	$0.71	$0.00	$0.00	$30.55	$43.69
Sign Journeyman Class B	$26.27	$3.36	$0.21	$0.00	$0.51	$0.00	$0.71	$0.00	$0.00	$31.06	$44.20
Sign Journeyman Class C	$26.27	$3.36	$0.21	$0.00	$1.01	$0.00	$0.71	$0.00	$0.00	$31.56	$44.70
Sign Journeyman Class D	$26.27	$3.36	$0.21	$0.00	$1.52	$0.00	$0.71	$0.00	$0.00	$32.07	$45.21
Tech Sign Fabrication/ Erector Class A	$20.67	$3.36	$0.21	$0.00	$0.00	$0.00	$0.56	$0.00	$0.00	$24.80	$35.14
Tech Sign Fabrication/ Erector Class B	$20.67	$3.36	$0.21	$0.00	$0.40	$0.00	$0.56	$0.00	$0.00	$25.20	$35.54

Tech Sign Fabrication/ Erector Class C	$20.67		$3.36	$0.21	$0.00	$0.80	$0.00	$0.56	$0.00	$0.00	$25.60	$35.94
Tech Sign Fabrication/ Erector Class D	$20.67		$3.36	$0.21	$0.00	$1.19	$0.00	$0.56	$0.00	$0.00	$25.99	$36.33
Apprentice	BHR	Percent										

(*)Special Calculation Note :

Other is for paid holidays.

Ratio :

Jurisdiction (* denotes special jurisdictional note) :

Adams, Allen, Auglaize, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Greene, Hamilton, Hancock, Hardin, Henry, Highland, Holmes, Huron, Jackson, Knox, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Mercer, Miami, Montgomery, Morrow, Muskingum, Ottawa, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Trumbull, Tuscarawas, Union, Van Wert, Warren, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note :

Details :

Class A: less that 1 year. Class B: 1-3 years. Class C; 3-10 years. Class D: More than 10 years.

An Official State of Ohio site. Here's how you know

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Plasterer Local 132 (Dayton)	LCN01-2026ib	Plasterer	05/20/2026	05/20/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	BHR											
Plasterer	$31.68		$8.90	$7.60	$0.70	$0.00	$3.90	$0.07	$0.00	$0.00	$52.85	$68.69
Apprentice	Percent	BHR										
1st 800 Hours	70.000000	$22.18	$8.90	$0.00	$0.70	$0.00	$3.90	$0.07	$0.00	$0.00	$35.75	$46.84
2nd 800 Hours	74.000000	$23.44	$8.90	$0.00	$0.70	$0.00	$3.90	$0.07	$0.00	$0.00	$37.01	$48.73
3rd 800 Hours	78.000000	$24.71	$8.90	$7.60	$0.70	$0.00	$3.90	$0.07	$0.00	$0.00	$45.88	$58.23
4th 800 Hours	82.000000	$25.98	$8.90	$7.60	$0.70	$0.00	$3.90	$0.07	$0.00	$0.00	$47.15	$60.14
5th 800 Hours	86.000000	$27.24	$8.90	$7.60	$0.70	$0.00	$3.90	$0.07	$0.00	$0.00	$48.41	$62.03
6th 800 Hours	90.000000	$28.51	$8.90	$7.60	$0.70	$0.00	$3.90	$0.07	$0.00	$0.00	$49.68	$63.94
7th 800 Hours	94.000000	$29.78	$8.90	$7.60	$0.70	$0.00	$3.90	$0.07	$0.00	$0.00	$50.95	$65.84
8th 800 Hours	98.000000	$31.05	$8.90	$7.60	$0.70	$0.00	$3.90	$0.07	$0.00	$0.00	$52.22	$67.75

Special Calculation Note

OTHER: International Training Fund

Ratio

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Champaign, Clark, Clinton, Darke, Greene, Miami, Montgomery, Preble, Shelby

Special Jurisdictional Note

Details

An Official State of Ohio site. Here's how you know

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Plumber Pipefitter Local 162	LCN01-2026ib	Plumber Pipefitter	07/08/2026	07/08/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Plumber Pipefitter	$50.60		$12.30	$10.87	$1.11	$0.00	$3.35	$0.00	$0.00	$0.00	$78.23	$103.53
Apprentice	**Percent**	**BHR**										
1st Year	50.570000	$25.59	$12.30	$3.26	$0.57	$0.00	$0.00	$0.00	$0.00	$0.00	$41.72	$54.52
2nd Year	55.470000	$28.07	$12.30	$5.69	$0.62	$0.00	$0.00	$0.00	$0.00	$0.00	$46.68	$60.72
3rd Year	60.370000	$30.55	$12.30	$8.53	$0.66	$0.00	$0.00	$0.00	$0.00	$0.00	$52.04	$67.31
4th Year	70.170000	$35.51	$12.30	$10.63	$0.76	$0.00	$0.00	$0.00	$0.00	$0.00	$59.20	$76.95
5th Year	80.000000	$40.48	$12.30	$10.87	$0.85	$0.00	$3.35	$0.00	$0.00	$0.00	$67.85	$88.09

Special Calculation Note

Ratio

1 Journeyman to 1 Apprentice
2 - 4 Journeymen to 2 Apprentices
5 - 7 Journeymen to 3 Apprentices
8 - 10 Journeymen to 4 Apprentices

Jurisdiction (* denotes special jurisdictional note)

Champaign, Clark, Clinton, Darke, Fayette, Greene, Miami, Montgomery, Preble

Special Jurisdictional Note

Details

Wage rate covers: all plumbing, pipefitting, heating, refrigeration and air conditioning work.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Roofer Local 75

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Roofer	6/24/2026	6/24/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Roofer	$31.95		$8.98	$8.98	$0.58	$0.00	$2.00	$0.00	$0.00	$0.00	$52.49	$68.47
Slate and Tile	$32.17		$8.98	$8.98	$0.58	$0.00	$2.00	$0.00	$0.00	$0.00	$52.71	$68.80
Apprentice	BHR	Percent										
Apprentice Probation 499 hrs	$21.73	$68.00	$2.50	$0.50	$0.58	$0.00	$2.00	$0.00	$0.00	$0.00	$27.31	$38.17
1st Term 1250 hrs	$21.73	$68.00	$8.58	$1.32	$0.58	$0.00	$2.00	$0.00	$0.00	$0.00	$34.21	$45.08
2nd Term 1250 hrs	$23.96	$75.00	$8.58	$2.20	$0.58	$0.00	$2.00	$0.00	$0.00	$0.00	$37.32	$49.30
3rd Term 1250 hrs	$25.56	$80.00	$8.58	$3.07	$0.58	$0.00	$2.00	$0.00	$0.00	$0.00	$39.79	$52.57
4th Term 1250 hrs	$28.75	$90.00	$8.58	$3.95	$0.58	$0.00	$2.00	$0.00	$0.00	$0.00	$43.86	$58.23
Pre-Apprentice	$25.24	$79.00	$5.00	$1.58	$0.58	$0.00	$2.00	$0.00	$0.00	$0.00	$34.40	$47.02

(*)Special Calculation Note :

Ratio :

3 Journeymen to 2 Apprentices
1 Pre-Apprentice to 2 Apprentices

Jurisdiction (* denotes special jurisdictional note) :

Allen, Auglaize, Clark, Clinton, Darke, Greene, Mercer, Miami, Montgomery, Preble, Shelby, Van Wert

Special Jurisdictional Note :

Details :

Pre-Apprentices can do all work of a Journeyman

Prevailing Wage Rate
Skilled Crafts

Name of Union: Sheet Metal Local 24 (Dayton)

Type of Rate: Commercial

Change #: LCN01-2025ib

Craft: Sheet Metal Worker

Effective Date: 6/11/2025

Effective Date: 6/11/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Sheet Metal Worker	$35.62		$10.14	$15.60	$1.17	$0.00	$0.00	$0.00	$0.00	$0.00	$62.53	$80.34
Apprentice	BHR	Percent										
1st Year (Probationary Period)	$21.37	$60.00	$9.48	$5.50	$1.17	$0.00	$0.00	$0.00	$0.00	$0.00	$37.52	$48.21
2nd Year	$23.15	$65.00	$9.56	$6.77	$1.17	$0.00	$0.00	$0.00	$0.00	$0.00	$40.65	$52.23
3rd Year	$26.72	$75.02	$9.73	$9.28	$1.17	$0.00	$0.00	$0.00	$0.00	$0.00	$46.90	$60.26
4th Year	$30.28	$85.00	$9.90	$11.80	$1.17	$0.00	$0.00	$0.00	$0.00	$0.00	$53.15	$68.29
5th Year	$32.06	$90.00	$9.98	$13.07	$1.17	$0.00	$0.00	$0.00	$0.00	$0.00	$56.28	$72.31

(*)Special Calculation Note :

Ratio :

1 Journeyman to 1 Apprentice then, 1 Apprentice for every 2 Journeymen thereafter

Jurisdiction (* denotes special jurisdictional note) :

Allen, Auglaize, Butler, Champaign, Clark, Clinton, Darke, Greene, Hardin, Logan, Mercer, Miami, Montgomery, Preble, Shelby, Van Wert, Warren, Wyandot

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Sprinkler Fitter Local 669

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCR01-2025ib	Sprinkler Fitter	8/6/2025	8/6/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Sprinkler Fitter	$48.28		$12.40	$7.40	$0.54	$0.00	$7.74	$0.00	$0.00	$0.00	$76.36	$100.5
Apprentice	BHR	Percent										
CLASS 1	$24.14	$50.00	$9.03	$0.00	$0.54	$0.00	$0.00	$0.00	$0.00	$0.00	$33.71	$45.78
CLASS 2	$27.04	$56.00	$9.03	$0.00	$0.54	$0.00	$0.00	$0.00	$0.00	$0.00	$36.61	$50.13
CLASS 3	$29.45	$61.00	$12.40	$7.40	$0.54	$0.00	$1.15	$0.00	$0.00	$0.00	$50.94	$65.66
CLASS 4	$31.38	$65.00	$12.40	$7.40	$0.54	$0.00	$1.15	$0.00	$0.00	$0.00	$52.87	$68.56
CLASS 5	$33.31	$69.00	$12.40	$7.40	$0.54	$0.00	$1.40	$0.00	$0.00	$0.00	$55.05	$71.70
CLASS 6	$36.21	$75.00	$12.40	$7.40	$0.54	$0.00	$1.40	$0.00	$0.00	$0.00	$57.95	$76.05
CLASS 7	$38.14	$79.00	$12.40	$7.40	$0.54	$0.00	$1.40	$0.00	$0.00	$0.00	$59.88	$78.95
CLASS 8	$40.56	$84.00	$12.40	$7.40	$0.54	$0.00	$1.40	$0.00	$0.00	$0.00	$62.30	$82.58
CLASS 9	$42.97	$89.00	$12.40	$7.40	$0.54	$0.00	$1.40	$0.00	$0.00	$0.00	$64.71	$86.19
CLASS 10	$44.90	$93.00	$12.40	$7.40	$0.54	$0.00	$1.40	$0.00	$0.00	$0.00	$66.64	$89.09

(*)Special Calculation Note :

Ratio :

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note :

Details :

Sprinkler Fitter work shall consist of the installation, dismantling, maintenance, repairs, adjustments, and corrections of all fire protection and fire control systems including the unloading, handling by hand, power equipment and installation of all piping or tubing, appurtenances and equipment pertaining thereto, including both overhead and underground water mains, fire hydrants and hydrant mains, standpipes and hose connections to sprinkler systems used in connection with sprinkler and alarm systems. Also all tanks and pumps connected thereto, also included shall be CO-2 and Cardox Systems, Dry Chemical Systems, Foam Systems and all other fire protection systems.

An Official State of Ohio site. Here's how you know

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Truck Driver Locals 20,40,92,100,175,284,348,377,637,697,908,957 - Bldg & HevHwy Class 1	LCN01-2026ib	Truck Driver	05/01/2026	04/29/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Truck Driver CLASS 1	$34.90		$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$55.75	$73.20
Apprentice	**Percent**	**BHR**										
First 6 months	80.000000	$27.92	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$48.77	$62.73
7-12 months	85.020000	$29.67	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$50.52	$65.36
13-18 months	90.000000	$31.41	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$52.26	$67.97
19-24 months	95.020000	$33.16	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$54.01	$70.59
25-30 months	100.000000	$34.90	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$55.75	$73.20

Special Calculation Note

Ratio

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note

Details

CLASS 1: Drivers on trucks, including but not limited to: 4-wheel service trucks; 4-wheel dump trucks; batch trucks; drivers on tandems; truck sweepers (not to include power sweepers and scrubbers) Drivers on tractor – trailer combinations including but not limited to the following: Semi-tractor trucks; pole trailers; ready-mix trucks; fuel trucks; all trucks five (5) axle and over; drivers on belly dumps; truck mechanics (when needed).

An Official State of Ohio site. Here's how you know

Prevailing Wage Rates - Skilled Crafts

Details

Union	Change#	Craft	Effective Date	Posted Date
Truck Driver Locals 20,40,92,100,175,284,348,377,637,697,908,957 - Bldg & HevHwy Class 2	LCN01-2026ib	Truck Driver	05/01/2026	04/29/2026

Wage Rates

			Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification	**BHR**											
Truck Driver CLASS 2	$35.91		$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$56.76	$74.72
Apprentice	**Percent**	**BHR**										
First 6 months	79.990000	$28.72	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$49.57	$63.93
7-12 months	85.000000	$30.52	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$51.37	$66.63
13-18 months	90.000000	$32.32	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$53.17	$69.33
19-24 months	95.000000	$34.11	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$54.96	$72.02
25-30 months	100.000000	$35.91	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$56.76	$74.72

Special Calculation Note

Ratio

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note)

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note

Details

CLASS 2: Drivers on articulated dump trucks; rigid-frame rock trucks; distributor trucks; low boys/drag driver on the construction site only and heavy duty equipment (irrespective of load carried) when used exclusively for transportation on the construction site only.

Troy Aquatics Park Maintenance Improvements

460 West Staunton Drive, Troy, Ohio 45373

Project Manual & Specifications

The City of Troy

7/10/2026

MSA Project Number 25306.00

Owner
City of Troy, Ohio
100 S. Market Street
Troy, Ohio 45373

ARCHITECT
MSA Design
15 West Cherry Street, Suite 300
Columbus, Ohio 43215

CIVIL, MEPT, & STRUCTURAL ENGINEER
Korda
1650 Watermark Dr, Suite 200
Columbus, Ohio 43215

POOL CONSULTANT
Water Technology, Inc.
100 Park Ave
Beaver Dam, Wisconsin 53916

SECTION 000001 - PROJECT MANUAL INDEX

Division 00 – Procurement and Contracting Requirements

Introductory Information

..... Project Manual Index (Section 00 00 01)

Procurement and Contracting Requirements

..... Advertisement
..... Mission Statement
..... Instructions to Bidders
.....General Construction Provisions
..... Bid Documents
..... Contract Documents

Division 01 – General Requirements

Section 01 10 00 Summary
Section 01 12 50 Scopes of Work General
Section 01 12 51 Contract Summary
Section 01 25 00 Substitution Procedures
Section 01 26 00 Contract Modification Procedures
Section 01 29 00 Payment Procedures
Section 01 31 00 Project Management and Coordination
Section 01 32 00 Construction Progress Documentation
Section 01 33 00 Submittal Procedures
Section 01 40 00 Quality Requirements
Section 01 40 05 Special Inspections
Section 01 42 00 References
Section 01 50 00 Temporary Facilities and Controls
Section 01 60 00 Product Requirements
Section 01 73 00 Execution Requirements
Section 01 73 29 Cutting and Patching
Section 01 74 19 Construction and Waste Management
Section 01 77 00 Closeout Procedures
Section 01 78 23 Operation and Maintenance Data
Section 01 78 39 Project Record Documents
Section 01 79 00 Demonstration and Training
Section 01 79 10 Warranties

Division 02 – Existing Conditions

Section 02 41 16 Structure Demolition
Section 02 41 19 Selective Demolition

Division 03 – Concrete

Section 03 30 00 Cast-in-Place Concrete

Division 04 – Masonry

Not Included (No Scope)

Division 05 – Metals

Section 05 12 00 Structural Steel
Section 05 12 13 Architectural Exposed Structural Steel
Section 05 30 00 Metal Decking

Division 06 – Woods, Plastics, and Composites

Section 06 11 00 Structural Lumber and Sheathing
Section 06 16 00 Sheathing
Section 06 40 23 Interior Architectural Woodwork

Division 07 – Thermal and Moisture Protection

Section 07 41 13 Metal Roof Panels
Section 07 62 00 Sheet Metal Flashing and Trim
Section 07 92 00 Joint Sealants

Division 08 – Openings

Section 08 16 13 Fiberglass Doors and Frames
Section 08 71 00 Door Hardware

Division 09 – Finishes

Section 09 91 00 Painting

Division 10 – Specialties

Section 10 50 00 Solid Phenolic Lockers

Division 11 – Equipment

Not Included (No Scope)

Division 12 – Furnishings

Section 12 36 61 Solid Surfacing Countertops

Division 13 – Special Construction

Section 13 11 13 Pool General

Section 13 11 14 Pool Start-Up, Maintenance and Operations Training
Section 13 11 18 Pool Concrete
Section 13 11 20 Pool Pipe and Pipe Fittings
Section 13 11 23 Pool Pipe Supports
Section 13 11 24 Pool Valves
Section 13 11 25 Pool Centrifugal Pumps
Section 13 11 26 Pool Pump VFD
Section 13 11 34 Pool Vertical Fiberglass Filters
Section 13 11 37 Pool Chemical Systems and Controls
Section 13 11 40 Pool Heating Systems
Section 13 11 42 Perimeter Overflow Gutter Grating
Section 13 11 45 Pool Rail Goods
Section 13 11 46 Pool Equipment
Section 13 11 60 Pool Quartz Aggregate Finish
Section 13 11 61 Pool Ceramic Tile
Section 13 14 14 Slide Flume Refinish

Division 14 – Conveying Equipment

Not Included (No Scope)

Division 20 – General Sections for Plumbing and HVAC

Section 20 05 01 Introductory Statement
Section 20 05 05 Plumbing Fire Protection and HVAC General Requirements
Section 20 05 15 Submittals
Section 20 05 20 Record and Information Manuals
Section 20 05 45 Hangers Supports and Inserts (Non-Seismic)
Section 20 05 65 Equipment Piping and Ductwork Identification
Section 20 05 70 Demolition
Section 20 05 99 Requirements For Contract Completion

Division 21 – Fire Suppression

Not Included (No Scope)

Division 22 – Plumbing

Section 22 42 01 Plumbing Fixtures

Division 23 – Heating, Ventilation, Air Conditioning

Section 23 05 01 Heating, Ventilating, and Air Conditioning
Section 23 51 16 Vent Piping, Breeching, and Stacking

Division 26 – Electrical

Section 26 00 00 Electrical Introductory Statement
Section 26 00 05 General Requirements

Section 26 00 10 Coordination Between Trades
Section 26 00 15 Submittals
Section 26 00 20 Record and Information Manuals
Section 26 00 55 Sleeves, Seals, and Firestops
Section 26 00 99 Requirements for Contract Completion
Section 26 05 10 Wire and Cable
Section 26 05 26 Grounding & Bonding
Section 26 05 29 Hangers and Supports
Section 26 05 33 Conduit and Fittings
Section 26 05 34 Outlet Boxes
Section 26 05 35 Pull and Junction Boxes
Section 26 05 43 Underground Raceways
Section 26 05 53 Electrical Identification
Section 26 07 10 Voice/Data System Raceways
Section 26 08 40 Electrical Tests, Adjustments, Inspection
Section 26 27 26 Wiring Devices and Plates
Section 26 28 13 Fuses
Section 26 28 16 Safety Switches
Section 26 51 14 Luminaires
Section 26 90 01 Special Requirements for Water Features

Division 27 - Communications

Section 27 10 00 Structured Cabling

Division 31 – Earthwork

Not included (no scope)

Division 32 – Exterior Improvements

Not Included (no scope)

Division 33 – Utilities

Not Included (no scope)

END OF PROJECT MANUAL INDEX

Troy Aquatic Park Improvements

Procurement and Contracting Requirements

Robin Oda, Mayor

William G. Rozell, President of Council

Members of Council

Kristie L. Marshall
Madison Hickman
Jeffrey A. Schilling
Lynne B. Snee
Bobby W. Phillips
Susan Westfall
Todd D. Severt
William C. Twiss
Jeffrey G. Whidden

Patrick E. J. Titterington, Director of Public Service and Safety
Jillian A. Rhoades, PE, City Engineer

TABLE OF CONTENTS

1. COPY OF LEGAL ADVERTISEMENT 3
2. MISSION STATEMENT 4
3. INSTRUCTIONS TO BIDDERS AND GENERAL CONDITIONS 5
4. GENERAL CONSTRUCTION PROVISIONS 15
5. BID DOCUMENTS
   - A. FORM OF PROPOSAL 16
   - B. BID GUARANTY AND PERFORMANCE BOND 19
   - C. BID BOND FORM 21
   - D. EXPERIENCE SHEET 23
   - E. NON-COLLUSION AFFIDAVIT 25
   - F. AMERICANS WITH DISABILITIES ACT COMPLIANCE CERTIFICATION 26
6. CONTRACT DOCUMENTS
   - A. CONTRACT 29
   - B. FISCAL OFFICER'S STATEMENT 30
   - C. CONTRACT AFFIDAVIT 31
   - D. AFFIDAVIT OF CONTRACTOR OR SUPPLIER OF NON-DELINQUENCY OF PERSON PROPERTY TAXES 32
   - E. PERFORMANCE AND PAYMENT BOND 34
   - F. HOLD HARMLESS AGREEMENT 36
   - G. DRUG-FREE WORKPLACE COMPLIANCE AFFIDAVIT FORM (ORC SECTION. 153.03 – 153.031) 37
   - H. DECLARATION REGARDING MATERIAL ASSISTANCE/NON-ASSISTANCE TO A TERRORIST ORGANIZATION 38
   - I. AFFIDAVIT OF COMPLIANCE WITH OHIO REVISED CODE SECTION 3517.13 40
7. PREVAILING WAGE RATES 41
8. AIA DOCUMENT A201 – 2007 42

SECTION 011000 – SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Documents.
2. Type of the Contract.
3. Work phases.
4. Work under other contracts.
5. Products ordered in advance.
6. Owner-furnished products.
7. Use of premises.
8. Owner's occupancy requirements.
9. Work restrictions.
10. Specification formats and conventions.

B. Related Sections include the following:

1. Division 1 Section "Summary of Contracts" for division of responsibilities for the Work.
2. Division 1 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Troy Aquatic Park Improvements

B. Project Location: 460 West Staunton Dr., Troy, Ohio 45373

C. Owner: City of Troy

1. Owner's Representative: Patrick E. J. Titterington, Director of Public Service and Safety.

D. Architect: MSA Design, 15 West Cherry Street, Suite 300 Columbus, Ohio 43215

E. The Work consists of the following:

1. Miscellaneous Improvements to existing pool facility.

1.4 TYPE OF CONTRACT

A. Project will be constructed under a single contract. See Division 1 Section "Summary of Contracts" for a description of work included.

1.5 USE OF PREMISES

A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period.

B. Use of Site: Limit use of premises to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine constructions operations to the immediate property only.
2. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

a. Schedule deliveries to minimize use of driveways and entrances.
b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.6 OWNER'S OCCUPANCY REQUIREMENTS

A. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of the Project site, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.

1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.

1.7 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed during normal business working hours of 7:00a.m. to 6:00 p.m., Monday through Friday, except otherwise indicated.

1. Weekend Hours: Working hours will be the same as weekday hours.
2. Early Morning Hours: Work may not begin prior to 7:00am, unless authorized by the Owner.
3. Other: As coordinated and approved by owner.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner’s permission.

1.8 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
2. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.9 MISCELLANEOUS PROVISIONS

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100

SECTION 011250 – SCOPES OF WORK, GENERAL

PART 1 - GENERAL

1.1 GENERAL

A. The following Scopes of Work are intended to be an additional source of information, and at times, a clarification to the Construction Drawings and Specifications. The intention is to have the successful Contractor perform all related work shown on the Contract Documents (Construction Drawings, Specifications, Scopes of Work) other than those items specifically indicated below to be excluded.

B. The words “Prime Contractor” and “Contractor” may be used interchangeably throughout the Contract Documents. *A Prime Contractor or Contractor has a contract with the Owner.* The words “Summary of Work” may be used interchangeably with the words “Scope of Work” or “Scope”.

1.2 OVERVIEW OF WORK

A. **Provide all necessary labor, material, equipment, mockups, supervision, safety, protection, tools, hoisting, scaffolding, unloading, rigging, placing, storage, permits, engineering, shop drawings, samples, coordination, layout, inspection, cleaning, etc., to complete all work for the above-referenced Project, as shown or implied by the Contract Documents and Conditions, stated herein or inferable therefrom.**

1.3 RELATED DOCUMENTS

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

1.4 SUMMARY

A. This is a **Prevailing Wage Project**. City of Troy will provide applicable rates upon request.

B. This Project is **Tax-Exempt** on materials that are a permanent part of the building.

C. Material testing services will be provided by the Owner unless otherwise specifically noted in the specifications.

D. The General Building Permit will be secured by the Owner. All other permits, inspection fees, etc. that may be required by various governing entities for specific work activities outlined in the bid package shall be secured and paid for by the Contractor performing the work requiring a permit/inspection fee, etc.

E. All tap fees will be paid for by the Owner.

F. Construction schedule and management of any required phasing of the work with be the responsibility of the Lead Contractor. All work associated with this Project is to be completed per the Project schedule as developed by the Lead Contractor and included in the Project Manual. All Contractors are to include in their proposal all costs associated with the necessary resources to complete their scope of work based upon the durations provided in this schedule including, but not limited to the following; all additional overtime costs, multiple crews and expediting costs required to procure any/all materials in order to maintain this Project schedule.

G. The Contractor must provide sufficient manpower and equipment to maintain and meet the Project schedule

H. The General Trades Contractor will provide initial Project control using information provided by the Owner, Architect & Engineers and stake and grade for pavements, curbs, storm structures, etc. All layout and field engineering required for the performance of the work beyond the initial layout, including protection of reference points and replacement of such points that are lost or damaged during the execution of this work, shall be the responsibility of the prime Contractor needing such layout.

I. Provide all protection of your work.

J. The Contractor is responsible for replacing/repairing any damage to existing structures in or outside the building limits caused by this Contractors' workforce.

K. The Contractor shall provide its employees with all protective equipment and tools and enforce their use, as required by the Project Safety Program, federal, state and local codes and regulations.

L. Each job trailer shall be equipped with at least one (1) 20# ABC type fire extinguisher in good working order with prominent signage leading to the location, an OSHA approved First Aid Kit and current OSHA Manual. Trailers with phones shall have posted emergency numbers of the following; list of hospitals, ambulance service, fire and police departments. If gang boxes are used in lieu of a trailer, the gang box shall contain an OSHA approved First Aid Kit, OSHA Manual and one (1) 20# ABC type fire extinguisher, at a minimum.

M. The Contractor should have at least one qualified / certified first aid and CPR trained person and one qualified OSHA 30-hour trained person present on the Project.

N. The Contractor is required to conduct a weekly toolbox safety meeting with its employees and Subcontractors.

O. All Subcontractors shall comply with all OSHA regulations and shall submit to the Lead Contractor the required Material Safety Data Sheets for any hazardous material they may use or bring on the site in the performance of their work. Contractors are to submit site-specific MSDS organized in a binder.

P. Each Subcontractor shall submit to the Lead Contractor a Daily Construction Report. This report must contain at a minimum the following:

a. Contractors Name
b. Date
c. Manpower – by trade (i.e. supervision, carpenter, laborer, electrician, etc.) listed by Foreman, Journeyman and Apprentices.
d. Minority / Female Participation
e. Brief description of Day's Work
f. Deliveries and any other pertinent information.

The Daily Construction Reports (DCR's) shall include the same information for the Contractor's SubContractors and Sub-Subcontractors . These reports are to be received by the Construction Manager no later than 9:00 am on Monday of the following week. Failure to submit these reports in a timely fashion may result in the prorating of monthly application payments to the offending Contractors.

Q. All Contractors shall enforce the wearing of OSHA approved hard hats ("cowboy" hats not permitted) during the total construction of this Project.

R. The Contractor is responsible for all its Subcontractors and suppliers compliance with the Project Safety Requirements.

S. All Contractors' key people to be assigned to the Project should be named with the provision that they will not be removed without prior approval by the Owner.

T. Project Management / Field Supervision: (The following is not intended to be an all-inclusive list of duties)

1. The Contractor shall provide the following Project staff as outlined below:

Project Manager
- Offsite personnel

Duties consist of:
- Preparing and updating schedule
- Shop drawing review and procurement
- Preparing and updating material procurement log
-Distribute all submittals required to all parties
-Review, distribute, prepare estimate and submit pricing on all changes
-Prepare monthly requisitions and all appropriate documents
-Attend weekly jobsite meetings (mandatory)
-Handle Subcontractor issues and confrontations

Project Superintendent
- Fulltime onsite personnel
- Overseeing new construction

The Project Manager and Project Superintendent for the Contactor shall be a person who has held that position for the Contractor on a Project of similar size, complexity and cost. The Project Manager and Project Superintendent shall be responsible for the following:

- Complete knowledge of drawings and specifications and should develop the onsite plans and procedures for the implementation, including quality control procedures and requirements
- To plan and review the construction program, including site logistics, plant layout, equipment and manpower.
- To assist the Lead Contractor in preparing progress schedules and keep them properly updated and to see that the job does everything feasible to meet the required dates. These schedules must be coordinated with all Contractors and submitted to the Architect monthly with pay application.
- To expedite the delivery method of material and equipment furnished by Subcontractors and to assume the primary responsibility for their timely site delivery and development of material procurement log. This log will be updated and submitted monthly with pay application.
- To coordinate, direct and monitor the activities of the Subcontractors and suppliers, including weekly coordination meetings, weekly toolbox safety meetings and monthly safety meetings.
- To establish and maintain good safety and security practices for the entire Project in accordance with the Jobsite Safety Program.
- To prepare regular and special reports for Job Meetings and attend the meetings.
- To maintain good relations and communications with all involved in the Project.

U. All private and public paved roadways, parking areas, service roads, etc., are to be kept free of excavated materials, mud, debris, etc., resulting from equipment or vehicles performing the work of this Contract, in compliance with local city Ordinances. Failure to do so may result in serious fines imposed on each violating SubContractor. All paved areas are to be kept “broom clean” at all times. Roads should be checked on a two times a day basis if not more often.

V. On-site storage areas are limited. All requests for on-site material storage are to be coordinated in advance with the Construction Manager.

W. The Contractor is responsible to provide its own drinking water.

X. The Contractor will be responsible to de-water its own work areas, which includes, but is not limited to utility trenches.

Y. The Contractor is responsible for the clean up required or associated with its specific work activities and the work of lower tier Subcontractors and suppliers. Each Contractor shall provide trash receptacles, gondolas, etc. as required to transport debris to containers/dumpsters (provided by General Trades Contractor). All debris generated that must be disposed of with special care or handling is the responsibility of the Contractor associated with such debris.

Z. Debris shall be immediately placed into containers. There shall be no stockpiling of materials on the site.

AA. Each Subcontractor shall coordinate all work of other trades through the Lead Contractor for proper functions and sequence to avoid construction delays and to deter conflicts. Each Subcontractor shall provide to all other trades information (drawings, diagrams, templates, embedments) and other related materials necessary for the coordination of the work.

BB. Smoking or use of Tobacco products is not permitted anywhere on the project site including all interior and exterior.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011250

SECTION 011251 - CONTRACT SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes a summary of each contract, including responsibilities for coordination and temporary facilities and controls.

B. Specific requirements of each contract are also indicated in individual Specification Sections and on Drawings.

C. Work is in one (GC) General Trades Contract.

1.3 DEFINITIONS

A. General Contractor (GC): Includes work normally associated with the scope of work as outlined within the contract documents.

B. Owner: The Owner is the City of Troy as outlined in the Notice to Bidders.

C. Architect or Associate: MSA Design and associated consultants.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. As outlined in the Summary of Work.

1.5 COORDINATION

A. Lead Contractor shall be responsible for coordination of the General Construction Contract.

1. General Contractor shall act as Lead Contractor. In the specifications, any reference to “Project Coordinator” is referring to the Lead Contractor.

B. Work under separate contracts by the Owner which may be performed during the work of this contract are also anticipated, some of which are outlined elsewhere as “Term Contractors.” Contractors are to coordinate their work with the Owner’s occupied spaces and work of the Owners projects to maintain access and workflow for all projects.

1.6 OWNER’S OCCUPANCY REQUIREMENTS

A. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of the project, before Completion, provided such occupancy does not interfere with the completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the Work.

1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.

1.7 LEAD CONTRACTOR

A. Lead Contractor: Full-time Lead Contractor shall be experienced in administration and supervision of building construction, including fire protection, mechanical, plumbing and electrical work.

1. Coordination activities of Lead Contractor include, but are not limited to, the following:

a. Responsibilities as outlined in the General Conditions for the coordinating contractor.
b. Provide overall coordination of the Work.
c. Coordinate shared access to work spaces.
d. Assemble, track and coordinate all submittals and RFI's and distribute information to all parties to create a single point of contact for such information. Maintain Submittal and RFI logs. Coordinate information among and between all subcontractors.
e. Coordinate product selections for compatibility.
f. Provide overall coordination of temporary facilities and controls.
g. Coordinate, schedule, and approve interruptions of permanent and temporary utilities, including those necessary to make connections for temporary services.
h. Coordinate construction and operations of the Work with work performed by Owner's construction forces on other work in the building and site.
i. Coordinate sequencing and scheduling of the Work. Include the following:
1) Initial Coordination Meeting: At earliest possible date, arrange and conduct a meeting with separate contractors for sequencing and coordinating the Work; negotiate reasonable adjustments to schedules.
2) Prepare a Contractor's Construction Schedule for entire Project. .
3) Distribute copies of schedules to Associate, Owner, and separate contractors.
4) Conduct weekly coordination meetings, the results of which are to be reported in the weekly progress meeting with the Owner and Associate.

j. Provide construction photography.
k. Coordinate sequence of activities to accommodate tests and inspections, and coordinate schedule of tests and inspections.
l. Provide information necessary to adjust, move, or relocate existing utility structures affected by construction.
m. Locate existing permanent benchmarks, control points, and similar reference points, and establish permanent benchmarks on Project site.
n. Provide field documentation of in-progress construction.
o. Provide progress cleaning of common areas and coordinate progress cleaning of areas or pieces of equipment where more than one contractor has worked.
p. Coordinate cutting and patching including coordinating of various trades to include combining work in the same trenches and routes wherever possible to minimize cutting and patching.
q. Coordinate protection of the Work.

2. The Lead Contractor is responsible for all meetings, and coordination of a single master schedule for the project.

a. The Lead Contractor shall be responsible for progress meetings with the Owner, Architect, and Subcontractors.
b. The Lead Contractor shall be responsible for weekly coordination meetings, schedule updates, and safety meetings with the Subcontractors.
c. The Lead Contractor shall take and provide copies of meeting minutes to all Subcontractors, the Owner, and the Architect.
d. Meeting agendas are to include review of schedules and progress in relation to schedules, delays, reasons for delays, anticipated work, changes, off-site work and fabrication, submittals, scheduled deliveries, sequence of construction and component installations required, and job site administration needs of each entity.
e. The Lead Contractor shall be responsible for providing an updated schedule and report of the project progress on a monthly basis, beginning on the date of the preconstruction meeting.
f. The Owner may consider failure to conduct or attend meetings, update schedules and provide meeting notes as cause for potential loss or damage to the work and backcharges may be assessed.

3. Responsibilities of Lead Contractor for temporary facilities and controls include, but are not limited to, those as outlined in "Temporary Facilities and Controls."

1.8 GENERAL REQUIREMENTS OF THE CONTRACTS

A. Extent of Contract: All work described in the Contract Documents shall be conducted by the Contractor unless specifically noted otherwise.

1. Unless otherwise indicated, the Work described in this Section shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
2. The Contractor is to review all documents to understand all parts of the work in a given area. Coordinate work with Owner's contractors (if applicable) to resolve clearances between systems, equipment, and devices.
3. Minimize numbers of trenches required and combine work into trenches.
4. Selective Demolition work shall follow, but is not limited to, specification section 024119 - Selective Demolition.

B. Substitutions: The contractor shall coordinate approved substitutions with remainder of the Work.

C. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section the contractor is responsible for the following:

1. Installation, operation, maintenance, and removal of each temporary facility usually considered as its own normal construction activity, and costs and use charges associated with each facility.
2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
3. Its own field office complete with necessary furniture, utilities, and telephone service.
4. Its own storage and fabrication sheds.
5. Temporary enclosures for its own construction activities.
6. Special or unusual hoisting requirements for its own construction activities, hoisting material or equipment into spaces below grade, and hoisting requirements outside building enclosure.
7. Progress cleaning of its own areas on a daily basis.
8. Secure lockup of its own tools, materials, and equipment.
9. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.

10. Waste disposal facilities for collection and legal disposal of its own hazardous, dangerous, unsanitary or other harmful waste materials. Other waste materials are to be removed to a location as specified by the Lead Contractor for common waste facilities.
11. Restoration of Owner facilities used as temporary facilities or access to the site or temporary facilities; or any existing facilities damaged by Contractor.

1.9 GENERAL CONSTRUCTION CONTRACT

A. Work in the General Contract includes, but is not limited to, the following:

1. Demolition.
2. New Work as outlined on Contract Documents.
3. Final Cleaning

B. Temporary facilities and controls in the General Contract include, but are not limited to, the following:

1. Unpiped temporary toilet facilities and fixtures, wash facilities, and drinking water facilities, including disposable supplies.
2. Excavation support and protection.
3. Project identification and temporary signs.
4. General/common waste disposal facilities and dumpsters.
5. Pest control.
6. Temporary fire-protection equipment.
7. Dewatering of the site and excavations.
8. Barricades, warning signs, and lights.
9. Security enclosure and lockup.
10. Environmental protection.
11. Piped sewers and drainage.
12. Piped water service including backflow preventers.
13. Plumbing connections to existing systems and temporary facilities and controls, including but not limited to temporary water, drains and gas.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 USE OF PREMESIS

A. General: The Contractor shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits.

B. Use of Site: Limit use of premises to areas within the Contract limits. Do not disturb portions of Project site beyond areas in which the Work is indicated.
   1. Driveways and Entrances: Keep driveways and loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
      a. Schedule deliveries to minimize use of driveways and entrances.
      b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

3.2.1 WORK RESTRICTIONS

C. On-Site Work Hours: The Site shall be made available on a 24-hour basis, 7 days a week, as needed to complete the work. Coordinate Arena schedule with owner prior to start of construction to identify no-work periods due to events.

D. Hours for Utility Shutdowns:
   1. Coordinate any Utility Shutdowns with Owner 7 days prior to anticipated shutdown date.

END OF SECTION 011200

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use of form provided in Project Manual.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC.
j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify the Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.

2. Within 14 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to the Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Sections include the following:

1. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Division 01 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

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

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:

a. Application for Payment forms with Continuation Sheets.
b. Submittals Schedule.
c. Contractor's Construction Schedule.
d. Contractor’s Payment Application and Checklist.

2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
4. Submit Contractor’s Payment Application and Checklist, Section 000530.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section, and divide the work into appropriate areas of work to allow for evaluation of each area. Break each line item into two lines, one for labor and one for materials to allow for assignment of retainage

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

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

2. Submit draft of AIA Document G703 Continuation Sheets.

3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar value.

      1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate. Include separate line items under required principal subcontracts for operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training in the amount of 5 percent of the Contract Sum.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

   a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.

7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

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

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

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

10. Provide completed Contractor's Payment Application Checklist, Section 000530.

1.5 APPLICATIONS FOR PAYMENT

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

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

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

1. Submit a separate Application for each change order issued under a separate purchase order. Applications can be in the sequence of the normal applications, but are to be limited to only the scope of the change in order to allow the district to separate the billings under each change order (for example, a line can be added in the schedule of values for a specific change order, and that line billed as a pay application) Multiple applications are acceptable .

C. Payment Application Forms: Use AIA Document G702, AIA Document G703 Continuation Sheets, and contractor payment checklist and certification as form for Applications for Payment.

D. Completed Contractor's Application for Payment Checklist, Section 000530.

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

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders issued before last day of construction period covered by application, but bill the Change orders separately as noted above.
3. Retention will be withheld as follows:
   a. Partial payments to the Contractor for labor performed shall be made at the rate of 92 percent of the amount invoiced through the Contractor Payment Request which shows the total Contract Completion at 50 percent or less.
   b. After the Contract is 50 percent complete, as evidenced by payments in the amount of at least 50 percent of the Contract Sum to the Contractor, no additional funds shall be retained from payments for labor.

F. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

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

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

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

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

1. List of subcontractors.
2. Schedule of Values.
3. Contractor's Construction Schedule (preliminary if not final).
4. Submittals Schedule (preliminary if not final).
5. List of Contractor's staff assignments.
6. List of Contractor's principal consultants.
7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
8. Initial progress report.
9. Certificates of insurance and insurance policies.
10. Performance and payment bonds.
11. Data needed to acquire Owner's insurance.
12. Initial settlement survey and damage report if required.

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

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

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

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. Final Waivers of Liens, Evidence that claims have been settled.
5. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Coordination Drawings.
2. Project meetings.
3. Requests for Interpretation (RFIs).

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

C. Related Sections include the following:

1. Division 1 Scopes of Work for a description of the division of Work among separate contracts and responsibility for coordination activities not in this Section.
2. Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Division 1 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.4 COORDINATION

A. Coordination: The Lead Contractor shall be responsible for the overall coordination of the project. Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.
9. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities. The Lead Contractor shall be responsible for organizing the coordination drawing process.

1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:

   a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
   b. Indicate required installation sequences.
   c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

2. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
3. Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
4. Number of Copies: Submit a minimum of three (3) opaque copies of each submittal. Architect will retain two copies and return all additional copies.

1.6 PROJECT MEETINGS

A. General: The Lead Contractor shall schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner and Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

a. Tentative construction schedule.
b. Critical work sequencing and long-lead items.
c. Designation of key personnel and their duties.
d. Procedures for processing field decisions and Change Orders.
e. Procedures for requests for interpretations (RFIs).
f. Procedures for testing and inspecting.
g. Procedures for processing Applications for Payment.
h. Distribution of the Contract Documents.
i. Submittal procedures.
j. Preparation of Record Documents.
k. Use of the premises.
l. Work restrictions.
m. Owner's occupancy requirements.
n. Responsibility for temporary facilities and controls.
o. Construction waste management and recycling.
p. Parking availability.
q. Office, work, and storage areas.
r. Equipment deliveries and priorities.
s. First aid.
t. Security.
u. Progress cleaning.
v. Working hours.

3. Minutes: Record and distribute meeting minutes.

C. Progress Meetings: Conduct progress meetings at regular intervals. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: In addition to representatives of Owner, Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

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

        1) Review schedule for next period.

    b. Review present and future needs of each entity present, including the following:

        1) Status of submittals.
        2) Access.
        3) Site utilization.
        4) Temporary facilities and controls.
        5) RFIs.
        6) Status of proposal requests.
        7) Status of Change Orders.
        8) Documentation of information for payment requests.

3. Minutes: Project Coordinator will record and distribute to Contractor the meeting minutes.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

    a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

D. Coordination Meetings: Conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner, Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    b. Schedule Updating: Revise Combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
    c. Review present and future needs of each contractor present, including the following:

        1) Interface requirements.
        2) Sequence of operations.
        3) Status of submittals.
        4) Deliveries.
        5) Off-site fabrication.

6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Change Orders.

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

1.7 REQUESTS FOR INTERPRETATION (RFIs)

A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.

1. RFIs shall originate with each Contractor and shall be submitted to the Lead Contractor. RFIs submitted directly to the Architect or the Architect's consultants by entities other than Lead Contractor will be returned with no response.

2. The Lead Contractor shall have the responsibility of organizing and processing RFI's. The Lead Contractor shall submit RFI's to the Architect and shall be responsible for coordinating, assembling and distributing information regarding RFI's to all applicable contractors.
3. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:

1. Project name.
2. Date.
3. Name of Contractor.
4. Name of Architect.
5. RFI number, numbered sequentially.
6. Specification Section number and title and related paragraphs, as appropriate.
7. Drawing number and detail references, as appropriate.
8. Field dimensions and conditions, as appropriate.
9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
10. Contractor's signature.
11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.

a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.

C. Architect's Action: Architect will review each RFI, determine action required, and return it. Although the Architect will endeavor to promptly return all RFI's within three days, Contractors shall allow five working days for Architect's response for each RFI. RFIs received after 3:00 p.m. will be considered as received the following working day. RFI's that are extensive in nature or require significant investigation or coordination between trades or disciplines may take longer to review.

1. The following RFIs will be returned without action:

a. Requests for approval of submittals.
b. Requests for approval of substitutions.
c. Requests for coordination information already indicated in the Contract Documents.
d. Requests for adjustments in the Contract Time or the Contract Sum.

e. Requests for interpretation of Architect's actions on submittals.
f. Incomplete RFIs or RFIs with numerous errors.

2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modification Procedures."

a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

D. On receipt of Architect's action, Lead Contractor shall update the RFI log and immediately distribute the response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's Construction Schedule.
2. Submittals Schedule.
3. Daily construction reports.

B. Related Sections include the following:

1. Division 1 Section "Summary of Multiple Contracts" for preparing a combined Contractor's Construction Schedule.
2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
3. Division 1 Section "Submittal Procedures" for submitting schedules and reports.
4. Division 1 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.

3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

F. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

G. Major Area: A story of construction, a separate building, or a similar significant construction element.

H. Milestone: A key or critical point in time for reference or measurement.

I. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

1.4 SUBMITTALS

A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.
2. Specification Section number and title.
3. Submittal category (action or informational).
4. Name of subcontractor.
5. Description of the Work covered.
6. Scheduled date for Architect's and Construction Manager's final release or approval.

B. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.

1. Submit an electronic copy of schedule, using software indicated, on CD-R, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.

C. CPM Reports: Concurrent with CPM schedule, submit three copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.

D. Daily Construction Reports: Submit two copies at monthly intervals.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.

1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.

2. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
4. Startup and Testing Time: Include not less than 14 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's and Construction Manager's administrative procedures necessary for certification of Substantial Completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Work under More Than One Contract: Include a separate activity for each contract.
2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.

3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

a. Subcontract awards.
b. Deliveries.
c. Installation.
d. Adjusting.
e. Startup and placement into final use and operation.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

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

1. Refer to Division 1 Section "Payment Procedures" for cost reporting and payment procedures.

2. Contractor shall assign cost to construction activities on the CPM schedule. Costs shall not be assigned to submittal activities unless specified otherwise but may, with Architect's approval, be assigned to fabrication and delivery activities. Costs shall be under required principal subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
3. Each activity cost shall reflect an accurate value subject to approval by Architect.
4. Total cost assigned to activities shall equal the total Contract Sum.

G. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized, time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 14 days after date established for the Notice to Proceed.

   a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
4. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.

C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

   a. Mobilization and demobilization.
   b. Work by Owner that may affect or be affected by Contractor's activities.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

D. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Principal events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the Schedule of Values).

E. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

F. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.

a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.

b. Submit value summary printouts one week before each regularly scheduled progress meeting.

2.4 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (refer to special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.

16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial Completions and occupancies.
19. Substantial Completions authorized.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Actual Completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect, Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

B. Related Sections include the following:

1. Division 1 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule and construction photographs.
2. Division 1 Section "Quality Requirements" for submitting test and inspection reports and Delegated-Design Submittals and for erecting mockups.
3. Division 1 Section "Closeout Procedures" for submitting warranties Project Record Documents and operation and maintenance manuals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. General: Upon request, electronic copies of CAD Drawings of the Contract Drawings will be provided by Architect and Engineers for Contractor's use in preparing submittals. Contractors will be required to sign and submit a drawing file agreement.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals.
2. If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Allow 15 days for processing each resubmittal.
4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

E. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information on label for processing and recording action taken:

a. Project name.
b. Date.
c. Name and address of Architect.
d. Name and address of Contractor.
e. Name and address of subcontractor.
f. Name and address of supplier.
g. Name of manufacturer.
h. Unique identifier, including revision number.
i. Number and title of appropriate Specification Section.
j. Drawing number and detail references, as appropriate.
k. Other necessary identification.

F. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.

1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect and Construction Manager.
2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.

H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.

1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

1. Number of Copies: Architect will retain up to two copies of all submittals; therefore, submit two copies of each submittal in addition to the quantity of copies the contractor wishes returned, unless otherwise indicated. Mark up and retain one returned copy as a Project Record Document.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's written recommendations.
b. Manufacturer's product specifications.
c. Manufacturer's installation instructions.
d. Standard color charts.
e. Manufacturer's catalog cuts.
f. Wiring diagrams showing factory-installed wiring.
g. Printed performance curves.
h. Operational range diagrams.
i. Mill reports.
j. Standard product operating and maintenance manuals.
k. Compliance with recognized trade association standards.
l. Compliance with recognized testing agency standards.
m. Application of testing agency labels and seals.
n. Notation of coordination requirements.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data. Shop Drawings based on reproduction of the Contract Documents may be rejected at the discretion of the Architect.

1. Preparation: Include the following information, as applicable:

a. Dimensions.
b. Identification of products.
c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams.
e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
f. Shopwork manufacturing instructions.
g. Templates and patterns.
h. Schedules.
i. Design calculations.
j. Compliance with specified standards.
k. Notation of coordination requirements.
l. Notation of dimensions established by field measurement.

2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches .
4. Number of Copies: Submit six blue- or black-line prints of each submittal, unless prints are required for operation and maintenance manuals. Submit seven prints where prints are required for operation and maintenance manuals. Architect and Construction Manager will retain two prints; remainder will be returned. Mark up and retain one returned print as a Project Record Drawing.

D. Coordination Drawings: Comply with requirements in Division 1 Section "Project Management and Coordination."

E. Samples: Prepare physical units of materials or products, including the following:

1. Comply with requirements in Division 1 Section "Quality Requirements" for mockups.
2. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:

    a. Generic description of Sample.
    b. Product name or name of manufacturer.
    c. Sample source.

5. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, provide the following:

    a. Size limitations.
    b. Compliance with recognized standards.
    c. Availability.
    d. Delivery time.

6. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.

    a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three sets of paired units that show approximate limits of the variations.
    b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

7. Number of Samples for Initial Selection: Submit one full set[**s**] of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

8. Number of Samples for Verification: Submit three sets of Samples. Architect will retain two sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.

    a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

9. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

F. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product.
2. Number and name of room or space.
3. Location within room or space.

G. Delegated-Design Submittal: Comply with requirements in Division 1 Section "Quality Requirements."

H. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for Construction Manager's action.

I. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."

J. Application for Payment: Comply with requirements in Division 1 Section "Payment Procedures."

K. Schedule of Values: Comply with requirements in Division 1 Section "Payment Procedures."

L. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. Architect will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."

B. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

C. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.

D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.

F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.

G. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.

H. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

I. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.

J. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

K. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.

L. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

M. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

N. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures".

O. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

P. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:

1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

Q. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

R. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

S. Construction Photographs: Comply with requirements in Division 1 Section "Construction Progress Documentation".

T. Material Safety Data Sheets: Submit information directly to Owner. If submitted to Architect, Architect will not review this information but will return it with no action taken.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for compliance with the Contract Documents. Highlight any deviations from contract documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General:
1. Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action. Submittals that bear Contractor's approval stamp but appear not to have been reviewed may also be returned without action at the Architect’s discretion.
2. Architect shall not be responsible for ascertaining the completeness of the submittals and will review submittals as they are received.

B. Reviews: Architect will review submittals and up to two (2) re-submittals. Architect reserves the right to back-charge for labor and reimbursable expenses for additional resubmittals.

C. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. Reviewed.
2. Reviewed as noted.
3. Resubmit.
4. Other.

D. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

E. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-control services required by Architect, Owner, Construction Manager**,** or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Sections include the following:

1. Division 1 Section "Allowances" for testing and inspecting allowances.
2. Division 1 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
3. Divisions 2 through 16 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.

C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.

D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.4 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.5 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

C. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Ambient conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.

G. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

H. Preconstruction Testing: Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.

1. Contractor responsibilities include the following:

a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Fabricate and install test assemblies using installers who will perform the same tasks for Project.
d. When testing is complete, remove assemblies; do not reuse materials on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, through Construction Manager, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect or Construction Manager.
2. Notify Architect and Construction Manager seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's and Construction Manager's approval of mockups before starting work, fabrication, or construction.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

1.7 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

    a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Special Tests and Inspections: Owner will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.

1. Testing agency will notify Architect, Construction Manager**,** and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Architect, through Construction Manager, with copy to Contractor and to authorities having jurisdiction.
3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
5. Testing agency will retest and reinspect corrected work.

D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Architect, Construction Manager**,** and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
5. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field-curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.

7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

1.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014005 – SPECIAL INSPECTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Special Conditions and Division 01 Specification Sections apply to work of this Section.

1.2 GENERAL

Special inspection is the monitoring of the materials and workmanship that are critical to the integrity of the building structure. The owner shall employ a special inspector to oversee and to provide inspections during the constructions process. Chapter 17, section 1704 of the OBC identifies the type of work and inspection required based on the building use and seismic design category. These inspections are in addition to those specified in section 109 of the OBC.

The General Contractor shall make available an updated construction schedule and list of activities that are to be performed during a given week. The General Contractor will need to work cordially with the special inspector(s) and notify the inspection agency regarding changes in the construction and inspection schedule. The General Contractor shall provide access to the site and provide the special inspector(s) with access to the current set of construction documents. The General Contractor is responsible for control of construction means, methods, sequences and procedures, for providing a safe place to work. The contractor is responsible for construction the project in accordance with the construction documents and for controlling the quality of construction. The inspection process does not relieve the Contractor of their responsibility to provide internal quality control.

END OF SECTION 014005

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Installer": Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

J. "Experienced": When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

K. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

C. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

E. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov	 (800) 872-2253 (202) 272-5434
CFR	Code of Federal Regulations Available from Government Printing Office www.access.gpo.gov/nara/cfr	 (888) 293-6498 (202) 512-1530
CRD	Handbook for Concrete and Cement Available from Army Corps of Engineers Waterways Experiment Station www.wes.army.mil	 (601) 634-2355
DOD	Department of Defense Specifications and Standards Available from Defense Automated Printing Service www.astimage.daps.dla.mil/online	 (215) 697-6257

FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Defense Automated Printing Service www.astimage.daps.dla.mil/online	(215) 697-6257
	Available from General Services Administration www.fss.gsa.gov/pub/fed-specs.cfm	(202) 619-8925
	Available from National Institute of Building Sciences www.nibs.org	(202) 289-7800
FTMS	Federal Test Method Standard (See FS)	
MILSPEC	Military Specification and Standards Available from Defense Automated Printing Service www.astimage.daps.dla.mil/online	(215) 697-6257
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-5434

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

C. OBC – Ohio Building Code, latest Version.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.

B. Temporary utilities include, but are not limited to, the following:

1. Sewers and drainage.
2. Water service and distribution.
3. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
4. Heating and cooling facilities.
5. Ventilation.
6. Electric power service.
7. Lighting.
8. Telephone service.

C. Support facilities include, but are not limited to, the following:

1. Temporary roads and paving.
2. Dewatering facilities and drains.
3. Project identification and temporary signs.
4. Waste disposal facilities.
5. Field offices.
6. Storage and fabrication sheds.
7. Lifts and hoists.
8. Temporary elevator usage.
9. Temporary stairs.
10. Construction aids and miscellaneous services and facilities.

D. Security and protection facilities include, but are not limited to, the following:

1. Environmental protection.
2. Stormwater control.
3. Site enclosure fence.
4. Barricades, warning signs, and lights.
5. Temporary enclosures.
6. Temporary partitions.
7. Fire protection.

E. Related Sections include the following:

1. Division 1 Section "Summary of Multiple Contracts" for division of responsibilities for temporary facilities and controls.
2. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
3. Division 1 Section "Execution Requirements" for progress cleaning requirements.
4. Division 2 Section "Dewatering" for disposal of ground water at Project site.

5. Division 2 Section "Hot-Mix Asphalt Paving" for construction and maintenance of asphalt paving for temporary roads and paved areas.
6. Division 2 Section "Cement Concrete Pavement" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.
7. Divisions 2 through 16 for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.3 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

A. General: Cost or use charges for temporary facilities are not chargeable to Owner or Architect and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:

1. Owner's construction forces.
2. Occupants of Project.
3. Architect.
4. Testing agencies.
5. Personnel of authorities having jurisdiction.

B. Sewer Service: Pay sewer service use charges for sewer usage, by all parties engaged in construction, at Project site.

C. Water Service: The Plumbing Contractor shall pay water service use charges, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site.

D. Electric Power Service: The Electrical Contractor shall pay electric power service use charges, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site.

1.5 SUBMITTALS

A. Temporary Utility Reports: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

B. Implementation and Termination Schedule: Within 15 days of date established for submittal of Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.

1.6 QUALITY ASSURANCE

A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.

1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.7 PROJECT CONDITIONS

A. Temporary Utilities: At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.

1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:

1. Keep temporary services and facilities clean and neat.
2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.

B. Pavement: Comply with Division 2 pavement sections.

C. Chain-Link Fencing: Minimum 2-inch , 0.148-inch- thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top rails.

D. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry".

E. Gypsum Board: Minimum 1/2 inch thick by 48 inches wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36.

F. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively.

G. Paint: Comply with requirements in Division 9 Section "Painting."

H. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

I. Water: Potable.

2.2 EQUIPMENT

A. General: Provide equipment suitable for use intended.

B. Field Offices: Mobile units with lockable entrances, operable windows, and serviceable finishes; heated and air conditioned; on foundations adequate for normal loading.

C. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

D. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

E. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.

1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F.

F. Heating Equipment: Unless Owner authorizes use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed.

G. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.

H. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
3. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.

B. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.

1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
2. Connect temporary sewers to municipal system as directed by sewer department officials.
3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
4. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.

C. Water Service: Provide temporary connections and metering, if required.

1. Provide rubber hoses as necessary to serve Project site.
2. As soon as water is required at each level, extend service to form a temporary water- and fire-protection standpipe. Provide distribution piping. Space outlets so water can be reached with a 100-foot (30-m) hose. Provide one hose at each outlet.
3. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
4. Provide pumps to supply a minimum of 30-psi static pressure at highest point. Equip pumps with surge and storage tanks and automatic controls to supply water uniformly at reasonable pressures.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.

1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy.
3. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.

    a. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.

4. Drinking-Water Facilities: Provide bottled-water, drinking-water units.

    a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F.

5. Locate toilets and drinking-water fixtures so personnel need not walk more than two stories vertically or 200 feet (60 m) horizontally to facilities.

E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.

1. Maintain a minimum temperature of 50 deg F in permanently enclosed portions of building for normal construction activities, and 65 deg F for finishing activities and areas where finished Work has been installed.

F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

G. Electric Power Service: Use of Owner's existing electric power service will be permitted once such service has been established, as long as equipment is maintained in a condition acceptable to Owner. Until such time, temporary power shall be provided by the contractor.

H. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.

1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
2. Provide warning signs at power outlets other than 110 to 120 V.
3. Provide metal conduit, tubing, or metallic cable for wiring exposed to possible damage. Provide rigid steel conduits for wiring exposed on grades, floors, decks, or other traffic areas.
4. Provide metal conduit enclosures or boxes for wiring devices.
5. Provide 4-gang outlets, spaced so 100-foot extension cord can reach each area for power hand tools and task lighting. Provide a separate 125-V ac, 20-A circuit for each outlet.

I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
2. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.

J. Telephone Service: Provide temporary telephone service throughout construction period for common-use facilities used by all personnel engaged in construction activities. Install separate telephone line for each field office and first-aid station.

1. Provide additional telephone lines for the following:

a. In field office with more than two occupants, install a telephone for each additional occupant or pair of occupants.
b. Provide a dedicated telephone line for each facsimile machine and computer with modem in each field office.
c. Provide a separate telephone line for Owner's use.
d. Install a telephone on every second or third story of construction.

2. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Architect's office.
e. Engineers' offices.
f. Owner's office.
g. Principal subcontractors' field and home offices.

3. Provide an answering machine or voice-mail service on superintendent's telephone.
4. Provide a portable cellular telephone for superintendent's use in making and receiving telephone calls when away from field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
2. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.
3. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 2 Section "Earthwork."
3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.

4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 2 Section "Hot-Mix Asphalt Paving."

C. Dewatering Facilities and Drains: Comply with requirements in applicable Division 2 Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining property nor endanger permanent Work or temporary facilities.
2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
3. Remove snow and ice as required to minimize accumulations.

D. Project Identification and Temporary Signs: Prepare Project identification and other signs in sizes indicated. Install signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.

1. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details indicated.
2. Prepare temporary signs to provide directional information to construction personnel and visitors.
3. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.
4. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.

E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.

1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
2. Develop a waste management plan for Work performed on Project. Indicate types of waste materials Project will produce and estimate quantities of each type. Provide detailed information for on-site waste storage and separation of recyclable materials. Provide information on destination of each type of waste material and means to be used to dispose of all waste materials.

F. Common-Use Field Office: Provide an insulated, weathertight, air-conditioned field office for use as a common facility by all personnel engaged in construction activities; of sufficient size to accommodate required office personnel and meetings of 10 persons at Project site. Keep office clean and orderly.

1. Furnish and equip offices as follows:

a. Water cooler and private toilet complete with water closet, lavatory, and medicine cabinet with mirror.
b. Coffee machine and supplies, including regular and decaffeinated coffee, filters, cups, stirring sticks, creamer, sugar, and sugar substitute.
c. Provide a room of not less than 240 sq. ft. for Project meetings. Furnish room with conference table, 12 folding chairs, and 4-foot- square tack board.

1. Provide resilient floor covering and painted gypsum wallboard walls and acoustical ceiling. Provide operable windows with adjustable blinds and insect screens.
2. Provide an electric heater with thermostat capable of maintaining a uniform indoor temperature of 68 deg F . Provide an air-conditioning unit capable of maintaining an indoor temperature of 72 deg F .
3. Provide fluorescent light fixtures capable of maintaining average illumination of 20 fc at desk height. Provide 110- to 120-V duplex outlets spaced at not more than 12-foot intervals, 1 per wall in each room.

G. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within building or elsewhere on-site.

1. Construct framing, sheathing, and siding using fire-retardant-treated lumber and plywood.

2. Paint exposed lumber and plywood with exterior-grade acrylic-latex emulsion over exterior primer.

H. Lifts and Hoists: Provide facilities for hoisting materials and personnel. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

I. Temporary Elevator Usage: Refer to Division 14 Sections for temporary use of new elevators.

J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished, permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.

B. Stormwater Control: Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains.

C. Site Enclosure Fence: When excavation begins, install chain-link enclosure fence with lockable entrance gates. Locate where indicated, or enclose entire Project site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.

1. Set fence posts in compacted mixture of gravel and earth.
2. Provide gates in sizes and at locations necessary to accommodate delivery vehicles and other construction operations.
3. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one set of keys.

D. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.

1. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch- thick exterior plywood.

E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
2. Vertical Openings: Close openings of 25 sq. ft. or less with plywood or similar materials.
3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
5. Where temporary wood or plywood enclosure exceeds 100 sq. ft. in area, use fire-retardant-treated material for framing and main sheathing.

F. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

1. Construct dustproof partitions of not less than nominal 4-inch studs, 5/8-inch gypsum wallboard with joints taped on occupied side, and 1/2-inch fire-retardant plywood on construction side.
2. Insulate partitions to provide noise protection to occupied areas.
3. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.

4. Protect air-handling equipment.
5. Weatherstrip openings.

G. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.

   a. Field Offices: Class A stored-pressure water-type extinguishers.
   b. Other Locations: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
   c. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.

2. Store combustible materials in containers in fire-safe locations.
3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
5. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
6. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

B. Related Sections include the following:

1. Division 1 Section "Allowances" for products selected under an allowance.
2. Division 1 Section "Alternates" for products selected under an alternate.
3. Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout.
4. Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words “standard of quality” and/or "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use form provided by Owner.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified material or product cannot be provided.

b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
h. Cost information, including a proposal of change, if any, in the Contract Sum.
i. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
j. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

a. Form of Acceptance: Change Order.
b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

B. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor through Construction Manager of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

a. Form of Approval: As specified in Division 1 Section "Submittal Procedures."
b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
2. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.

3. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.

4. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
5. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

    a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.

6. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.

    a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
    b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

A. Timing: Architect will consider requests for substitution if received within 60 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.

B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.

4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

2.3 COMPARABLE PRODUCTS

A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Sections include the following:

1. Division 1 Section "Submittal Procedures" for submitting surveys.
2. Division 1 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
3. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

A. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.4 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

a. Description of the Work.
b. List of detrimental conditions, including substrates.
c. List of unacceptable installation tolerances.
d. Recommended corrections.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than seven days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner’s written permission.

C. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

E. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

C. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.

G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction forces.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F .
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Related Sections include the following:

1. Division 1 Section "Selective Demolition".
2. Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

    a. Requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 15 and 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 DEFINITIONS

A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used and firms or entities that will perform the Work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

1. Verify location of structural steel tube columns on the second floor which are hidden in stud framed walls prior to beginning wall demolition.

B. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

1. Primary operational systems and equipment.
2. Air or smoke barriers.
3. Fire-protection systems.
4. Control systems.
5. Communication systems.
6. Conveying systems.
7. Electrical wiring systems.
8. Operating systems of special construction in Division 13 Sections.

C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Exterior curtain-wall construction.
4. Equipment supports.
5. Piping, ductwork, vessels, and equipment.
6. Noise- and vibration-control elements and systems.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections of these Specifications.

B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION 017329

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for the following:

1. Recycling nonhazardous demolition and construction waste.
2. Disposing of nonhazardous demolition and construction waste.

B. Related Sections include the following:

1. Division 01 Section "Multiple Contract Summary" for coordination of responsibilities for waste management.
2. Division 01 Section "Temporary Facilities and Controls" for environmental-protection measures during construction, and location of waste containers at Project site.

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

1.4 PERFORMANCE GOALS

A. Salvage/Recycle Goals: Owner's goal is to salvage and recycle as much nonhazardous demolition and construction waste as possible including the following materials:

1. Demolition Waste:

a. Structural and miscellaneous steel.
b. Windows.

c. Glazing.
d. Metal studs.
e. Carpet.
f. Demountable partitions.
g. Copper wiring.
h. Ceiling Tile.

2. Construction Waste:

a. Metals.
b. Carpet and pad.
c. Piping.
d. Electrical conduit.

1.5 SUBMITTALS

A. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.6 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

1.7 WASTE MANAGEMENT PLAN

A. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

B. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
2. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
3. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

PART 2 - EXECUTION

2.1 PLAN IMPLEMENTATION

A. General: Implement waste management plan as approved by Architect. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with Division 1 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.

B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

1. Distribute waste management plan to everyone concerned within threedays of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Division 1 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

2.2 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

2.3 RECYCLING DEMOLITION WASTE

A. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.

B. Carpet: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

C. Acoustical Panels/Tiles: Stack pulp type tiles & panels on pallets as recommended by the recycling /manufacturer

1. Review with Owner and Architect for consolidation of loads from other projects to equal full loads for pick-up by the recycler.
2. Strap or wrap tiles in 4x4x4h pallets or 4x4x6h.

2.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Project Record Documents.
3. Operation and maintenance manuals.
4. Warranties.
5. Instruction of Owner's personnel.
6. Final cleaning.

B. Related Sections include the following:

1. Division 01 Section "Construction Progress Documentation" for submitting Final Completion construction photographs and negatives.
2. Division 01 Section "Execution Requirements" for progress cleaning of Project site.
3. Divisions 02 through 33 Sections for specific closeout and special cleaning requirements for products of those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs and photographic negatives, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, which must be completed or corrected before certificate will be issued. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected. Should the work not be 100% complete, the Architect reserves the right to back-charge time and materials required for subsequent reinspection and documentation.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three hard copies of list as well as in electronic spreadsheet format. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

1.6 PROJECT RECORD DOCUMENTS

A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

B. Record Drawings: Maintain and submit two sets of blue- or black-line white prints of Contract Drawings and Shop Drawings.

1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity that obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
   a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
   b. Accurately record information in an understandable drawing technique.
   c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
   d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
3. Mark important additional information that was either shown schematically or omitted from original Drawings.
4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

C. Record Specifications: Submit two copies of Project's Specifications, including addenda and contract modifications. Mark copies to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Note related Change Orders, Record Drawings, and Product Data, where applicable.

D. Record Product Data: Submit two copies of each Product Data submittal. Mark two sets to indicate the actual product installation where installation varies substantially from that indicated in Product Data.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Drawings, and Record Specifications, where applicable.

E. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.7 OPERATION AND MAINTENANCE MANUALS

A. Assemble three complete sets of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

1. Operation Data:

   a. Emergency instructions and procedures.
   b. System, subsystem, and equipment descriptions, including operating standards.
   c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
   d. Description of controls and sequence of operations.
   e. Piping diagrams.

2. Maintenance Data:

   a. Manufacturer's information, including list of spare parts.
   b. Name, address, and telephone number of Installer or supplier.
   c. Maintenance procedures.
   d. Maintenance and service schedules for preventive and routine maintenance.
   e. Maintenance record forms.
   f. Sources of spare parts and maintenance materials.
   g. Copies of maintenance service agreements.
   h. Copies of warranties and bonds.

B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.8 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Partial Occupancy: Submit properly executed warranties within15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

   1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
   2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
   3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

   1. Provide instructors experienced in operation and maintenance procedures.

2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
3. Schedule training with Owner**,** through the Lead Contractor**,** with at least seven days' advance notice.
4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.

B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:

1. System design and operational philosophy.
2. Review of documentation.
3. Operations.
4. Adjustments.
5. Troubleshooting.
6. Maintenance.
7. Repair.

3.2 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
    1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
n. Replace parts subject to unusual operating conditions.
o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
q. Clean ducts, blowers, and coils if units were operated without filters during construction.

r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
s. Leave Project clean and ready for occupancy.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Operation manuals for systems, subsystems, and equipment.
3. Maintenance manuals for the care and maintenance of products, materials, and finishes; and systems and equipment.

B. Related Sections include the following:

1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 01 Section "Closeout Procedures" for submitting operation and maintenance manuals.
3. Division 01 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Initial Submittal: Submit 2 draft copies of each manual at least 15 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will return one copy of draft and mark whether general scope and content of manual are acceptable.

B. Final Submittal: Submit one copy of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.

1. Correct or modify each manual to comply with Architect's comments. Submit 3 copies of each corrected manual within 15 days of receipt of Architect's comments.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

   a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.

   b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.

3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.

4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

   a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.

   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training videotape, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."

F. Comply with Division 1 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

B. Related Sections include the following:

1. Division 01 Section "Closeout Procedures" for general closeout procedures.
2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set of marked-up Record Prints.

2. Number of Copies: Submit copies of Record Drawings as follows:

a. Initial Submittal: Submit one set of plots from corrected Record CAD Drawings and one set of marked-up Record Prints. Architect will initial and date each plot and mark whether general scope of changes, additional information recorded, and quality of drafting are acceptable. Architect will return plots and prints for organizing into sets, printing, binding, and final submittal.

b. Final Submittal: Submit one set of marked-up Record Prints, one set of Record CAD Drawing files, one set of Record CAD Drawing plots, and three copies printed from record plots. Plot and print each Drawing, whether or not changes and additional information were recorded.

1) Electronic Media: CD-R.

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one copy of each Product Data submittal.

1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an understandable drawing technique.
    c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:

    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations below first floor.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Change Order or Construction Change Directive.
    k. Changes made following Architect's written orders.
    l. Details not on the original Contract Drawings.
    m. Field records for variable and concealed conditions.
    n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record CAD Drawings: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Architect. When authorized, prepare a full set of corrected CAD Drawings of the Contract Drawings, as follows:

1. Format: Same CAD program, version, and operating system as the original Contract Drawings.
2. Incorporate changes and additional information previously marked on Record Prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Architect for resolution.
4. Architect will furnish Contractor one set of CAD Drawings of the Contract Drawings for use in recording information.

    a. Architect makes no representations as to the accuracy or completeness of CAD Drawings as they relate to the Contract Drawings.
    b. CAD Software Program: The Contract Drawings are available in AutoCAD 2005.

C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.

1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

D. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Record CAD Drawings: Organize CAD information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each CAD file.
3. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect.
e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.

4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Qualification Data: For facilitator and/or instructor.

C. Attendance Record: For each training module, submit a list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.
c. Name of Architect.
d. Name of Construction Manager.

e. Name of Contractor.
f. Date of video recording.

2. At completion of training, submit complete training manual(s) for Owner's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Section 017823 "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.

D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.7 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.
    h. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.
    g. Instructions on stopping.
    h. Normal shutdown instructions.
    i. Operating procedures for emergencies.
    j. Operating procedures for system, subsystem, or equipment failure.
    k. Seasonal and weekend operating instructions.
    l. Required sequences for electric or electronic systems.
    m. Special operating instructions and procedures.

5. Adjustments: Include the following:

    a. Alignments.
    b. Checking adjustments.
    c. Noise and vibration adjustments.
    d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

    a. Diagnostic instructions.
    b. Test and inspection procedures.

7. Maintenance: Include the following:

    a. Inspection procedures.
    b. Types of cleaning agents to be used and methods of cleaning.
    c. List of cleaning agents and methods of cleaning detrimental to product.
    d. Procedures for routine cleaning.
    e. Procedures for preventive maintenance.
    f. Procedures for routine maintenance.
    g. Instruction on use of special tools.

8. Repairs: Include the following:

    a. Diagnosis instructions.
    b. Repair instructions.
    c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
    d. Instructions for identifying parts and components.
    e. Review of spare parts needed for operation and maintenance.

1.8 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner through Construction Manager, with at least seven days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Cleanup: Collect used and leftover educational materials. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.10 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode.

1. Submit video recordings on thumb drive
2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:

a. Name of Contractor/Installer.
b. Business address.
c. Business phone number.
d. Point of contact.
e. Email address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.

a. Produce segments to present a single significant piece of equipment per segment.
b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.

c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.

E. Narration: Describe scenes on video recording. Include description of items being viewed.

F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017900

SECTION 017910 - WARRANTIES

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

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

1.2. SUMMARY

A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturer’s standard warranties on products and special warranties.

1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Submittals" specifies procedures for submitting warranties.
2. Division 1 Section "Closeout Procedures" specifies contract closeout procedures.
3. Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.
4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3. WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents at no cost to the Owner. All warranties shall include material and labor. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.4. SUBMITTALS

A. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.

1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within 15 days of completion of that designated portion of the Work.

B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Architect, for approval prior to final execution.

1. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.
2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.

E. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

1.5 The foregoing provisions shall not in any way limit or vary any warranties Owner may have (including from other parties), either actual or implied, including those relating to any construction, materials or equipment which may, by industry standard, law or express warranty, extend beyond one year.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01790

SECTION 024116 - STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Su25304pplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Salvaging items for reuse by Owner.

B. Related Requirements:

1. Section 011000 "Summary" for use of the premises and phasing requirements.
2. Section 013200 "Construction Progress Documentation" for preconstruction photographs taken before building demolition.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store. Include fasteners or brackets needed for reattachment elsewhere.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

A. Pre-demolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be demolished.

2. Review structural load limitations of existing structures.
3. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review and finalize protection requirements.
5. Review procedures for noise control and dust control.
6. Review items to be salvaged and returned to Owner.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

1. Adjacent structures: Detail special measures proposed to protect adjacent structures to remain.

C. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before the Work begins.

D. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

1.9 FIELD CONDITIONS

A. structures immediately adjacent to demolition area will be occupied. Conduct structure demolition so operations of occupied structures will not be disrupted.

a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Before building demolition, Contractor will conduct an onsite meeting with the Owner to confirm that all Owner items have been removed.

C. Hazardous Materials: May be present in structures to be demolished.

1. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.

D. On-site storage or sale of removed items or materials is not permitted.

1.10 COORDINATION

A. Arrange demolition schedule so as not to interfere with operations of adjacent occupied buildings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

2.2 SOIL MATERIALS

A. Satisfactory Soils: Comply with requirements in Section 312000 "Earth Moving."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.

D. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

F. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

B. Salvaged Items: Comply with the following:

1. Clean salvaged items of dirt and demolition debris.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to storage area designated by Owner.
5. Protect items from damage during transport and storage.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Utilities to be Disconnected: Locate, identify, disconnect, and seal or cap off utilities serving buildings and structures to be demolished.

1. Owner will arrange to shut off utilities when requested by Contractor.

2. Arrange to shut off utilities with utility companies.
3. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
4. Cut off pipe or conduit a minimum of 24 inches below grade or as indicated on the drawings. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
5. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.4 PROTECTION

A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.

B. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of demolition.

C. Existing Utilities to Remain: Maintain utility services to remain and protect from damage during demolition operations.

1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.

    a. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.

D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 015000 "Temporary Facilities and Controls."

1. Protect adjacent buildings and facilities from damage due to demolition activities.
2. Protect existing site improvements, appurtenances, and landscaping to remain.
3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.

E. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.5 DEMOLITION, GENERAL

A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
2. Maintain fire watch during and immediately after after flame-cutting operations.
3. Maintain adequate ventilation when using cutting torches.
4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.

2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

C. Explosives: Use of explosives is not permitted.

3.6 DEMOLITION BY MECHANICAL MEANS

A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.

B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.

C. Salvage: Items to be removed and salvaged shall be confirmed with Owner prior to demolition.

D. Below-Grade Construction: Demolish foundation walls and other below-grade construction.

1. Remove below-grade construction, including basements, foundation walls, and footings, completely.

E. Existing Utilities: Demolish and remove existing utilities and below-grade utility structures.

3.7 SITE RESTORATION

A. Below-Grade Areas: Rough grade below-grade areas ready for further excavation or new construction.

B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.8 REPAIRS

A. Promptly repair damage to adjacent buildings caused by demolition operations.

3.9 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction and recycle

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Do not burn demolished materials.

3.10 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.

1. Clean roadways of debris caused by debris transport.

END OF SECTION 024116

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 017300 "Execution" for cutting and patching procedures.
3. Section 311000 "Site Clearing" for site clearing and removal of above- and below-grade improvements not part of selective demolition.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and [deliver to Owner ready for reuse] [store].

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at [Project site] <Insert location>.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.5 INFORMATIONAL SUBMITTALS

A. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.

B. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.8 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Arrange to shut off utilities with utility companies.
   2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
   3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

      a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
      b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
      c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
      d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
      e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
      f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
      g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

   1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
   2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
   3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
   4. Cover and protect furniture, furnishings, and equipment that have not been removed.
   5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

   1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least <Insert number> hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly.[Comply with requirements in Section 017419 "Construction Waste Management and Disposal."]

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area [on-site] [off-site] [designated by Owner] [indicated on Drawings].
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition[and cleaned] and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

D. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. Basic Specification: Perform work of this Section according to ACI 301-16, "Specifications for Structural Concrete," except as specifically modified herein. Numbers in parentheses (0.00) indicate a related paragraph of ACI 301.

B. Section Includes: All cast-in-place concrete shown on the Drawings and required by these Specifications. Allow for the installation of cast-in-place items furnished under other Sections. Install anchor bolts for structural steel. Provide and install grout under steel column base plates and beam bearing areas.

C. The Engineer has designed a project which will be safe after full completion. The Engineer has no expertise in, and takes no responsibility for, construction means and methods or job site safety during construction, which are exclusively the Contractor's responsibility. Processing and/or approving submittals made by the Contractor which may contain information related to construction methods or safety issues, or participation in meetings where such issues might be discussed, shall not be construed as voluntary assumption by the Engineer of any responsibility for safety procedures.

D. Coordinate the work of other trades who will provide and install items (sleeves, piping, conduit, inserts, etc.) to be cast in the concrete. Place no concrete until all such items are in place.

E. Inspection and testing services required to establish mix designs are to be performed by an agency retained by the Contractor (1.6.2 and 1.6.3). Other services required by this Section are to be performed by an agency retained by the Owner. Provide facilities for storage and curing of specimens molded by the Owner's agency (1.6.2.2.d).

F. Related Sections: Carefully examine all other Sections and all Drawings for related work which includes but is not limited to:
1. Section 05 12 00, "Structural Steel"
2. Section 05 30 00, "Metal Decking"

1.02 QUALITY ASSURANCE

A. Reference Standards:
1. ACI 117-10 Specifications for Tolerances for Concrete Construction and Materials.
2. ACI Detailing Manual, SP66(04).
3. CRSI "Code of Standard Practice," 2019, 10th edition.
4. WRI "Manual of Standard Practice" December 2016, 9th edition.

1.03 SUBMITTALS

A. Submit for approval the name of the agency proposed for the required inspection and testing services. All of the required field testing and sampling is to be performed by personnel employed by the proposed agency.

B. Submit a mix design for each class of concrete required (1.6.2.2.a). Submittals to comply with appropriate methods in ACI 301-16 (4.2.3). Indicate whether mixes have been designed for pumping.

C. Submit shop drawings for all reinforcing. Indicate strength, size, and details of all bar reinforcing, and style and specification of all welded wire fabric (3.1.1). Notwithstanding any other requirements specified elsewhere in these specifications, one electronic copy of the drawings shall be submitted for approval. One electronic copy will be returned to the Contractor, who will make and distribute as many copies as needed. Only prints with the approval stamp printed on them shall be permitted on the site.

D. Submit, on request only, product literature for admixtures and curing compounds proposed for use.

E. Submit reports of all required testing and inspection.

F. Submit, on request only, mill test certificates for reinforcing.

G. Submit for approval proposed spacing and location of construction and/or control joints in concrete slabs on grade. Include coordinated layout locating all embedded electrical floor boxes, floor drains, recesses, and trenches in the submittal.

1.04 FIELD REFERENCE MANUALS

A. Provide at least one (1) copy of the ACI Field Reference Manual, SP-15(16), and one (1) copy of CRSI's "Code of Standard Practice" in the field office at all times (1.3.3).

PART 2 PRODUCTS

2.01 MATERIALS

A. Cementitious Material (4.2.1.1):
   1. Portland Limestone Cement: ASTM C595, Type IL
   2. Ground Granulated Blast-Furnace Slag (GGBF): ASTM C989/C989M-18a, Grade 100 or higher. GGBF can be substituted for Portland cement up to a maximum of 30% by mass.
   3. Fly Ash or Pozzolans: ASTM C618-19, Class F. Maximum loss on ignition 3%.

B. Water: Potable, conforming to ASTM C94/C94M-18 (4.2.1.3).

C. Aggregates:
   1. Conform to ASTM C33/C33M-18 (4.2.1.2).
   2. Use crushed limestone for coarse aggregate in Class III.

3. Coarse Aggregate Size:
   a. No. 57 unless otherwise indicated.

D. Admixtures (where required or permitted) (4.2.1.4):
1. Water-Reducing: ASTM C494/C494M-17, Type A and D.
2. Superplasticizer (High Range Water Reducer): ASTM C494/C494M-17, Type F or G. Acceptable products include, but are not limited to:
   a. Eucon 37 by Euclid Chemical Company.
   b. Sikament 686 by Sika Corporation.
   c. Master Rheobuild 1000 by BASF.
   d. Daracem 19 by GCP Applied Technologies.
3. Superplasticizer (High Range Water Reducer) (Polycarboxylates): ASTM C494/C494M-17, Type A and F. Acceptable products include, but are not limited to:
   a. Plastol 5000 by Euclid.
   b. Adva 140M by GCP Applied Technologies.
   c. ViscoCrete 4100 by Sika.
   d. MasterGlenium 3030 by BASF.
4. Mid-range Water Reducer: ASTM C494/C494M-17, Type A or G. Acceptable products include, but are not limited to:
   a. SikaPlast 200 or Sikaplast 300 GP by Sika.
   b. Eucon MR by Euclid.
   c. Master Polyheed 900 by BASF.
   d. Mira 35 by GCP Applied Technologies.
5. Air-Entraining: ASTM C260/C260M-10a(2016).
6. Accelerating: ASTM C494/C494M-17, Type C or E, containing no more chlorides than are present in municipal drinking water. Acceptable products include, but are not limited to:
   a. Accelguard 90 by Euclid.
   b. MasterSet FP20 by BASF.
   c. Plastocrete 161HE by Sika Corporation.
   d. PolarSet by GCP Applied Technologies.
7. Synthetic Fiber Reinforcement: ASTM C1116/C1116M-10a(2015). Acceptable products include, but are not limited:
   a. Nycon RC Nylon Fibers or Procon-M Polypropylene Fibers by Nycon.
   b. Nylo-Mono Nylon Fibers or Mighty-Mono Polypropylene Fibers by Forta
   c. Fibermesh 150 F Polypropylene Fibers by Propex.
   d. Sinta F19 or Sinta M2219 by GCP Applied Technologies
   e. PSI Fiberstrand 150 by Euclid.
8. Calcium chloride is NOT permitted (4.2.1.4).
9. Upon request only, provide a qualified full-time representative to assure proper use of admixtures.
10. Use of admixtures other than listed above will be permitted only when approved prior to use.

E. Reinforcing (3.2.1):
1. Deformed Bars: ASTM A615/A615M-15ae1, A996/A996M-16 (bars from rail steel shall be Type R) or A706/A706M-16. Minimum yield strength to be 60 ksi. Bars to be welded shall conform to ASTM A706.

F. Preformed Expansion Joint Filler: ASTM D1751-18 (2.2.1.4).
   1. Acceptable products include, but are not limited to:
      a. Fibre or Ceramar by W.R. Meadows.
      b. A.P.S. Fiber Board by A.P.S.
      c. Fibre Expansion Joints by Atlas Construction Supply

G. Curing Compound: Comply with ASTM C309-19, Type 1, Class B (clear). Compound shall comply with EPA's VOC requirements. Must be compatible with adhesive specified for floor finishes.

H. Curing and Sealing Compound: Comply with ASTM C1315-19. Type I Class A (clear) Compound shall comply with EPA's VOC requirements. Apply at the manufacturer's written recommended application rate. Must be compatible with adhesive specified for floor finishes.

I. Grout for Masonry Core Fill: ASTM C476-18, coarse type or fine type, per ACI 530.1-13, Table 5.

J. Non-shrink Grout under Bearing Elements: Conform to Corps of Engineers Specification CRD-C621-88 and ASTM C1107/C1107M-17 Grade B or C. Acceptable products include, but are not limited to:
   1. L&M Crystex by Laticrete.
   2. NS Grout by Euclid.
   3. Sikagrout 212 by Sika.
   4. 1107 Advantage Grout by Dayton Superior.
   5. SureGrout by Kaufman Products, Inc.
   6. Kemset Grout by ChemMasters.

K. Dovetail Slots: Galvanized steel, 24 ga. minimum.

L. Bonding Agent: No thinner than 75 square feet per gallon. Acceptable products include, but are not limited to:
   1. Euco #452MV by Euclid.
   2. Sikadur 32 Hi-Mod by Sika.
   3. Sure-Poxy HM by Kaufman Products.
   4. Sure Bond J58 by Dayton Superior

M. Vapor Barrier: 10 mil clear polyethylene.

N. Sealer: Clear membrane-forming compound which will not yellow. Must be formulated for the intended application, either interior or exterior and applied per the manufacturer's written recommendations. Must comply with EPA's VOC requirements and be compatible with the curing compound used.

O. Joint Sealant: Use 1-component polyurethane conforming to ASTM C920-18, Type S, Grade NS, Class 25. Use with backer rod as required. Acceptable products include, but are not limited to:
   1. Eucolastic 1NS by Euclid.
   2. Sikaflex-1a by Sika.
   3. Dymonic 100 by Tremco.

P. Keyed Floor Slab Joints: Mill galvanized steel, 20 gauge minimum, with minimum key dimensions of 3/4 inch deep by 1 1/2 inches at its widest point. Acceptable products include, but are not limited to:
1. Tongue & Groove Joint 95 by Heckmann Building Products, Inc.
2. G-33 Screed Key Joint by Dayton Superior

Q. Preformed Adhesive Waterstop: Conform to Federal Specification SSS-210. Acceptable products include but are not limited to:
1. Conseal CS202 by Concrete Sealants, Inc.
2. Synko-Flex by Henry Company.
3. Ultrastop by Vinylex
4. Lock Stop by Sika Greenstreak

R. Waterstops: Premolded, flexible, polyvinylchloride, conforming to CRD-572 (2.2.1.5).

S. Paper Curing Membranes Conforming to ASTM C171-16:
1. Orange Label Sisalkraft by Henry Company
2. Blue Shield 3560 by Holland
3. Ultra Cure NCF by Sika

2.02 MIXES

A. The following classes of concrete are required (4.2.2.8):
1. Class I - FootingsMinimum f'c=3000 psi.
2. Class III - Exterior slabs on gradeand all exterior concrete not otherwise identified. Minimum f'c=4500 psi, air-entraining admixture and water-reducer required. Minimum cementitious material content 564 lbs. per cubic yard. Maximum water-cementitious material ratio 0.45, air content 6+1, -1.5% (4.2.2.4).
3. Class IV - Backfill below footings. Controlled Density Fill (CDF) 300 psi.
4.

B. Pozzolans are permitted in all Classes.

C. Class IV concrete may be site mixed; all other concrete is to be ready-mixed (4.3.1). All admixtures are to be added at the batch plant, except that superplasticizer, if used, is to be added at the site. Superplasticizer/retarder can be added at the batch plant.

D. Slump:
1. Design concrete mixes for a maximum slump of 4 inches, unless a superplasticizer is to be used.
2. If a superplasticizer is to be used, design mixes for a slump of 2 inches - 4 inches before its addition; maximum slump permitted after its addition is 8 inches.

E. No air entraining admixture is required unless an air content is specified (4.2.2.4).

F. Concrete mixes shall not contain any deleterious or other reactive aggregates or materials that can initiate and promote alkali silica reaction (ASR).

PART 3 EXECUTION

3.01 ERECTION

A. This structure is designed to be self-supporting and stable after the building is fully completed. It is solely the Contractor's responsibility to determine erection procedures and sequence, and to ensure the stability of the building and its component parts, and the adequacy of temporary or incomplete connections, during erection. This includes the addition of any shoring, sheeting, temporary guys, bracing or tie-downs that might be necessary. Such material is not shown on the Drawings. If applied, they shall be removed as conditions permit, and shall remain the Contractor's property.

3.02 SURFACE CONDITIONS

A. Verify that excavations are free of water and ice, are of the required dimensions, and have been approved by the testing agency responsible for soils inspection, prior to placing concrete (5.3.1).

B. Determine field conditions by actual measurement.

C. Notify the Architect not less than 24 hours in advance of placing concrete. Place concrete only when the Architect is present, unless this requirement is specifically waived.

3.03 FORMWORK, METAL DECK AND REINFORCING

A. Footings may be cast against earth cuts when soil conditions permit (2.2.2.3).

B. Reinforcing:
1. Welding of reinforcing is prohibited, except where shown. All welding of reinforcing shall conform to AWS D1.4/1.4M:2018.
2. Provide support bars and other devices as required to maintain alignment of scheduled reinforcing. Note that such supports are not generally shown on the Drawings, but are the Contractor's responsibility, and are to be included in the bid. They are not to be counted as satisfying any part of the requirement for "contingency" reinforcing (see Structural Notes on Drawings).

C. Removal of Forms and Shoring:
1. Remove no forms within first 24 hours after placement for supported slabs and 12 hours for columns and walls.

3.04 EMBEDDED ITEMS

A. Install embedded conduit, pipes, sleeves and anchor bolts subject to the following limitations:
1. Do not embed aluminum without prior approval of coating material.
2. Do not displace reinforcing steel.
3. In slabs, walls, and beams, limit outside dimension of conduits and pipes to 1/3 member thickness. For slabs over metal decks, thickness is measured from the top of the metal deck.
4. In columns, limit total area of pipes and conduit to 4% of column area.
5. Maintain a center-to-center spacing of at least 3 diameters of conduit, pipe or sleeve.

6. Install anchor bolts for base plates of steel elements according to tolerances of AISC Code of Standard Practice for Steel Buildings and Bridges, April 14, 2010, Paragraph 7.5.

3.05 DELIVERY AND PLACEMENT

A. Preparation Before Placement:
   1. Remove all debris from forms and deck. Clean steel deck of grease, oil, and other substances which would reduce bond to concrete.
   2. Do not use additives or salts to remove ice.
   3. In cold weather, maintain temperature of forms and reinforcing such that concrete temperature can be kept within the specified range.

B. Delivery:
   1. Conform to ASTM C94/C94M-17A.
   2. Delivery tickets to contain the following, in addition to the information required by C94:
      a. Reading of revolution counter at first addition of water.
      b. Type and brand of cement.
      c. Amount of cement.
      d. Total water content by producer.
      e. Maximum size of aggregate.
   3. Secure the Architect's written approval if non-agitating type equipment is to be used for transportation.
   4. Water may be added at the site only with the Architect's prior approval. Secure the Architect's signature on the delivery ticket which indicates the quantity of water added.
   5. ASTM C94 requires discharge within 1 1/2 hours or 300 revolutions, whichever occurs first, after the introduction of water to cement and aggregates, or the introduction of cement to the aggregates (4.3.2.2). The Architect may require an earlier discharge during hot weather or when high-early strength cement is being used.
   6. Place concrete at the maximum slump for which the mix was designed with a tolerance of up to 1 inch above the maximum for one (1) batch in any five (5) consecutive batches tested (4.3.2.1).

C. Conveying: Keep delivery carts and buggies on runways; do not allow them to bear on reinforcing or uncured concrete.

D. Placement:
   1. Place within 6 feet of final position. Spreading with vibrators is prohibited.
   2. In walls and columns, deposit concrete in uniform horizontal layers with a maximum depth of 5 feet
   3. Maximum free fall without chutes or elephant trunks to be 5 feet

E. Records: Keep a complete log of pours, including date, location, quantity, weather, and identification of test cylinders, for each pour.

3.06 JOINTING

A. Exterior Slabs on Grade: Locate joints as shown on the Drawings. In the absence of information on the Drawings, provide the following:
   1. Expansion Joints: Full depth, with 1/2 inch joint filler, where slabs abut vertical surfaces, at intersections of sidewalks, at abrupt changes in width, and at a spacing not exceeding 30 feet.
   2. Control Joints: Tooled, 7/8 inch deep, 4 feet to 6 feet on center between expansion joints.

3.07 FINISHES

A. Schedule of finishes on flatwork is as follows:
   1. Broom finish: exterior slabs (5.3.4.2.d).

B. Schedule of finishes on formed surfaces is as follows:
   1. Rough form finish: slabs, and other surfaces not otherwise specified. SF – 1.0. (5.3.3.3.a).

3.08 FINISHING TOLERANCES

A. Obtain written approval of the Architect and Engineer of remedial measures proposed before implementing measures.

B. All exterior slabs shall be finished to a 1/2 inch in 10 foot tolerance.

3.09 CURING AND PROTECTION

A. Temperature:
   1. When air temperature during placement is less than 40 degrees F, or will be within 24 hours, temperature of concrete as placed is to be between 50 and 95 degrees F (55 and 95 degrees F for sections less than 12 inches thick). Maintain concrete temperature within these limits for the full curing period of seven (7) days (or three (3) days for high-early-strength concrete) (4.2.2.6).
   2. The temperature of concrete as delivered shall not exceed 95 degrees F (4.2.2.6).

B. Curing:
   1. All other slab areas may be either moist-cured or receive an application of curing compound (5.3.6.4.e).
   2. Whichever curing method is used, it is to commence immediately after disappearance of water sheen and continue for at least seven days. Cure high-early-strength concrete for a minimum of three (3) days (5.3.6.1). Do not allow curing to be delayed overnight.
   3. Prevent excessive moisture loss from formed surfaces (5.3.6.3). If forms are removed before seven (7) days have elapsed, cure the formed surfaces by moist-curing or application of curing compound for the remainder of the curing period.
   4. All exterior slabs are to receive an application of sealer prior to completion of construction.

3.10 GROUTING

A. Grout below bearing plates, setting plates, and column base plates is to be installed only after the steel is plumbed. The use of leveling plates at column bases is prohibited.

B. Install grout per the recommendations of the manufacturer.

3.11 FIELD QUALITY CONTROL

A. Obtain concrete for required tests at point of placement (1.6.3.2).

B. For each concrete class, except Class IV, perform one strength test for each 50 yards, or fraction thereof, placed in any one day (1.6.3.2.d and 1.6.3.2.e).

C. Determine slump for each strength test (1.6.3.2.d).

D. Air Content:
1. Determine air content for each strength test of air-entrained concrete per ASTM C231/C231M-17a, C173/C173M-16 or C138/138M-17a (1.6.3.2.g).
2. At first strength test of air-entrained flatwork in any one day, calibrate a hand-held air indicator with a sample from the same batch.
3. At least twice each day when air-entrained flatwork is being placed, monitor the air content using the hand-held indicator, after floating. If air content of slab is more than 1/2% lower than at the chute, revise finishing procedure to correct the situation.

E. Determine concrete temperature for each strength test when air temperature is less than 40 degrees, or will be within 24 hours (1.6.3.2.d).

F. Do not place concrete when slump, air content, or temperature vary from allowable.

G. Individual floor sections for floor tolerance testing purposes shall be bound by the following that provide the smallest sections: construction joints, control joints, column lines and half-column lines.

H. Each individual floor cast in a single day shall meet the composite flatness requirements.

I. Floor tolerance tests shall typically be performed (and all defective areas identified) within 24 hours after slab placement and reported to all parties as soon as possible, but not later than 72 hours after installation. At areas cured with a paper curing membrane, floor tolerance tests shall be performed immediately following its removal. Shored elevated slabs shall be tested prior to removal of shoring.

J. Visual inspections:
1. Periodically inspect reinforcing steel for size, location and placement.
2. Continuously inspect reinforcing to be welded.
3. Continuously inspect anchor bolts cast into concrete.
4. Periodically verify the use of the required design mix.
5. Continuously inspect the placement of the concrete for proper techniques. Periodically inspect for maintenance of specified curing temperature and techniques.
6. Periodically inspect concrete formwork for shape, location and dimensions of members.

K. Maintain records of all tests, indicating exact location of the structure represented by each test.

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: All labor and materials required to furnish and install the structural steel shown on the Drawings and required by these Specifications, including that shown on mechanical or electrical Drawings, or required in their Specification Sections.

B. The Engineer has designed a project which will be safe after full completion. The Engineer has no expertise in, and takes no responsibility for, construction means and methods or job site safety during construction, which are exclusively the Contractor's responsibility. Processing and/or approving submittals made by the Contractor which may contain information related to construction methods or safety issues, or participation in meetings where such issues might be discussed, shall not be construed as voluntary assumption by the Engineer of any responsibility for safety procedures.

C. Related Sections: Carefully examine all other Sections and all Drawings for related work, which includes but is not limited to:
1. Section 03 30 00, "Cast-in-Place Concrete"
2. Section 05 30 00, "Metal Decking"

D. Work Furnished but Installed Under Other Sections: Anchor bolts and base plates.

E. Work Affected by Others: Framing, loads, openings, and structure in any way related to plumbing, HVAC, or electrical requirements is shown for bidding purposes only. Responsibility for coordinating the work of this Section with these requirements is solely that of the Contractor. Contractor's review of shop Drawings will be taken to indicate that this coordination has been accomplished.

F. Inspection and testing required by this Section to be at the Contractor's expense.

1.02 QUALITY ASSURANCE

A. Reference Standards:
1. By the American Institute of Steel Construction (AISC):
   a. Specification for Structural Steel Buildings (July 7, 2016).
   b. Specification for Structural Joints using High-Strength Bolts (August 1, 2014).
   c. Code of Standard Practice for Steel Buildings and Bridges (June 15, 2016).
2. By the American Welding Society (AWS):
   a. Structural Welding Code – Steel AWS D1.1/D1.1M:2015, Paragraph 6.6.5 specifically excluded.
   b. Symbols for Welding and Non-Destructive Testing AWS A2.4:2012.

B. Fabricator's Qualifications:
   1. Minimum five (5) years' continuous experience in the fabrication of steel for projects of similar quality and scope.
   2. Certification Standard for Steel Building Structures (STD) in accordance with the American Institute of Steel Construction.

C. Erector's Qualifications: Minimum five (5) years' continuous experience in similar steel erection.

D. Welders' Qualifications: Personnel and procedures are to be qualified in accordance with AWS D1.1/D1.1M:2015.

E. Inspection Agency's Qualifications: Minimum three (3) years' experience in similar steel inspection, and approval of the Architect.

1.03 SUBMITTALS

A. Steel Fabricator's and Contractor's Certification: The following certifications shall be placed on the front cover of, or on the initial sheet of each steel fabrication shop Drawing and each certification be signed and dated by an official authorized by the company prior to beginning of fabrication:

Steel Fabricator Certification

The steel fabricator identified below certifies that for this project all load-bearing structural steel (as defined by the State of Ohio Department of Administrative Services, Directive Number 01-30, dated August 31, 2001) has been fabricated or produced, to the best of its knowledge, only from steel made in the United States in accordance with Sections 153.011 and 153.99, of the Ohio Revised Code (ORC). Further, the steel fabricator hereby certifies that it has read and understands that a monetary penalty for violations may be imposed under the authority of the referenced sections of the ORC.

[Printed or Typed Name of Fabrication Company]
by
[Printed or Typed Name of Company Official]

_____ _____
Signature of Company Official **Date**

Contractor Certification

The Contractor identified below certifies that it has required as condition of purchase, that for this project all load-bearing structural steel (as defined by the State of Ohio Department of Administrative Services, Directive Number 01-30, dated August 31, 2001) shall be fabricated and produced using, to the best of its knowledge, only steel made in the United States in accordance with Sections 153.011 and 153.99, of the Ohio Revised Code (ORC). Further, the Contractor certifies that it has read and understands that a monetary penalty for violations may be imposed under the authority of the referenced sections of the ORC.

[Printed or Typed Contractor Company Name]
by
[Printed or Typed Name and Title of Contractor Company Official]

_____ _____
Signature of Company Official **Date**

B. Certification of Experience: Submit, on request only, written summary of personnel, projects, and equipment which document the experience and qualifications required of the fabricator, inspection agency, erector, and welders.

C. Shop Drawings:
1. Indicate all shop and erection details, including cuts, copes, connections, holes, threaded fasteners, and welds. Include layout plan of all items to be embedded into concrete.
2. Indicate material specifications and finishes.
3. Indicate shop and field welds with symbols per AWS A2.4:2012.
4. Notwithstanding any other requirements specified elsewhere in these Specifications, one electronic copy of the shop Drawings shall be submitted for approval. One electronic copy will be returned to the Contractor, who will make and distribute as many copies as needed. Only prints with the approval stamp printed on them shall be permitted on the site.

D. Inspection Reports: Submit reports for the inspection specified.

1.04 PRODUCT DELIVERY AND STORAGE

A. Delivery:
1. Comply with A6/A6M-17a. Non-compliance will be cause for rejection.
2. Deliver anchor bolts and other items to be embedded in cast-in-place concrete or masonry prior to the start of that work. Provide setting drawings, templates, or instructions required for the installation of such items.

B. Storage:
1. Store steel at site above ground on platforms, skids or other supports.
2. Protect steel from damage.

PART 2 PRODUCTS

2.01 MATERIALS

A. Structural Steel Wide Flange Shapes:
   1. Fy=50 ksi Steel: ASTM A572/A572M-18 or ASTM A992/A992M-11(2015).

B. Structural Steel Channels, Angles, Plates, Bars, Etc.:
   1. Fy=36 ksi Steel: ASTM A36/A36M-14.

C. Structural Steel Tubing:
   1. Fy=42 ksi Round Tubing: ASTM A501/A501M-14.
   2. Fy=46 ksi Square and Rectangular Tubing: ASTM A500/A500M-13, Grade B.

D. Anchor Bolts, Standard Bolts and Nuts: ASTM F1554-18. 36 KSI. Provide washers and heavy nuts for anchor bolts (both ends).

E. Welding Electrodes:
   1. For Carbon Steels: Conform to requirements of AWS D1.1/D1.1M:2015, using Series E70 electrodes, appropriate for the materials being welded.

F. Shop Paint Primer:
   1. For galvanized steel to be painted, use epoxy primer, equal in quality to Series 27 F.C. Typoxy by Tnemec Company, Inc.
   2. Primer to be compatible with finish paint.

2.02 FABRICATION

A. Conform to applicable provisions of the reference standards listed in Part 1 of this Section, as modified herein.

B. Connection Design:
   1. Select connections per AISC standards for forces and moments given on the Drawings. Where none are given, select connection for the full uniform load capacity of the member.
   2. Connections of beams framing into a girder from one side only, such as at spandrel girders, shall be made with double angle connections. Unless indicated otherwise, all other connections may be double angle connections or single plate shear connections.
   3. Connections of HSS beams or girts to be end plates or double angles (oriented vertically) with bolts selected by the fabricator to develop the full uniform load capacity of the member for the member's strong axis or forces shown on plans. Connections of horizontal HSS members to HSS columns shall be field welded all around with AISC minimum fillet welds (or flare-bevel grove welds at HSS corners) with all welds grounded smooth per AESS requirements.
   4. Connection details on the Drawings are to illustrate location, type, and general arrangement only, and to establish minimum requirements.
   5. Shop connections may be welded or bolted, unless shown otherwise.
   6. Field connections shall be bolted, unless shown otherwise.

7. Standard bolts and nuts are permitted only for connections of secondary members, unless noted otherwise. High strength threaded fasteners are required for all other bolted connections.

C. Camber: Provide beam camber as noted on the Drawings. If none is noted, orient beam so natural camber is upward.

D. Sweep: Fabricate exterior spandrel beams with natural sweep toward the interior of the building.

E. Finishing: Ends of members in direct contact bearing, such as columns at their bases and splices, are to be "finished," as defined in the Code of Standard Practice.

F. Bearing and Base Plates: Column base plates are to be shop attached. Beam bearing plates may be attached or loose.

G. Holes: Drill or punch holes in members as required for passage of conduit and piping, and attachment of joists, nailers, etc. Burning such holes is not permitted. If opening is not shown on structural Drawings, obtain prior approval.

H. Cleaning:
1. Remove oil, dirt, loose mill scale, or other material which would impair welding, performance of slip critical connections, or adherence of concrete or sprayed fireproofing.
2. For steel that is to be painted, cleaning techniques are to be as required by the appropriate SSPC paint Specification listed below.

I. Shop Painting:
1. Shop-paint steel exposed to view in the finished structure, except that to be galvanized, with primer as follows:
   a. Prepare surface by commercial blast cleaning (SSPC - SP6) and apply one (1) coat of primer.
   b. Minimum dry film thickness shall be 2.0 mils. The primer shall be applied in a manner to assure no runs or sags in the coating and an overall uniform application.
   c. Do not paint surfaces to be encased in concrete or to receive sprayed fireproofing, or contact surfaces in slip-critical connections, or surfaces to be field welded, or top surfaces of crane rails.
2. Steel not exposed to view in the finished structure need not be painted.
3. Paint all lintels in interior walls with one (1) coat of primer per the requirements in #1 above.
4. See the Architectural Drawings and Section 09 90 00 for galvanized steel items to be painted. Prepare the galvanized surface of galvanized steel that is to be painted by solvent cleaning (SSPC-SP1) or by high-pressure detergent cleaning to remove soluble contaminants. Use SSPC-SP2 Hand Tool Cleaning or SSPC-SP3 Power Tool Cleaning to remove insoluble contaminants such as white rust, if present. Complete the cleaning process with SSPC-SP7 Brush Off Blast Cleaning, using the proper abrasive and care to prevent removal of the galvanizing. Prime paint with primer to be used for galvanized steel.

J. Galvanizing:
1. Galvanizing is to conform to ASTM A123/A123M-15, Grade 100, or ASTM A153/A153M-16a, Class C. Follow all recommendations of the American Galvanizers Association.
2. Except for bolts, nuts, washers, and anchors, perform all galvanizing after fabrication.
3. Prior to galvanizing, clean steel of foreign substances per ASTM A385/A385M-17.
4. Do not treat galvanized finish with a stain-inhibiting chromate treatment.
5. After final erection, touch-up all abrasions with a cold galvanizing compound, Z.R.C. Cold Galvanizing Compound or Z.R.C Galvilite Galvanizing Repair by Z.R.C Worldwide, or equal.
6. Galvanize all shelf angles, lintels in exterior walls, all exterior steel exposed to the elements, and all items indicated on the Drawings as "galvanized."

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

A. Prior to beginning work of this Section, verify that the installed work of other trades is complete and correct to the extent necessary for the proper execution of the work of this Section. This includes locations of anchor bolts, and lines and grades of bearing areas.

B. In the event of discrepancies, immediately notify the Architect. Do not proceed with work affected by the discrepancies until they have been resolved.

3.02 ERECTION

A. Conform to the applicable provisions of the reference standards listed in Part 1 of this Section, as modified herein.

B. This structure is designed to be self-supporting and stable after the building is fully completed. It is solely the Contractor's responsibility to determine erection procedures and sequence, and to ensure the stability of the building and its component parts, and the adequacy of temporary or incomplete connections, during erection. This includes the addition of any shoring, sheeting, temporary guys, bracing or tie-downs that might be necessary. Such material is not shown on the Drawings. If applied, they shall be removed as conditions permit, and shall remain the Contractor's property.

C. Safety: It is solely the Contractor's responsibility to follow all applicable safety codes and regulations governing this work.

D. Clean bearing surfaces and other surfaces in permanent contact, prior to assembly.

E. Splices are permitted only where indicated.

F. Tolerances: Per AISC Code of Standard Practice. Note special requirements therein for "Architecturally Exposed Structural Steel."

G. Field corrections of fabrication errors by gas cutting is not permitted in structural members without prior approval of the Architect.

H. The use of leveling plates or leveling nuts at column bases is prohibited. Grout below column base plates is to be installed only after the steel is plumbed.

I. Welds which are subject to foot traffic or are exposed to view in the finished structure are to be ground smooth and flush with adjacent surfaces.

J. Touch-up Painting: After erection, touch-up field connections and abrasions in the shop coat with same paint used for shop coat. Do not paint welds until they have been cleaned in accordance with AWS D1.1/D1.1M:2015.

K. Remove galvanizing prior to welding. Touch-up with ZRC cold galvanizing compound by ZRC Products Company.

3.03 FIELD QUALITY CONTROL

A. Inspection agency shall perform the following:
1. Review qualifications of welders, operators, and welding procedures submitted by the Contractor.
2. Review materials' proofs of compliance. Identify markings of structural steel shapes to conform to ASTM standards specified. Review structural steel shapes certificates of compliance.
3. Inspect bolted connections, per the requirements of the AISC Specification for Structural Joints. Periodically identify markings of bolts to conform to ASTM standards specified. Periodically inspect bearing type bolts. Continuously inspect slip-critical connections. Review bolt manufacturer’s certificates of compliance.
4. Inspect welded connections per the requirements of AWS D1.1/D1.1M:2015, Chapter 6. Identify markings of weld filler materials to conform to AWS specifications specified. Review weld filler materials certificates of compliance. Continuously inspect and test complete and partial penetration groove welds by other than visual methods. Continuously inspect and test multipass fillet welds using other than visual methods. Periodically inspect and test single pass fillet welds by visual methods.
5. Inspect installation of stud welding, per the requirements of AWS D1.1/D1.1M:2015, Articles 7.7 and 7.8.
6. Periodically inspect bracing and stiffening details of the steel frame for compliance with the construction documents.
7. Periodically inspect member locations of the steel frame.
8. Inspect the application of joint details at each connection for compliance with the construction documents.

B. Inspection agency shall be directly responsible to the Architect.

3.04 ADDITIONAL TESTING

A. The Owner reserves the right to perform non-destructive testing other than visual on any shop or field weld. The Owner shall be responsible for all associated costs including handling, surface preparation and non-destructive testing if welds are found to be acceptable, per AWS D1.1, Section 6, Part C. If the welds are not found to be acceptable the Contractor shall be responsible for the repair of discontinuities and all associated costs including those listed above.

END OF SECTION

SECTION 05 12 13
ARCHITECTURAL EXPOSED STRUCTURAL STEEL

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 the Section.

1.02 SUMMARY

A. This Section includes requirements regarding the appearance and surface preparation of Architecturally Exposed Structural Steel (AESS). Refer to Section 05 12 00, "Structural Steel" for all other requirements regarding steel work not included in this Section. This section applies to any members noted on Architectural and Structural Drawings as AESS and in the areas defined as AESS below.

B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 1, Section "Quality Control" for independent testing agency procedures and administrative requirements.
2. Section 05 12 00, "Structural Steel"
3. Section 05 30 00, "Metal Decking" for erection requirements relating to exposed steel decking and its connections
4. Division 5, Section "Metal Fabrications" for loose steel bearing plates and miscellaneous steel framing.
5. Division 9, Section "Special Coatings" for finish coat requirements and coordination with primer and surface preparation specified in this section.

1.03 SUBMITTALS

A. General: Submit each item below according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of product specified.

C. Shop Drawings detailing fabrication of AESS components.
1. Provide erection drawings clearly indicating which members are considered as AESS members.
2. Include details that clearly identify all of the requirements listed in Paragraph 2.03, "Fabrication" and Paragraph 3.03, "Erection" of this Specification. Provide connections for exposed AESS consistent with concepts shown on the architectural or structural drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length and type of each weld. Identify grinding, finish and profile of welds as defined herein.
4. Clearly indicate which surfaces or edges are exposed and what class of surface preparation is being used.

5. Indicate special tolerances and erection requirements as noted on the drawings or defined herein.

D. Qualification data for firms and persons specified in the "Quality Assurance" article shall demonstrate their capabilities and experience. Include lists of completed projects names and address, names and addresses of architects and owners, and other information specified.

1.04 QUALITY ASSURANCE

A. Fabricator Qualifications: In addition to those qualifications listed in Section 05 12 00, "Structural Steel", engage a firm experienced in fabricating AESS similar to that indicated for this Project with a record of successful in-service performance, as well as sufficient production capacity to fabricate AESS without delaying the Work.

B. Erector Qualifications: In addition to those qualifications listed in Section 05 12 00, "Structural Steel", engage an experienced Erector who has completed AESS work similar in material, design, and extent to that indicted for this Project and with a record of successful in-service performance.

C. Comply with applicable provisions of the following specifications and documents:
1. AISC "Code of Standard Practice," latest edition, Section 10 as amended herein.

D. Build mock-ups to comply with the following requirements, using materials indicated for final unit of Work.
1. Locate mock-ups on-site or in the fabricators shop as directed by Architect. Mock-ups shall be full size pieces unless the Architect approves smaller models.
2. Notify the Architect one week in advance of the dates and times when mock-ups will be available for review.
3. Demonstrate the proposed range of aesthetic effects regarding each element listed under the fabrication heading below.
4. Mock-up will have finished surface (including surface preparation and paint system).
5. Obtain Architect's approval of mock-ups before starting fabrication of final units.
6. Retain and maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed work.
    a. Approved mock-ups in an undisturbed condition at the time of Substantial Completion may become part of the completed work.

E. Pre-installation Conference: The General Contractor shall schedule and conduct a conference at the project site to comply with requirements of Division 1 Section "Project Meetings." As a minimum, the meeting shall include the General Contractor, Fabricator, Erector, the finish painting subcontractor, and the Architect. Coordinate requirements for shipping, special handling, attachment of safety cables and temporary erection bracing, touch-up painting, and other requirements for AESS.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver AESS to project site in such quantities and at such times to ensure continuity of installation.

B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. Use special care in handling to prevent twisting or warping of AESS members.

C. Erect pre-painted finish pieces using padded slings or other methods such that they are not damaged. Provide padding as required to protect while rigging and aligning member's frames. Weld tabs for temporary bracing and safety cabling only at points concealed from view in the completed structure or where approved by the Architect during the pre-installation meeting. Methods of removing temporary erection devices and finishing the AESS members shall be approved by the Architect prior to erection.

1.06 PROJECT CONDITIONS

A. Field Measurements: Where AESS is indicated to fit against walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

1.07 COORDINATION

A. Coordinate installation of anchors for AESS members that connect to the work of other trades. Furnish setting drawings, templates, and directions for installing anchors, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to the project site in time for installation. Anchorage concepts shall be as indicated on Drawings and approved on final shop drawings.

PART 2 PRODUCTS

2.01 MATERIALS

A. General: Meet requirements in Section 05 12 00, "Structural Steel" as amended below.

B. Provide standard carbon steel mechanically galvanized finish.

2.02 PRIMERS

A. For galvanized steel to be painted, use epoxy primer, equal in quality to Series 27 F.C. Typoxy by Tnemec Company, Inc.

B. For zinc-epoxy- polyurethane system use Series 90-97 Tnemec-Zinc by Tnemec.

C. Galvanizing Repair Paint: High-zinc-dust-content paint for galvanizing welds and repair painting galvanized steel, with dry film coating not less than 90 percent zinc dust by weight. Acceptable products include Z.R.C. Cold Galvanizing Compound or Z.R.C. Galvilite Galvanizing Repair by Z.R.C. Worldwide.

2.03 FABRICATION

A. Fabricate and assemble AESS in the shop to the greatest extent possible. Locate field joints in AESS assemblies at concealed locations or as approved by the Architect. Detail AESS assemblies to minimize field handling and expedite erection.

B. Fabricate AESS with exposed surfaces smooth, square and of surface quality consistent with the approved mock up. Use special care in handling and shipping of AESS both before and after shop painting.

C. In addition to special care used to handle and fabricate AESS, employ the following fabrication techniques.
   1. For structural members and joints more than 26 feet above an occupied level:
      a. Piece Marks Hidden: Fabricate such that piece marks are fully hidden in the final structure or made with such media to permit full removal after erection.
   2. For structural members and joints between 16 feet and 26 feet above an occupied level:
      a. All items listed in Paragraph 2.03C.1.
      b. Welds ground smooth: Fabricator shall grind welds of AESS smooth.. For groove welds, the weld shall be made flush to the surfaces each side and be within +1/16", -0" of plate thickness.
      c. Contouring and blending of welds: Where fillet welds are indicated to be ground contoured, or blended, oversize welds as required and grind to provide a smooth transition and match profile on approved mock-up.
   3. For all structural members and joints within 16 feet of an occupied level:
      a. All items listed in Paragraphs 2.03C.1 and 2.03C.2.
      b. Continuous Welds: Where welding is noted on the Drawings, provide continuous welds of a uniform size and profile.
      c. Joint Gap Tolerance: Maintain a uniform gap of 1/8" ±1/32
      d. Mill Mark Removal: Fabricator shall deliver steel with no mill marks (stenciled, stamped, raised, etc.) in exposed locations. Mill marks shall be omitted by cutting of mill material to appropriate lengths where possible. Where not possible, the fabricator may fill and/or grind to a surface finish consistent with the approved mock-up.
      e. Grinding of sheared edges: Fabricator shall grind all edges of sheared, punched or flame cut steel to match approved mock-up.
      f. Seal Welds: Seal weld open ends of round and rectangular hollow structural section with 3/8" closure plates. Provide continuous, sealed welds at angle to gusset plate connections and similar locations where AESS is exposed to weather.

2.04 SHOP CONNECTIONS

A. Weld Connections: Comply with AWS D1.1/D1.1M:2015 and Section 05 12 00, "Structural Steel". Appearance and quality of welds shall be consistent with the mock-up. Assemble and weld built-up sections by methods that will maintain alignment of members without warp exceeding the tolerance of this section.

2.05 SHOP PRIMING

A. Shop prime steel surfaces, except the following:
   1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
   2. Surfaces to be field welded.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Prepare surfaces according to SSPC Specifications as follows:
   1. SSPC-SP 1 "Solvent Cleaning"
   2. SSPC-SP 3 "Power Tool Cleaning." (This level of surface prep is the minimum for most AESS projects. It may be acceptable for alkyd primers and acrylic or alkyd finish coats, particularly in interior applications.)
   3. SSPC-SP 6 "Commercial Blast Cleaning." (This level of surface prep adds significantly to the total cost of the steel. It is required for epoxy primers to allow adequate bonding to the steel. Recommended for locations where a rust inhibitive primer will be used in an exterior application. It is also required where polyurethane finish coats will be used over the primer.)
   4. Coordinate the required blast profile with the approved paint submittal prior to beginning surface preparation.

2.06 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to AESS indicated for galvanizing according to ASTM A123/A123M-17. Provide galvanized finish or members and assemblies within the range of color and surface textures presented in the mock-ups.

PART 3 EXECUTION

3.01 EXAMINATION

A. The erector shall check all AESS members upon delivery for twist, kinks, gouges, or other imperfections that may result in rejection of the appearance of the member. Coordinate remedial action with fabricator prior to erecting steel.

3.02 PREPARATION

A. Provide connections for temporary shoring, bracing, and supports only where noted on the approved shop drawings. Temporary connections not shown shall be made at locations not exposed to view in the final structure or as approved by the Architect. Handle, lift, and align pieces using padded slings and/or other protection required to maintain the appearance of the AESS through the process of erection.

3.03 ERECTION

A. Set AESS accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section.

B. In addition to the special care used to handle and erect AESS, employ the following erection techniques:
   1. For structural members and joints more than 26 feet above an occupied level:
      a. Erection tolerances: Erection tolerances shall meet the requirements of standard frame tolerances for structural steel per Chapter 7 of the AISC "Code of Standard Practice."
      b. Removal of field connection aids: Run out tabs, erection bolts, and other steel members added to connections to allow for alignment, fit-up, and welding in the field shall be removed from the structure. Field groove welds shall be selected to eliminate the need for backing bars or to permit their removal after welding. Welds at run out tabs shall be removed to match adjacent surfaces and ground smooth. Holes for erection bolts shall be plug welded and ground smooth.
   2. For structural members and joints between 16 feet and 26 feet above an occupied level:
      a. All items listed in Paragraph 3.03B.1.
      b. Welds ground smooth: Erector shall grind welds smooth in the connections of AESS members. For groove welds, the weld shall be made flush to the surfaces each side and be within +1/16", -0" of plate thickness.
      c. Contouring and blending of welds: Where fillet welds are indicated to be ground contoured, or blended, oversize welds as required and grind to provide a smooth transition and match profile on approved mock-up.
   3. For all structural members and joints at within 16 feet of an occupied level:
      a. All items listed in Paragraphs 3.03B.1 and 3.03B.2, except 3.03.B.1.b.
      b. AESS Erection Tolerances: Erection tolerances shall meet the requirements of Chapter 10 of the AISC "Code of Standard Practice".
      c. Continuous Welds: Where noted on the Drawings, provide continuous welds of a uniform size and profile.

C. Field Welding: Weld profile, quality, and finish shall be consistent with mock-ups approved prior to fabrication.

D. Splice members only where indicated.

E. Obtain permission for any torch cutting or field fabrication from the Architect. Finish sections thermally cut during erection to a surface appearance consistent with the mock-up.

F. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts. Replace connection plates that are misaligned where holes cannot be aligned with acceptable final appearance.

3.04 FIELD CONNECTIONS

A. Welded Connections: Comply with AWS D1.1 for procedures, and appearance. Refer to Division 5, Section 05 12 00, "Structural Steel" for other requirements.
   1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp. Verify that weld sizes, fabrication sequence, and equipment used for AESS will limit distortions to allowable tolerances.
   2. Obtain Architects approval for appearance of welds in repaired or field modified work.

3.05 FIELD QUALITY CONTROL

A. Structural Requirements: The Owner will engage an independent testing and inspecting agency to perform field inspections and tests and to prepare test reports. Refer to Division 5, Section 05 12 00, "Structural Steel" for detailed bolt and weld testing requirements.

B. AESS Acceptance: The Architect shall observe the AESS steel in place and determine acceptability based on the mock-up. The Testing Agency shall have no responsibility for enforcing the requirements of this Section.

3.06 ADJUSTING AND CLEANING

A. Touch-up Painting: Cleaning and touch-up painting of field welds, bolted connections, and abraded areas of shop paint shall be completed to blend with the adjacent surfaces of AESS. Such touch up work shall be done in accordance with manufacturer's instructions as specified in Division 9, Section "Painting."

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

END OF SECTION

SECTION 05 30 00
METAL DECKING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: All labor and materials required to furnish and install metal decking and accessories including closures, hanger devices, edge filler plates, pour stops, ridge and valley plates and end closure angles, where shown on the Drawings and/or required for a complete installation.

B. The Engineer has designed a project which will be safe after full completion. The Engineer has no expertise in, and takes no responsibility for, construction means and methods or job site safety during construction, which are exclusively the Contractor's responsibility. Processing and/or approving submittals made by the Contractor which may contain information related to construction methods or safety issues, or participation in meetings where such issues might be discussed, shall not be construed as voluntary assumption by the Engineer of any responsibility for safety procedures.

C. Related Sections: Carefully examine all other Sections and all Drawings for related work, which includes but is not limited to:
1. Section 03 30 00, "Cast-In-Place Concrete"
2. Section 05 12 00, "Structural Steel"

D. Inspection Agency shall be the same agency retained under Section 05 12 00, "Structural Steel."

1.02 QUALITY ASSURANCE

A. Reference Standards:
1. North American Specification for the Design of Cold-Formed Steel Structural Members, 2016 Edition, by the American Iron and Steel Institute.
2. SDI Roof Deck Design Manual Second Edition (RDDM2), June 2020, by the Steel Deck Institute.
3. Floor Deck Design Manual Second Edition (FDDM2), June 2020, by the Steel Deck Institute.
4. Diaphragm Design Manual, Third Edition (DDM04) September 2015, by the Steel Deck Institute.

B. Manufacturer's Qualifications: Regularly engaged in the manufacture of similar decking.

C. Erector's Qualifications: Minimum five (5) years' experience in installation of similar decking.

D. Welder's Qualifications: Personnel and procedures are to be qualified per the requirements of the American Welding Society, as given in AWS D1.3/D1.3M-2008.

1.03 SUBMITTALS

A. Certification of Experience: Submit, on request only, written summary of personnel, projects, and equipment which document the experience and qualifications required of the manufacturer, erector, and welders.

B. Shop Drawings:
1. Indicate mark, number, type, finish, and location of all deck units.
2. Indicate method of connection to supporting members. Provide literature from the fastener and/or deck manufacturers verifying compliance with the minimum required diaphragm shear strengths and stiffnesses.
3. Indicate details and installation instructions for all accessories.
4. Indicate sequence of installation, where critical.
5. Notwithstanding any other requirements specified elsewhere in these Specifications, one electronic copy of the shop drawings shall be submitted for approval. One electronic copy will be returned to the Contractor, who will make and distribute as many copies as needed. Only prints with the approval stamp printed on them shall be permitted on the site.

C. Manufacturer's Certification:
1. Certify compliance with structural criteria. Published load tables and literature are usually acceptable. Provide design calculations on request only.
2. Certify compliance with finish criteria, with test reports as required.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Prevent damage to deck or finish during handling and storage.

B. Store on blocking or platforms, off the ground, with one end elevated for drainage.

C. Protect from rusting with waterproof covering, or storage under roof.

PART 2 PRODUCTS

2.01 DESIGN CRITERIA

A. Typical Roof Deck:
1. Type: 1 1/2 inches deep, 20 gauge minimum, wide rib.
2. Finish: Galvanized.
3. Acceptable products include, but are not limited to:
a. B or B-Dek by New Millennium
b. 1.5B by Vulcraft Division of Nucor Corp.
c. 1.5B by Cordeck Building Solutions.

2.02 MATERIALS AND FINISHES

A. Materials: Steel sheet conforming to ASTM A653/A653M-19.

B. Finishes:
   1. Galvanized: Conform to ASTM A653/A653M-17, G60.

C. Accessories: Same material and finish as deck units, except that interior closures may be of compressible material.

D. Field Touch-Up Paint:
   1. For galvanized deck, use zinc chromate paint.

E. Welding Electrodes: Conform to requirements of AWS D1.3/D1.3M-2008 using Series E60 electrodes, appropriate for the materials being welded, with welding washers as required.

F. Self-drilling Fasteners: Heat-treated and zinc-plated with fluted drill point. Acceptable products include, but are not limited to:
   1. Teks screws by ITW Buildex.
   2. Self-Drilling Screw Fasteners, by Hilti Fastening Systems.

2.03 FABRICATION

A. Units are to be continuous over at least three (3) spans, where possible. Where units are single or double span, use heavier gage if required for stress or deflection control. End laps (2 inches minimum) are to occur over supports.

B. Units are to have nested side laps.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

A. Prior to beginning work of this Section, verify that the installed work of other trades is complete and correct to the extent necessary for the proper execution of the work of this Section.

B. In the event of discrepancies, immediately notify the Architect. Do not proceed with work affected by the discrepancies until they have been resolved.

3.02 ERECTION

A. Install decking in accordance with approved placing Drawings.

B. Tolerance: Align adjacent units within 1/4 inch in 40 feet.

C. Connection to Supporting Members: Connect to supports from top side only. Powder- and pneumatically-driven fasteners are not permitted unless approved by the Architect. Welds which burn holes in decking or supporting members will be rejected. Erector shall select the method of connecting the deck to the supports, including the connector type and spacing, and also the method of sidelap fastening, including the connector type and spacing, to provide the following minimum diaphragm shear strengths and stiffnesses, in accordance with the SDI Diaphragm Design Manual:

Deck Type	Shear Strength (plf)	Stiffness (k/in)
1 1/2 inch roof deck	300	21

Submit for approval the proposed method of connecting the deck and information verifying compliance with the above requirements. Additional minimum requirements for connections are as follows:

1. Roof Deck: Attach to resist a gross uplift of 45 lbs. per square foot in eave overhang areas, 30 lbs. per square foot in all other areas. Connections shall occur at every other rib for 1 1/2 inch roof deck (12 inch spacing) (36/4), except all side laps shall be connected to supports.

D. Sidelap Fastening: Spacing shall not exceed 3 feet. Button punching is not permitted for roof decks.

E. Closures: Install in deck flutes over supports or other construction at building perimeter and at perimeters of interior rooms. Set in a true even line, flush with construction below, eliminating any shelf or pocket. Closures are to be accurately shaped and installed, to provide a tight fit.

F. Openings: Field cut small openings, bevels, miters, etc., as required. Provide reinforcing for openings which interrupt ribs.

G. Hanging Loads: Do not hang items from the underside of metal roof decks or metal centering, unless specifically approved by the Architect.

H. Construction Loads: Do not use deck as storage or working platform until it has been permanently attached to supports. Assure that construction loads do not exceed the carrying capacity of the deck.

I. Repair and Touch-Up:
1. Where deck will be exposed to view, remove and replace any units with damage or defects which cannot be concealed by painting.
2. Where deck will not be exposed to view, repair any cuts and holes with plate of same gage as deck.
3. Touch up all damaged areas of finish, on both top and bottom sides of deck.

3.03 FIELD QUALITY CONTROL

A. Inspection shall include visual examination of deck and its attachment to the supporting structure, including quantity of connectors and/or fusion welds and the quality of the connections to the supporting structure.

B. Inspect installation of welded stud shear connectors for composite beams per the requirements of AWS D1.1/D1.1M:2015, Articles 7.7 and 7.8.

END OF SECTION

SECTION 06 11 00
STRUCTURAL LUMBER AND SHEATHING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: All labor and materials for structural lumber shown on the Drawings for walls, roof and floor framing, and sheathing, including all connections and accessory materials shown on the Drawings, required by this Section, or necessary for a complete installation.

B. Related Sections: Carefully examine all other Sections and all Drawings for related work, which includes but is not limited to:
1. Section 03 30 00, "Cast-In-Place Concrete"
2. Section 05 12 00, "Structural Steel"
3. Section 05 30 00, "Metal Decking"

1.02 QUALITY ASSURANCE

A. Reference Standards:
1. National Design Specification for Wood Construction, by the American Wood Council, 2015 Edition.
2. Panel Design Specification, May 2012 by APA – Engineered Wood Association.
3. Voluntary Product Standard PS1-09.
4. Voluntary Product Standard PS2-10.
5. APA PRP-108 – Performance Standards and Policies for Structural-Use Panels, May 2002, by APA – The Engineered Wood Association.

PART 2 PRODUCTS

2.01 MATERIALS

A. Lumber: Spruce Pine Fir No. 1/No. 2 or better, surfaced at 19% moisture content. Minimum allowable design stresses per the National Design Specification Supplement.

B. Plywood Sheathing manufactured to conform to Voluntary Product Standard PS1-09:
1. For roofs: C-D plugged, Structural I, exposure 1, 5 ply, with panel index of 24/0; 1/2 inch thick (with plywood clips for roof sheathing).

C. Nails: Unless noted otherwise, all nails and spikes are to be common wire (when connecting to wood treated with ACQ use galvanized nails conforming to ASTM A153/A153M-16a or stainless steel).

D. Plywood Clips: PSCL/PSCA by the Simpson Company or equivalent products of other approved manufacturers.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

A. Prior to beginning work of this Section, verify that the installed work of other trades is complete and correct to the extent necessary for the proper execution of the work of this Section.

B. In the event of discrepancies, immediately notify the Architect. Do not proceed with work affected by the discrepancies until they have been resolved.

3.02 ERECTION

A. Provide solid or diagonal bridging at midspan of all joists and rafters.

B. Attach all sheathing to supporting members per the requirements of the APA.

C. Apply adhesive per manufacturer's written recommendations.

3.03 ACCEPTANCE

A. Members with excessive knots, twists, checks, or shakes, or other obvious imperfections, will be rejected.

END OF SECTION

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Roof sheathing

1.3 PREINSTALLATION MEETINGS

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications:

   1. For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS

A. Emissions: Products shall meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

C. Factory mark panels to indicate compliance with applicable standard.

2.2 ROOF SHEATHING

A. Plywood Sheathing: Either DOC PS 1 or DOC PS 2, sheathing.

1. Span Rating: Not less than 40/20.
2. Nominal Thickness: Not less than 19/32 inch.

2.3 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For roof sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

B. Nails, Brads, and Staples: ASTM F1667.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
2. ICC-ES evaluation report for fastener.

D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Roof Sheathing:

a. Nail to wood framing.
b. Space panels 1/8 inch apart at edges and ends.

3.3 FIELD QUALITY CONTROL

A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.

B. Testing and Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 061600

SECTION 064023 – INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Interior standing and running trim for opaque finish.
2. Plastic Laminate Cabinets.
3. Shop finishing interior woodwork.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing interior architectural woodwork that are concealed within other construction before interior architectural woodwork installation.
2. Section 099000 “Paintings and Coatings” for field finishing of interior architectural woodwork.

1.3 DEFINITIONS

A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items, unless concealed within other construction before woodwork installation.

1.4 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections, to ensure that interior architectural woodwork can be supported and installed as indicated.

1.5 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Provide cabinetry capable of withstanding the effects of earthquake motions determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads" and in conformance with applicable sections of the Ohio Building Code (OBC).

1.6 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.7 ACTION SUBMITTALS

A. Product Data:

1. Anchors.
2. Adhesives.
3. Shop finishing materials.

B. Wood-Preservative Treatment:

1. Include data and warranty information from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
2. Indicate type of preservative used and net amount of preservative retained.
3. Include chemical-treatment manufacturer's written instructions for finishing treated material and manufacturer's written warranty.

C. Shop Drawings:

1. Include the following:

a. Dimensioned plans, elevations, and sections.
b. Attachment details.

2. Show details full size.
3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
4. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.

D. Samples: For each exposed product and for each shop-applied color and finish specified.

1. Size:

a. Panel Products: 12 inches by 12 inches (300 mm by 300 mm).
b. Lumber Products: Not less than 5 inches (125 mm) wide by 12 inches (300 mm) long, for each species and cut, finished on one side and one edge.

E. Samples for Initial Selection: For each type of shop-applied exposed finish.

1. Size:

a. Panel Products: 12 inches by 12 inches (300 mm by 300 mm).
b. Lumber Products: Not less than 5 inches (125 mm) wide by 12 inches (300 mm) long, for each species and cut, finished on one side and one edge.

F. Samples for Verification: For the following:

1. Lumber for Transparent Finish: Not less than 5 inches (125 mm) wide by 12 inches (300 mm) long, for each species and cut, finished on one side and one edge.

2. Lumber and Panel Products with Shop-Applied Opaque Finish: 5 inches (125 mm) wide by 12 inches (300 mm) long for lumber for each finish system and color.

    a. Finish entire exposed surface.

1.8 INFORMATIONAL SUBMITTALS

A. Qualification Data: For architectural woodwork manufacturer and Installer.

B. Product Certificates: For the following:

1. Composite wood products.
2. Adhesives.

C. Evaluation Reports: For preservative-treated wood materials, from ICC-ES.

1.9 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups of typical interior architectural woodwork as shown on Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations by Change Order.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Comply with the Architectural Woodwork Standards, Section 2.

B. Do not deliver interior architectural woodwork until painting and similar finish operations that might damage woodwork have been completed in installation areas.

C. Store woodwork in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1. Handle and store fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions.

1.11 FIELD CONDITIONS

A. Environmental Limitations with Humidity Control: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and

maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.

B. Field Measurements: Where interior architectural woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being concealed by construction, and indicate measurements on Shop Drawings.

C. Established Dimensions: Where interior architectural woodwork is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Frames: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing in accordance with NFPA 257 or UL 9.

2.2 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE FINISH

A. Architectural Woodwork Standards Grade: [Premium] [Custom] [Economy].

1. Wood Species: Any closed-grain hardwood.
2. Wood Moisture Content: 5 to 10 percent.

2.3 CLOSET AND UTILITY SHELVING

A. Architectural Woodwork Standards Grade: Premium.

B. Cleats: 3/4-inch (19-mm) [solid lumber] [thermally fused laminate panel] [panel product].

C. Wood Species: Eastern white pine, sugar pine, or western white pine

2.4 PRESERVATIVE-TREATED-WOOD MATERIAL

A. Preservative-Treated-Wood Materials: Provide with water-repellent preservative treatment complying with AWPA N1 (dip, spray, flood, or vacuum-pressure treatment).

1. Preservative Chemicals: 3-iodo-2-propynyl butyl carbamate (IPBC)

2. Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.

B. Extent of Preservative-Treated Wood Materials: Treat interior architectural woodwork in contact with concrete or masonry.

2.5 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Door Hardware"

B. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.

C. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening

D. Pulls: Equal to Mockett no. DP105A/6 – Back mounted, 6-27/32 inches long, 9/16 inch square pull.

E. Catches: Push-in magnetic catches, BHMA A156.9, B03131.

F. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081

G. Drawer Slides: Side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, BHMA A156.9, B05091, and rated for the following loads, minimum:

1. Box Drawer Slides: 75 lbf.
2. File Drawer Slides: 200 lbf
3. Pencil Drawer Slides: 45 lbf
4. Keyboard Slide: 75 lbf
5. Trash Bin Slides: 150 lbf

H. Door Locks: BHMA A156.11, E07121.

I. Drawer Locks: BHMA A156.11, E07041.

J. Grommets for Cable Passage through Countertops: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.

K. Paper Slots: 12 inches long by 1-3/4 inches wide by 1 inch deep; brown, molded-plastic, paper-slot liner with 1/4-inch lip.

L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for finish indicated.

1. Brushed chrome finish: Satin, brushed steel finish (US26D and/or US32D, as applicable).

M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.6 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Nailers: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
   a. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
   b. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
   c. Mark lumber with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee's (ALSC) Board of Review.

   2. Fire-Retardant Treatment: Complying with requirements; provide where indicated.

B. Provide self-drilling screws for metal-framing supports, as recommended by metal-framing manufacturer.

C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.

   1. Provide metal expansion sleeves or expansion bolts for post-installed anchors.
   2. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

D. Installation Adhesive: Product recommended by fabricator for each substrate for secure anchorage.

2.7 FABRICATION

A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

B. Fabricate interior architectural woodwork to dimensions, profiles, and details indicated.

   1. Ease edges to radius indicated for the following:

      a. Edges of Solid-Wood (Lumber) Members: 1/16 inch (1.5 mm) unless otherwise indicated.
      b. Edges of Rails and Similar Members More Than 3/4 Inch (19 mm) Thick: 1/8 inch (3 mm).

C. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site.

   1. Disassemble components only as necessary for shipment and installation.
   2. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
   3. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled.

a. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting.
b. Verify that parts fit as intended, and check measurements of assemblies against field measurements indicated on approved Shop Drawings before disassembling for shipment.

D. Interior Woodwork Grade: Provide Custom grade interior woodwork complying with the referenced quality standard.

E. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

F. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch (1.5 mm).
2. Edges of Rails and Similar Members More than 3/4 inch thick: 1/8 inch.
3. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1/16 inch

G. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

H. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

1. Seal edges of openings in countertops with a coat of varnish.

2.8 PLASTIC-LAMINATE CABINETS

A. Quality Standard: Comply with AWI Section 400 requirements for laminate cabinets.

B. AWI Type of Cabinet Construction: Flush overlay.

C. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
1. Horizontal Surfaces Other Than Tops: HGS
2. Vertical Surfaces: HGS
3. Edges: PVC tape, 0.018-inch minimum thickness, matching laminate in color, pattern, and finish.

D. Materials for Semi-exposed Surfaces: Provide surface materials indicated below:
1. Surfaces Other Than Drawer Bodies: Thermoset decorative overlay
2. Drawer Sides and Backs: Thermoset decorative overlay
3. Drawer Bottoms: Thermoset decorative overlay.

E. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. Match Architect’s Sample.

2.9 SHOP PRIMING

A. Preparations for Finishing: Comply with the Architectural Woodwork Standards for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing interior architectural woodwork, as applicable to each unit of work.

B. Interior Architectural Woodwork for Opaque Finish: Shop prime with one coat of wood primer as specified in Section 099123 "Interior Painting."

1. Backpriming: Apply one coat of primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to surfaces installed in contact with concrete or masonry and to end-grain surfaces.

C. Interior Architectural Woodwork for Transparent Finish: Shop-seal concealed surfaces with required pretreatments and first coat of finish as specified in Section 099300 "Staining and Transparent Finishing."

1. Backpriming: Apply one coat of sealer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to surfaces installed in contact with concrete or masonry and to end-grain surfaces.

2.10 SHOP FINISHING

A. Finish interior architectural woodwork indicated on Drawings at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.

B. Preparation for Finishing: Comply with Architectural Woodwork Standards, Section 5 for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing interior architectural woodwork, as applicable to each unit of work.

1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of interior architectural woodwork. Apply two coats to end-grain surfaces.

C. Transparent Finish:

1. Architectural Woodwork Standards Grade: Premium
2. Finish System:
   a. 2: Lacquer, Pre Catalyzed.
   b. 3: Lacquer, Post Catalyzed.
   c. 4: Latex Acrylic, Water Based.

3. Wash Coat for Closed-Grain Woods: Apply wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
4. Staining: Match Architect's sample.
5. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter in accordance with ASTM D523.

D. Opaque Finish:

1. Architectural Woodworking Standards Grade: Premium.
2. Finish System:
   a. 2: Lacquer, Pre Catalyzed.

b. 3: Lacquer, Post Catalyzed.
c. 4: Latex Acrylic, Water Based.

3. Color: As selected by Architect from manufacturer's full range.
4. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter in accordance with ASTM D523.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition interior architectural woodwork to humidity conditions in installation areas for not less than 72 hours prior to beginning of installation.

B. Before installing interior architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming of concealed surfaces.

3.2 INSTALLATION

A. Grade: Install interior architectural woodwork to comply with same grade as item to be installed.

B. Assemble interior architectural woodwork and complete fabrication at Project site to the extent that it was not completed during shop fabrication.

C. Install interior architectural woodwork level, plumb, true in line, and without distortion.

1. Shim as required with concealed shims.
2. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

D. Scribe and cut interior architectural woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Preservative-Treated Wood: Where cut or drilled in field, treat cut ends and drilled holes in accordance with AWPA M4.

F. Anchor interior architectural woodwork to anchors or blocking built in or directly attached to substrates.

1. Secure with countersunk, concealed fasteners and blind nailing.
2. Use fine finishing nails[or finishing screws] for exposed fastening, countersunk and filled flush with interior architectural woodwork.
3. For shop-finished items, use filler matching finish of items being installed.

G. Standing and Running Trim:

1. Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible.
2. Do not use pieces less than 60 inches (1500 mm) long, except where shorter single-length pieces are necessary.

3. Scarf running joints and stagger in adjacent and related members.
4. Fill gaps, if any, between top of base and wall with plastic wood filler; sand smooth; and finish same as wood base if finished
5. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches (3 mm in 2400 mm).

H. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
2. Maintain veneer sequence matching of cabinets with transparent finish.
3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish

I. Wall Rails: Support rails on wall brackets securely fastened to wall framing.

a. Space rail brackets not more than 24” o.c.

J. Complete the finishing work specified in this Section to extent not completed at shop or before installation of woodwork. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats were applied in shop.

3.3 FIELD QUALITY CONTROL

A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade.

1. Inspection entity is to prepare and submit report of inspection.

3.4 REPAIR

A. Repair damaged and defective interior architectural woodwork, where possible, to eliminate functional and visual defects and to result in interior architectural woodwork being in compliance with requirements of Architectural Woodwork Standards for the specified grade.

B. Where not possible to repair, replace defective woodwork.

C. Shop Finish: Touch up finishing work specified in this Section after installation of interior architectural woodwork.

1. Fill nail holes with matching filler where exposed.
2. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are shop applied.

D. Field Finish: See Section 09900 "Paintings and Coatings" for final finishing of installed interior architectural woodwork not indicated to be shop finished.

3.5 CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 064023

SECTION 074113 – METAL ROOF PANELS

PART 1 - GENERAL

1.1 SCOPE OF WORK.

A. Work described in this section includes pre-formed metal roofing system complete with clips, perimeter and penetration flashing, closures, gutters, down spouts and snow guards.

1.2 RELATED SECTIONS.

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

B. Related work specified elsewhere:

1. Architecturally Exposed Structural Steel
2. Metal Roof Decks.
3. Structural Steel.
4. Rough Carpentry.
5. Flashing and Sheet Metal.

1.3 SUBMITTALS.

A. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches (1:10).

B. Product Data: For standing-seam metal roof panels. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

C. Samples: Provide full scale samples of the following materials and system components. Samples shall be of identical material type, thickness, panel width, and material grade/alloy/temper as the system specified for this project. Except for item 2, samples may be of any of the manufacturer's standard colors.

1. Submit a 12" long by actual width sample of panel showing seam profile and stiffening mesas across the flat pan of the panel. Also include separate snap-on cap with factory applied hot melt sealant beads.

2. Provide a 6" x 6" sample of the color selected for this project. The sample shall be the actual specified coating system on a metal substrate.
3. Provide samples of actual system components, including: each type of anchor/clip required, head closure assembly, roll goods (if specified), bearing plates and/or framing (if specified).

1.4 INFORMATION SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For standing-seam metal roof panels, for tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

1.7 DELIVERY, STORAGE, AND HANDLING.

A. Manufacturer's responsibility:

1. Protect components during fabrication and packing from mechanical abuse, stains, discoloration, and corrosion.
2. Provide protective interleaving between contact areas of exposed surfaces to prevent abrasion during shipment, storage, and handling.

B. Installer's responsibility:
1. Store materials off ground providing for drainage; under cover providing for air circulation; and protected from wind movement, foreign material contamination, mechanical damage, cement, lime or other corrosive substances.
2. Handle materials to prevent damage to surfaces, edges and ends of roofing sheets and sheet metal items. Damaged material shall be rejected and removed from the site.
3. Protect panels from wind-related damages.

4. Inspect materials upon delivery. Reject and remove physically damaged or marred material from project site.

1.8 JOB CONDITIONS.

A. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage requirements for pre-formed metal roofing system.

B. Protection:

1. Provide protection or avoid traffic on completed roof surfaces.
2. Do not overload roof with stored materials.
3. Support no roof-mounted equipment directly on roofing system.

C. Ascertain that work of other trades which penetrates the roof or is to be made watertight by the roof is in place and approved prior to installation of roofing.

D. It shall be the Contractor's responsibility to respond immediately to correction of roof leakage during construction.

1.9 DESIGN AND PERFORMANCE CRITERIA.

A. Thermal Expansion and Contraction.

1. Completed metal roofing and flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.
2. The design temperature differential shall be not less than 200 degrees F.
3. Interface between panel and clip shall provide for unlimited thermal movement in each direction along the longitudinal direction.
4. Location of metal roofing rigid connector shall be at roof ridge unless otherwise approved by the project architect and designed per job conditions by specified manufacturer.

B. Uniform Wind Uplift Load Capacity.

1. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria. Anchor clips shall not be installed closer than the spacing given in section 3.2 C.
   a. Design Code: ASCE 7-98, Method 2 for Components and Cladding.
   b. Safety Factor: 1.875 after any load reduction or material stress increase.
   c. Category II Building with an Importance Factor of 1.15.
   d. Wind Speed: 107 mph.
   e. Ultimate Pullout Value: 450 pounds per each of the two fasteners holding The panel anchor to the roof decking or framing system.
   f. Exposure Category: C.
   g. Design Roof Height: 23 feet.
   h. Minimum Building Width: 32 feet.

i. Roof Pitch: 4 inches per foot.

Roof Area Design Uplift Pressure:

Zone 1 - Field of roof 18.4 psf
Zone 2 - Eaves, ridges, hips, and rakes 42.9 psf
Zone 3 - Corners 42.9 psf

2. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria. Anchor clips shall not be installed closer than the spacing given in section 3.2 C.

C. Uniform Positive Load Capacity.

1. The installed roof system shall be capable of resisting the following positive uniform roof loads: Roof Live Load of 17 psf; Roof Snow Load of 20 psf plus drifting snow loads as indicated in the structural drawings.
2. Capacity to resist positive loads shall be determined by empirical calculations in accordance with AISI. Calculation shall be sealed by a registered professional engineer.
3. Installed roof system shall carry positive uniform design loads with a maximum system deflection of L/180 as measured at the rib (web) of the panel.

D. Underwriters' Laboratories, Inc., (UL) fire resistance P ratings for roof assemblies: If applicable, panel system shall be approved for use in an appropriate Construction Assembly, as defined by UL 263.

E. Underwriters' Laboratories, Inc., (UL), wind uplift resistance classification: Roof assembly shall be classified as Class 1-90, as defined by UL 580.

F. Underwriters' Laboratories, Inc., (UL) Class A fire rating per UL 790.

G. ASTM E1680: Static pressure air infiltration (roof panels):

Pressure	Leakage Rate
1.57 PSF	0.0012 cfm/sq.ft.
6.24 PSF	0.0001 cfm/sq.ft.
20.0 PSF	0.0011 cfm/sq.ft.

H. ASTM E1646: Static pressure water infiltration (roof panels):

Pressure	Result
5 Gal/Hr Per S.F. and Static Pressure Of 20.0 Psf for 15 minutes	No Leakage

I. Water penetration (dynamic pressure): No water penetration, other than condensation, when exposed to dynamic rain and 70 mph wind velocities for not less than five minutes duration, when tested in accord with principles of AAMA 501.1.

J. Capacities for gauge, span or loading other than those tested may be determined by interpolation of test results within the range of test data. Extrapolation for conditions outside test range are not acceptable.

1.10 WARRANTIES.

A. Owner shall receive ONE (1) WARRANTY from manufacturer of roof panels covering ALL of the following criteria. Multiple warranties are NOT acceptable.

1. Manufacturer's 20 year watertight warranty, including coverage for all trim, flashings, and penetrations associated with the standing seam roof area.
2. 20 year coverage on finish including checking, crazing, peeling, chalking, fading and/or adhesion.
3. 20 year material coverage.
4. Warranty shall commence on date of substantial completion.
5. Installer shall provide manufacturer with 2 year warranty covering roofing system installation and watertightness.

PART 2 - PRODUCTS

2.1 STANDING SEAM ROOF SYSTEM.

A. Materials.
1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
a. Garland Company; R-Mer Loc (Basis of Design)
b. Innovative Metals Company, Inc. (IMETCO).
c. Dimensional Metals, Inc.
d. Metal Panel Systems.
e. Petersen Corporation (PAC-CLAD); T-250 Panel.
2. Panel material: 24 ga., Galvalume steel, type AZ-55, smooth as per ASTM A792-96.
3. Flashing and flat stock material: Fabricate in profiles indicated on drawings of same material, thickness, and finish as roof system, unless indicated otherwise.

B. Finish on surfaces:

1. Exposed surfaces for coated panels:
a. Two coat coil applied, baked-on full-strength (70% resin) fluorocarbon coating system (polyvinylidene fluoride, PVF2), applied by manufacturer's approved applicator.
b. Coating system shall provide nominal 1.0 mil dry film thickness, consisting of primer and color coat. Color shall match existing standing seam roof, architect to select based on manufacturer's full range of standard colors.

2. Unexposed surfaces for coated panels shall be baked-on polyester coating with .20 - .30 dry film thickness (TDF).

C. Characteristics:

1. The same panel profile from a single manufacturer shall be used for ALL standing seam roof areas.
2. Configuration: Standing seams incorporating mechanically interlocked, concealed anchor clips allowing unlimited thermal movement, and of configuration which will prevent entrance or passage of water.
    a. Panel/Cap configuration must have a total of four (4) layers of steel surrounding anchor clip for prevention of water infiltration and increased system strength designed to limit potential for panel blow-off.
    b. Profile of panel shall have mesa's every 2" o.c. continuous throughout panel which are a minimum of 1.5" wide. These will absorb thermal stresses, reduce oil canning, and increase load carrying capacity.
    c. Exposed fasteners, screws and/or roof mastic is unacceptable and will be rejected. System configuration only allows for exposed fasteners at panel overlap (if required) and trim details (as per manufacturer's guidelines).
    d. Panels must be furnished in continuous lengths from ridge to eave with no overlaps unless approved by manufacturer to length of run.
    e. Panels lengths which exceed maximum shipping lengths shall be field rolled on equipment owned by the panel manufacturer. Equipment shall have at least 12 rolling stations and provide a product identical to factory manufactured product. The equipment shall be operated by a trained full time experienced technician. Seam caps shall be manufactured in the factory and may be installed with endlaps. Seam sealant must be factory applied! All requirements of section 1.5 C shall apply.
3. Seam must be 2-3/8" minimum height for added upward pressures and aesthetic appeal. Seam shall have continuous anchor reveals to allow anchor clips to resist positive and negative loading and allow unlimited expansion and contraction of panels due to thermal changes. Integral (not mechanically sealed) seams are not acceptable.
4. Concealed Standard Anchor Clips: Clips must be 16 gauge Galvalume steel, ONE (1) piece clip with projecting legs for additional panel alignment and provision for unlimited thermal movement in each direction along the longitudinal dimension.
    a. Two-piece (2) clips are NOT acceptable.
    b. Clip design must isolate sealant in panel cap from clip to ensure that no sealant damage occurs from the clip during expansion and contraction.
    c. Clip must maintain a clearance of a minimum of 3/8" between panel and substrate for proper ventilation to help prevent condensation on underside of panel and eliminate the contact of panel fastener head to panel.
5. Seam cap: Snap-on cap shall be a minimum of 1" wide "T" shaped of continuous length up to 45 feet according to job conditions and field seamed by means of manufacturer's standard seaming machine.
    a. Cap shall be designed to receive four (4) beads of continuous hot applied gasketing sealant which will not come in contact with the anchor clip to allow unlimited thermal movement of panel without damage to cap sealant.
    b. Sealant shall be a SIS (Styrene-Isoprene-Styrene) block copolymer type thermoplastic rubber adhesive, non-fatigue water barrier.
6. Standing Seam Panel Width: 18".
7. Stiffening ribs: Located in flat of panel to minimize oil canning and telegraphing of structural members.

8. Replaceability: Panels shall be of a symmetrical design with snap on cap configuration such that individual panels may be removable for replacement without removing adjacent panels.
9. Panel ends shall be panned at ridge, headwall, and hip conditions where applicable.
10. Panel length: Full length without joints, including bends.

D. Accessories.
1. Gable anchor clips: Standing Seam style aluminum alloy 6061-T6 minimum thickness .090".
2. Fasteners:
   a. Concealed fasteners: Corrosion resistant steel screws (zinc plated or equal) designed to meet structural loading requirements. The normal minimum screw size shall be #14.
   b. Exposed fasteners: Series 410 stainless steel screws or 1/8" diameter stainless steel waterproof rivets. All exposed fasteners shall be factory painted to match the color of the standing seam panels.
3. Closures: Factory precut closed cell foam meeting ASTM D1056 and/or D3575, enclosed in metal channel matching panels when used at hip, ridge, rake, and jamb.
4. Provide all miscellaneous accessories for complete installation.

2.2 ACCESSORY PRODUCTS.

A. Roof Panel Accessories: Provide components approved by roof panel manufacturer and as required for a complete metal roof panel assembly including trim, copings, fasciae, corner units, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal roof panels.
2. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foamor closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
3. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

B. Sealant:
1. Acceptable product:
   a. Concealed Application : PT1-707 or Bostik Chem-Calk butyl sealant or equal.
   b. Exposed Application : General Electric Co., SILGLAZE II 2800 or equal.
2. Colors: As selected by architect from sealant manufacturer's standard selection.

C. Underlayment:
1. Underlayment shall be applied to entire roof.
2. Underlayment shall be one ply of 40 mil self adhesive membrane or equal. Seams shall be lapped in accordance with manufacturer's recommendations.

D. Bearing Plates:
1. Install bearing plates directly over rigid board insulation/underlayment between clips and insulation board at each anchor clip location.
2. Bearing plates shall be 3" x 5" x 16 gauge (minimum) galvanized steel.

3. Bearing plates shall be pre-punched with a hole pattern matching that of the panel anchor clips. Slotted holes are acceptable.

E. Flashing and Trim: Formed from same material as roof panels, prepainted with coil coating, minimum 0.022 inch thick. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal roof panels.

F. Gutters: Formed from same material roof panels. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- long sections, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports spaced a maximum of 36 inches o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match roof fascia and rake trim.

G. Downspouts: Formed from same material as roof panels. Fabricate in 10-foot- long sections, complete with formed elbows and offsets, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual". Finish downspouts to match gutters.

H. Soffits: Formed from same material as roof panels. Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to support using concealed fasteners in side laps. Include accessories required for watertight installation. Solid panels to be formed with vertical panels edges and a flat pan between panel edges, with flush joint between panels. Finish soffit to match roof.

2.3 FABRICATION.

A. Shop fabricate metal roofing and flashing components to the maximum extent possible, forming metal work with clear, sharp, straight, and uniform bends and rises. Hem exposed edges of flashings.

B. Form flashing components from full single width sheet in minimum 10'-0" sections. Provide mitered corners, joined using closed end pop rivets and joint sealant.

C. Fabricate roofing and related sheet metal work in accord with approved shop drawings and applicable standards.

PART 3 - EXECUTION

3.1 PREPARATION.

A. Inspection: Examine the alignment and placement of the building structure and substrate. Correct any objectionable warp, waves or buckles in the substrate before proceeding with installation of the pre-formed metal roofing. The installed roof panels will follow the contour of the structure and may appear irregular if not corrected.

B. Establish straight side and crosswise benchmarks.

C. Use proper size and length fastener for strength requirements. Approximately 5/16" is allowable for maximum fastener head size beneath the panel.

D. Rectangular Roofs shall be checked for square and straightness. Gable ends may not be straight; set a true line for the gable clips and flashing with string line.

E. Measure the roof lengthwise to confirm panel lengths, overhangs, coverage of flashings at eaves and ridges and verify clearances for thermal movement.

F. Pre-roofing conference: Prior to beginning metal roofing work, a pre-roofing conference shall be held to review work to be accomplished.
1. Architect, contractor, metal roofing subcontractor, metal roofing system manufacturer's representative and all other subcontractors who have equipment penetrating roof or whose work involves access to roof shall be present.

3.2 ROOFING AND FLASHING INSTALLATION.

A. All details will be shown on manufacturer's shop drawings to successful bidder; install roofing and flashings in accordance with approved shop drawings and manufacturer's product data, within specified erection tolerances.

B. Prepare roof for the installation of standing seam panels, including:
1. Install all decking, framing, and/or furring members as indicated in this specification and bid documents.
2. Install all insulation, vapor retarders, and/or air infiltration barriers as indicated in this specification and bid documents.
3. Install all underlayments and/or temporary water proofing materials as required in this specification and bid documents.

C. Directly over the completed roof substrate, install one piece panel anchor clips. All anchor clips will be set on 16 gauge galvanized pre-punched bearing plates to distribute the loads on the board insulation. All anchor clips will be fastened into the structural roof substrate based on the following spacing pattern:
1. Clip spacing must be 5 ft. 6 in. for Zone 1 (field) Clip spacing must be 3 ft. 3 in. for Zone 2 (eave, ridge, hip, and rake). Clip spacing must be 3 ft. 3 in. for Zone 3 (corners) * Clip spacing for Zones 2 & 3 must extend 13 ft. 6 in. onto the roof area. * This clip spacing must be followed to ensure integrity of the completed installation. These have been determined based on the uplift calculations for the specified roof and the test results of ASTM E-1592.

D. Installation of Roof Panels: Roof panels can be installed by starting from either end and working towards the opposite end. Due to the symmetrical design of the specified panel system, it is also acceptable to start from the middle of the roof and work toward each end.
1. A stainless steel pop rivet shall be secured through the anchor reveal of the panel leg and extend into the arms of the panel clip located at the ridge of the system. This is done at each arm of the clip along the ridge. The panel is then anchored at both sides of the clip.

a. Be sure to capture all drilling debris during this operation with a rag or loth placed on the panels at the drilling operation.
b. Panels are not securely attached to the roof until fixed to the anchor clip. To avoid damage and injury, all panels shall be fixed to the anchor clip immediately as they are installed.

2. The seam caps are shipped with four (4) beads of factory applied hot melt sealant located inside the caps. To install the caps, hook one side of the cap over the panel edge and rotate over the opposite panel leg. For ease of installation, start at one end of the panel and work toward the opposite end.
3. A hand crimping tool is used to crimp the cap around the top of two adjacent panels
4. Caps shall then be permanently seamed with manufacturers mechanical seamer.
5. At the end of each day's work, seam caps shall be mechanically seamed or hand crimped (crimp 4 inches every 8 feet) to reduce the possibility of wind damage prior to completion of the project.
6. Un-installed panels which are temporarily stored on the ground or roof shall be secured in place at the end of each day's work to prevent possible damage or injury.

E. Isolate dissimilar metals and masonry or concrete from metals with bituminous coating. Use gasketed fasteners where required to prevent corrosive action between fastener, substrate, and panels.

F. Limit exposed fasteners to extent indicated on shop drawings.

G. Anchorage shall allow for temperature expansion/contraction movement without stress or elongation of panels, clips, or anchors. Attach clips to structural substrate using fasteners of size and spacing as determined by manufacturer's design analysis to resist specified uplift and thermal movement forces.

H. Seal laps and joints in accordance with roofing system manufacturer's product data.

I. Coordinate flashing and sheet metal work to provide weathertight conditions at roof terminations. Fabricate and install in accordance with standards of SMACNA Manual.

J. Provide for temperature expansion/contraction movement of panels at roof penetrations and roof mounted equipment in accordance with system manufacturer's product data and design calculations.

K. Installed system shall be true to line and plane and free of dents, and physical defects. In light gauge panels with wide flat surfaces, some oil canning may be present. Oil canning does not affect the finish or structural integrity of the panel and is therefore not cause for rejection.

L. Form joints in linear sheet metal to allow for 1/4" minimum expansion at 20'-0" o.c. maximum and 8'-0" from corners.

M. At joints in linear sheet metal items, set sheet metal items in two 1/4" beads of butyl sealant. Extend sealant over all metal surfaces. Mate components for positive seal. Allow no sealant to migrate onto exposed surfaces.

N. Remove damaged work and replace with new, undamaged components.

O. Touch up exposed fasteners using paint furnished by roofing panel manufacturer and matching exposed panel surface finish.

3.3 METAL SOFFIT PANEL INSTALLATION

A. In addition to complying with requirements in "Metal Roof Panel Installation, General" Article, install metal soffit panels to comply with requirements in this article.

B. Metal Soffit Panels: Provide metal soffit panels full width of soffits. Install panels perpendicular to support framing.
1. Flash and seal panels with weather closures where metal soffit panels meet walls and at perimeter of all openings.

C. Metal Fascia Panels: Align bottom of panels and fasten with blind rivets, bolts, or self-tapping screws. Flash and seal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

3.4 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

C. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

D. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.

1. Provide elbows at base of downspouts to direct water away from building.
2. Connect downspouts to underground drainage system indicated.

3.5 SNOW GUARD INSTALLATION

A. Bar-Type Snow Guards: Attach bar supports to vertical ribs of standing-seam metal roof panels with clamps or set screws. Do not use fasteners that will penetrate metal roof panels.
   1. Provide 1 row of snow guards, above all door locations and above lower roofs and canopies and at other locations indicated on Drawings, spaced apart, beginning up from gutter.

3.6 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal roof panel units within installed tolerance of 1/4 inch in 20 feet and 3/8" in 40 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect metal roof panel installation, including accessories. Report results in writing.

B. Manufacturer's Inspections: When the project is in progress, the Roofing Manufacturer is to perform the following installation inspection services:
   1. Keep the Architect informed as to the progress and quality of the work as observed.
   2. Provide job site inspections a minimum of three days per week.
   3. Report to the Architect in writing, any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
   4. Confirm, after completion of the project and based on manufacturer's observations and tests, that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
   1. Notify Architect and Owner 48 hours in advance of date and time of inspection.

D. Roofing system will be considered defective if it does not pass tests and inspections.
   1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.8 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal roof panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal roof panel installation, clean finished surfaces as recommended by metal roof panel manufacturer. Maintain in a clean condition during construction.

B. Replace metal roof panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074113

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Formed roof-drainage sheet metal fabrications.
2. Formed low-slope roof sheet metal fabrications.
3. Formed steep-slope roof sheet metal fabrications.
4. Formed wall sheet metal fabrications.
5. Formed equipment support flashing.
6. Formed overhead-piping safety pans.

1.3 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
3. Review requirements for insurance and certificates if applicable.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each of the following

1. Underlayment materials.

2. Elastomeric sealant.
3. Butyl sealant.
4. Epoxy seam sealer.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, and counterflashings.
10. Include details of special conditions.
11. Include details of connections to adjoining work.
12. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches.

C. Samples: For each exposed product and for each color and texture specified, 12 inches long by actual width.

D. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

E. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For each type of coping and roof edge flashing that is ANSI/SPRI/FM 4435/ES-1 tested and FM Approvals approved.

C. Product Test Reports: For each product, for tests performed by a qualified testing agency.

D. Evaluation Reports: For copings and roof edg
jurisdiction showing compliance with ANSI/SPRI/FM 4435/ES-1.

E. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1. For copings and roof edge flashings that are ANSI/SPRI/FM 4435/ES-1 tested and FM Approvals approved, shop shall be listed as able to fabricate required details as tested and approved.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Build mockup of typical roof edge, including fascia and fascia trim approximately 10 feet long, including supporting construction cleats, seams, attachments, underlayment, and accessories.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
2. Protect stored sheet metal flashing and trim from contact with water.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.10 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration in

    a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
    b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
    c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the following design pressure:

    1. Design Pressure: As indicated on Drawings.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

    1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
    1. Factory Prime Coating: Where painting after installation is required, pretreat metal with white or light-colored, factory-applied, baked-on epoxy primer coat; minimum dry film thickness of 0.2 mil .
    2. Clear Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

    3. Exposed Coil-Coated Finish:

a. Two-Coat Fluoropolymer: AAM/
percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

4. Color: As selected by Architect from manufacturer's full range.
5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

C. Stainless Steel Sheet: ASTM A240/A240M, [Type 304] [Type 316], dead soft, fully annealed; with smooth, flat surface.

1. Finish: ASTM A480/A480M, No. 4 (polished directional satin).

a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
b. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1) Run grain of directional finishes with long dimension of each piece.
2) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.

B. Self-Adhering, High-Temperature Sheet Underlayment: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer in accordance with underlayment manufacturer's written instructions.
1. Source Limitations: Obtain underlayment from single source from single manufacturer.
2. Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus 20 deg F or lower.

2.4 MISCELLANEOUS MATERIALS

A. Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads mat
applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
3. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.
4. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329.
5. Fasteners for Zinc Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329.

C. Solder:
1. For Stainless Steel: ASTM B32, with acid flux of type recommended by stainless steel sheet manufacturer.
2. For Zinc-Coated (Galvanized) Steel: ASTM B32

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187/D1187M.

2.5 FABRICATION, GENERAL

A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.

1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

5. Conceal fasteners and expansion provisions where possible in exposed work unless otherwise indicated. Do not conceal fasteners and expansion provisions on faces exposed to view.

B. Fabrication Tolerances:

1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

G. Seams:

1. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.

H. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters:

1. Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required.
2. Fabricate in minimum 96-inch- long sections.
3. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard, but with thickness not less than twice the gutter thickness.
4. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.
5. Gutter Profile: As shown on drawings
6. Expansion Joints: Lap type
7. Gutters with Girth up to 15 Inches. Fabricate from the following materials:

a. Aluminum: 0.032 inch thick.
b. thick.

B. Downspouts: Fabricate rectangular downspouts to dimensions indicated on Drawings, complete with mitered elbows. Furnish with metal hangers from[same material as downspouts and anchors.

1. Fabricated Hanger Style: as indicated on the drawings in accordance with SMACNA's "Architectural Sheet Metal Manual."
2. Fabricate from the following materials:
   a. Aluminum: 0.024 inch thick.

2.7 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- long, but not exceeding 12-foot- long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings; and form with 2-inch- high, end dams. Fabricate from the following materials:
1. Stainless Steel: 0.0156 inch thick.

2.8 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Overhead-Piping Safety Pans: Fabricate from the following materials:

1. Galvanized Steel: 0.040 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT

A. Self-Adhering, High-Temperature Sheet Underlayment:

1. Install self-adhering, high-temperature sheet underlayment; wrinkle free.
2. Prime substrate if recommended by underlayment manufacturer.

3. Comply with temperature restrictior
   primer for installing underlayment at low temperatures.
4. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses.
5. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller.
6. Roll laps and edges with roller.
7. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.

1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of welds and sealant.
3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
5. Install continuous cleats with fasteners spaced not more than 12 inches o.c.
6. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
8. Do not field cut sheet metal flashing and trim by torch.
9. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum and stainless steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.

1. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
3. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate
for nails and not less than 3/4 inch for wood screws, substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated.

a. Embed hooked flanges of joint members not less than 1 inch into sealant.
b. Form joints to completely conceal sealant.
c. When ambient temperature at time of installation is between 40 and 70 deg F set joint members for 50 percent movement each way.
d. Adjust setting proportionately for installation at higher ambient temperatures.

1) Do not install sealant-type joints at temperatures below 40 deg F.

2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter.

1. Pretin edges of sheets with solder to width of 1-1/2 inches; however, reduce pretinning where pretinned surface would show in completed Work.
2. Do not solder [metallic-coated steel] [and] [aluminum] sheet.
3. Do not pretin zinc-tin alloy-coated copper.
4. Do not use torches for soldering.
5. Heat surfaces to receive solder, and flow solder into joint.

a. Fill joint completely.
b. Completely remove flux and spatter from exposed surfaces.

6. Stainless Steel Soldering:

a. Tin edges of uncoated sheets, using solder for stainless steel and acid flux.
b. Promptly remove acid-flux residue from metal after tinning and soldering.
c. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

H. Rivets: Rivet joints in uncoated aluminum or zinc where necessary for strength.

3.4 INSTALLATION OF ROOF-DRAINAGE SYSTEM

A. Install sheet metal roof-drainage items to produce complete roof-drainage system in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Hanging Gutters:

1. Join sections with riveted and soldered joints or joints sealed with sealant.
2. Provide for thermal expansion.
3. Attach gutters at eave or fascia to firmly anchor them in position.
4. Provide end closures and seal watertight with sealant.
5. Slope to downspouts.
6. Fasten gutter spacers to front and back of gutter.
7. Anchor gutter with gutter brackets spaced not more than 24 inches apart to roof deck unless otherwise indicated, and loosely lock to front gutter bead.

C. Downspouts:

1. Join sections with 1-1/2-inch telescoping joints.
2. Provide hangers with fasteners designed to hold downspouts securely to walls.
3. Locate hangers at top and bottom and at approximately 60 inches o.c.
4. Provide elbows at base of downspout to direct water away from building.
5. Connect downspouts to underground drainage system.

D. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated on Drawings. Lap joints minimum of 4 inches in direction of water flow.

3.5 INSTALLATION OF ROOF FLASHINGS

A. Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard.

1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

C. Copings:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated.

    a. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch centers.

b. Anchor interior leg of coping w
24-inch centers.

3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.

1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.
2. Extend counterflashing 4 inches (over base flashing.
3. Lap counterflashing joints minimum of 4 inches
4. Secure in waterproof manner by means of snap-in installation and sealant or lead wedges and sealant or interlocking folded seam or blind rivets and sealantunless otherwise indicated.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.6 INSTALLATION OF WALL FLASHINGS

A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.7 INSTALLATION OF MISCELLANEOUS FLASHING

A. Equipment Support Flashing:

1. Coordinate installation of equipment support flashing with installation of roofing and equipment.
2. Weld or seal flashing with elastomeric sealant to equipment support member.

B. Overhead-Piping Safety Pans:

1. Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings.
2. Pipe and install drain line to plumbing waste or drainage system.

3.8 INSTALLATION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch)offset of adjoining faces and of alignment of matching profiles.

3.9 CLEANING

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

3.10 PROTECTION

A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

B. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.

C. Maintain sheet metal flashing and trim in clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 076200

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Mildew-resistant joint sealants.
5. Latex joint sealants.
6. Acoustical joint sealants

B. Related Requirements:

1. Division 320000 specifications for sealing joints in paved roads, parking lots, walkways, and curbing.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.

C. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:

1. Joint-sealant location and designation.
2. Manufacturer and product name.
3. Type of substrate material.
4. Proposed test.
5. Number of samples required.

D. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

E. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

F. Field-Adhesion-Test Reports: For each sealant application tested.

G. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Adhesion Testing: Use ASTM C 794 to determine adhesion of joint sealants to joint substrates. Primers and other preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with metal and wood substrates.
4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

1.8 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.9 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.

2. Disintegration of joint substrates from
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following:

1. Architectural sealants shall have a VOC content of 250 g/L or less.
2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250` g/L or less.
3. Sealants and sealant primers for nonporous substrates shall have a VOC content of 775 g/L or less.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Dow Corning Corporation.
b. GE Construction Sealants; Momentive Performance Materials Inc.
c. Pecora Corporation.
d. Sika Corporation.
e. Tremco Incorporated.

2.3 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

    a. Dow Corning Corporation.
    b. GE Construction Sealants; Momentive Performance Materials Inc.
    c. Pecora Corporation.
    d. Sika Corporation
    e. Tremco Incorporated.

2.4 URETHANE JOINT SEALANTS

A. Urethane, M, NS, 50, T, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade NS, Class 50, Uses T and NT.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

    a. Pecora Corporation.
    b. Polymeric Systems, Inc.
    c. Tremco Incorporated.

2.5 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Dow Corning Corporation.
    b. GE Construction Sealants; Momentive Performance Materials Inc.
    c. May National Associates, Inc.; a subsidiary of Sika Corporation.
    d. Tremco Incorporated.

2.6 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. BASF Corporation-Construction Systems.
    b. May National Associates, Inc.; a subsidiary of Sika Corporation.

c. Pecora Corporation.
d. Sherwin-Williams Company (The).
e. Tremco Incorporated.

2.7 ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant for Exposed and Concealed Joints: For each product of this description indicated in the Non-Elastomeric Joint-Sealant Schedule at the end of Part 3, provide manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C834 and the following:
1. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.
2. Acoustical Sealant for Exposed and Concealed Joints: Where joint sealants of this type are indicated, provide products complying with the following:
3. Products: Provide one of the following or equal:
a. AC-20 FTR Acoustical and Insulation Sealant; Pecora Corporation.
b. SHEETROCK Acoustical Sealant; USG Corp., United States Gypsum Co.
4. Applications: Interior exposed and concealed joints in concrete masonry and where indicated.

2.8 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. BASF Corporation-Construction Systems.
b. Construction Foam Products; a division of Nomaco, Inc.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.9 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical
sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.
    d. Exterior insulation and finish systems.
    e. Wood.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.

d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
4. Provide flush joint profile at locations indicated on Drawings according to Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C 1193.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

    a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
    b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

    a. Whether sealants filled joint cavities and are free of voids.
    b. Whether sealant dimensions and configurations comply with specified requirements.
    c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants

that fail to adhere to joint substrates during t
applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 081613 – FIBERGLASS REINFORCED POLYESTER (FRP) DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fiberglass reinforced polyester doors.
2. Fiberglass frames for non fire rated and rated fiberglass reinforced polyester doors.

B. Related Sections:

1. Division 08 Sections "Door Hardware" for door hardware.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
2. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
3. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
4. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.
5. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
6. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
7. ASTM D 256 - Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
8. ASTM D 543 - Evaluating the Resistance of Plastics to Chemical Reagents.
9. ASTM D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
10. ASTM D 2126 - Response of Rigid Cellular Plastics to Thermal and Humid Aging.
11. ASTM D 6670-01 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.
12. ASTM E 84 - Surface Burning Characteristics of Building Materials.
13. NFRC 102 – Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems.
14. NFRC 400 - Procedure for Determining Fenestration Product Air Leakage.
15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, components, hardware reinforcements, profiles, and finishes.

B. Templates: Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Details of anchorages, joints, field splices, and connections.
5. Locations of reinforcement and preparations for hardware.
6. Details of each different wall opening condition.
7. Details of accessories.
8. Details of preparations for power, signal, and control systems.

D. Samples for Verification:

1. Samples are only required by request of the architect.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain doors and frames through one source from a single manufacturer wherever possible.

B. Energy Efficient Exterior Openings: Comply with minimum thermal ratings, based on ASTM C1363. Openings to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.

1. Thermal Performance (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM C1363 and meet or exceed the following requirements:

   a. Door Assembly Operable U-Factor and R-Value Ratings: U-Factor 0.35, including insulated door, thermally broken hollow metal frame and threshold.

2. Air Infiltration (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM E283 to meet or exceed the following requirements:

   a. Rate of leakage of the door assembly shall not exceed 0.20 cfm per square foot of static differential air pressure of 1.567 psf (equivalent to 25 mph wind velocity).

C. Pre-Installation Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to

review proper methods and procedures for installing doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

B. Store materials under cover at Project site in accordance with the manufacturer's instructions. Do not store in a manner that traps excess humidity

C. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation. Stack doors and frames in a vertical upright position.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for door frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.8 WARRANTY

A. Provide manufacturer's written warranty against defects in materials and workmanship upon final completion and acceptance of Work in this section. Warranty period is ten years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CECO Door Products (C).
2. Curries Company (CU).
3. Special-Lite (SP).

B. Substitutions: Material from alternate door and frame fabricators will not be accepted on jobsite without prior written and sample approval in accordance with requirements specified in Division 01.

2.2 MATERIALS

A. Aluminum: 6063-T6 hardened aluminum alloy. 0.7 mil anodized finish.

B. Fiberglass Reinforced Plastic Sheet: Thickness of .120" with the finish color for the full thickness of the sheet.

2.3 FIBERGLASS REINFORCED POLYESTER DOORS

A. General: Provide 1-3/4 inch doors of type and design indicated, not less than thickness indicated; fabricated without visible joints or seams on exposed faces unless otherwise indicated.

1. Design: As indicated on the drawings.
2. Core Construction: Five pound density foam-in-place polyurethane core with a minimum U factor of 0.26.
3. Stiles and Rails: Extruded aluminum with mitered corners. Provide 3/8" diameter tie rods top and bottom.
4. Faces: Fiberglass reinforced plastic sheets of .120" thickness with a pebble texture.
5. Surface Applied Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6.

2.4 FIBERGLASS REINFORCED POLYESTER FRAMES

A. General: Provide frames from extruded tube backer with an applied stop.

1. Fabricate frames with butted ends.
2. Fabricate frames with corner brackets for secure fastening.
3. Stops are to be integral.

B. Configuration: Three sided, sidelight, transom, or borrowed light as indicated.

C. Surface Applied Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6.

2.5 FABRICATION

A. General: Fabricate work to be rigid and free of defects. Accurately form to required sizes and profiles.

B. Fiberglass Reinforced Polyester Doors:

1. Top Caps: Close tops of doors flush with aluminum top caps.

C. Fiberglass Reinforced Polyester Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

D. Surface Hardware Preparation: Factory prepare work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section, "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors to receive non-template, mortised and surface-mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of work for hardware.

2.6 FINISHES

A. Pebble texture face finish shall be:

1. As selected by owner/architect from manufacturers standard finishes.

B. Aluminum finish for stiles and rails shall be:

1. As selected by owner/architect from manufacturers standard finishes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prior to installation, check openings for squareness, alignment, twist, and plumbness.

B. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions. Comply with NFPA 80 at fire rated openings.

B. Fiberglass Reinforced Polyester Doors: Fit doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Doors:

a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
c. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).

2. Fire-Rated Doors: Install doors with clearances complying with NFPA80.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including stainless steel work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from stainless steel work immediately after installation.

C. Remove stains and materials that will have and adverse affect on the doors and frames and restore slight blemishes in accordance with manufacturer's instructions to match original finish.

END OF SECTION 081613

SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Fiberglass Doors”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 101 - Life Safety Code.
4. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   e. Explanation of abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for door hardware.
   g. Door and frame sizes and materials.
   h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

D. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.

3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:
   1. Seven years for heavy duty cylindrical (bored) locks and latches.
   2. Twenty five years for manual overhead door closer bodies.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

   1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

   1. Quantity: Provide the following hinge quantity:

      a. Two Hinges: For doors with heights up to 60 inches.
      b. Three Hinges: For doors with heights 61 to 90 inches.
      c. Four Hinges: For doors with heights 91 to 120 inches.
      d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

    a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
    b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

    a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
    b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

    a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
    b. Non-Ferrous Hinges: Stainless steel pins

5. Manufacturers:

    a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - TA Series. Hager BB Series

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

    a. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.3 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:

a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.4 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
5. Keyway: Match Facility Standard. Contact facility to verify existing keyway and keying system requirements.

C. Keying System: Each type of lock and cylinders to be factory keyed.

1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Field verify and key locks to match Owner's existing system.

D. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

E. Construction Keying: Provide construction master keyed cylinders.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified.

1. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.

2. Locks are to be non-handed and fully field reversible.

3. Manufacturers:

a. Corbin Russwin Hardware (RU) – CL3300 Series.

b. Sargent Manufacturing (SA) – 10 Line.
c. Stanley Best (BE) – 9K Series.
d. Yale Locks and Hardware (YA).

2.6 AUXILIARY LOCKS

A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) - DL4100 Series.
b. Sargent Manufacturing (SA) - 4870 Series.
c. Stanley Best (BE) - 48H Series.
d. Yale Locks and Hardware (YA).

2.7 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.8 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to

be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.

4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.

1. Manufacturers:

   a. Corbin Russwin Hardware (RU) - DC8000 Series.
   b. Norton Door Controls (NO) – 9500 Series.
   c. Sargent Manufacturing (SA) - 281 Series
   d. Yale Locks and Hardware (YA) - 4400 Series.

C. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Manufacturers:

   a. Corbin Russwin Hardware (RU) - DC6000 Series.
   b. Sargent Manufacturing (SA) - 351 Series.
   c. Norton Door Controls (NO) - 7500 Series.

d. Yale Locks and Hardware (YA).

2.9 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:

a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6. Manufacturers:

a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.10 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

a. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO), Glynn-Johnson

2.11 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE). National Guard

2.12 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.13 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Frames: Comply with ANSI/DHI A115 series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Section "Closeout Procedures" for project punch and reporting requirements including compliance with approved submittals and verification door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate selection for the material and application.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood
4. SA - SARGENT
5. RU - Corbin Russwin
6. RF - Rixson
7. SU - Securitron
8. OT – Other
9. VD – Von Derpin
10. HG – Hager
11. NG – National Guard
12. SC – Schlage
13. IV – Ives
14. GJ – Glynn Johnson

Hardware Sets

Set: 1.0

Doors: 200, 204 (Storage Door)

2 ea	Continuous Hinge	224HD	628	IV
2 ea	Manual Flush Bolt	FB358/FB458 (as req'd)	626	IV
1 ea	Dust Proof Strike	DP2	626	IV
1 ea	Storeroom Lock	L9080	630-AM	SC
1 ea	Closer w/ Stop (Active Leaf)	4040XP-SCUSH	689-SRI	LCN

1 ea	Overhead Stop (Inactive Leaf)	90S	SP28	GJ
1 set	Perimeter Seal	By FRP Door Manuf.		
1 ea	Threshold	By FRP Door Manuf.		
1 ea	Sweep	By FRP Door Manuf.		
1 ea	Astragal Seal	By FRP Door Manuf.		

Notes:
System Operational Narrative:
- Door normally closed and secure.

Set: 2.0

Doors: 201 (Storage Door)

3 ea	Hinge	BB1191 4.5 x 4.5 NRP	630-316	HG
1 ea	Storeroom Lock	L9080	630-AM	SC
1 ea	Closer w/ Stop	4040XP-SCUSH	689-SRI	LCN
1 set	Perimeter Seal	5050	CLR NGP	
1 ea	Threshold	By FRP Door Manuf.		
1 ea	Astragal Seal	By FRP Door Manuf6		

Notes:
System Operational Narrative:
- Door normally closed and secure.

Set: 3.0

Doors: 202 (Storage Door)

6 ea	Heavy-Weight Hinge	BB11199 5 x 4.5 NRP	630-316	HG
1 set	Auto Flush Bolt	FB31P/FB41P as req'd	630	IV
1 ea	Dust Proof Strike	DP2	626	IV
1 ea	Storeroom Lock	L9080	630-AM	SC
2 ea	Closer w/ Stop	4040XP-SCUSH	689-SRI	LCN
1 ea	Coordinator	COR x FL (MB as req'd)	628	IV
1 set	Perimeter Seal	5050	CLR NGP	
1 ea	Threshold	By FRP Door Manuf.		
1 ea	Sweep	By FRP Door Manuf.		
1 ea	Astragal Seal	By FRP Door Manuf.		

Notes:
System Operational Narrative:
- Door normally closed and secure.

END OF SECTION 087100

SECTION 099100 –PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following interior new and existing substrates:

1. Concrete Masonry Units (CMU)
2. Metal Ductwork
3. Metal Conduit
4. Steel
5. Gypsum board.
6. Wood Trim
7. Metal doors and frames

B. This Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Wood
2. Metal doors and frames
3. Stucco
4. Misc. metals
5. Misc. high-performance metals
6. Aluminum

C. Related Sections include the following:

1. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.
2. Division 08 Sections for factory priming windows and doors with primers specified in this Section.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

B. Quantity: Furnish an additional 2 percent, but not less than 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer Limitations

1. Provide all materials for all systems from the same manufacturer except where the manufacturer does not offer products in a specific system that conform to the requirements.

2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following manufacturers:

a. Benjamin Moore & Co.
b. PPG Architectural Finishes, Inc.
c. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For existing surfaces, verify the types of existing substrates and provide paint system compatible with surface to be covered (existing paint) while maintaining the intended sheen for the base material of the substrate.
3. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. Colors: As indicated in the finish schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.
5. Plaster: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

H. Aluminum Substrates: Remove surface oxidation.

I. Wood Substrates:
1. Sand surfaces that will be exposed to view, and dust off.
2. Prime edges, ends, faces, undersides, and backsides of wood.
3. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

J. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

K. Plaster Substrates: Do not begin paint application until plaster is fully cured and dry.

L. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:

1. Mechanical/Plumbing Work:

a. Uninsulated metal piping.
b. Uninsulated plastic piping.
c. Pipe hangers and supports.
d. Insulated items that have been previously painted.
e. Tanks that do not have factory-applied final finishes.
f. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
h. Mechanical equipment that is indicated to have a factory-primed finish for field painting.

2. Electrical Work:

a. Electrical equipment that is indicated to have a factory-primed finish for field painting.
b. Conduits & back/junction boxes
c. Electrical & low voltage panel tubs

3.4 FIELD QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:

1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Miscellaneous Steel Substrates:

1. Finish System

a. Prime Coat: Anticorrosive metal primer. Basis-of-Design: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer

b. Intermediate Coat: Interior matching topcoat. Basis-of-Design: Sherwin-Williams Pro-Industrial Pre-Catalyzed Epoxy
c. Topcoat: Interior (semi-gloss). Basis-of-Design: Sherwin-Williams Pro-Industrial Pre-Catalyzed Epoxy

B. Gypsum Board and Plaster Substrates (Walls):

1. High-Performance Architectural Latex System:

a. Prime Coat: Interior latex primer/sealer. Basis-of-Design: Sherwin-Williams ProMar 200 Zero VOC Primer

b. Intermediate Coat: High-performance architectural latex matching topcoat. Basis-of-Design: Sherwin-Williams ProMar 200 Zero VOC
c. Topcoat: High-performance architectural latex (semi-gloss or eggshell as indicated in the finish schedule). Basis-of-Design: Sherwin-Williams ProMar 200 Zero VOC

C. Gypsum Board and Plaster Substrates (Ceilings):

1. High-Performance Architectural Latex System:

a. Prime Coat: Interior latex primer/sealer. Basis-of-Design: Sherwin-Williams ProMar 200 Zero VOC Primer

b. Intermediate Coat: High-performance architectural latex matching topcoat. Basis-of-Design: Sherwin-Williams ProMar 200 Zero VOC
c. Topcoat: High-performance architectural latex (flat or as indicated in the finish schedule). Basis-of-Design: Sherwin-Williams ProMar 200 Zero VOC

D. Concrete Substrates, Traffic Surfaces:

1. Water-Based Clear Sealer System:

a. First Coat: Interior/exterior clear concrete floor sealer (water based).
b. Topcoat: Interior/exterior clear concrete floor sealer (water based).

3.7 EXTERIOR PAINTING SCHEDULE

A. Steel Substrates (standard metals)

1. Finish system

a. Prime Coat: Anticorrosive metal primer. Basis-of-Design: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer

b. Intermediate Coat: Exterior matching topcoat. Basis-of-Design: Sherwin-Williams Pro-Industrial Acrylic (satin or semi-gloss)
c. Topcoat: Exterior (satin or semi-gloss). Basis-of-Design: Sherwin-Williams Pro-Industrial Acrylic

B. Steel Substrates (high-performance metals)

1. Finish system

a. Prime Coat: Basis-of-Design: Sherwin-Williams Marcopoxy 646 Fast Cure

b. Intermediate Coat: Basis-of-Design: Sherwin-Williams Hi-Solids Polyurethane
c. Topcoat: Basis-of-Design: Sherwin-Williams Hi-Solids Polyurethane

C. Stucco

1. Finish system

    a. Prime Coat: Basis-of-Design: Sherwin-Williams Loxon Concrete and Masonry Primer

    b. Intermediate Coat: Basis-of-Design: Sherwin-Williams A-100 Exterior Latex (flat)
    c. Topcoat: Basis-of-Design: Sherwin-Williams A-100 Exterior Latex (flat)

D. Aluminum Substrates

1. Finish system

    a. Prime Coat: Basis-of-Design: Sherwin-Williams Bond-Plex Water Base Acrylic Coating

    b. Topcoat: Basis-of-Design: Sherwin-Williams Bond-Plex Water Based Acrylic Coating

E. Wood Substrates

1. Finish system

    a. Prime Coat: Basis-of-Design: Sherwin-Williams Exterior Oil Based Wood Primer

    b. Intermediate Coat: Basis-of-Design: Sherwin-Williams Pro Industrial Acrylic
    c. Topcoat: Basis-of-Design: Sherwin-Williams Pro Industrial Acrylic

END OF SECTION 099100

SECTION 105000 – SOLID PHENOLIC LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes athletic lockers as follows:

1. Type: Solid phenolic lockers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of locker and bench.

B. Shop Drawings:

1. Include plans, elevations, sections, and attachment details.
2. Show details full size.
3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
4. Show locations and sizes of cutouts and holes for items installed in lockers.
5. Show locker fillers, trim, base, sloping tops, and accessories.
6. Show locker identification system and numbering sequence.

C. Samples for Initial Selection: For each type of the following:

1. Manufacturer's color charts consisting of sections of actual units showing the full range of colors, textures, and patterns available for each type of compartment or screen indicated.

D. Samples for Verification:

1. Of each compartment or screen color and finish required, prepared on 6-inch- square Samples of same thickness and material indicated for Work.
2. Corner pieces of locker front frame joints between stiles and rail, as well as exposed end pieces, not less than 18 inches wide by 18 inches high by 6 inches deep (457 mm wide by 450 mm high by 152 mm deep).
3. Exposed cabinet hardware and accessories, one unit for each type and finish.

1.4 INFORMATONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Locker doors, complete with specified door hardware. Furnish no fewer than five of each type and color installed.
2. Units of the following locker hardware items equal to 10 percent of amount installed for each type and finish installed, but no fewer than five units:

    a. Hinges.
    b. Pulls.
    c. Shelf rests.
    d. Cylinder and drawer locks.
    e. Blank identification plates and holders.
    f. Hooks.

1.7 QUALITY ASSURANCE

A. Qualifications:

1. Fabricator shall have 10 years or more experience in fabrication of solid phenolic materials and shall be experienced in performing work of similar size and scope.
2. Fabricator shall be capable of providing field service representation.
3. Installer shall be approved by the manufacturer and be experienced in performing work of similar size and scope.
4. Pre Installation Meeting: Convene a preinstallation meeting two weeks before start of installation of lockers. Require attendance of parties directly affecting work of this section, including Contractor, Architect, installer, and manufacturer's representative. Review installation and coordination with other work

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockup of typical corner, including one locker on each side of corner and corner filler, as shown on Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

1. Do not deliver lockers until painting and similar operations that could damage lockers have been completed in installation areas. If lockers must be stored in other-than-installation areas, store only in areas where environmental conditions are the same as those in final installation location, and comply with requirements specified in "Field Conditions" Article.
2. Deliver master and control keys and combination control charts

B. Storage: Store materials in a clean, dry area in accordance with manufacturer's instructions.

C. Handling: Protect materials and finishes during handling and installation to prevent damage.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of lockers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures.
b. Faulty operation of locks or hardware.
c. Deterioration of wood, finishes, and other materials beyond normal use.

2. Warranty Period: Three years from date of Substantial Completion

1.10 PROJECT CONDITIONS

A. Field Measurements: Where lockers are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings.

1. Locate concealed framing, blocking, and reinforcements that support lockers by field measurements before being enclosed, and indicate measurements on Shop Drawings.

B. Established Dimensions: Where lockers are indicated to fit to other construction, establish dimensions for areas where lockers are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.11 COORDINATION

A. Coordinate sizes and locations of concealed wood support bases.

1. Requirements are specified in Section 061000 "Rough Carpentry."

B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that lockers can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: For lockers and locker benches indicated to be accessible, comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design," the ABA standards of the Federal agency having jurisdiction, and ICC A117.1.

2.2 SOLID PHENOLIC LOCKERS – L4

A. Manufacturers

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Basis of design: Spacesaver Corporation Day Locker
    b. Summit Lockers
    c. MultiSpace Locker Systems, a Division of Club Resource Group

2.3 MATERIALS

A. Panel Material:

1. Decorative papers impregnated with melamine resin on faces with a clear protective overcoat and integrally compression molded with a core of solid phenolic impregnated kraft papers.
2. Panel Material shall meet fire resistance per ASTM E84 Class A
3. Colors:

    a. Core: Black
    b. Locker Interior: Manufacturer’s full color range.
    c. Doors and Ancillary Panels: Manufacturer’s full color range.

B. Doors:

1. Material: 1/2 inch thick solid phenolic composite panels.
2. Corners: Rounded.
3. Edges: Chamfered.
4. Restraining Bar: Stainless steel, to allow a maximum opening of 90 degrees.
5. Door Fastening: Through bolted

C. Locker Bodies:

1. Exposed edges: Straight profile; eased edges to remove sharpness; machine polished and free from tooling imperfections.
2. Tops and intermediate shelves: 1/2” (13mm) thick solid phenolic composite material.
3. Locker backs: ¼” (6mm) thick solid phenolic composite material.

4. Locker Sides: 1/2" (13mm) thick solid phenolic composite material.
5. Bench Lid: 1/2" (13mm) thick solid phenolic composite material. 12" deep.
6. Lower Storage Bottom and Front: 1/2" (13mm) thick solid phenolic composite material with dual ventilation holes.
7. Locker Base:

    a. Unless otherwise noted: Base furnished with locker.

D. Ancillary Panels: Finished end panels and closures shall be ½" thick solid phenolic composite panels.

E. Hardware:

1. Hinges:

    a. Material: 304-grade stainless steel.
    b. Through-bolting at doors with stainless steel fasteners.
    c. Mounted to inside, invisible from outside of locker.
    d. Quantity: Three (3) for full height doors and two (2) for multi-tier units.

2. Interior Hooks:

    a. Material: High polish chrome plated brass.
    b. One (1) single-prong top hook and two (2) double-prong side wall hooks per locker.

3. Restraining Bar: Stainless steel, to allow a maximum opening of 90 degrees.
4. Fasteners: Exposed fasteners shall be 304-grade stainless steel.
5. Fastener Application: Apply directly into or through material.
6. Other Reinforcement: Aluminum or metal profiles for reinforcements shall not be permitted.
7. Bench Lid Dampener: One (1) hydraulic dampener per bench lid.

2.4 SIZE

1. Size, type, and style as indicated on drawings.

2.5 ACCESSORIES

A. Locking System:

1. Digital Keypad Lock: Battery-powered electronic keypad with reprogrammable manager and owner codes that override access. Three consecutive incorrect code entries will disable lock for three minutes.

    a. Designed for shared or temporary access by multiple users, with user-defined code to lock and unlock. Provide LED indicator to show when lock is in use

B. End Panels: ½ inch thick solid phenolic composite panels.
C. Filler Panels: ½ inch thick solid phenolic composite panels, verify per layouts

1. Lockers in Corridor L 150 shall have filler panels above lockers to soffit above (1'-4" +/-). Provide vertical seams to align with locker separations below.

D. Locker Top:

1. Top shall be flat of ½ inch thick solid phenolic composite panels.

E. Door Identification:

1. Number Plates: Identification plates to be black background with white fonts and surface mounted with permanent adhesive integral with the locking mechanism.
2. Fonts to be a minimum ½" high and up to four alphanumeric characters.
3. Numbering sequence to be provided by architect.

2.6 FABRICATION

A. Fabricate locker components square, rigid, with finish free of scratches and chips.
B. Assemble lockers together with Type 304 stainless steel fasteners directly into solid phenolic composite panels. Aluminum or other metal profiles or reinforcements are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive lockers. Notify Architect if areas are not acceptable. Do not begin installation until unacceptable conditions have been corrected.

3.2 INSTALLATION

A. General: Install lockers at locations indicated on the drawings and in accordance with manufacturer's written installation instructions. Install units rigid, straight, plumb, and level with flush installation. Install all required trim, fillers, end panels, and closures per manufacturer's instructions.

B. Hardware: Use manufacturer's supplied hardware.

C. Provide flush hairline joints against adjacent surfaces.

D. Attach number plates to doors after lockers are in place. Attach number plates in sequence as indicated on drawings.

E. Replace defective or damaged doors or other components as directed by Architect.

3.3 ADJUSTING AND CLEANING

A. Adjust doors and locks for smooth operation without binding.
B. Lubricate door hinges and locks per manufacturer's instructions.

C. Clean surfaces in accordance with manufacturer's instructions.

D. Do not use abrasive cleaners.

END OF SECTION 10500

SECTION 123661.16 - SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid surface material countertops.
2. Solid surface material backsplashes.
3. Solid surface material end splashes.

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials and sinks.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

1. Show locations and details of joints.
2. Show direction of directional pattern, if any.

C. Samples for Initial Selection: For each type of material exposed to view.

D. Samples for Verification: For the following products:

1. Countertop material, 6 inches square.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of countertops.

1.6 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.7 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

A. Solid Surface Material: Homogeneous-filled plastic resin complying with ISFA 2-01.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Basis of design: Corian. DuPont; DuPont de Nemours, Inc.
b. Formica Corporation.
c. Wilsonart LLC.

2. Colors and Patterns: As indicated on the drawings.

B. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Grade: Premium.

B. Configuration:

1. Front: Straight, slightly eased at top
2. Backsplash: Straight, slightly eased at corner.
3. End Splash: Matching backsplash.

C. Countertops:

1. 1/4-inch- (6.4-mm-) thick, solid surface material laminated to 3/4-inch- (19-mm-) thick plywood with exposed edges faced with 1/4-inch- (6.4-mm-) thick, solid surface material.

D. Backsplashes: 1/2-inch- (12.7-mm-) thick, solid surface material.

E. Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

1. Fabricate with loose backsplashes for field assembly.

F. Joints:

1. Fabricate countertops in sections for joining in field.

a. Joint Locations: Not within 18 inches (450 mm) of a sink or cooktop and not where a countertop section less than 36 inches (900 mm) long would result, unless unavoidable.

G. Cutouts and Holes:

1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.

a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch (5 mm) into fixture opening.

2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
4. Counter-Mounted Cooktops: Prepare countertops in shop for field cutting openings for cooktops. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet (3 mm in 2.4 m), 1/4 inch (6 mm) maximum. Do not exceed 1/64-inch (0.4-mm) difference between planes of adjacent units.

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.

D. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

E. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

1. Install metal splines in kerfs in countertop edges at joints. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

F. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

G. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.

H. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

1. Seal edges of cutouts in particleboard subtops by saturating with varnish.

I. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.16

SECTION 131113 - POOL GENERAL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Project administrative requirements that relate to Division 13 11 Pools.

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

B. The following contain requirements that relate in Division 13 11:
   1. Mechanical/Electrical/Equipment Coordination: General Conditions, Supplementary General Conditions and Division 01 General Requirements
   2. Earth Work and Pool Excavation: Division 31
   3. Concrete Deck Work: Division 03
   4. Mechanical: Plumbing Systems - Division 22, HVAC Systems and Equipment - Division 23
   5. Electrical: Division 26

C. Applicable requirements of the following Codes and Standards apply to Work in Division 13 11:
   1. Association of Pool and Spa Professionals (APSP)
      a. Minimum Standard for Public Swimming Pools
   2. National Electrical Code (NEC)
   3. National Sanitation Foundation (NSF): Seal of Approval Program
   4. American Society for Testing and Materials (ASTM): Specifications referenced herein.
   5. Governmental Health and Building Codes
   6. ADA Accessibility Guidelines for Buildings and Facilities
   7. American National Standards Institute

1.3 REFERENCES

A. Refer to individual Division 13 11 sections.

1.4 DESCRIPTION OF WORK

A. Work of Division 13 11 includes, but is not limited to, the following:
   1. Layout of all pool(s) and pool related work required under Division 13 11.
   2. Project benchmarks and control points.
   3. Excavation and stone fill as required for pool tank structure and pipe trenching. Refer to Division 01 and 31 for special conditions.
   4. Pool vessels, as detailed on Contract Drawings and Shop Drawings.
   5. Pool mechanical systems, including piping, recirculation system, filtration system, activity mechanical systems and water chemical treatment system.
   6. Heating system for swimming pool. Coordinate venting and interlocking for pool heater(s) with HVAC Contractor.
   7. Waterslide and water activity mechanical systems including all piping.
   8. Interior pool finishes.
   9. Pool deck equipment and accessory equipment shown and/or specified, including required anchors embedded within the pool deck and coordination with Deck Contractor.

10. Coordination of all electrical interlocks for pool and pool related equipment.
11. Miscellaneous pool testing, safety and control equipment.
12. Low voltage wiring for pool and pool related equipment is installed and connected by the Swimming Pool Contractor unless required otherwise by code. Where code requires that low voltage wiring is installed by a licensed electrical contractor, low voltage wiring is specified in Electrical Documents.

B. Definitions
1. The term "pool" as used in Division 13 11 shall refer to the following:
   a. Pool A – Leisure Pool
   b. Pool B – Wading Pool
2. The term "concrete" as used in Division 13 11 refers to concrete for swimming pool construction only.
3. The term "Architect/Engineer" as used in Division 13 11 refers to the swimming pool designer only.
4. The term "Contractor" as used in Division 13 11 refers to the swimming pool contractor only.
5. DELEGATED DESIGN: The term "delegated design" as used in Division 13 11 refers to Elements of the pool or pool systems which require the contractor to provide design services or certifications of a design professional licensed in the project location. The Owner and the Architect will specify performance and design criteria that such services must satisfy. The contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the contract documents. As may be required by the local jurisdiction, the contractor shall cause such services and or certifications to be provided by a properly licensed design professional, whose signatures and seal shall appear on all drawings, specifications, certifications, shop drawings, and other submittals prepared by such professional.
6. The term “Low Voltage Wiring” as used in Division 13 11 includes wiring <= 24V. All Low Voltage Wiring is Provided with the Equipment. Low voltage wiring is shown in Low Voltage Wiring Diagram included in the pool drawings except where specified by Electrical Consultant.
7. The term “Control Wiring” as used in Division 13 11 refers to connections from individual equipment components to the Building Management System (BMS).

C. Applicable Code Permit and Inspection Responsibilities.
1. State and/or County Health Department permit fees by Owner.
2. Local Departments of Health inspection fees by Contractor.
3. Other permits/fees required paid by Contractor.
4. Scheduling of Required Inspections – Contractor
5. Documentation and Submission of accepted modifications to approved plans to Permit Authorities – Contractor.

D. Related Work Not in Division 13 11 Specified Elsewhere
1. Pool deck construction, including finishes, sealants, and drains.
2. Potable water or fresh water: Fresh water connection to auto fill and wastewater connections (see Contract Drawings).
3. Pool electrical work: Electrical connections shall be by the General Construction Contract Electrical Sub-Contractor. The Pool Contractor shall provide the filter pumps, motors, solenoids, relays, water level probes (with housing), motorized valves, etc., as shown on Contract Drawings and required by pool systems equipment manufacturer. The Electrical Contractor shall install and wire electrical equipment furnished by the Pool Contractor and shall provide motor starters and disconnect switches as indicated or required by Codes. The Electrical Contractor shall provide grounding and bonding per NEC Article 680.
4. Control Wiring for all electrical and HVAC equipment shall be by the control system sub-contractor.
5. Heating system for pools, heater by the Pool Contractor; venting and controls by Division 23.
6. Surge Tank Ventilation System
   a. All surge tank equipment shall be purchased and installed by the Pool Contractor.
   b. All surge tank ventilation and plumbing shall be purchased and installed by the Mechanical Contractor.
   c. All plumbing shall be Schedule 40 PVC.
   d. Exhaust fan shall be of non-corrosive materials, Plastec 20 model PLA 20, or approved equal.
   e. Pool Contractor to coordinate surge tank penetrations with Mechanical Contractor.
   f. The Electrical Contractor shall provide all wiring, bonding, and grounding per NEC Article 680.

1.5 QUALITY ASSURANCE

A. Qualifications of Pool Contractor:
1. Work of Division 13 11 shall be performed by a Pool Contractor who has a minimum of five (5) projects with a proven five (5) year record of competence and experience in the construction of similar facilities of this size and complexity.
2. Pool Contractor prequalification is required prior to bid. This must be received by the Architect fourteen (14) days prior to the bid date on the appropriate AIA form. (AIA A305)
3. Pool Contractor shall meet all Local and State Certifications and License requirements prior to bidding. Copies of the required Certificates and Licenses shall be made available upon request.

B. Performance Criteria: Certain sections of Division 13 11 contain performance criteria rather than product descriptions. It shall be the obligation of the Pool Contractor to ensure that all criteria are satisfied and the burden of proof of conformance shall rest with the Pool Contractor. The Architect/Engineer shall require complete calculations, past performance records and, if required, inspection trips of similar facilities to substantiate conformance with these criteria. The Architect/Engineer shall be sole judge of conformance, and the Pool Contractor is cautioned that he will be required to provide a finished product meeting all stated criteria and meeting or exceeding Department of Public Health requirements.

C. All work of Division 13 11 shall be performed by the qualified Pool Contractor or a Subcontractor to the qualified Pool Contractor unless otherwise pre-approved in writing by the Architect/Engineer. A representative of the Pool Contractor shall oversee work subcontracted by the Pool Contractor.

D. The following shall be performed during construction of the project.
1. Refer to General Conditions, Division 01, and other Division 13 11 sections for further requirements.

1.6 SUBMITTALS

A. Submittals Required
1. Refer to General Conditions, Division 01, and individual Division 13 11 sections for number required.
2. The Contractor shall submit for approval to the Architect/Engineer complete lists, including descriptions, catalogs, product cut sheets, etc., and where applicable dimensioned shop drawings of all material, fixtures, and equipment to be furnished and installed as part of Division 13 11.
3. Submittals shall adequately and completely describe the equipment, including where necessary or requested complete construction and installation dimensions, complete capacity and performance data, all accessories and auxiliary equipment and all pertinent details of manufacture.
4. Submittals shall be provided in Adobe PDF electronic file format via email file size (10 MB max.). Create PDFs at native size and right-side up; illegible, partial, unlabeled, or unorganized submittal sections will be returned rejected. Contractor shall make their own copies from the original returned by the Architect.

B. Product Data: Provide manufacturer's/installer's written installation instructions.

C. Shop Drawings
1. The drawings accompanying this Specification are diagrammatic in nature and show the general arrangement of all equipment, piping, ductwork, services, etc. Because of the small scale of the drawings, it is not possible to show all offsets, fittings and accessories that may be required. The Contractor shall carefully investigate the structural and finish conditions of his work and shall arrange such work accordingly; furnishing all fittings, pipe and accessories that may be required to meet such conditions. Where conditions necessitate a rearrangement, the Contractor shall obtain the Architect/Engineer's approval.
2. Shop drawings for equipment shall be submitted, and Engineer’s review of shop drawing shall be obtained before proceeding with fabrication. Shop drawings shall not be "doctored" reproductions of Architect/Engineer’s drawings.

D. Samples: Submit samples of materials, finishes, and trim as requested by the Architect/Engineer.

E. Schedule of Values
   1. Provide Architect/Engineer with a copy of the Schedule of Values developed for this project relevant to Division 13 11 for approval.

F. Valve Charts: Submit two (2) copies of valve charts for each piping system, consisting of Isometric Drawings or piping layouts showing and identifying each valve and describing its function to the Architect/Engineer for approval.
   1. Upon completion of the Work, one (1) copy of each chart sealed to rigid backboard with clear lacquer placed under glass and framed, shall be hung in a conspicuous location in the equipment room.

G. Furnish to the Architect/Engineer the following:
   1. Refer to individual Division 13 11 sections for additional requirements.
   2. Submittals
      a. Shotcrete Nozzle Man Qualifications and Certifications
      b. Pool Finish Experience/Qualification Requirements
      c. Concrete Mix Design
      d. Non-shrink Grouts
      e. PVC and Pre-formed Plastic Adhesive Waterstop
      f. Expansion/Construction Joint Materials
      g. Caulking/Sealants
      h. Pumps and Strainers
      i. Heater(s)
      j. Chemical Controller(s)
      k. Chemical Feeders
      l. Bulk Chemical Storage Tanks
      m. Valves
      n. Gauges
      o. Flow Meters
      p. Thermometers
      q. Pool Water Test Kit
      r. Inlets
      s. Grating
      t. Pre-fabricated Submerged Outlets
      u. Under Water Pool Lighting
      v. Deck Equipment
      w. Safety Equipment
      x. Maintenance Equipment
      y. Piping Materials (pipe, fittings, solvents, cements)
      z. Wall Sleeves and Seals for Piping
      aa. Tile Setting Materials and Joint Fillers
   3. Shop Drawings
      a. Reinforcing Steel
      b. Pool Play Equipment & Water Activities
      c. Filters
      d. Stainless Steel Gutter
      e. Precast Pool Coping Stone
      f. UV Disinfection System
      g. Concrete Pump Pit & Surge Tank Penetration Drawings
      h. Water Flume Rides/Towers
   4. Test Results
      a. Water Treatment Analysis
      b. Compaction
      c. Piping Pressure Testing
   5. Samples
      a. Special Aggregate – Factory and Field Applied
      b. Tile
      c. Gratings
   6. Guarantees/Warranties
      a. Standard 1-Year

b. Standard 5-Year on Quartz Aggregate Finish
c. Standard 2-Year on Pool Finish Application
d. Special Equipment – Standard Manufacturer's Warranty
e. Future 3-Days of Instruction and Operational Checkout

7. Close Out Documents
   a. O & M Manuals
   b. Record Drawings
   c. Owner's Certification of Instruction
   d. Extra Materials

1.7 SUBSTITUTIONS

A. Refer to General Requirements and Division 01.

B. Along with the Shop Drawings, the Contractor shall submit, in duplicate, a certificate properly attested, stating the material, equipment, and construction comply with the requirements of the Contract Documents, for all equipment and materials proposed as a Substitute for the specified equipment and materials.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Refer to General Requirements and Division 01 of the Specifications for additional requirements.

B. Deliver all materials and equipment to the work site in original packages, fully identified with manufacturer's label. Store off ground and protect from weather with a suitable covering.

C. Protect plastic pipe from exposure to chemicals (aromatic hydrocarbons, halogenated hydrocarbons and other esters and keytones) that might attack the material. Protect all pipes from mechanical damage and long exposure to sunlight during storage.

1.9 WARRANTIES

A. Warranty: Provide one (1) year warranty covering all pool workmanship, materials, and equipment. Refer to General Requirements and Division 01 of the Specifications for additional requirements.

B. All standard manufacturer's warranties shall apply to all equipment and products provided by this Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EQUIPMENT BASES AND SUPPORTS

A. Provide for major equipment, reinforced concrete housekeeping bases poured directly on structural floor slabs (or as required by equipment manufacturer) 4 inches thick minimum; unless noted otherwise on plans, extended 4 inches beyond machinery bedplates. Provide templates, anchor bolts, vibration isolators, and accessories required for mounting and anchoring equipment. Anchorage system shall be in accordance with the equipment manufacturer's specifications and local code requirements. Consult with equipment manufacturer for length and installation of anchor bolts.

3.2 CLEAN UP AND PROTECTION

A. After work of Division 13 11 has been completed, cleanup work areas and remove all equipment, excess materials, and debris. Protect pool from damage until substantial completion. Remove and replace equipment and finishes that are chipped, cracked, abraded, improperly adhered, or otherwise damaged.

B. At turnover to Owner, Contractor shall be responsible for, but not limited to, the following:
   1. Vacuuming and cleaning all pool floors, steps, and walls.
   2. Cleaning all depth marker tiles, pool tile and gutter grating.
   3. Cleaning and waxing of all pool deck equipment, water features and stainless-steel products per Manufacturer's instructions.
   4. See also Division 01 Specification requirements.

END OF SECTION 131113

SECTION 131114 - POOL START-UP, MAINTENANCE & OPERATIONS TRAINING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pool start-up and chemical balancing of water.

B. Training of the Owner's personnel in pool operations procedures.

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

1.3 DESCRIPTION OF WORK

A. Water treatment and balancing.

B. Operations and maintenance instruction and manuals.

1.4 SUBMITTALS

A. Operations and Maintenance (O&M) Manual
   1. Pool Contractor shall deliver to the Architect/Engineer water sample location, analysis test results, SI calculation, and chemical adjustment calculations per Part 3.03.
   2. Pool Contractor shall deliver to the Architect/Engineer, bound together in a three-ring binder a complete manual, four (4) complete sets of operating and maintenance instructions for the swimming pool structure(s), finishes, and all component equipment. O&M Manual shall include, but is not limited to, the following:
      a. Table of contents.
      b. All equipment cut sheets.
      c. Accurate parts lists.
      d. Pool start-up, emptying, and winterization instructions.
      e. Pool equipment commissioning certifications.
      f. Pool and equipment operation and maintenance training certifications.
      g. Pool cleaning instructions.
      h. Pool maintenance requirements, divided into the following:
         1) Daily
         2) Weekly
         3) Monthly
         4) Seasonally
         5) Annually
      i. Narrative on the pool operation through all sequences.
      j. A DVD of complete start-up and shut-down procedures and training session.
      k. Trouble shooting information and procedures.
      l. A schematic of piping as installed.
      m. Valve charts for each piping system, consisting of isometric drawings or piping layouts showing and identifying each valve and describing its function.
      n. Copy of Measurement Certification of Permanent Racing Course
      o. Record Drawings

p. Warranties

PART 2 - MATERIALS (Not Used)

PART 3 - EXECUTION

3.1 EQUIPMENT START-UP & COMMISSIONING

A. Provide pool equipment start-up and commissioning services. See individual pool equipment specification sections and provide services in accordance with all specification requirements. Provide Equipment Commissioning Certifications. Certifications to include date/s of commissioning activities, a summary of the commissioning work performed, signature of commissioning agent/s, and a Certification statement that equipment has been properly installed and commissioned per the manufacturer's requirements. Include copies of all equipment Commissioning Certifications in the Owner's Operation and Maintenance Manual, and as a Submittal to the Engineer/Architect.

3.2 OPERATIONS & MAINTENANCE INSTRUCTION

A. Provide an experienced swimming pool operator-instructor (NSPF Certified Pool Operator, or equivalent certification) for a period of not less than three (3) days (two (2) full days operations and start-up, and one (1) full day shut-down assistance) after the pool has been filled and initially placed into operation.
1. During this period, the Owner's designated representative(s) shall be thoroughly instructed in all phases of pool and pool equipment operation and maintenance (O&M).
2. At a minimum, the swimming pool training and O&M Manuals must include the following:
   a. General pool operations,
   b. Pool materials and deck equipment maintenance,
   c. Pool fill and operating water level
   d. Pool/Equipment start-up, shut-down, emptying, and winterizing procedures.
   e. Circulation pumping, pipe, fittings, valves, and ancillary equipment,
   f. Filtration equipment,
   g. Heating/cooling equipment,
   h. Chemical treatment & monitoring systems,
   i. Slide and water features
3. Equipment training must be provided by the certified swimming pool operator-instructor and qualified equipment manufacturer representatives. See individual Specification sections for pool materials/equipment training and O&M requirements.

B. Contractor shall obtain written certification from the Owner's designated representative acknowledging that all O&M instructions/training and materials have been provided. Certification shall include the detailed listing of equipment above with training completion and delivery dates, instructor contact information, and Owner representative's signatures.

C. Include the cost of three (3) additional days of instruction and operational checkout/verification by an experienced swimming pool operator-instructor during the first year's operation. Written reports of each of these three (3) visits outlining the pool's operation, competence and performance of the pool's operating personnel and other pertinent comments shall be submitted to the Owner and Architect/Engineer within one week after each visit.

D. Provide a DVD documenting training and operational requirements, including start-up, emptying, and winterizing procedures.

E. In addition to initial pool instruction listed, the Pool Contractor shall perform the first season pool closing (winterizing) and the following season pool start-up, including all labor and materials required.

3.3 WATER TREATMENT AND BALANCING

A. Obtain a chemical analysis of the source/pool make-up water supply from a location as close as possible to the actual pool autofill. Conduct laboratory testing for the following parameters:
   1. Total Alkalinity [Parts per Million (ppm)]
   2. pH
   3. Calcium Hardness [ppm]
   4. Free Chlorine [ppm] & Combined Chlorine [ppm]
   5. Total Dissolved Solids (TDS) [ppm]
   6. Iron (Must test to a lower detectable limit of <=0.05 ppm)
   7. Manganese (Must test to a lower detectable limit of <=0.01 ppm)
   8. Copper (Must test to a lower detectable limit of <=0.1 ppm)
   9. Cyanuric Acid (CYA) [ppm]

B. The following are ideal ranges for the water analysis test results. If results fall outside these ranges the Contractor shall make chemical adjustments to the water during the pool filling process until values within the ideal ranges are obtained.
   1. Total Alkalinity: 80-100 ppm (for high pH disinfectants) 100-120 ppm (for low pH disinfectants)
   2. pH: 7.4-7.6
   3. Calcium Hardness: 200-400 ppm (Pools), 150-250 ppm (Spas)
   4. Free Chlorine: 2.0-4.0 ppm & Combined Chlorine: 0.0-0.2 ppm
   5. Total Dissolved Solids: Acceptable Start-up Range is not applicable (Maintain future TDS levels to within 1500 ppm above the start-up measurement)
   6. Temperature: Ideal Range is +-2 degrees F from the desired pool operating water temperature.
   7. Iron: <=0.05 ppm
   8. Manganese: <=0.01 ppm
   9. Copper: <=0.1 ppm

C. Contractor shall calculate the Langlier Saturation Index (LSI) using values from the water analysis. The formula for LSI is shown below. Calculations may be made easier using through use of Orenda Technologies Mobil App, or a similar calculator. The LSI values shall fall within an acceptable “balanced” range of -0.3 to +0.5. If the LSI is outside this range OR test values are outside the ideal range listed above, the Pool Contractor shall prepare to add chemicals to the pool water volume as required until all parameters are within the ideal ranges previously listed, and the LSI is considered “balanced”. Contractor is responsible for calculating required chemical additions and for adding all adjustment chemicals up until the time of project completion. Owner is responsible for providing the chemicals.

LSI Equation:
LSI = (pH) + (Temperature factor) + (Calcium factor) + (Alkalinity factor) – (TDS factor)
LSI = pH+Tf+Cf+Af-TDSf

Af: The Alkalinity Factor is determined by correcting the Total Alkalinity for Cyanuric Acid (CYA) to find the Carbonate Total Alkalinity. To make this correction, subtract 1/3 of the measured CYA from the total alkalinity. Then use the corrected Carbonate Total Alkalinity to determine the Alkalinity factor (Af). [Carbonate TA =TA-(CYA/3)]

Langelier Saturation Index (LSI) - Factor Table								
Temperature			Calcium Hardness expressed as CaC02		Total Carbonate Alkalinity		Total Dissolved Solids (TDS)	
F	C	factor	ppm (mg/L)	factor	ppm (mg/L)	factor	ppm (mg/L)	factor
32	0	0	25	1	25	1.4	≤ 800	12.1
37	2.8	0.1	50	1.3	50	1.7	801-1,500	12.2
46	7.8	0.2	75	1.5	75	1.9	1,501-2,900	12.3
53	11.7	0.3	100	1.6	100	2	2,901-5,500	12.4
60	15.6	0.4	125	1.7	125	2.1	> 5,500 5	12.5
66	18.9	0.5	150	1.8	150	2.2		
76	24.4	0.6	200	1.9	200	2.3		
84	28.9	0.7	250	2	250	2.4		
94	34.4	0.8	300	2.1	300	2.5		
105	40.6	0.9	400	2.2	400	2.6		
			800	2.5	800	2.9		

D. Contractor shall provide a submittal to the Engineer/Architect after receiving the water analysis. Submittal shall include the following:
   1. Water sample location and analysis test results,
   2. LSI Calculation,
   3. Chemical adjustment calculations indicating the following:
      a. Pool Volume
      b. Chemical Parameters requiring adjustment
      c. Chemicals required to make the adjustments
      d. Calculations showing amounts of each chemical addition that is required

E. Contractor shall provide list of required balancing chemicals with quantities to the Owner for Owner purchase immediately after receiving the approved submittal from the Engineer/Architect.

F. The Owner shall be responsible for payment of water required to fill each pool one time for leak testing and a second time for the final pool start-up process. The Contractor shall be responsible for payment of any additional water and chemicals required due to draining and refilling of pools as needed for pool or pool piping repairs.

G. Contractor shall make chemical adjustments to the pool water during the pool startup process based on calculations provided in the approved submittal. It is critical to keep the pool water clean and balanced during the initial fill and while the pool plaster finish is curing. Follow all recommendations of the National Pool Plasterers Council for initial adjustments required during the plaster cure time. See additional requirements in Pool Finish Specification Section/s.

H. OUTDOOR POOLS ONLY: Stabilize pool water to within a range of 5 to 15 ppm maximum of cyanuric acid (CYA).

I. Heat pool water to within 5 degrees Fahrenheit of the desired pool operating temperature. Once this temperature is attained, the Pool Contractor shall enter the chemical controller settings for all chemical parameters. Do not enter chemical controller settings prior to reaching the desired pool operating temperature range.

END OF SECTION 131114

SECTION 131118 - POOL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Cast-in-Place Concrete to be used for pool floor and wall construction and related structures including surge/collector/balance tanks.
2. Shotcrete alternate to pool wall construction only if Contractor's qualifications have been pre-approved by Architect/Engineer.
3. Concrete used for Aquatic Play Surfaces without safety surfacing
4. Admixtures.
5. Curing and Treatment Requirements.
6. Formwork, shoring, bracing, and anchorage.
7. Concrete reinforcement and accessories.

B. Related Sections:
1. Applicable provisions of Division 01 – General Requirements shall govern all work under this Section

1.2 REFERENCES

A. Incorporated Guides and References:
1. American Concrete Institute (ACI):
   a. ACI 302.1R – Guide for Concrete Floor and Slab Construction.
   b. ACI 304R – Guide for Measuring, Mixing, Transporting and Placing Concrete.
   c. ACI 304.2R - Placing Concrete by Pumping Methods.
   d. ACI 305R - Hot Weather Concreting.
   e. ACI 309R – Guide for the Consolidation of Concrete.
   f. ACI 347 – Guide to Formwork for Concrete.
   g. ACI SP-66 – ACI Detailing Manual.
2. Concrete Reinforcing Steel Institute (CRSI):
   a. CRSI Manual of Standard Practice
   b. CRSI 63 – Recommended Practice for Placing Reinforcing Bars.
3. National Electric Code (NEC):
   a. Article 680 – Swimming Pools, Fountains, and Similar Installations.

B. Specifications & Standards:
1. American Concrete Institute (ACI):
   a. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials.
   b. ACI 301 - Specifications for Structural Concrete.
   c. ACI 305.1 – Specification for Hot Weather Concreting.
   d. ACI 306.1 – Standard Specification for Cold Weather Concreting.
   e. ACI 308.1 – Specification for Curing Concrete.
   f. ACI 315 - Details and Detailing of Concrete Reinforcement.
   g. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
   h. ACI 350.1 – Specification for Tightness Testing of Environmental Engineering Concrete Containment Structures
   i. ACI 506.2 – Specification for Shotcrete
2. ASTM International (ASTM):
   a. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
   b. ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

c. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field.
d. ASTM C33 – Standard Specification for Concrete Aggregates.
e. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
f. ASTM C94 – Standard Specification for Ready-Mixed Concrete.
g. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete
h. ASTM C150 – Standard Specification for Portland Cement.
i. ASTM C171 – Standard Specification for Sheet Materials for Curing Concrete.
j. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete.
k. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
l. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete.
m. ASTM C321 – Standard Test Method for Bond Strength of Chemical-Resistant Mortars.
n. ASTM C494 – Standard Specification for Chemical Admixtures for Concrete.
o. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use in Concrete.
p. ASTM C672 – Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals
q. ASTM C1602 – Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
r. ASTM D1037 – Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.
s. ASTM D4541 – Standard Test Methods for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
t. ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials.
u. ASTM F2461 - Standard Practice for Manufacture, Construction, Operation, and Maintenance of Aquatic Play Equipment

3. Standards Australia (AS)
   a. AS - 4586 Slip Resistance Classification of New Pedestrian Surface Materials
4. Corps of Engineers:
   a. CRD C-527 - Corps of Engineers Specification for Polyvinylchloride Water Stop.
5. NSF International (NSF)
   a. NSF/ANSI Standard 61 – Drinking Water System Components

1.3 SUBMITTALS

A. Submit proposed mix design of each class of concrete to Engineer/Architect not later than 10 days after Notice to Proceed or twenty-one (21) days prior to the first concrete placement, whichever comes first.

B. Submit shop drawings of reinforcing steel under provisions of Division 01 – General Requirements.
   1. Initial submittal of reinforcement shop drawings shall be complete. No partial submittals will be accepted.
   2. Indicate reinforcement sizes, spacing, locations and quantities of reinforcing steel, bending and cutting schedules, splicing, supporting and spacing devices. Include additional reinforcement for opening through concrete structures.
   3. Reinforcement placement shop drawings shall conform to ACI SP-66 providing full wall elevations.

C. Material Certificates: For each of the following, signed by the manufacturers:
   1. Cementitious materials.
   2. Admixtures.
   3. Waterstops.
   4. Non-shrink grouts.
   5. Expansion Joint Materials.
   6. Sealants.
   7. Waterproof Bondcoat
   8. Concrete Densifier

D. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
   1. Aggregates.
   2. Concrete Testing
   3. Compaction

E. Shotcrete Nozzleman Qualifications.

F. Pool Finish Experience/Qualification Requirements.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301, 305.1, and 306.1.

B. Maintain copy of ACI 301 on site.

C. Qualifications of Pool Contractor
   1. Work of this Section shall be performed by a Contractor who has a proven record of competence and experience in the construction of similar facilities of this size and complexity for not less than five (5) years. Contractors shall have an established record of reliability.

D. Qualifications of Nozzleman and Gunman
   1. Except when shotcrete is applied under a fully automated process, the quality of shotcrete depends largely on the skill of nozzleman and gunman, and the Contractor shall satisfy the Architect/Engineer that the nozzleman has had a minimum of two years' continuous experience on shotcreting of this type of work, and that the gunman has handled the gun for a period of at least six months. The nozzleman shall show proof of good quality successful shotcreting work similar to that required for this project. Experience gained on shotcrete and ditch construction will not be considered as experience for qualifying the nozzleman.

E. Concrete Testing: The following tests shall be performed during construction of the project. Refer to General Conditions and Division 01 for further requirements.
   1. Tests to measure slump, entrained air content and compressive strength shall be conducted by independent testing laboratory employed by the Contractor unless noted otherwise in front-end specifications.
      a. Provide minimum of two 6 by 12 in. cylinders or three 4 by 8 in. cylinders per 150 cubic yard or fraction thereof for each class of concrete poured each day. Comply with ACI 318 (samples secured - ASTM C172, cylinders prepared and cured - ASTM C31, and tested - ASTM C39). Identify samples moist cure at 70 degrees F for five (5) days and ship samples to laboratory.
   2. Slump and Air Content Tests
      a. Perform on concrete from same batch as sampled for strength tests and whenever there is consistency of concrete. Slump tests shall be made in accordance with ASTM C143. Air content tests shall be made in accordance with ASTM C231. If measured slump or air content falls outside specified limits, check shall be made immediately on another portion of same sample. In event of second failure, concrete shall not be used in Work.
   3. Compliance
      a. Average of any three (3) consecutive strength tests for each class of concrete shall be equal to or greater than specified strength, and no individual test shall fall more than 500 psi below specified strength.
      b. When tests results are below specified requirements or when tests of field cured cylinders indicate deficiencies in protection and curing, Architect/Engineer may require additional tests in accordance with ACI 318.

F. Wet Mix Process Cylinder Sample
   1. Where automated wet mix equipment is used, shotcrete cylinders shall be taken from the mixer or ready-mix truck and tested in accordance with the requirements specified in this Section. Wet mix processes shall only be used with approved automated equipment.

G. Pools, surge tanks, and gutters shall have a water tightness performed per ACI 350.1. Documentation of testing and results shall be submitted for review. Refer to Water Tightness Test section of this specification.

1.5 REGULATORY REQUIREMENTS

A. Conform to requirements of local, state and federal rules and regulations applicable to Work and Project location.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Concreting
1. Placement and curing of concrete where (1) average daily temperature for three consecutive days is less than 40 degrees F, and (2) air temperature is not greater than 50 degrees F for more than one-half of a 24-hour period from midnight to midnight shall be in accordance with ACI 306.1.

B. Hot Weather Concreting
1. Placement and curing of concrete subject to a combination of (1) rising air temperature (generally greater than 75 degrees F) and (2) wind and low relative humidity shall be in accordance with ACI 305.1.
2. Contractor shall provide plan for minimizing exposure of concrete to adverse conditions due to combinations of high air temperature, direct sunlight, drying winds, and high concrete temperature.
3. Protect concrete from rapid temperature drop.
4. Pre-wet subgrade and forms.

1.7 WARRANTIES

A. Special 2-Year on Concrete Structure: The Pool Contractor shall guarantee for two (2) years repair of the concrete pool structure.

PART 2 - PRODUCTS

2.1 SUBGRADE, SUBBASE AND BACKFILL MATERIALS

A. Pool Subgrade:
1. In-situ soils meeting the Project Geotechnical Report requirements for materials and preparation.
2. Subgrade soils must meet the soil parameters for pool structural design as stated in the Pool Structural Drawings for:
a. Net allowable soil bearing capacity in pounds per square foot (PSF),
b. Stated equivalent fluid pressure in pounds per square foot per foot (PSF/FT),
c. Ground water elevation
3. Pool subgrade materials shall be free of large rocks, organic matter, and other deleterious substances.

B. Filter Fabric:
1. MIRAFI 140N: Nonwoven polypropylene geotextile barrier, 4.8 oz/yd2, by Tencate Geosynthetics.

C. Concrete Pool/Tank Subbase & Backfill Materials:
1. Existing subsoil materials shall not be used for pool subbase.
2. Prefabricated Pool Panels: See Pool (PL) drawing details for prefabricated pool wall panel backfill materials and installation requirements. The requirements of this section are for concrete structures only.
3. ASTM D 2487 Class IA Manufactured Aggregate:

a. Aggregate containing little or no fines (clear), including angular, crushed stone or rock, crushed slag, cinders, or shell.
b. Gradation: Open graded, clean: < = 10% Passing No.4 sieve, < 5% Passing No. 200 sieve.
c. Concrete Pool/Tank Subbase: ¾" to 1" nominal sized aggregate.
d. Concrete Pool/Tank backfill: ¾" nominal sized aggregate.

2.2 FORM MATERIALS

A. Plywood Forms: Douglas Fir or Spruce-Pine-Fir species: Sound, undamaged sheets with clean true edges, exterior glue, facing material to provide finish specified.

B. Lumber: Douglas Fir or Spruce species; construction grade or better; with grade stamp clearly visible.

C. Preformed Steel Wall Forms: Minimum 16 gage thick, Vertically and horizontally matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and surface appearance.

D. Tubular Column Type: Round, spirally wound laminated fiber material; inside surface treated with release agent.

E. Form Ties for Exposed Surfaces: Plastic cone snap ties with 1-inch outside diameter by 1-inch (nominal) long cones, with no metal within 1-inch of concrete face after removal;
1. Manufacturers:
a. Advance Concrete Formwork, Inc.
b. Dayton Superior.
c. Symons - A Dayton Superior Company.
d. Williams Form Engineering Corporation.
e. Substitutions: As approved by Engineer/Architect.

2.3 SHOTCRETE

A. Mix Design
1. Wet-mix design only. Dry mix, mixed at the nozzle, shall not be allowed.
2. A proven mix design shall be used for all Shotcrete applications.
3. In addition to cylinders, testing of shotcrete shall be done per ACI 506.2.

B. Rebound
1. Rebound materials shall not be reused in any form for shotcrete work and shall never be worked into the construction by the nozzleman.

2.4 REINFORCING STEEL

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

B. Reinforcement Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire fabric, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete. Supports shall have a minimum 2" concrete cover on waterside of pool concrete.

2.5 CONCRETE MATERIALS

A. Cementitious Materials
1. Portland Cement: ASTM C150, gray color, Type I except as specified below.
2. Fly Ash: ASTM C618, Class C.

3. Limit cement replacement to 20%.

B. Fine and Coarse Aggregates: ASTM C33.

C. Water: ASTM C1602, clean and not detrimental to concrete.

D. Admixtures
1. Admixtures to be used in the concrete mixture shall be submitted to the Engineer for approval as part of the mixture proportions.
2. Admixtures containing intentionally-added chlorides, sulfides, or nitrides are not permitted.
3. Admixtures shall be certified to NSF/ANSI 61.
4. Air-Entraining Admixture: ASTM C260.
5. Water Reducing Admixture: ASTM C494, Type A.
6. Retarding Admixture: ASTM C494, Type B or Type D.
7. Accelerating Admixture: ASTM C494, Type C or Type E.
8. High-Range Water-Reducing Admixture: ASTM C494, Type F.
9. Workability-Retaining Admixture: ASTM C494, Type S.
10. Shrinkage-Reducing Admixture: ASTM C494, Type S.
11. Crystalline Waterproofing Admixture: ASTM C494, Type S.
    a. Uses insoluble crystalline compounds to block capillary pores.
    b. Crack sealing ability up to 0.016 in (0.40 mm).
    c. Water Penetration: Manufacturer must provide independent testing report that shows concrete treated with crystalline waterproofing admixture has the capability to reduce water penetration into concrete by 70 percent as compared to control mix, when measured by EN 12390-8/DIN 1048.
12. The amount of admixture added to the concrete shall be in accordance with the manufacturer's recommendations.
13. Admixtures permitted shall be supplied by a single manufacturer for project.
14. Approved Manufacturers:
    a. Axim Italcementi Group.
    b. Master Builders Solutions
    c. Grace Construction Products.
    d. The Euclid Chemical Company.
    e. Xypex
15. Substitutions: As approved by Engineer/Architect.

2.6 ACCESSORIES

A. Pool Concrete PVC Waterstop
1. Center bulb type and size shall be as shown on Drawings, extruded from an elastomeric plastic compound, the basic resin of which shall be polyvinyl chloride (PVC). No reclaimed PVC shall be used in the compound. Meet the performance requirements of CRD C-572 and the Table below.
2. PVC Waterstop Physical Property Table:

Property	Test	Value
Water absorption	ASTM D570	0.15% max.
Tear resistance	ASTM D624	300 lb/in min
Ultimate elongation	ASTM D638	350% min.
Tensile strength	ASTM D638	2000 psi min.
Low temperature brittleness	ASTM D746	Passes @ -35°F / -37°C

Stiffness in flexure	ASTM D747	700 psi min.
Specific gravity	ASTM D792	1.38 max.
Hardness Shore A15	ASTM D2240	79 ± 3
Tensile strength after accelerated extraction	CRD- C 572	1600 psi min.
Elongation after accelerated extraction	CRD- C 572	300% min.
Effect of Alkali: - Weight Change - Hardness Change	 CRD- C 572 CRD- C 572	 +0.25%-0.10% +/-5 points

3. All waterstops shall be rated for a minimum of 50 psi head pressure, have a 1" outside diameter center bulb, a number of parallel ribs or protrusions on each side of the center of the strip, and a constant thickness from the edge of the bulb to the outside edge. Corrugated type or tapered waterstops are not acceptable.
4. Manufacturers and suppliers who have provided samples meeting the specified geometry and who have the specified waterstop readily available are listed below. Other products shall not be used without prior review and acceptance by the Architect/Engineer.
   a. Sika Greenstreak Waterstops, P.O. Box 7139, St. Louis, Missouri 63177, phone: (314) 225-9400 or fax: (314) 225-9854. Style 717 for the 6-inch by 3/8-inch.
   b. BoMetals, Inc., 141 Hammond Street, Carrollton, GA. Phone 770-832-2000 or fax (770-832-2095.Style RCB638NT for the 6-inch by 3/8".
   c. Paul Murphy Plastics Company, Wirestop Waterstop, 15301 Eleven Mile Road, Roseville, Michigan, 48066, phone 800-544-2200 fax 586-774-9146. Style CR-6380 for the 6-inch x 3/8".

B. Pool Concrete Compressible Waterstop
1. Use as illustrated in drawing details for the following:
   a. Sealing non-moving cold joints and construction joints between structural elements against penetration of water from wet-face of structure with less than 30-foot hydrostatic head.
   b. Sealing pool piping penetrations against water penetration from wet-face of structure with less than 30-foot hydrostatic head.
2. Product Description: The product shall be a 0.59" x 0.39" compressible hydrophilic sponge rubber strip composed of vulcanized rubber and urethane polymer as the hydrophilic agent.
3. Product & Manufacturer:
   a. Adeka KBA-1510FP waterstop, manufactured by Adeka Corporation and distributed by OCM, Inc., Chicago, IL. USA.
   b. Website: www.adeka.com
   c. Physical & Swelling Property Requirements: The product shall at a minimum meet the physical properties as shown in the official Adeka literature as follows.
   d. Expansion Pressure: The product shall not produce more than 0.03MPa (4.35 psi) expansion pressure when fully hydrated.
   e. Tensile Strength: At least 0.78 MPa (113 psi),
   f. % Elongation: No greater than 350% when fully hydrated.
   g. Volume (thickness) % Change: No greater than 30% volume change or increase in thickness when fully hydrated.
   h. Alternative Products:
      1) General: Drawing documents have been completed using the specified Adeka waterstop product as a basis of design. Alternative compressible waterstops shall not be used without approval from Engineer/Architect. Considerations such as concrete coverage requirements and wall thicknesses must be considered when substituting alternative products. Contractor will be responsible for any structural changes required due to alternate product concrete coverage requirements.

2) Product Requirements: Compressible waterstop alternatives may not contain bentonite materials and may not have swelling properties that exceed the specified product.
3) Acceptable Alternative: An acceptable alternative may be Synko-Flex SF302 Preformed Plastic Adhesive Waterstop with Synko-Flex SF311 primer or equal, but it must be approved prior to use. Manufacturer: Henry Company, Houston, TX. Website: http://henry.com

C. Non-Shrink Grout: Premixed compound with non-metallic aggregate, cement, water reducing and plasticizing agents; capable of minimum compressive strength of 2400 psi.
1. Upcon High Flow, the Upco Company, Cleveland, Ohio; MasterFlow 713, Master Builders Solutions, Cleveland, Ohio; Duragrout, L & M Construction Chemicals, Inc., Omaha, Nebraska.

D. Joint Materials:
1. Waterstop: See Pool Concrete PVC Waterstop.
2. Expansion Joint Dowel Sleeves: PVC or molded plastic sleeve with end cap/plug. Size sleeve to allow movement of dowel.
3. Pre-molded Expansion Joint Filler: Multicellular, closed cell, flexible polyethylene plastic foam as manufactured by Dow Chemical Co., Midland, MI. Ethafoam expanded polyethylene closed-cell foam, W.R. Meadows, Elgin, IL, Ceramar or a pre-approved equal.
4. Backer Rod Joint Backing Material: Closed cell, polyethylene, flexible, rope-like foam joint backing material. Material shall be fully compatible with polysulfide sealant and for use in swimming pools. Product shall be Kool-Rod as Manufactured by W.R. Meadows, Elgin, IL, or pre-approved equal.
5. Gun Grade Sealant: Two-part polysulfide sealant and primer certified by Manufacturer as suitable for use in pools including submerged locations. “Deck-O-Seal Gun Grade” and “P/G” solvent based primer as manufactured by W.R. Meadows or equal. Color shall be white.

E. Adhesive Waterproof Bondcoat
1. Provide adhesive waterproof bondcoat where indicated on drawings.
a. Impact strength: 19 lbs / 8.6 kg
b. Compressive strength: 7050 psi / 48.61 MPa
c. Tensile strength: 732 psi / 5.05 MPa
d. Flexural strength: 2380 psi / 16.41 MPa
e. Adhesive strength (concrete): 1372 psi / 9.46 MPa
f. Shear bond adhesion: 720 psi / 4.96 MPa
g. ASTM C321
h. ASTM C672
i. ASTM D4541
j. ASTM E96
2. Materials
a. Basecrete or equal.
3. Accessories
a. Fiberglass mesh reinforcing, 4.5 oz/sq.yd., impact resistance 75-100 in lbs. per ASTM D1037 modified.

F. Concrete Densifier
1. Provide concrete densifier under tile pool installations and where indicated on drawings.
a. Basecrete + or equal.

2.7 CURING AND TREATMENT MATERIALS

A. Water: Potable and clean.

B. Burlap shall be clean, evenly woven, free of encrusted concrete or other contaminating materials, and shall be reasonably free of cuts, tears, broken or missing areas.

C. Polyethylene Film: ASTM C171, 6 mil thick, clear.

D. Curing Paper: ASTM C171;
   1. Manufacturers:
      a. Fortifiber – Orange Label Sisalkraft 280.
      b. Substitutions: As approved by Engineer.

2.8 CONCRETE MIXTURE

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture of field test data, or both, according to ACI 301.

B. Mix concrete in accordance with ASTM C94.

C. Concrete mix designs shall be designed and submitted in accordance with Division 01 and included as part of cost of this Work.

D. Mix designs shall be prepared by a qualified agency acceptable to Engineer/Architect. Electronic copies of mix designs shall be submitted for Engineer/Architect's review prior to placing any concrete.

E. Mix design shall indicate brands, types, and quantities of admixtures included, compressive strength, slump, sieve analysis for fine and coarse aggregate, quantities of all ingredients, type and brand of cement, source of aggregate, whether fine aggregate is natural or manufactured.

F. Design of mix shall assure placing and finishing characteristics that meet Project requirements.

G. Mix designs contained in the Schedule of Mixes may be modified and submitted to Engineer for approval, by use of mid or high range water reducing admixtures to control slumps required for pumping of concrete. Strength, placing and finishing requirements shall be maintained.

H. Concrete mixtures shall be designed to have low shrinkage characteristics and designed to minimize slab curling.

I. Initial and final set times of concrete mix designs shall be coordinated between the contractor and concrete supplier.

2.9 SCHEDULE OF MIXES

A. Pool Structures: Proportion normal-weight concrete mix as follows:
   1. Compressive Strength (28 Days): 4500 psi.
   2. Maximum Aggregate Size: 1 inch.
   3. Maximum Slump (Inch): 3
   4. Air Entrainment: 6 percent air content is required with an acceptable air content of plus or minus 1.5 percent. Required for pool structures subject to freeze/thaw cycles.
   5. Maximum Water-Cementitious Materials Ratio: 0.45.
   6. Additional admixtures may be required as indicated on Structural Drawings.

B. Shotcrete: Proportion normal-weight concrete mix as follows:
   1. Compressive Strength (28 Days): 5000 psi.
   2. Wet-mix design only. Dry mix, mixed at the nozzle, shall not be allowed.
   3. Maximum Aggregate Size: 3/8 - inch.
   4. Air Entrainment: 7-1/2 percent air content is required with an acceptable air content of plus or minus 1.5 percent. Required for pool structures subject to freeze/thaw cycles.
   5. Additional admixtures may be required as indicated on Structural Drawings.

PART 3 - EXECUTION

3.1 SUBGRADE, SUBBASE AND BACKFILL PLACEMENT

A. Prepare pool subbase using in-situ soils in compliance with the Project Geotechnical Report placement methods and testing requirements. Materials shall be graded to proper elevations, free of large rocks, organic matter, and other deleterious substances.

B. Place geotextile barrier below entire pool and up the sides of the pool walls separating the subbase aggregates and pool backfill aggregates from the subgrade and remaining backfill or in-situ soils to prevent mitigation of fines.

C. Place pool subbase & backfill aggregate materials in 6” compacted lifts to minimize void spaces and eliminate potential future settlement. Compact materials using walk-behind plate compactors properly sized and operated to prevent damage to pool pipes.

3.2 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance per ACI 117.

C. Verify lines, levels, and measurement before proceeding with formwork.

D. Earth forms are not permitted.

E. Align form joints.

F. Do not apply form release agent where concrete surfaces receive special finishes or applied coatings which may be affected by agent.

G. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

3.3 REINFORCEMENT

A. Place, support, and secure reinforcement against displacement.

B. Locate reinforcing splices as shown on Drawings.

C. Place reinforcing steel in conformance with the information on the drawings and CRSI 63 and CRSI, except as modified herein. Minimum length of splices shall be as shown in table on drawings. Tie splices with 18-gauge annealed wire as specified in the referenced CRSI standard. All tie wires shall be “made tight” for electrical bonding purposes, as required by NEC, Article 680.

3.4 WATERSTOP

A. PVC Waterstop

1. Split formwork is generally required for slab-to-slab, slab-to-wall and wall-to-wall joints where ribbed style waterstops are used. The centerline of the waterstop should be aligned with the center of the joint. The split form shall firmly hold the waterstop in position to prevent misalignment of waterstop during concrete placement. Secure waterstop with hog rings or integral wire loops prior to concrete placement. Loop tie wires through the hog ring/wire loops and tie off to adjacent reinforcing steel to prevent displacement of the waterstop during concrete placement. Fasteners through the body of the waterstop are not permitted.
2. Lapping of the waterstop is not permitted. PVC waterstop may be butt spliced in the field with Teflon coated, thermostatically controlled splicing iron. Direct exposure to a flame is not permitted. Factory fabricated fittings are recommended for ells, tees and crosses.
    a. The following defects at splices will not be acceptable:
        1) Use of adhesives, solvents, or free lap joints
        2) Misalignment of center bulb greater than 1/16”
        3) Misalignment that reduces waterstop cross section area more than 15%.
        4) Bond failure at joint, deeper than 1/16” or 15% of material thickness.
        5) Combination misalignment and bond failure with net reduction of waterstop cross-section area greater than 15%.
        6) Misalignment of waterstop splice resulting in misalignment of waterstop in excess of ½” in 10 feet.
        7) Visible porosity in the weld joint, including pinholes
        8) Charred or burnt material
        9) Bubbles or inadequate bonding detectable with a penknife
        10) Visible signs of splice separation when cooled splices are bent at a sharp angle.
        11) Edge welding
3. Thoroughly consolidate the concrete around the waterstop to prevent voids or honeycombing next to the waterstop. Maintain adequate clearance between reinforcing steel and the waterstop. Typical clearance should be twice the maximum aggregate size. Maintain continuity of the entire waterstop system. Properly store PVC waterstops prior to installation to prevent UV degradation.

B. Compressible Waterstop – Adeka KBA-1510FP
1. Non-moving Joint Installation:
    a. Consult manufacturer and follow all recommended installation instructions.
    b. Allow concrete to cure a minimum of 24 hours.
    c. Concrete must be dry and free from form oils, release agents, curing compounds, laitance and other dirt or debris prior installation. Use a wire brush to remove contaminants prior to installation of waterstop.
    d. Use butyl tape to attach KBA-1510FP to a dry and clean substrate. The butyl tape comes in a 3/4" X 1/8" X 82-foot roll (1 roll per roll of KBA-1510FP). Press the butyl strip onto the substrate and remove the release paper. Press the KBA-15010FP firmly onto the butyl tape.
    e. Check for any gaps between the product and the substrate. If gaps are present, fill in using Adeka P-201 applied to the side of the strip. Use P-201 on corner joints and on side-by-side splice joints.
    f. Once installed, keep the product covered, clean, and dry prior to concrete placement. For best results, place the waterstop product immediately before pouring concrete. Check to make sure the waterstop is firmly adhered before placing concrete.
    g. During concrete placement, assure that the concrete is well consolidated around the waterstop at all locations with no voids or gaps.
2. Penetration Installation:
    a. Consult manufacturer and follow all recommended installation instructions.
    b. Pipe must be dry and free from form oils, release agents, curing compounds, laitance, and other dirt or debris prior to installation.
    c. Press the butyl strip onto the clean pipe completely around the pipe diameter and remove the release paper. Press the KBA-15010FP firmly onto the butyl tape. Tightly butt strip ends together with 1” overlap or side lap.
    d. Once installed, keep the product covered, clean, and dry prior to concrete placement. For best results, place the waterstop product immediately before pouring concrete. Check to make sure the waterstop is firmly adhered before placing concrete.
    e. During concrete placement assure that the concrete is well consolidated around the waterstop at all locations with no voids or gaps.
3. Alternative Products Installation:

a. Drawing documents have been completed using the specified Adeka waterstop product as a basis of design. Alternative flexible adhesive waterstops shall not be used without approval from Engineer/Architect. See Section 2 for additional information.
b. If Synko-Flex has been approved during the submittal process, the following installation requirements shall be met, as well as all manufacturer's installation instructions.
   1) Allow concrete to cure a minimum of 24 hours before priming with Synko-Flex primer.
   2) Concrete must be dry and free from form oils, release agents, curing compounds, laitance and other dirt or debris prior to priming. Use a wire brush to remove contaminants prior to installation of primer.
   3) Apply Synko-Flex SF311 primer.
   4) Apply Synko-Flex SF302 Preformed Plastic Adhesive Waterstop over primed areas. Place Synko-Flex to primed areas at an approximately 5/8" thickness and approximately 1 ½" width.
   5) Tightly butt strips together with 1" overlap or side lap.

3.5 PLACING CONCRETE

A. Notify Engineer/Architect a minimum of 48 hours prior to commencement of concreting operations.

B. Failure to notify Engineer/Architect may result in rejection of concrete placed without observation.

C. Place concrete in accordance with ACI 301.

D. Place pumped concrete in accordance with ACI 304.2R. Line coating mix to initiate pumping shall not be used in pour but shall be wasted.

E. Ensure reinforcement and embedded items are not disturbed during concrete placement.

F. Concrete with excessive honeycomb or embedded debris shall be rejected and replaced at no cost to OWNER.

G. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury.

H. Placing During Hot Weather:
   1. Place concrete during hot weather conditions in accordance with ACI 305.1.

I. Placing During Cold Weather:
   1. Place concrete during cold weather conditions in accordance with ACI 306.1.

J. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.6 POOL WALL SHOTCRETE

A. Wet Mix Process
   1. The delivery equipment shall be of an approved design and size that has given satisfactory results in similar previous work.
   2. The equipment must be capable of discharging mixed material into the hose under close control, and it must be able to deliver a continuous smooth stream of uniformly mixed material at the proper velocity to the discharge nozzle, free from slugs of any kind.
   3. The nozzle shall be of a design and size that will ensure a smooth and uninterrupted flow of materials.
   4. Delivery equipment shall be thoroughly cleaned at the end of each shift.

B. Surface Preparation

1. Verify forms are true to line and dimensions, adequately braced against vibration, and constructed to permit escape of air and rebound during gunning operations.
2. Do not place shotcrete on any surface which is frozen, spongy, or where there is free standing water.

C. Alignment Control
1. Provide alignment wires to establish thickness and plane surface.
2. Install alignment wires at corners and offsets not established by form work.
3. Verify alignment wires are tight, true to line, and placed to allow further tightening.

D. Application
1. Ensure correct placement of reinforcement. Ensure sufficient clearance around reinforcement to permit complete encasement.
2. Allow easy access to shotcrete surfaces for screeding and finishing, permitting uninterrupted application.
3. Determine operating procedures for placement in close quarters, extended distances, or around unusual obstructions where placement velocities and mix consistency must be adjusted.
4. In shotcreting walls, begin application at bottom. Ensure work does not sag.
5. Hold nozzle as perpendicular to surface as work will permit, to secure maximum compaction with minimum rebound.
6. Follow routine that will fill and completely encase reinforcement, using maximum layer thickness.
7. Build up layers by making several passes of nozzle over work area. Completely encase reinforcement with first layer.
8. After initial set, remove excess material outside of forms and alignment lines.
9. Allow each layer of shotcrete to take initial set before applying succeeding layers.
10. Remove laitance that has taken final set, by sandblasting. Clean with air-water jet.
11. Sound work with hammer for voids. Cut out voids and replace with succeeding layers.
12. Keep rebound, and other loose or porous material out of new construction.
13. Remove rebound that does not fall clear to work. Discard salvaged rebound.
14. Remove trapped rebound at construction and expansion joints.

E. Protection of adjacent surfaces
1. Contractor shall take every possible precaution to protect adjacent concrete surfaces, equipment, etc., from being damaged by overshooting concrete. Overshot concrete and rebound materials deposited shall be removed at the Contractor's expense.

3.7 AQUATIC PLAY SURFACE CONCRETE

a. Aquatic Play Surface Concrete which does not have safety surfacing shall meet the following per Standards Australia AS-4586 utilizing the Slider 55 wet pendulum test method intended for wet surfaces subject to barefoot traffic:
b. Flat wet surfaces: slip resistance class P4, [SRV = 40 to 44]
c. Sloped wet surfaces: slip resistance class P5, [SRV = >44]

3.8 EXPANSION & CONTROL JOINTS

A. All control and expansion joints require PVC waterstop.

B. Installation of Joint Filler: At locations where joint sealant is to be applied, the pre-molded joint filler shall be installed in the joint accurately as detailed. Precut the pre-molded expansion joint filler to the required depth. Filler material shall be of sufficient width to completely fill the joint and shall be accurately cut to butt tightly against the waterstop and the side forms. Attach filler material to concrete with a bonding agent. Bonding agent shall be approved in writing by the joint sealant and joint filler manufacturer for compatibility.

C. Concrete shall be thoroughly vibrated along the joint form to produce a dense, smooth surface. Surface irregularities along the joint sealant cavity, due to improper concrete consolidation or faulty form removal, shall be repaired with an approved compound compatible with the joint sealant in a manner that is satisfactory to the sealant manufacturer.

D. All expansion and control joints require gun grade sealant. Cavities for joint sealant shall be formed with precut or pre-molded joint filler that can be removed as needed for sealant. Circular backer rod shall be used in joints as detailed to provide accurate shape for sealant.

3.9 CONSTRUCTION JOINTS

A. Construction joints shall be located as required for the contractor's scheduling, means and methods.

B. All construction joints require waterstop.

C. Contractor shall provide a submittal showing construction joint locations and detailing for review and approval.

3.10 ADHESIVE WATERPROOF BONDCOAT PLACEMENT

A. Clean and prepare surfaces and apply all products in accordance with manufacturer's recommendations.

B. Pool Renovations: Apply concrete densifier to all pool concrete surfaces receiving a tile finish and where indicated on drawings.

C. Apply adhesive waterproof bondcoat beneath gutter grating on the exposed sides and bottom of all concrete gutter trenches, and where indicated on drawings. Apply material in two coats (one horizontal and one vertical). Each layer shall be 1/16 inch in thickness.

D. Pool Renovations: Provide fiberglass mesh to bridge over cold joints and cracks in accordance with product manufacturer's recommendations.

E. Do not apply materials to frozen substrates or when temperatures are below 40 or above 105 degrees Fahrenheit.

3.11 CURING AND TREATMENT

A. Curing shall begin promptly to prevent drying of concrete. Curing shall continue for seven (7) days after placing.

B. Provide a moist cure for a full seven (7) days in accordance with ACI 308.1. Keep concrete slabs and walls continuously wet for a 7-day period. Intermittent wetting is not acceptable. Material shall completely cover the concrete surface and shall be weighted down to prevent shifting due to wind or other factors.

3.12 REPAIR OF VERTICAL SURFACE DEFECTS

A. Upon stripping of forms, vertical surfaces shall be inspected for defects caused by surface air voids, honeycombing, form tie holes, peeling, and fins.

B. Surface air voids shall be repaired with a unit packaged mixture of sand and cement mixed on job site with water and a unit of acrylic. Mixture shall be brushed uniformly on to surface and into voids. Where surface is to be exposed, surface finish of repair shall match adjacent surface.

C. Honeycombed and other defective concrete shall be removed down to sound concrete and patched to match adjacent surfaces. Cut edges perpendicular to surface at least 1 inch deep – no feathered edges allowed.
   1. Areas not subject to water shall be repaired similar to surface air voids as indicated above. A bonding agent shall be used prior to filling the holes. Patches shall be kept moist for a minimum of 7 days.

2. Areas subject to water shall be moist for a period of 24 hours prior to patching. Holes shall be filled with non-shrink grout and cured per recommendations by manufacturer. Concrete surface shall be prepared per recommendations by manufacturer.

D. Form tie holes shall be filled with non-shrink grout. Surface of concrete to prepared per recommendations by manufacturer. Grout shall be cured per recommendations by manufacturer.

3.13 FINISHING

A. Floor slabs shall not vary from level or true plane more than ¼ inch in 10 feet when measured with a straightedge. Floor slabs shall receive a broom finish to accommodate special aggregate mechanical bonding requirements.

B. After removal of forms and repair of defects, surfaces of concrete shall be given finishes specified below.

C. Rough Form Finish: Surface left with texture imparted by forms; form facing material not specified; tie holes and defects shall be patched; all fins shall be chipped or rubbed off. The surface shall be finished in such a way that will leave the surface for the substrate rough, coarse, and porous enough to ensure that subsequent application of the cementitious surface coating can achieve a good mechanical bond to the substrate similar to a broom finish.

D. Tops of walls or buttresses, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces shall be struck smooth after concrete is placed and shall be floated to a texture reasonably consistent with that of formed surface.

E. Final finish on formed surfaces shall continue uniformly across unformed surfaces.

3.14 WATER TIGHTNESS TEST

A. General
1. This test applies to the pool, the surge tank, and the gutter system. A water tightness test shall be completed on each pool, surge tank and gutter system, independently of each other, prior to the application of the pool finish.
2. The cost of the water shall be allocated as outlined in Specifications Section 13 11 14, Part 3, 3.02, F.
3. Contractor shall include and itemize these requirements in the overall construction schedule.
4. The Owner may elect to waive leak test requirements if schedule becomes a critical factor. Only the Owner may waive these requirements. If the Owner elects to waive these requirements the Contractor is still responsible for providing leak-free structures, and at a minimum, all specified applicable warranties shall apply.

B. Water Tightness Test Procedure
1. Preparation
   a. Visually examine the concrete structure and joints for potential leakage prior to fill. Contractor shall repair areas of potential leakage prior to fill.
   b. Allow the concrete structure to cure a minimum of 28 days, or as required to gain sufficient strength to withstand the test load, prior to initiating test.
   c. Securely seal all inlets/outlets and penetrations prior to fill.
   d. The test shall not be scheduled when the weather forecast indicates the water surface could freeze before the test is completed.
2. Fill
   a. Fill the pool with potable water from an approved water source, and then isolate the pool, the surge tank, and the gutter system. The water tightness test and measurement documentation shall begin after the test structure has been filled for a minimum of three (3) days to allow the concrete to absorb water and minimize absorption effects during the testing period.

b. Fill each structure to the design maximum liquid level or 4 inches below any fixed overflow level.
c. After the initial fill, remove ground water to a level below the bottom of the structure main drain or floor slab (below lowest concrete plane) utilizing the pool observation tube, the pool de-watering system, or the construction dewatering system. This shall be completed prior to the start of the water tightness test and maintained for the duration of the test.
d. For elevated pools with secondary containment structure, the secondary containment structure shall be monitored for the presence of water for the duration of the test. Groundwater elevation is not a factor in these pools.

3. Evaporation/Precipitation Measurement Procedure
   a. Partially fill a floating, restrained, calibrated (known volume and surface area), open container (hereafter "container" or "control container") with water and allow this container to float within the filled structure during the testing period. This will be used to measure total evaporation and precipitation.
   b. Mark and measure the change in container's water level. If the container water level has gone down (evaporation), this change shall be subtracted from each structure's water loss measurement. If the container water level has risen (rain), this change shall be added to each structure's water loss measurement.
4. Measurement
   a. Conduct all measurements with the Architect or Owner's representative present and document all measurements on the table below.
   b. Provide an as-built drawing or sketch the pool, surge tank, and gutter identifying measurement locations and the evaporation control container's location.
   c. The water surface elevation shall be recorded to within 1/16 of an inch, measured from a fixed point on the structure above the water surface.
   d. Average multiple sample locations for structures exposed to wind.
   e. Repeat and record the measurements for a total of three (3) consecutive days.

Measurement Times	Pool Measurements	Gutter System Measurements	Surge Tank Measurements	Control Container Measurements
12 Hrs.				
24 Hrs.				
36 Hrs.				
48 Hrs.				
60 Hrs.				
72 Hrs.				

5. Water Leakage
   a. Calculate water leakage as follows:
      1) Leakage [Gallons] = [7.481 x Structure Surface Area (SF)] x
      2) [Structure Loss Measurement* (FT) – Control Container Measurement (FT)].
      3) Structure loss measurement is a generic term referring to Pool Measurement, Gutter System Measurement or Surge Tank Measurement independently. Calculate the leakage from the pool, gutter, and surge tank independently.
   b. Add the measurements for two consecutive 12-hour periods to obtain the total daily loss due to leakage.
   c. Record Daily losses due to leakage for Day #1, #2, and #3 in the table below.

Total Daily Loss Due To Leakage	Pool Leakage	Gutter Leakage	Surge Tank Leakage
Day 1			
Day 2			
Day 3			

6. Submittal
   a. Provide test location as-built/sketch, measurement tables, and Water Leakage calculations to Engineer in the form of a submittal for review and records.
7. Allowable Loss from Leakage
   a. The allowable leakage rate for an unlined, open concrete structure (i.e. backfilled pool, gutter, and surge tank) shall not exceed 0.1 percent of the total water volume in a 24-hour period. (Example: 0.001 x 200,000-gallon pool = 200 gallons per 24-hour period.)

b. Elevated pools and gutters with a secondary containment vessel shall have no measurable loss; the drop in the water surface shall not exceed 1/8" over the three-day test period when adjusted for evaporation and precipitation.

8. Repair and Retest
   a. If the leakage volume calculated exceeds the "allowable loss" in section 7, Contractor shall locate and identify leakage points, repair the structure and provide documentation on the location of repaired areas.
   b. After proper curing of all repair work, re-test the water tightness of structure following the procedure specified in this section.

3.15 AQUATIC PLAY SURFACE SPECIAL INSTRUCTIONS

A. Once the surface is open for public use the contractor shall instruct the operator how to perform surface cleaning. Document instructions in project close out materials.

B. Instruct owner / operator on requirements for slip resistance performance validation requirements. Frequency of performance validation is dependent on project location, use, and wear of the surface. Provide a recommended testing interval, or as recommended by a performance validation testing agency. The performance validation testing and reporting shall be conducted in accordance with standards Australia AS 4663.

C. Instruct owner/operator that when the surface no longer meets the original friction classification, the owner shall restore the finish to meet the original specified slip resistance requirements.

END OF SECTION 131118

SECTION 131120 - POOL PIPE AND PIPE FITTINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pipe, pipe fittings, connections, wall penetrations.

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

1.3 REFERENCES/PIPE – FITTING REQUIREMENTS

A. The following latest edition reference specifications, guides, and standards shall become part of this Specification as if herein written. If provisions conflict, the more stringent provisions shall apply.
   1. ANSI/ASTM D2564 - Solvent Cements and ASTM F656 – Primers for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings
   2. ASTM D2855 – Practice for Making Solvent Cemented Joints with PVC Pipe and Fittings
   3. ANSI/ASTM D1785 – Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe Schedules 40, 80 and 120, NSF Seal for Potable Water
   4. ASTM D1784 - Standard Specification For Rigid Poly(Vinyl Chloride) (PVC) Compounds And Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
   5. ASTM F439 - Standard Specification For Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedules 80
   6. ASTM F441 - Standard Specification For Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
   7. ASTM F493 - Standard Specification For Solvent Cements For Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe And Fittings
   8. ASTM D2466 – PVC Plastic Pipe Fittings, Schedule 40, Injection Molded, Sizes Through 12”, NSF Listed. As manufactured by Spears Manufacturing Company, “or approved equal”.
   9. ASTM D2467 – Socket Type PVC Plastic Pipe Fittings, Schedule 80, Injection Molded, Sizes through 12”, NSF Listed. As manufactured by Spears Manufacturing Company, “or approved equal”.
   10. ASTM D2855 - Standard Practice For The Two-Step (Primer And Solvent Cement) Method Of Joining Poly (Vinyl Chloride) (PVC) Or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe And Piping Components With Tapered Sockets
   11. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
   12. ASTM D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
   13. ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (Modified Proctor Maximum Dry Density)
   14. ASTM F679 – PVC Large Diameter Plastic Gravity Sewer Pipe and Fittings, Bell Gasketed Joints, Sizes 18” Through 36”. As manufactured by J-M Manufacturing Co., Inc. “Perma-Loc”, “or approved equal”.
   15. ASTM B88 – Seamless Copper Water Tube
   16. Eslon Engineering Manual for Plastic Piping Systems
   17. ASTM D2563 – Fabricated, Fiberglass Wrapped PVC Pipe Fittings 14”, and above, Schedule 40 or 80 manufactured from PVC pipe conforming to ASTM D1785 and compliant to the most recent publication of the “Spears General Specification for Standard Fabricated Fittings (FAB-7-702)”. Butt-fusion welded fabricated fittings are not acceptable. All fittings shall be certified for potable water service by NSF. As manufactured by Spears Manufacturing Company or “approved equal”

18. CLASS 150 – All plastic pipe flanges shall be Class 150 and of the same schedule as the associated pipe with neoprene gaskets where required.

1.4 QUALITY ASSURANCE

A. Qualifications of Pool Contractor
1. Work of this Section shall be performed by a Contractor who has a proven record of competence and experience in the construction of similar facilities of this size and complexity for not less than 5 years. Contractors shall have an established record of reliability.

B. The following tests shall be performed during construction of the project. Refer to General Conditions and Division 01 for further requirements.
1. Testing and Flushing of Piping
a. Contractor shall be responsible for discovering leaks and making necessary repairs.
1) Pressure piping and suction piping: After the piece is laid, the joints completed and the trench partially backfilled, leaving joints exposed for examination, subject new lines to a hydrostatic pressure of not less than 50 pounds per square inch. Joints shall remain watertight under this pressure for a period of two (2) hours. All air must be expelled from pipes prior to testing.
2) Gravity lines: A water test shall be applied to all gravity drain piping systems, either in their entirety or in sections. All openings shall be tightly plugged and each system filled with water and tested with at least a 10 foot head of water (4.3 psi). The water shall be kept in the system, or in the portion under test, for at least fifteen (15) minutes before the inspection starts. System shall be watertight at all joints.
3) Leaks shall be repaired and tested repeatedly until leakage or infiltration is approved.
b. Provide documented records of all pipe pressure tests to the Architect/Engineer before covering with concrete. Records must identify each pipe description, recorded pressure readings, test date/time, and test durations.

1.5 SUBMITTALS

A. Refer to General Requirements and Division 01.

B. Product Data: For each type of manufactured material and product indicated.

C. Provide Shop Drawings showing all pipe penetration locations through concrete pump pit walls and concrete surge tank walls. Include dimensioned location of pipe penetrations in plan and elevation view, pipe sizes, sleeve sizes, link-seal sizes, and sleeve and link-seal material/product information.

D. Provide a submittal including system drain valves and location of drain valves for Owner’s use during pool shutdown and/or pool winterizing.

1.6 SUBSTITUTIONS

A. Refer to General Requirements and Division 01.

PART 2 - PRODUCTS

2.1 PIPE BEDDING & BACKFILL MATERIALS

A. Pipe Trench Foundation/Subbase: In-situ soils meeting the Project Geotechnical Report requirements for preparation. Trench base materials shall be free of large rocks, organic matter, and other deleterious substances.

B. Pipe Trench Embedment Zone (bedding, haunching, initial backfill):
1. Existing subsoil materials shall not be used for pipe bedding.
2. Condition 1: ASTM D 2487 Class IA Aggregate.
   a. Manufactured aggregates containing little or no fines including angular, crushed stone or rock, crushed slag, cinders, or shell.
   b. Open graded, clean: < = 10% Passing No.4 sieve, < 5% Passing No. 200 sieve
   c. Maximum pipe diameters >=6": Maximum aggregate size <= 1.5".
   d. Maximum pipe diameters <6": Maximum aggregate size 3/4".
   e. Where conditions may cause migration of fines into the trench from adjacent soil (and loss of pipe support) apply Condition 2 and use Class 1B Aggregate. Alternatively, include the addition of a filter fabric between the trench and Class 1A aggregate to prevent migration of fines into the embedment zone.
3. Condition 2: ASTM D 2487 Class IB Aggregate.
   a. Use where conditions may cause migration of fines from adjacent soil and loss of pipe support. Process materials as required to obtain gradation which will minimize migration of adjacent materials.
   b. Manufactured processed aggregates; angular, crushed stone (or other Class IA materials) and stone/sand mixtures with gradations selected to minimize migration of adjacent soils.
   c. Dense graded, clean: < = 50% Passing No.4 sieve, < 5% Passing No. 200 sieve
   d. Maximum pipe diameters >=6": Maximum aggregate size <= 1.5".
   e. Maximum pipe diameters <6": Maximum aggregate size 3/4".

C. Final Pipe Trench Backfill: Use on-site existing soils meeting the Project Geotechnical Report requirements for backfill materials. Final trench backfill may not include organic material, clay, topsoil, or other deleterious substances. The source and suitability of all proposed off-site fill shall be confirmed by the Project Geotechnical Engineer prior to bringing material on site.

2.2 PVC & CPVC PIPE & FITTINGS

A. Refer to Section 1.03 for applicable standards/requirements.

B. Refer to pipe schedule(s) on drawings for size and type.

C. PVC Pipe: All PVC Schedule 40 and schedule 80 pipe shall be manufactured from a Type I, Grade I Polyvinyl Chloride (PVC) compound with a Cell Classification of 12454 per ASTM D1784. The pipe shall be manufactured in strict compliance to ASTM D1785 consistently meeting and/or exceeding the quality assurance test requirements of these standards. The pipe shall be provided with plain ends in 20-foot cut lengths. All PVC pipe shall be certified by NSF International for potable water applications and marked accordingly.

D. PVC Sch40 Fittings: All PVC Schedule 40 white fittings shall be manufactured from PVC Type I cell classification 12454. All fittings of 12" diameter or less shall conform to ASTM D1784 for injection molded PVC Schedule 40 white fittings. All fittings greater than 12" diameter may be either injection molded or fabricated fittings produced in accordance with "Spears General Specification for Standard Fabricated Fittings (FAB-7-702)". All fittings shall be certified for potable water service by NSF International and manufactured in strict compliance to ASTM D2466.

E. PVC Sch80 Fittings: All PVC Schedule 80 fittings shall be manufactured from PVC Type I, cell classification 12454. All fittings of 12" diameter or less shall conform to ASTM Standard D1784 for injection molded PVC Schedule 80 fittings. All fittings greater than 12" diameter may be either injection molded or fabricated fittings produced in accordance with "Spears General Specification for Standard Fabricated Fittings (FAB-7-702)". All fittings shall be Certified for potable water service by NSF International manufactured in strict compliance to ASTM D 2467.

F. CPVC Pipe: All CPVC Schedule 80 pipe shall be manufactured from a Type IV, Grade I Chlorinated Polyvinyl Chloride (CPVC) compound with a Cell Classification of 23447 per ASTM D1784. The pipe shall be manufactured in strict compliance to ASTM F441, consistently meeting the quality assurance test requirements of this standard. All pipe shall be provided with plain ends in 20 foot cut lengths. CPVC Pipe shall be certified by NSF International for potable water applications and marked accordingly.

G. CPVC Fittings: All CPVC Schedule 80 fittings shall be produced from CPVC materials, cell classification 23447 conforming to ASTM Standard D1784 for injection-molded fittings through 12", and shall be manufactured in compliance to ASTM F439 and Certified by NSF International for use with potable water service. All 14" through 24" fabricated CPVC fittings shall be produced in accordance with "Spears General Specification for Standard Fabricated Fittings (FAB-7-702)".

H. PVC Flanges: All PVC & CPVC flanges shall be designed and manufactured to meet CL150 bolt pattern per ANSI Standard B16.5 and rated for a maximum internal pressure of 150 psi, non-shock at 73°F.

I. Manufacturer:

J. As manufactured by Spears Manufacturing Company, "or approved equal".

2.3 THREAD TAPE

A. Teflon 2

2.4 PVC solvent cement

A. Joining method for PVC pipe and fittings shall be solvent cement welding. All PVC solvent cement shall be suitable for all class and pipe schedules that are to be utilized.

B. PVC solvent cement shall conform to ASTM D2564, shall have DWV, SW and U.P. Code listings and be certified by NSF International for potable water use.

C. PVC solvent cement shall conform to Low VOC emission requirements in accordance with SCAQMD Rule 1168/316A. PVC cement shall be certified by Underwriters Laboratories (UL) to UL 2818 GREENGUARD GOLD for low chemical emissions.

D. All PVC solvent cement shall be provided in a clear or gray color and have a three (3) year shelf life.

2.5 CPVC solvent cement

A. Joining method for CPVC pipe and fittings shall be solvent cement welding. All CPVC solvent cement shall be suitable for all class and pipe schedules that are to be utilized.

B. CPVC Solvent cement shall be manufactured in accordance with ASTM F493 and certified by NSF International for potable water applications.

2.6 WALL SLEEVES

A. Pipes penetrating all watertight walls shall use "Century Line" thermoplastic wall sleeves in combination with “Link Seals” having stainless steel service designation. As manufactured by Thunderline Corporation, or the Metraflex Company, “or approved equal”.

2.7 NON-SHRINK GROUT

A. Upcon High Flow, The Upco Company, Cleveland, Ohio; Masterflow 713, The Master Builder Company, Cleveland, Ohio; Duragrout, L & M Construction Chemicals, Inc., Omaha, Nebraska.

2.8 PIPE SIGNAGE

A. Brady, B-946, custom legend, self-sticking markers, and arrows or equal.

PART 3 - EXECUTION

3.1 PIPE INSTALLATION

A. Pool Pipe Trench Excavation
1. General:
a. Excavation for all pool systems and related piping shall comply with the following:
1) Division 31 Earthwork Specifications for buried utilities.
2) Project Geotechnical Report requirements for pipe trench preparation, backfilling, and engineered fill.
3) Current OSHA criteria and regulations.
b. See pool pipe plans for additional piping details, notes/requirements, pipe routing, material types and sizes.
2. Pipe Trench Requirements: Excavate pool piping trenches to proper depths for pool operations, required pipe slopes, and a minimum final cover plus backfill depth of 36-inches. Trench widths shall be minimized as indicated in the Pool Drawings “Typical Pool Pipe Trench Detail” and as required for proper compaction. Maintain a clear trench width of 6 to 12-inches beyond the nearest pipe wall. Maintain a minimum of 6-inches between each adjacent pipe. Protect the soils adjacent to the trench to maintain an undisturbed condition for optimal pipe support.
3. Pipe Trench Foundation/Subbase: The trench bottom shall be smooth and free from large dirt clods, frozen material, and stones greater than 1.5-inches in diameter. A subbase is necessary only when native subgrade soils are unstable. For such conditions, over excavate the subgrade soils and place a layer of supportive engineered fill material as the trench subbase. Compact subbase materials to provide a firm foundation for the subsequent pipe embedment materials. Match the compaction effort specified in the Final Backfill layer of the pipe trench.

B. Pool Pipe Bedding & Backfill
1. Embedment Zone: Controlled placement of pipe trench materials is required in the embedment zone for pipe performance and to minimize deflection. Schedule inspections prior to the backfilling as needed, however backfilling the embedment zone should follow pipe assembly as closely as possible to protect the pipe from falling debris, minimize the possibility of flooding an open trench and avoiding shifting pipe. See Part 2 PRODUCTS for material specifications and assure selected embedment zone materials are free from dirt clods, clay, frozen materials, and rocks greater than 1.5-inches in diameter. Place materials in six-inch lifts in the following three subzones:
a. Bedding: Place six inches of supportive, compacted bedding materials beneath the pool piping to provide uniform longitudinal support under the pipe, prevent low spots, and to set piping to the proper grade. Do not use blocking of any type to bring the pipe to grade. If the native trench soil is comprised of fine grain soils and migration of those soils into the bedding material is anticipated, a well-graded bedding material without voids or a fabric barrier should

be used to avoid compromising the trench backfill materials. Consult the Geotechnical Report for specific recommendations.

b. Haunching: Haunching is required from the bottom of the pipe to the centerline of the pipe ("springline"). To provide resistance to pipe deflection compaction of the haunching zone is required prior to placement and compaction of the initial and final backfill. Place the haunching materials by hand to give effective support of the pipe Compact materials using shovel slicing and/or firmly tamping the materials under the pipe haunches, around the pipe, up to the spring-line of the pipe and out to the trench walls. If automatic tampers are used, avoid contacting and damaging the pipe. Control haunching to avoid vertical and horizontal displacement of the pipe from proper alignment.

c. Initial Backfill: The initial backfill extends from the pipe springline to a point above the top of the pipe. Place the initial backfill in 6-inch maximum loose lifts to a 12-inch minimum depth of cover above the pipe. Using small handheld or walk behind vibratory plate tampers, compact the initial backfill zone to a level no higher than ¾ of the pipe diameter, taking care not to contact the pipe/s. Do not compact the initial backfill layer directly above the pipe.

2. Final Backfill: This zone extends from the top of the initial backfill to the top of the trench and up to final grade. Adjust final grades as required to allow for landscaping, flatwork, or roadwork materials if applicable. Place materials for this zone using materials and compaction efforts in accordance with the Geotechnical Report and/or Division 31 Specification requirements. If those requirements are not provided, place materials in accordance with the following:
   a. +- 2% of the optimum moisture content
   b. 12-inch maximum lifts, as measured in loose thickness.
   c. Uniformly compact each lift to a minimum of 95 percent of the material's ASTM D-1557 Modified Proctor Maximum Dry Density, prior to placement of subsequent lifts.
   d. Place each subsequent lift and compact in a similar manner until achieving proposed finished grades.
   e. Final cover plus backfill materials shall measure a minimum of 36-inches above the top of the pipe/s unless noted otherwise on the plans or details.

C. Piping Placement and Use
1. Base Bid shall be on pipe materials shown. See the PL Drawings and associated schedules for required pipe material types.
2. All material transitions shall be above-grade, flange to flange connections and include ribbed EPDM type rubber gaskets. Below-grade materials transitions will not be allowed unless approved by Engineer and Client and meeting special transition fittings within these specifications.
3. Piping must be laid on a grade so it will drain completely by gravity. In all instances where gravity drainage is not provided, the contractor shall install drain valves so that all lines can be drained completely. Shop drawings will be required on any such installation.
4. No installation shall be made that will provide a cross connection or inter-connection between distribution supply for drinking purposes and the swimming pool that will permit a backflow of water into the potable water supply.
5. Inspect pipe for defects before installation. Clean the interior of pipe thoroughly of foreign matter and keep clean during laying operation. Pipe shall not be laid in water or when trench conditions are unstable. Water shall be kept out of the trench until the pipe is installed. When Work is not in progress, open ends of pipe and fittings shall be securely closed so that no trench water, earth or other substance will enter the pipes or fittings.
6. All gutter lines shall drain by gravity to the surge tank.
7. All above grade outdoor piping shall be painted, in accordance with the manufacturer's recommendations, to protect against ultraviolet degradation.

D. PVC/CPVC Pipe & Fittings Installation
1. General: All PVC pipe connections shall be flanged or solvent welded. PVC welding is not allowed without prior approval of the Architect/Engineer. Refer to ASTM D 2855, Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings for the basic techniques and requirements for making solvent cement pipe joints. Make adjustments as required to the methods and tools used according to size of piping. Consistent, quality joints in PVC and CPVC piping products requires the following:
   a. The joining surfaces of pipe and fitting must be softened and made semi-fluid.
   b. Sufficient cement must be applied to fill the gap between pipe and fitting.
   c. Assembly of pipe and fittings must be made while the surfaces are still wet and fluid.

2. Cutting the Pipe: Cut all pipe to a square face using mechanical cutting tools designed for plastic pipe. To ensure that the pipe is cut square, use a miter box when cutting with a saw. Do not damage pipe during cutting process. If damage or cracking is evident, cut off at least 2" of the pipe beyond any visible crack.
3. Deburring & Beveling: Remove all burrs and filings from the outside and the inside of the pipe using a suitable deburring/chamfering tool. Chamfer the outside end of the pipe to ease entry of the tube into the socket and minimize the chance of cement being wiped off the fitting.
4. Threaded joints: Threaded joints may be required to some equipment or special fittings. When required, after cutting and before threading, the pipe shall be reamed and shall have burrs removed. Screw joints shall be made with graphite or inert filler and oil or with an approved graphite compound applied to male threads only. Threads shall be full-cut and not more than 3 threads on the pipe remained exposed. Use Teflon II tape on the male threads of all threaded pipe joints. Caulking of threaded joints to stop or prevent leaks will not be permitted. Unions shall be provided where required for disconnection of exposed piping. Unions will be permitted only where access is provided.
5. Solvent Cementing Assembly: Solvent welding shall be made in accordance with the manufacturer's printed instructions and the following minimum standards:
    a. All fittings shall fit easily on the pipe before applying cement. The outer surface area of pipe and inner wall of fitting shall be dry and clean. Cleaner is to be applied to the outer surface of the pipe and to the inner surface of the fitting. Cement is to be applied to the outer surface of the pipe, or on the male section of fittings only. When the outside surface area of the pipe is satisfactorily covered with cement allow ten (10) seconds open time to lapse before inserting pipe end into fittings. After full insertion of pipe into fitting, turn fitting about the pipe end approximately 1/8 to 1/4 of a turn. Wipe off excess cement at the joint in a neat cove bead. Follow manufacturer's instructions on solvents. Remove all debris, including, containers, brushes, applicators and other items from premises, dispose of properly. Burying of debris on site is not permitted.
    b. In addition to the requirements outlined above, the solvent weld process for pipe sizes of 6” diameter and larger includes additional requirements outlined below. As pipe diameter increases, so does the difficulty in installing it. Follow all of the solvent weld manufacturer’s recommendations for larger diameter pipe.
        1) The installer shall use proper size applicators to ensure enough cement is applied to fill the larger gap that exists between the pipe and fittings.
        2) Use the applicable cement for the size of pipe and fittings being installed.
        3) Provide adequate crew size to properly handle and fit pipe installations.
        4) It is important in large diameter joining that the primer and cement be applied simultaneously to the pipe and fittings. Apply a second, full layer of cement to the pipe. Pipe must be bottomed into the fitting.
        5) Large diameter pipe and fittings require longer set and cure times. Prefabricate as many joints as possible. If pipe is to be buried, fabricate as many joints as possible above ground, after joints have cured, carefully lower into trench.
    a. Follow manufacturer’s recommendations for specific product/application set time and cure time requirements. All joints shall remain completely undisturbed for a minimum of 10 minutes from time of jointing the pipe and fitting. If necessary, to apply pressure to a newly made joint, limit to 10% of rated pipe pressure, during the first 24 hours after the joint has been made.
    b. Make provisions for expansion and contraction by way of swing joints or snaking.
    c. Protect plastic pipe from exposure to aromatic hydrocarbons, halogenated hydrocarbons, and most of esters and keytones that attack the material. Protect all pipe from mechanical damage and long exposure to sunlight during storage.

E. Field Coordination
1. It is the Contractor's responsibility to provide piping by means that account for all necessary coordination, including, but not limited to: water stops, oversize sleeves, pipe supports, valves and other attachments, over-excavations required for fusion machinery or other equipment, etc.
2. Provide pipe extensions and temporary caps necessary for pressure testing requirements.
3. Contractor is required to provide coordination and adequate protection as needed to all external services (i.e., ducts, pipes, cables) that run throughout the project site. Plumbing shall be located and placed to prevent damage during and after construction from traffic loads above.

F. Overhead piping in mechanical room/pool room shall be run such that a minimum head clearance of 7'-0" is observed to all piping, pipe fittings and pipe hangers/supports. Piping runs shall not create path obstruction or a tripping hazard.

G. Pipe Identification
1. Provide identification on all piping located in mechanical equipment, chlorine, acid rooms, heater courts, etc.
2. All piping in Mechanical Room to be labeled with description of line and arrows indicating direction of flow.
3. Mark at least once on each line and at 5 ft. intervals minimum. Consult Health Department Code for minimum marking requirements.
4. Color code per Health Department requirements. If code does not identify color coding requirements consult Architect/Engineer.

3.2 SLEEVES AND WALL PENETRATIONS

A. Patch exterior side of wall penetrations with non-shrink grout. Other methods of water tightness shall be pre-approved by the Architect/Engineer.

3.3 PRESSURE TESTING

A. Pressure test all piping in accordance with Part 1.04B. requirements.

B. Submit pressure test records to Engineer/Architect in accordance with Part 1.04B. requirements.

END OF SECTION 131120

SECTION 131123 - POOL PIPE SUPPORTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pipe Hangers & Supports.

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

1.3 SUBMITTALS

A. Refer to General Requirements and Division 01.

B. Product data including manufacturer's specifications, installation instructions.

C. Shop Drawings showing type and locations.

1.4 SUBSTITUTIONS

A. Refer to General Requirements and Division 01.

1.5 DELIVERY, STORAGE AND HANDLING

A. Refer to General Requirements and Division 01.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hangers and Supports
   1. General
      a. All hangers, pipe supports, threaded rod, hardware, etc. shall be hot-dipped galvanized steel, ASTM A123, or type 304 stainless steel or better grade.
      b. All piping connections and support hardware inside surge tanks and gutters shall be stainless steel.
   2. Strut
      a. Minimum height 1 5/8", minimum width 1 5/8", minimum thickness 12-gauge material.
      b. Finish shall be hot-dipped galvanized steel, ASTM A123; or type 304 stainless steel or better grade, ASTM A240.
   3. Strut Clamps
      a. Pipe sizes ½" thru 12", two-piece clamps with clamping bolt and nut. Pipe sizes 14" and larger, provide "U" bolts, nuts and washers.

b. Finish shall be hot-dipped galvanized steel, ASTM A123; or type 304 stainless steel or better grade, ASTM A240.

4. Strut Accessories
   a. Flat plate fittings, corner braces, post bases, etc. Finish shall be hot-dipped galvanized steel, ASTM A123; or type 304 stainless steel or better grade, ASTM A240.
5. Wedge Anchors
   a. One-piece assembly, 3/8" minimum body diameter.
   b. Grade 2, hot-dipped galvanized steel anchors and clips, ASTM A123; or type 304 stainless steel or better grade, ASTM A240.
6. Beam Clamps
   a. Steel "C" clamp type with locknut.
   b. Finish shall be hot-dipped galvanized, ASTM A123; or type 304 stainless steel or better grade, ASTM A240.
7. Support Components
   a. All threaded rod, threaded rod couplings, nuts, washers, etc. Finish shall be hot-dipped galvanized, ASTM A123; or type 304 stainless steel or better grade, ASTM A240.
8. Exposed/cut Ends: All galvanized channel supports or other metallic pipe support hardware that is cut shall be field treated to cold galvanize over all exposed/compromised areas with a 95% zinc rich paint to a 1.0 to 3.0 mil thickness.

B. Locations
1. In the Pool/Waterpark/Natatorium Room: All piping supports, connections and support hardware shall be type 304 stainless steel or better grade, ASTM A240.
2. Inside Surge/Collector Tanks & Gutters: All piping supports, connections and support hardware shall be type 304 stainless steel or better grade, ASTM A240.
3. In the Pool Mechanical Room: All piping supports, connections and support hardware shall be hot-dipped galvanized, ASTM A123; or type 304 stainless steel or better grade, ASTM A240.
4. Pump Support Pads: All pump equipment pad support channels and anchor hardware shall be type 304 stainless steel or better grade, ASTM A240.
5. Pool Chemical Rooms: All piping supports, connections and support hardware shall be fiberglass or type 304 stainless steel or better grade, ASTM A240.
6. Exterior Locations: All piping supports, connections and support hardware installed outside and exposed shall be hot-dipped galvanized, ASTM A123; or type 304 stainless steel or better grade, ASTM A240.

PART 3 - EXECUTION

3.1 GENERAL

A. All mechanical room piping must be properly supported using the schedule indicated on the drawings as a guideline for maximum allowable spacing between supports.

B. It shall be the contractor's responsibility to properly support piping at all valves, pumps, equipment, overhead areas, and changes in direction.

C. All piping must be supported laterally as well as vertically hung.

D. Ring, clevis, roller, and J hook type hangers are not acceptable.

E. Exposed/cut Ends: All galvanized channel supports or other metallic pipe support hardware that is cut shall be field treated to cold galvanize over all exposed/compromised areas with a 95% zinc rich paint to a 1.0 to 3.0 mil thickness.

F. Comply with manufacturer's written instructions.

END OF SECTION 131123

SECTION 131124 - POOL VALVES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Butterfly Valves

B. Ball Valves

C. Check Valves

D. Expansion Joint/Flexible Connector

E. Submerged Service Operators

F. Valve Operator Extension

G. Drainage Valves

H. Reducers

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

1.3 REFERENCES

A. The following latest edition reference specifications, guides and standards shall become part of this Specification as if herein written. If provisions conflict, the more stringent provisions shall apply.
   1. ANSI – American National Standards Institute
   2. ASTM – American Society of Testing Materials

1.4 SUBMITTALS

A. Refer to General Requirements and Division 01.

B. Submit Shop Drawings, clearly indicating make, model, location, type, size, pressure rating, and type of service.

C. Valve charts
   1. Submit two copies of valve charts for each piping system, consisting of isometric Drawings, or piping layouts showing and identifying each valve and describing its function to the Architect/Engineer for approval.
   2. Upon completion of the Work, one copy of each valve chart sealed to rigid backboard with clear lacquer, placed under glass and framed, shall be hung in a conspicuous location in the equipment room.

1.5 SUBSTITUTIONS

A. Refer to General Requirements and Division 01.

1.6 DELIVERY, STORAGE AND HANDLING

A. Refer to General Requirements and Division 01.

1.7 WARRANTIES

A. Standard Manufacturer's Warranty

PART 2 - PRODUCTS

2.1 GENERAL

A. Cast Iron valves 3" and larger shall have an epoxy coated body on all interior and exterior surfaces, ductile iron-nylon II coated disc, one piece 416 stainless steel shaft with Buna-N or EPDM seat minimum, 150 PSI rating, or cast aluminum ASTM S12A housing and fully coated with Rilsan on all interior and exterior surfaces. Internal components include EPDM resilient lining, Rilsan coated ductile iron disc and T304 stainless steel shaft. 150 psi rating.

B. Cast Aluminum valves 3" and larger shall have an ASTM S12A body and coated with Rilsan on all interior and exterior surfaces. Internal components include Buna-N or EPDM resilient lining and seat, Rilsan coated ductile iron disc and T304 stainless steel shaft. 150 psi rating.

C. Thermoplastic valves 3" and larger shall be constructed from PVC Type 1 Cell Classification 12454 or CPVC type 4 cell classification 23447. Thermoplastic valves shall include PVC disc with solid type 316L stainless steel shaft with Buna-N or EPDM seat pressure rated to 150 psi @ 73 degrees Fahrenheit.

2.2 BUTTERFLY VALVES

A. Butterfly valves 3" - 12" shall be wafer or lug bodies and shall be suitable for use between ANSI 125 and 150 lb. flanges.

B. Bodies of the flangeless design shall be provided with at least two bolt guides to center the valve in the pipeline.

C. All valves shall be as manufactured by Bray Valve, Dominion, Asahi/America, or equal.

D. All bolts and, nuts and washers shall be corrosion resistant hot-dipped galvanized, ASTM A123 or type 304 stainless steel with plated washers to be used when secured to PVC flanges.

2.3 BALL VALVES

A. PVC True Union Ball Valves, Ipex, Asahi, Spears or equal.

2.4 CHECK VALVES

A. ½" thru 2 ½" shall be PVC body, true union, ball type, seal material EPDM as manufactured by Ipex, Asahi Spears or equal as indicated on Contract Drawings.

B. 3" thru 20" diameter check valves:
1. Type: Split disc wafer style
2. Valve Body: Ductile or cast iron with an epoxy painted exterior
3. Lining: Fully lined with a Buna N elastomer
4. Shaft: 316 stainless steel shaft and shaft plug
5. Plates: 316 stainless steel (3" – 12") or Aluminum Bronze (14"+)
6. Spring & Plate Travel Stop: 316 stainless steel
7. Manufacturer: Center Line Series 800 as manufactured by CRANE ChemPharma & Energy, or Model CVXXK Series by Metraflex, or approved equal.

2.5 EXPANSION JOINT/FLEXIBLE CONNECTOR (where required)

A. Shall be the Metrasphere, Style R with EPDM body and threaded bolt holes, Model #MSREE Series manufactured by Metraflex, as indicated on drawings. Install with a control unit assembly (tie rods) from flange to flange per manufacturer's instructions to minimize expansion joint damage caused by excessive motion.

2.6 SUBMERGED SERVICE OPERATORS

A. Use only approved service operators for the valve requiring underwater operation in the surge tank or in manhole used for pool draining.

2.7 VALVE OPERATOR EXTENSION

A. Extensions shall be stainless steel and by same manufacturer as the valve manufacturer.

2.8 DRAINAGE VALVES

A. Provide min. 3/4" True Union Ball valve on all piping at such a location to allow complete drainage of system.

2.9 REDUCERS

A. Use Eccentric reducers on pump suction lines only and concentric reducers on pump discharge lines only.

B. Stainless steel body and flanges, T304 materials, ANSI 125# rated flanges.

C. Use Neptune Benson, 15-CNS/15ECS series "or equal".

D. Provide valves of same manufacturer throughout where possible and practical.

E. Provide valves with manufacturer's name and pressure rating clearly marked on outside of body.

2.10 VALVE LABELS

A. Provide and install 2” round, 1/16” thick, multi-layered valve tags with contrasting lettering with non-corrosive beaded tie on all valves. All labels shall be labeled in accordance with the valve chart per Section 13 11 14.

PART 3 - EXECUTION

3.1 VALVE CONNECTIONS

A. Provide valves suitable for connection to adjoining piping.

B. Valve size shall be the same as the pipe size.

3.2 VALVE USE

A. Pipe sizes 3" - 14" – Butterfly

B. Miscellaneous valves 1/2" – 2-1/2" - PVC True Union Ball Valves

C. All chemical lines and equipment - PVC True Union Ball Valves

3.3 VALVE OPERATORS

A. All butterfly valves shall have gear operators and chain operators as required unless drawings indicate otherwise. Chain operators shall be required on all gear operators located 7’-0” or higher above finished floor.

B. Provide extension lengths as necessary to operate submerged or below surface valves and the appropriate valve box access cover.

END OF SECTION 131124

SECTION 131125 - POOL CENTRIFUGAL PUMPS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pumps
   1. Flooded Suction

B. Pump Accessories
   1. Pump Strainers
   2. Gauges
   3. Flow meters

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

1.3 REFERENCES

A. The following latest edition reference specifications, guides, and standards shall become part of this Specification as if herein written. If provisions conflict, the more stringent provisions shall apply.
   1. Hydraulic Institute Standards
   2. Institute of Electrical and Electronics Engineers Standards (IEEE)
   3. National Electrical Manufacturers Association Standards (NEMA)
   4. Occupational Safety and Health Administration Rules and Regulations (OSHA)
   5. National Sanitary Foundation (NSF)
   6. American Society for Testing and Materials Standards (ASTM)
   7. American Iron and Steel Institute (AISI)
   8. American National Standards Institute (ANSI)
   9. ASTM A48 – Standard Specification for Gray Iron Castings
   10. ASTM B584 – Standard Specification for Copper Alloy Sand Castings for General Applications
   11. AISI 1045
   12. ASTM B62 – Standard Specification for Composition Bronze or Ounce Metal Castings

1.4 DESCRIPTION OF WORK

A. The pumping units shall be installed in accordance with the instructions of the manufacturer and as shown on the drawings by the Architect/Engineer.

B. Pump capacity, horsepower, TDH (Total Dynamic Head), speed, suction and discharge diameters, type, and other requirements shall be as shown on the drawings and shall comply with the requirements as specified herein.

C. The General Conditions shall apply to this Section as fully as if repeated herein.

1.5 QUALITY ASSURANCE

A. To ensure a properly integrated and compatible system, the Equipment Manufacturer shall assume full responsibility for the warranty and proper operation of the pumps, pump motors, and/or accessory equipment within this Specification.

B. Acceptable Products and Manufacturer: ASC Pumping Equipment Inc. (West Bend, WI; Appleton, WI; & Kansas City, MO: https://ascpump.com/) and/or as listed on the contract documents or included herein, or an Engineer approved equal product and manufacturer.

C. All pumps and strainers shall be NSF50 certified as provided, including required coatings, and shall be labeled as such on the serial number identification tag.

1.6 SUBMITTALS

A. Refer to General Requirements and Division 01.

B. Submit complete motor and pump data together with shop drawings for the driven machine. All material is to be collated in a card stock binder, with pockets for large drawings, and with index. This data shall be prepared by the motor and/or pump manufacturer and shall include:
1. Pump manufacturer and model number, name of motor manufacturer, type of pump and motor with dimensioned drawings.
2. Characteristic curves at full load motor speed showing flow, TDH, efficiency, horsepower, and NPSH required. For all VFD applications include a family of performance curves, separate of the full load motor speed curve, for speeds of 105%, 100%, 89%, 83%, 66%, and 50% of the scheduled RPM.
3. Nominal motor horsepower, speed at full load, frame size, enclosure construction, winding insulation class and treatment, temperature rise at nominal horsepower, service factor, voltage rating (indicate if dual voltage), number of phases, frequency rating, full-load amperes at nominal horsepower for application voltage, starting code letter, or locked rotor KVA or amperes.
4. Complete pump description plus material list including casings, impellers, seals, shaft, bearing frame, motor mounts, guards, base plate, exterior coating type and mill thickness
5. Pump sub-base and motor riser drawings. Include dimensioned drawings of the stainless steel sub-base and the motor riser support required for each pump installation. Drawings to include plan and section views to scale showing length, width and height dimensions, material specification, and required mounting holes. Coordinate these drawings and the design of these components with the pump supplier to assure a proper and level installation for each pump/motor.
6. Installation Instruction and Operation and Maintenance Manuals shall include recommended protection and maintenance required for storage prior to putting pumps in service and may be submitted any time before shipment of the pumps.

1.7 SUBSTITUTIONS

A. Refer to General Requirements and Division 01.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Refer to General Requirements and Division 01.

1.9 WARRANTIES

A. Manufacturer’s standard pump warranty. Warranty on mechanical seals covering 100% of the cost on all parts and labor extending over the same time period as the standard pump warranty.

B. Flooded Suction Pumps
   1. Pump failure of any pump component directly attributable to materials and/or workmanship within one (1) year after substantial completion shall be repaired or replaced by the pump manufacturer at no cost to the Owner.
   2. Motor failure of any motor component directly attributable to materials and/or workmanship within three (3) years after substantial completion shall be repaired or replaced by the pump manufacturer at no cost to the Owner.

PART 2 - PRODUCTS

2.1 END SUCTION, CENTRIFUGAL PUMPS

A. General
   1. Pump performance shall be optimized with provision of variable speed drives where designated in the drawings.
   2. Operational Pump Characteristics
      a. Engineer has the right to reject any pump with a pump curve having a design point operating efficiency more than 5% below the operating efficiency of the scheduled pump provided on the drawings.
   3. Furnish and install horizontal close-coupled end suction centrifugal pumps as specified on the Contract Drawings or as pre-approved by the Architect/Engineer.

B. Materials of Construction:
   1. Flooded Suction Pumps
      a. Pump internal materials shall be as follows:
         1) Casing – Ductile Iron (ASTM A536)
         2) Impeller – 316 Stainless Steel
         3) Shaft – 316 Stainless Steel
         4) Shaft Sleeve – 316 Stainless Steel
      b. Coating: All internal cast iron wetted parts shall be sandblasted and coated per the coating manufacturer's recommendations with Scotchkote 134 or equal product.
      c. Casing
         1) The casing will be of the end suction design with tangential discharge outlet. For suction piping diameters of 2" or greater, the suction and discharge shall be bolt through flanged connections. Flange connections shall be ANSI 125# rated with NPT gauge tapings.
         2) The casing shall have tapped and plugged holes for priming and draining. The casing bore shall be large enough to allow "back pullout" of the impeller without disturbing the casing or suction and discharge piping. The casing shall be supported by casing feet to avoid pipe strain.
      d. Impeller: The impeller shall be of the enclosed type, vacuum cast in one piece. It shall be finished all over, the exterior being turned and the interior being finished smooth and cleaned of all burrs, trimmings and irregularities. The impeller shall be dynamically balanced. The impeller will be keyed to the shaft, and fastened with 316 stainless steel washers, gasket and cap screw.
      e. Mechanical Seal: Shaft sealing shall be accomplished by means of a John Crane Type 21 or equal mechanical seal with solid silicone carbide face/primary ring; solid silicone carbide seat/mating ring; 316 stainless drive band, retainer and spring; and Buna-N elastomers.
      f. Shaft: The impeller shall be direct coupled to the 316SS motor shaft. The motor shaft shall be machined to provide a key way and drilled and tapped to accept the impeller fastener. Stub shafts are not acceptable.
      g. Shaft Sleeve: The pump shaft shall be fitted with a 316SS shaft sleeve to minimize shaft wear. The sleeve shall be sealed to the impeller hub by an 0-ring and shall be positively driven by a pin to the key way. The use of adhesive compounds to fasten the sleeve to the shaft shall not be accepted.
      h. Pump / motor must mount on the same plane and preserve back-pull-out design. 304SS MOTORIZER shall be supplied when pump mounting feet and motor feet do not align.

i. Pump nameplate shall be engraved via computer on 316SS data plate.
j. Pump support:
   1) Concrete Pump Pad: Install a reinforced cast in place concrete pump pad for leveling purposes and to assure the motor is raised above the equipment room floor.
   2) Sub-base: Provide a 316SS sub-base beneath the pump and connected to the concrete pump pad to assure a level installation and support for the pump and motor.
   3) Motor Riser: Provide a 316SS motor riser connected to the sub-base to assure a level installation and support for the pump motor. The motor riser shall be mechanically connected to the pump sub-base support to allow removal of motor and pump impellor without removal of pump sub-base support or pump piping.
   4) Manufacturer: Pump sub-base and motor riser supports fabricated/manufactured by ASC Pumping Equipment Inc.
k. Motor
   1) The motor shall be a NEMA-JM configuration motor meeting current NEMA and IE3 Premium Efficiency standards and shall be totally enclosed fan cooled (TEFC). NEMA –JP configurations shall only be used on large pumps (Aurora 6x8x13.5 & 8x10x13.5) only.
   2) The motor shall have a service factor of a least 1.15. The service factor is reserved for variations in voltage and frequency.
   3) Motor must be rated for use with a Variable Frequency Drive and meet the NEMA MG1 Standard, Part 30.
   4) Motors shall have 316SS shaft
   5) Motors must achieve 15:1 constant torque turndown.
   6) Motors shall come equipped with internal shaft grounding brush.
   7) Motors Frames 326 and below shall have removable feet to achieve F1, F2, & F3 field convertible conduit box position.
   8) Motor Conduit box shall have NPT threaded entry
   9) The motor shall have a sufficient horsepower rating to operate the pump at any point on the pump's head capacity curve at full load speed (60 Hz) regardless of selected operating speed without overloading the nameplate horsepower rating of the motor, regardless of service factor. Vendor shall confirm that motor current does not exceed allowable full load amperage at reduced frequency. Vendor shall verify scheduled horsepower meets above requirements. In no case shall the horsepower be less than indicated on the Drawings without specific approval from the Engineer.
   10) Electrical requirements including phase, frequency, and voltage are indicated on the Drawings.

2.2 PUMP ACCESSORIES

A. Pump Strainers
   1. All Horizontal Pumps
      a. Unless the pump has an integral hair and lint strainer, supply and install strainers equal to those indicated on the Contract Documents.
      b. Provide each strainer with two strainer baskets.

B. Gauges
   1. Provide compound gauges where called for on Drawings and as required by Code.
   2. Compound gauges shall be Liquid Filled, 30 Hg to 60 PSI with gauge cock and snubber as manufactured by Weksler, Marsh, Winters or equal.

C. Flowmeters
   1. Provide flow meters where called for on the Drawings and as required by Code on main lines and on branch lines of flow ranges indicated.
   2. Flowmeters shall be as specified on the contract documents or approved equal.
   3. Transmitter shall have an operating voltage of 12-24VDC and meet appropriate CE, CSA & UL standards. Reading accuracy must be within +/- 0.5% of reading at 25oC. Device shall meet NEMA 4X & IP65.

D. Pump Labels
   1. Provide corrosion-resistant, permanent pump labels with contrasting lettering.
   2. Label shall include pump ID from contract drawings and a description. (e.g. “P1A Lap Pool Filtration Pump”)

PART 3 - EXECUTION

3.1 PUMP INSTALLATION

A. The pumping units shall be installed in accordance with the instructions of the manufacturer and as shown on the drawings by the Pool Engineer.

B. Ensure that the pumps and motors are properly supported and aligned with no pipe strain transmitted to the pump casing. Secure the pump and motor as recommended by the manufacturer using mechanical connections provided on the pump and motor feet. See the Pool (PL) Drawings for additional pump installation details and requirements, including concrete pump pad, sub-base, and motor riser supports. The sub-base and motor riser supports are critical for proper vertical alignment and to allow removal of motor and pump impellor without removal of pump sub-base support or pump piping. Installations of the Aurora 3801 Series end suction pump without the sub-base, and motor riser supports will not be accepted.

C. Installation shall include furnishing the required oil and grease for initial operation. The grades of oil and grease shall be in accordance with the manufacturer's recommendations.

D. Permanently affix pump label to the pump.

3.2 ACCESSORY INSTALLATION

A. Install accessories as shown on the contract documents and in accordance with manufacturer’s instructions.

B. Strainers shall be supported on a concrete housekeeping pad and provided with sufficient space for maintenance.

C. Gauges shall be positioned to be read adjacent to the pump or from above, where pumps are in a pump pit.

D. Field mount the flowmeter and flow meter transmitter as located and shown on the pool plans. Mount transmitter at 4-5 feet above the floor utilizing the 3-8050 universal mounting kit.

E. Permanently affix pump label to the pump in an easily visible location.

3.3 FACTORY TRAINED REPRESENTATIVE

A. Provide a factory-trained representative for the purpose of supervising installation, start-up, final field acceptance testing, and providing instruction to the owner's operating personnel in the proper operation and maintenance of the equipment in this section.

B. Contractor and factory-trained representative shall verify pump flow aligns with the pump curve and calibrate flowmeter as required.

END OF SECTION - 131125

SECTION 13 11 26 - POOL PUMP VFD

GENERAL

1.01 DESCRIPTION

A. Work Includes:
1. Furnish all labor, materials, tools, and equipment, as indicated, in accord with provisions of Contract Documents.
2. Completely coordinate with work of all other trades.
3. Although such work is not specifically shown or specified, all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation shall be furnished and installed as part of this work.

B. General:
1. See Section 26 0001 for General Electrical Requirements.
2. See Division 1 for General Requirements.
3. Coordinate all requirements with Contractor providing equipment including but not limited to contacts bypass and controls.

1.02 RELATED WORK

A. Section 26 05 26 – Grounding and Bonding

B. Section 26 05 53 – Electrical Identification

C. Section 26 28 13 – Fuses

D. Section 26 28 16 – Enclosed Switches

1.03 REFERENCE STANDARDS

A. ANSI/IEEE 519 Guide for Harmonic Control and Reactive Compensation of Static Power Converters.

1.04 SUBMITTALS

A. Submit shop drawings and product data under provisions of Division 01, General Conditions of the Contract, and Section 26 0001.

B. Include physical, electrical, and performance characteristics of each variable frequency drive and associated components, including dimensions; weight; input and output performance; voltage, phase, current and overcurrent characteristics; installation instructions; protective features; wiring and block diagrams indicating specified options; electrical noise attenuation equipment where required to meet the criteria specified; line side voltage notch wave form and line side current harmonics; certified efficiency versus load and speed curves; and required operating environment.

1.05 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Submit operation and maintenance data under provisions of Section 26 0001 and Division 01.

B. Instructions to include recommended maintenance procedures, maintenance schedules, recommended spare parts list, and vendor name for those parts.

1.06 EQUIPMENT STARTUP AND AGENCY TRAINING

A. Provide the services of a factory trained and certified technician to approve the installation; start-up, test, and adjust for proper operation; and instruct and train the Agency's representative in the operation and maintenance of the unit(s). Upon completion of the equipment startup, submit a complete manufacturer's field report, including startup and test log, signed by the factory trained technician. Coordinate with other Contractors as required. The startup shall be completed within ten (10) working days from the startup date.

1.07 WARRANTY

A. The warranty shall be for a period of 36 months applied from the date of project Substantial Completion, but not to exceed 42 months from shipment. Further, the warranty shall include all parts, labor, travel time, administrative costs, overhead, travel expenses, technical support and any and all other costs to provide the warranty service.

1.08 COORDINATION

A. All line voltage power wiring to equipment, factory mounted control panels, to motor control centers, to and from disconnect switches, and to individually mounted starters, and from starter to motors, shall be provided by the Electrical Contractor.

B. Vendor/Contractor that specifies "starters by Electrical Contractor" shall furnish project specific wiring diagrams to Electrical Contractor for all equipment and devices furnished by this Contractor and indicated to be wired by the Electrical Contractor. In addition, furnish complete sets of wiring diagrams for Owner's bound maintenance manual.

C. All line, or low voltage, wiring which is not indicated on the drawings, or specified, but necessary to complete the installation, shall be provided by this Division.

2. PRODUCTS

2.01 MANUFACTURERS

A. ABB 580 Series

B. Alternate manufacturer's requests shall be submitted in writing to the Engineer for approval at least 20 working days prior to bid. A compliance list point by point to this specification shall be provided. Factory authorized local support for service for warranty shall be identified.

2.02 DESIGN AND CONSTRUCTION

A. The unit shall be variable torque, modular design for control of the motors and rated at the motor full load nameplate amps.

B. The unit shall be UL 61800-5-1 listed, solid state, micro processor-based with a pulse width modulated (PWM) output wave form (none others are acceptable).

C. The VFD shall employ a full wave bridge rectifier, to prevent line notching, with dual DC bus chokes, capacitors to minimize the ripple of the rectified voltage to maintain near constant DC voltage. Insulated gate bipolar transistors (IGBT's) shall be employed as the output switching device.

D. Control circuitry shall be plug-in, plug-out modular basis with a corrosion resistant coating on printed circuit boards.

E. Units to be suitable for an operating environment from 0°C to 40°C temperature and humidity up to 95% non-condensing. The VFD shall be rated to Class 3S2 Pollution degree 2 according to IEC/EN 61800-5-1. The entire VFD package shall be UL listed at 100KA SCCR.

F. Electrically and physically isolate control circuitry and conductors from power circuitry and power conductors. Control conductors and power conductors shall not be run in the same conduit.

G. The unit enclosure shall be UL Type 12 (IP55) enclosure for the application minimum. All components shall be factory assembled and tested prior to leaving the manufacturing facility.

H. Include the following operating and monitoring devices mounted on the front cover:
   1. Fused disconnect switch with door interlocked handle and lock-open padlocking provisions (VFDs with no bypass).
   2. Operating mode selector switch marked "hand-off-auto". Manual speed adjustment via keypad, mounted on the door.
   3. Manual bypass selector switch to select power through drive or bypass where indicated on drawings. A main door interlocked, thermal magnetic circuit breaker (pad lockable, door interlocked) and VFD exclusive fuses on all drives with bypass
   4. Pilot light marked "RUN".

I. Provide a manual bypass circuit and bypass starter to transfer from variable frequency drive operation to bypass operation where indicated on drawings. When no bypass is required, a door interlocked, padlockable disconnect and fast acting fuses are to be provided.

J. Provide partitioning within drive enclosure to separate and isolate bypass section from variable frequency drive section and to house bypass wiring, contactors, relays, and manual bypass circuit so that devices within the converter/inverter compartment are able to be serviced without electrical danger to the service technician.

K. Starters shall have provisions for additional control requirements such as, but not limited to inputs and outputs for connection to external relays and equipment where required.

2.03 PERFORMANCE REQUIREMENTS

A. Units shall be suitable for input power of electrical system as scheduled on the drawings ±10% to 15%, 3 phase, 60 Hertz nominal. The VFD shall operate with line voltage +30% and -35%. All faults shall be selectable for manual or auto restart. The VFD shall detect when a motor disconnect is open and disable the VFD.

B. Provide minimum 5% line reactor in each AC phase on the input side or 5% dual DC bus reactors to reduce harmonic voltage distortion. Limit line noise, as measured at the point of common coupling, to a voltage factor of 5% or less as defined in IEEE-519, latest edition. If the distortion is greater than that allowed by IEEE-519, latest edition, the line reactor shall be changed in size to ensure

compliance. The supplier of the VFD shall provide distortion calculations to be used for setup and analysis.

C. Use a current limiting control device to limit output current to 110% continuous for one minute; also refer to Protection Features in this section. Full load output current available from drive shall not be less than motor nameplate amperage. The full load amp rating of the VFD shall not be less than the values indicated in the NEC Table 430-150.

D. Output power shall be suitable for driving standard NEMA B design, three phase alternating current induction motors at full rated speed with capability of 10:1 turndown.

E. Additional performance capabilities to include the following:
   1. Ride through a momentary power outage of 15 cycles.
   2. Short circuit and ground fault output protection (power applied only and running).
   3. Start into a rotating load without damage to drive components or motor.
   4. Capable of automatic restart into a rotating load after a preset, adjustable time delay following a power outage.
   5. Programmable time delay following a run command.
   6. Input power factor: Min 0.95 throughout the speed range.
   7. VFD's shall have a UL listed Short Circuit Withstand Rating of 65,000 AIC.
   8. Minimum efficiency: 95% at 100% speed, 85% at 50% speed.

2.04 CONTROL FEATURES

A. Use control circuits compatible with input signal from control system in the automatic mode and from manual speed control in the manual mode. Vary motor speed in response to the input control signal. Include components necessary to accept the signal from the control system in the form that it is sent. Coordinate with Vendor/Contractor supplying control system and or motor.

B. Include the following additional control features:
   1. Hand-Off-Automatic (HOA) selector switch to select local or remote start/stop and speed control.
   2. Analog input, selectable 0-10v or 4-20 mA, for automatic control from a compatible control system. Include an RS-485 port with BACnet protocol. The drive shall be BTL Listed to Revision 14 or later. Use of non-BTL Listed drives are not acceptable. The VFD shall also include a certified PROFINET communication port.Local speed control at the VFD.
   3. Local speed control at the VFD.
   4. Adjustable acceleration and deceleration rate so that the time period from start to full speed and from full speed to stop can be field adjusted.
   5. Adjustable minimum and maximum speed settings for both automatic and manual modes of operation.
   6. Three (3) sets of programmable form "C" contacts for remote indication of variable frequency drive condition. Note: default programming to be set for "Drive Run & Fault".
   7. Illuminated display keypad. VFD that use codes are not acceptable.
   8. External Fault indicator in English that is programmable (i.e. "motor disconnect open").
   9. One (1) input for a N.O. dry contact type input for a 2-wire remote start/stop.
   10. One (1) input for a N.C. dry contact type input for external faults: (freezestats, fire alarm, smokes, etc). This input shall be factory wired to prevent both the VFD and bypass starter operation when external fault is present.
   11. Jumpered terminals for remote "Emergency Stop" controls.
   12. Provide Safe Torque Off circuit according to EN 61800-5-2: 2016, IEC 61508 Parts 1-2:2010, ISO 13849-1:2015, ISO 13849-2:2012, IEC 62061:2015 SIL 3/PL shall be provided in the base VFD.

13. The VFD shall accept a N.O. dry contact that will change the control from a speed follower signal to a PID control. Actual flow and set point shall be displayed on two lines of the keypad. The flow shall be labeled GPM.

2.05 PROTECTION FEATURES

A. Use electronic protection circuitry in the power circuits to provide an orderly shutdown of the drive without blowing fuses or tripping circuit breakers and prevent component loss under the following abnormal conditions:
   1. Activation of any safety device.
   2. Instantaneous overcurrent and/or over voltage of output.
   3. Power line overvoltage and undervoltage protection.
   4. Phase loss.
   5. Single and three phase short circuiting.
   6. Ground faults.
   7. Control circuit malfunction.
   8. Over temperature.
   9. Output current over limit.

B. Provide the following additional protective features:
   1. Input transient overvoltage protection up to 3000 volts per ANSI 37.90A; Coordinated AC transient surge protection system consisting of 4 MOVs (phase-to-phase and phase-to-ground), a capacitor clamp, and internal chokes. The MOVs shall comply to UL 1449 4th Edition;
   2. DC bus fusing or other electronic controls which limit the rate of rise of the DC bus current and de-energizes the drive at a predetermined current level;
   3. Where a control transformer is part of the assembly, provide using for the control circuit transformer;
   4. Grounded control chassis; and
   5. Devices and/or control circuitry to ensure that the variable frequency drive and bypass starter are not both energized and driving motor simultaneously.
   6. Motor heating function to prevent condensation build up in the motor. Motor heating adjustment, via parameter, shall be in “Watts.”

C. Provide the following additional protective features:
   1. Coordinated AC transient surge protection system consisting of 4 MOVs (phase-to-phase and phase-to-ground), a capacitor clamp, and internal chokes. The MOVs shall comply with UL 1449 4th Edition. Drives that do not include coordinated AC transient surge protection shall include an external TVSS/SPD (Transient Voltage Surge Suppressor/Surge Protection Device).

2.06 DIAGNOSTICS

A. Provide an English character display (no error codes) with indicators for the following:
   1. Phase Loss
   2. Ground Fault
   3. Over Current
   4. Over Voltage
   5. Under Voltage
   6. Over Temperature
   7. Overload
   8. DC Buss Status

B. Keypad to have Bluetooth interface with a free phone app that has all the functions the keypad does. There shall be a built-in time clock in the control panel with 10-year battery backup. The calendar and timeclock can be used for programmed start/stop and other functions. Bluetooth connectivity shall allow uploading, downloading, and emailing of parameters.

2.07 QUALITY ASSURANCE TESTS

A. Use a factory heat stress test to verify proper operation of all functions and components under full load. Each VFD shall be tested on a motor load. Test results to be provided.

B. Field performance test of variable frequency drives to determine compliance with this specification will be performed at the owner's discretion and may include any specified feature, including operation of protective devices through a simulated fault. Contractor will pay for initial testing. Should drive be found deficient by this testing, drive manufacturer will be required to make any and all changes necessary to bring unit(s) into compliance with the specified performance and demonstrate this performance by retesting. Cost of changes and retest will be by this contractor.

C. Variable frequency drive manufacturer or designated representative to perform a field test of each drive, in the presence of the owner's representative, for the following items:
   1. Provide general inspection to verify proper installation;
   2. Demonstrate drive reaction to simulated power interruptions of two seconds and sixty seconds;
   3. Demonstrate adequate protection during switching from variable frequency drive operation to bypass starter operation and back again;
   4. Measure and record voltage distortion factor and line notch depth at the point of common coupling. Provide the recorded value as part of the startup report.

2.08 BYPASS EQUIPMENT

A. Bypass Starters:
   1. See Equipment schedule in drawings and provide bypass starters where indicated.
   2. The bypass starters shall be across-the-line magnetic starter type. There shall be a VFD-Off-Bypass selector switch or keypad that shall be separate from the VFD keypad. The bypass shall have a separate power supply from the VFD. The bypass control circuit shall include its own H-O-A switch to run in bypass without an external run command. The bypass shall be able to operate with the VFD removed for service.

B. Bypass Configuration:
   1. Provide one main fused disconnect switch or circuit breaker to isolate both the drive and bypass circuit. Bypass configuration shall consist of one input drive contactor or disconnect, one output drive contactor and one output bypass contactor. The two output contactors shall be mechanically and electrically interlocked.

C. Provide motor overload protection in the bypass circuit.

D. Provide high speed fuses for the VFD (not in the bypass circuit). The VFD and bypass shall be UL listed for 100KA SCCR.

2.09 LINE REACTORS

A. Line reactors shall be installed in each phase of the AC input side of the VFD and mounted within a common enclosure with the VFD.

B. Line reactor shall be a three-phase inductor, 5% impedance, iron core, 600V, Class H insulation, 115 degree C rise, copper windings with screw type terminal blocks.

3. EXECUTION

3.01 VARIABLE FREQUENCY DRIVES

A. Install where indicated on drawings and in accordance with approved submittals and manufacturer's published recommendations. Installation to be by the Division 26 contractor.

B. Input wiring shall be installed in a separate conduit system, output wiring shall be installed in a separate conduit system and control wiring shall be installed in a separate conduit system. Do not mix input power, output power, or control wiring in a common conduit.

C. Control signal for drive will be provided as indicated on drawings.

D. VFD manufacturer to perform a field test of each drive and provide Owner operational and maintenance training.

3.02 REMOTE EMERGENCY STOP

A. Factory jumper shall be removed from VFD Emergency Stop terminals. Terminals shall be wired to emergency stop pushbuttons as shown on the plans. Feature shall be programmed for Manual Reset that must occur at the VFD. VFD shall not automatically reset when emergency stop pushbuttons are reset.

END OF SECTION

SECTION 131134 - POOL VERTICAL FIBERGLASS FILTERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pool Vertical Fiberglass Filters

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

1.3 REFERENCES

A. The following latest edition reference specifications, guides and standards shall become part of this Specification as if herein written. If provisions conflict, the more stringent provisions shall apply.
   1. National Sanitary Foundation (NSF)

1.4 DESIGN REQUIREMENTS

A. As assurance that each item of apparatus is properly sized to perform in conjunction with each other, the Owner requires bidders to use the filter manufacturer as a single source of supply for the items of equipment as listed and described herewith.

1.5 SUBMITTALS

A. Provide detailed Shop Drawings of the items of equipment being provided, indicating the dimensions, material and characteristics of the filter shells, interior and exterior filter manifolds, nozzle system and filter media.

B. Provide a typed sheet of Operating Instructions, embracing the operation functions and recurring maintenance processes involved in connection with the complete filtration system.

1.6 CERTIFICATIONS

A. Shall bear the NSF Seal of Approval, Standard #50 for sand type filters.

1.7 QUALIFICATION STATEMENTS

A. The equipment described herein shall be a product of a manufacturer regularly engaged in the fabrication of fiberglass pressure vessels for at least fifteen (15) years.

1.8 WARRANTY

A. The equipment supplier shall guarantee that the equipment to be furnished is of the correct capacity, that the various parts are designed to operate correctly and in conjunction with each other, that if the installation is made in accordance with his drawings and operated in accordance with his instructions, the system will perform the prescribed functions correctly, the water entering the pool will be clear, bright, free from suspended matter visible to the unaided eye, will not produce any toxic effect or impart undesirable taste, odors or colors, and will be sanitary to the satisfaction of all authorities having jurisdiction.

B. Provide a standard one (1) year non-prorated warrantee.

1.9 SYSTEM STARTUP

A. An authorized representative of the equipment supplier shall provide the supervisory services of an Installation Engineer for at least 4 hours to fully instruct designated personnel in the operation, care and maintenance of the filter system.

PART 2 - PRODUCTS

2.1 FILTERS

A. Fiberglass Filter Tank
1. The filter tank shall be no less diameter and length than shown on plan. It shall be suitable for 50 psi working pressure.
2. The vessel(s) shall be constructed of multi-layer fiberglass. Layers shall consist of a combination of chopped glass and woven roving in an isopthalic-polyester matrix. The vessel shall be assembled from one side shell and two domed ends which shall be joined with an adhesive and reinforced with FRP layup. Alternate construction methods shall not be acceptable.
3. Vessels shall be provided with ABS support bases. The tanks will be secured to these bases with adhesive.
4. The wetted surface shall be a standard gel coat (GC). The gel coat shall be a modified polyester gel coat equivalent to a Cook gel coat 943-AN-023 with a thickness of no less than 10 mils.
5. The external surface shall be smooth in appearance and be free of cracks or other defects. The exterior surface shall be supplied with an all-weather coating. The tank coating shall be water based acrylic emulsion paint with UV inhibitors.
6. Each filter tank shall be equipped with a bottom mounted drain out system that shall completely empty the vessel.
7. Each tank shall have an automatic and manual air release system and shall be of non-corrosive materials.
8. Each filter tank shall be equipped with the necessary flanges and connections for the internal and external piping and valves.
9. Each tank shall have one influent header fitted with sufficient distributors to properly distribute incoming flow evenly across the sand bed surface and one hub with sufficient laterals equally distributed not less than 12 inches below the filtering sand bed with a total effective slot area such that the average velocity through the slots will not exceed 6 feet per second at the design flow rate. The hub shall be fabricated of ABS and all distributors and laterals shall be replaceable. The laterals shall have “cam and ramp” ¼ turn connections and be constructed of ABS plastic with molded ‘V’-groove slots. Laterals with machined or cut slots shall not be accepted. Laterals shall be threaded at right angles into the header pipe.
10. Exterior influent and effluent pipe connections shall be 2” PVC.
11. Each tank shall have an 8.5-inch diameter access manhole with molded cover, o-ring, and pressure gauge.
12. The system shall be designed for installation against a back or side wall with all servicing accessible without moving tank(s). When the system is off, the tank(s) must remain full of water and not allow water to gravity drain back to the source to prevent disturbance of the sand bed.

13. Each filter tank shall be equipped with the necessary flanges and connections for the internal and external piping and valves.

B. Multi-port and Hi Flow Valve Control Assembly (Unless Otherwise Noted in Drawings).
1. Valve assembly shall be pre-plumbed and constructed of PVC.
2. Valve shall include a six-position positive lock operation system.
3. Shall be side mounted.
4. Valve mechanism shall be designed so that the filter, drain, rinse and backwash cycles can be accomplished by repositioning one valve handle that will provide accurate positioning for tight shut off.

2.2 FILTER MEDIA

A. A sufficient quantity of #20 US sieve grade clean crystal silica sand to cover filter elements with a minimum 12-inch sand bed shall be furnished and installed into each tank and shall be free of limestone or clay and shall be free from minerals that may precipitate onto pool surfaces. The following is an acceptable gradation for this media:

#20 SILICA SAND

Effective size: 0.45 mm (0.018 in.)

Uniformity coefficient: 1.5

Mean diameter: 0.616 mm (0.0243 in.)

Standard deviation: 0.110 mm (0.00432 in.)

Grain Sphericity: GRTR 0.7

B. Each filter tank shall be provided with media as required per manufacturer’s recommendations.

END OF SECTION 131134

SECTION 131137 - POOL CHEMICAL SYSTEMS AND CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Chemical Controller with the following sensors:
   1. pH Sensor
   2. ORP Sensor
   3. Temperature Sensor
   4. Flow Sensor

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

1.3 QUALITY ASSURANCE

A. The controller shall carry the following product certifications:
   1. NSF Standard 50
   2. UL 61010-1

1.4 SUBMITTALS

A. Refer to General Requirements and Division 01.

B. Submittals required: For each type of manufactured material and product indicated. Provide Submittals indicating equipment provided, dimensions, material specifications, wiring diagrams and all accessory components including sensors.

1.5 SUBSTITUTIONS

A. Refer to General Conditions, Division 01.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Refer to General Conditions, Division 01.

1.7 WARRANTIES

A. Controller shall be covered by manufacturer’s 5-year warranty.

B. ORP and pH sensors shall be covered by manufacturer’s 2-year warranty.

C. Other sensors and flow cell components shall be covered by manufacturer’s 1-year warranty.

D. Chemical feed pumps shall be covered by manufacturer's 2-year warranty.

E. A factory trained/authorized representative shall provide training to the owner. The control system shall be provided with on-site start-up, on-site operator training, and 1-year on-site warranty service performed by a representative trained and authorized by the controller manufacturer.

PART 2 - PRODUCTS

2.1 All products listed as basis of design are acceptable, as are approved equivalents by project manager.

2.2 CHEMICAL CONTROLLER

A. The water chemistry control system shall provide continuous monitoring and control of the water chemistry and related disinfection equipment.
   1. The controller shall continuously monitor and control pH. Chemical feed shall be configurable for manual, automatic, proportional, and on/off modes.
   2. The controller shall continuously monitor and control sanitizer based upon the ORP reading, the free chlorine sensor, or both. Chemical feed shall be configurable for either on/off or time-based proportional feed.
   3. The controller shall have a programmable superchlorination function, based upon ORP or ppm superchlorination setpoint, which is triggered manually.
   4. The controller shall have a programmable dechlorination function, based upon ORP or ppm dechlor setpoint, which is triggered either manually or by the completion of the superchlorination function.
   5. The controller shall compute the Langelier Saturation Index and the Ryznar Saturation Index based upon sensor data and/or manual entered by the operator.
   6. The controller shall continuously monitor, display, and datalog system flow, maintaining a total flow volume. A Low Flow Alarm shall be operator settable, which can be programmed to disable chemical feeds.
   7. The controller shall also have a Minimum Flow Rate setting to turn off heater whenever system flow is less than this programmed minimum level. The controller shall also manage the heater on/off status based on real-time water temperature reading.

B. The standard display shall be a backlit transflective LCD that will continuously display information related to the following:
   1. All installed sensor readings
   2. Set points, with current control status
   3. All active alarms, including time activated

C. The flow sensor shall be used to prove flow to the chemical controller to prevent dosing of chemicals during a system low flow/no flow condition.

D. The controller shall automatically abort a Manual or Scheduled Turndown upon declining water chemistry and return to the standard programmed circulation rate to maintain optimal water quality. Declining water chemistry is signaled by any of the alarm conditions.

E. The controller shall signal all alarm conditions with the following indicators:
   1. A bright flashing LED on the front of the controller.
   2. Each active alarm listed on the LCD display along with time activated.
   3. Email and text alarm notifications.

F. The controller inputs are as follows:
   1. The controller shall have inputs available for pH, ORP, Temperature, free chlorine, and flow sensors.
   2. The controller shall come with a minimum of (3) fully assignable digital inputs available for items other than those listed above.

G. The controller outputs are as follows:
   1. The controller shall have integral line or dry contact 5A solid-state relay outputs capable of switching 3A under all normal operating conditions available for Acid or Co2 feed and sanitizer feed pumps.
   2. The controller shall come with a minimum of (2) fully assignable integral line or dry contact 5A solid-state relay outputs capable of switching 3A under all normal operating conditions available for items other than those listed above.
   3. All relays must account for the effects of the temperature gradient inside the IP66 or NEMA 4X enclosure. Systems that utilize relays that are not de-rated must submit an engineering evaluation justifying the use of relays at their full, optimal-condition capacity. All solid-state relays shall have a provision for an electrical interlock with the circulation pump motor starter.
   4. The controller shall come with a minimum of (8) separately isolated 4-20mA output signals.
   5. The controller shall be capable of expanded capabilities with optional expansion package.

H. Required controller safety features:
   1. The controller shall have built-in limits to the amount of time any relay control output may be forced on (i.e. in “Manual On” mode).
   2. The controller shall have programmable high and low alarm settings for pH, ORP, temperature, low flow & no flow. The controller shall have a programmable lockout of sanitizer feed upon pH high or low alarm.
   3. The controller shall activate a No Flow alarm when the dedicated sample stream flow switch indicates there is insufficient flow through the sample stream. This No Flow alarm shall lockout all chemical feed control operations.
   4. The controller shall have a dedicated Emergency Off button on the front panel of the system, which immediately halts all chemical feeds and control outputs when pressed. This feature shall require entry of a security access code.

I. Required controller remote communication and access features:
   1. The controller shall have the ability to allow field upgrades and updates and programming as needed. Controller must be capable of being accessed via remote communication.
   2. The controller shall have a means to preserve data logs during power outages, for input level recording and events. All input levels shall be recorded and maintained for 365 days on the controller, with a sample taken every minute. The controller shall record and maintain the events over the last 365 days recording all alarms, parameter changes, user logins, and operational cycles related to all control features.
   3. The controller shall also support the following types of connection to 3rd party applications such as EMS, BMS, BAC and SCADA systems:
      a. 1) MODBUS TCP/IP
      b. MS/TP (RS485)
      c. TCP/IP (Ethernet) BACnet connection
      d. The connection shall support access to Inputs (current readings), System Information, Set Points, Alarm Points, Control Status and Alarms. Set Points and Alarm Points shall be modifiable from the 3rd party application via the selected interface.
   4. The controller shall come with an integral Wi-Fi module.
   5. The controller shall be Windows 10 compatible or include the necessary software and apps to allow for the real-time monitor/ of the following via personal computer, smartphone, or tablet device:
      a. Auto-Polling – to allow automatic download of data logs.
      b. Graphical Operator’s Console – to display current readings, setpoints, alarm points and control status mode.
      c. Data Logging
      d. Email and text alarms notifications.
   6. The controller shall require security access codes.

J. The controller shall be housed in an IP66 or NEMA 4X polycarbonate enclosure. All high-voltage wiring shall be performed in a separate IP66 OR NEMA 4X enclosure that precludes access to the controller electronics.

2.3 pH SENSOR

A. The controller shall provide a measurement of pH by utilizing a sensor with the following characteristics:
   1. 2 – 12 sensing range
   2. operating temperature range of 32-140 °F (0-60°C)
   3. operating pressure range of 0 - 60 psi (0 TO 4.1 bar)
      a. The controller shall continuously monitor, display and data log pH with minimum 0.1 resolution.

2.4 ORP SENSOR

A. The controller shall provide a measurement of ORP by utilizing a sensor with the following characteristics:
   1. 0 to 999 mV sensing range;
   2. operating temperature range of 32- 140° F (0-60°C)
   3. operating pressure range of 0- 60 psi (0 TO 4.1bar)
      a. The controller shall continuously monitor, display and data log ORP with minimum 6mV resolution.

2.5 TEMPERATURE SENSOR

A. The controller shall provide a measurement of water temperature by utilizing a sensor with the following characteristics:
   1. 32 – 212°F (0 – 100°C) sensing range
   2. Operating temperature range of 32 – 212°F (0 – 100°C)
   3. Operating pressure range of 0-145 psi (0-10 bar)
      a. The controller shall continuously monitor, display and data log temperature with 5/9 °C (1°F) resolution.

2.6 CIRCULATION FLOW SENSOR

A. The controller shall provide a measurement of pool circulation flow rate and volume by utilizing a flow sensor with the following characteristics:
   1. Paddle wheel flow sensor
   2. O-ring seal
      a. The controller shall continuously monitor, display and data log flow rate with 0.45 lpm (0.1 gpm) resolution.

PART 3 - EXECUTION

3.1 CHEMICAL CONTROLLER INSTALLATION

A. Installation of the system shall be per the manufacturer's specification and no exceptions shall be allowed. A factory trained/authorized representative shall provide training to the owner. The control system shall be provided with on-site start-up, on-site operator training, and 1-year on-site warranty service performed by a representative trained and authorized by the controller manufacturer.

B. Provide coordination and instructional training of the chemical controller's remote use functions and alarms with Owner's designated staff and information technology personnel.

C. Calibration of chemical controller shall be executed only after the monitored pool temperature has been established to within 4 degrees of the design temp, or as required by the manufacturer's installation instructions, if more stringent.

3.2 CHEMICAL STORAGE INSTALLATION

A. Tank shall be hydrostatically tested at time of installation.

3.3 MANUALS

A. Manufacturer shall supply an Installation, Operation and Maintenance Manual describing features, operating instructions, maintenance procedures and replacement parts.

END OF SECTION 131137

SECTION 131140 - POOL HEATING SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Gas-fired Pool Heaters

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

1.3 DESCRIPTION OF WORK

A. Heating system for swimming pool. Coordinate all venting, interlocking and control wiring for pool heaters with HVAC Contractor.

1.4 SUBMITTALS

A. Refer to General Requirements and Division 01.

B. Submittals required:
   1. Heaters
   2. Thermometers
   3. Printed and bound operating, installation, and service manuals

1.5 SUBSTITUTIONS

A. Refer to General Requirements and Division 01.

1.6 DELIVERY, STORAGE AND HANDLING

A. Refer to General Requirements and Division 01.

1.7 WARRANTIES

A. Standard Manufacturer’s Warranty

PART 2 - PRODUCTS

2.1 POOL HEATERS

A. Provide gas fired heaters for pools, as scheduled on Contract Drawings, complete with controls.

B. Heaters must be A.S.M.E. Coded and labeled by manufacturer if they exceed the HLW-101 service limits; a heat input of 200,000 Btu/hr (60 kW) or a nominal water-containing capacity of 120 gal (450 L).

C. Heaters will not require A.S.M.E labeling if they do not exceed the HLW-101 service limits; a heat input of 200,000 Btu/hr (60 kW) nor a nominal water-containing capacity of 120 gal (450 L). However, the heater must meet HLW-700 and HLW-800 design requirements per current A.S.M.E. standards.

D. Provide and install per State and Local Codes, including State Boiler Code required control and safety device packages.

2.2 THERMOMETERS

A. Thermometers shall have an adjustable angle and separable 304 stainless steel socket thermowell. The insertion length shall accommodate pipe size as required by the manufacturer.

B. Thermometers shall be liquid filled with a 9" scale, glass window, and dual face to display both Fahrenheit and Celsius temperatures, manufactured by Weksler, Marsh, Winters or approved equal; or thermometers shall be solar powered with digital display, glass passivated thermistor and aluminum stem as manufactured by Wika or approved equal.

PART 3 - EXECUTION

3.1 POOL HEATERS

A. Install per manufacturer’s installation instructions and recommendations, and in accordance with all applicable State and Local Codes.

B. Furnish and install thermometers in inlet and outlet piping to heater and downstream in the blended water stream.

C. Furnish and install a pressure relief valve for each heater and pipe to within 6" of floor.

D. Furnish and install a flow switch per heater manufacturer's requirements.

E. Factory authorized start-up required. Start-up form shall be included in the Operating and Maintenance Manuals and submitted separately to the Architect/Engineer.

END OF SECTION 131140

SECTION 131142 - PERIMETER OVERFLOW GUTTER GRATING

PART 1 - GENERAL

A. A perimeter overflow gutter system consisting of a continuous grating covered overflow channel as shown in documents shall be installed. The gutter shall be level throughout.

1.2 SECTION INCLUDES

A. PVC Parallel grating

B. PVC Perpendicular grating

C. Polymer / High Density Polyethylene (HDPE) Grating

1.3 RELATED DOCUMENTS

A. Drawings and Contract Requirements, including General and Supplementary Conditions and Division 01 – General Requirements, apply to this Section.

B. Division 13 11 Pool specifications apply to this section

C. Division 13 11 18 Pool Concrete

D. Division 13 11 43 Pool Stainless Steel Gutter

1.4 REFERENCES

A. The following latest edition reference specifications, guides and standards shall become part of this Specification as if herein written. If provisions conflict, the more stringent provisions shall apply.
1. ANSI – American National Standards Institute
2. ASTM – American Society of Testing Materials
3. NSF – National Sanitation Foundation Standard 50
4. MAHC – Model Aquatic Health Code

1.5 SUBMITTALS

A. Refer to General Requirements and Division 01.

B. Submit Shop Drawings, clearly indicating make, model, type, and size of grating

C. Submit 4” x 4” samples of each of MFG. standard colors

1.6 SUBSTITUTIONS

A. Refer to General Requirements and Division 01.

1.7 DELIVERY, STORAGE AND HANDLING

A. Refer to General Requirements and Division 01.

1.8 WARRANTY

A. Manufacturer's Ten-Year Warranty, prorated after one year.

B. Grating installation shall be completed in accordance with all manufacturer's requirements for warranty coverage.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide perimeter overflow gutter grating type as identified and detailed in the drawings.

B. Perimeter overflow gutter grating shall be provided from a single manufacturer.

C. Materials shall meet product requirements within these specifications.

2.2 PARALLEL OVERFLOW GUTTER GRATING - PVC

A. The grating surface bars shall run parallel to the pool wall.

B. The grating shall be formed from molded, modular, interlocking, UV-stabilized PVC bars. The top surface of the grating bars shall be raised, water-shedding, slip-resistant and shall meet the IBC Classification C for Wet-Barefoot inclining platform (ramp) test for swimming pool surroundings.

C. Grating bars shall be a minimum of 15/32" (12mm) wide and an outside depth of 1.0" (25.4mm) with a middle depth that varies, dependent on grating width and load strength requirements.

D. Grating design shall meet ASTM D790-10 or ANSI/AS3996 Class A for covers and grates with load exceeding 10kN (2,248lb).

E. The grating shall provide at least 37.5% open area per foot for unrestricted water flow. The space between the bars shall not exceed 3/8" (9.5mm) and shall comply with IBC child finger/toe entrapment guidelines.

F. Grating width shall allow the insertion of the touchpad holding brackets between the grating and the gutter lip.

G. All inside and outside corners and custom radii sections under 3-feet inside diameter (short radius section) shall be custom fabricated and strengthened by the manufacturer.

H. Fasteners shall be SS-316, provided by the manufacturer, and installed per manufacturer instructions and as shown on drawings.

I. Colors selected by the Architect/Owner from manufacturer's standard colors.

J. Acceptable manufacturers:
   1. Daldorado LLC
   2. Lawson Aquatics

2.3 PERPENDICULAR OVERFLOW GUTTER GRATING - PVC

A. The grating surface bars shall run perpendicular to the pool wall.

B. The grating shall be formed from molded, modular, interlocking, UV-stabilized PVC bars. The top surface of the grating bars shall be raised, water-shedding, slip-resistant and shall meet the IBC Classification C for Wet-Barefoot inclining platform (ramp) test for swimming pool surroundings.

C. Grating shall be a minimum of 15/32” (12mm) wide and an outside depth of 1.0” (25.4mm) with a middle depth that varies, dependent on grating width and load strength requirements.

D. Grating design shall meet ASTM D790-10 or ANSI/AS3996 Class A for covers and grates with load exceeding 10kN (2,248lb).

E. The grating shall provide at least 37.5% open area per foot for unrestricted water flow. The space between the bars shall not exceed 3/8” (9.5mm) and shall comply with IBC child finger/toe entrapment guidelines.

F. Grating width shall allow the insertion of the touchpad holding brackets between the grating and the gutter lip.

G. All inside and outside corners and custom radii sections under 3-feet inside diameter (short radius section) shall be custom fabricated and strengthened by the manufacturer.

H. Fasteners shall be SS-316, provided by the manufacturer, and installed per manufacturer instructions and as shown on drawings.

I. Colors selected by the Architect/Owner from manufacturer’s standard colors.

J. Acceptable manufacturers:
1. Daldorado LLC
2. Lawson Aquatics
3. RenoSys

2.4 POLYMER / HDPE OVERFLOW GUTTER GRATING

A. The grating shall be machined from a marine grade polymer or High Density Polyethylene (HDPE) sheets using 1” thick, UV- stabilized material. Material must meet or exceed ASTM D696 for Coefficient of Linear Expansion of material.

B. The top surface of the grating shall be raised, water-shedding, slip-resistant and shall meet ASTM D2047 slip resistance (wet) with a nominal value of 0.62.

C. Grating design shall meet ASTM D790-10 or ANSI/AS3996 Class A for covers and grates with load exceeding 10kN (2,248lb).

D. The grating shall include machined slots providing at least 37.5% open area per foot for unrestricted water flow. The openings shall not exceed 3/8” (9.5mm) and shall comply with IBC child finger/toe entrapment guidelines. Direction of slots may be parallel and/or perpendicular to the pool wall as indicated in drawings.

E. Grating width shall allow the insertion of the touchpad holding brackets between the grating and the gutter lip.

F. All inside and outside corners and custom radii sections under 3-feet inside diameter (short radius section) shall be custom fabricated and strengthened by the manufacturer.

G. Fasteners shall be SS-316, provided by the manufacturer, and installed per manufacturer instructions and as shown on drawings.

H. Colors selected by the Architect/Owner from manufacturer's standard colors.

I. Acceptable manufacturers:
   1. Paddock Pool Equipment Company
   2. RenoSys
   3. Natare Corporation

PART 3 - EXECUTION

3.1 GENERAL

A. Inspect project conditions prior to installation. Concrete support ledge must meet the grating manufacturer's minimum width requirements. Concrete surface shall be clean and level to allow a level grating installation. Report conditions detrimental to grating installation in writing to Architect prior to initiating installation.

B. Install grating per manufacturer's instructions. Include manufacturer's PVC grating accessories (PVC curb angle, supports, hand-holds, fasteners and other accessories) as required by project conditions and/or as detailed in drawings.

C. Installation shall not allow water flow beneath the grating and into the gutter trench. Follow manufacturer's installation methods and use manufacturer's approved sealant as required between grating and pool wall surface on the front skimming edge to assure water uniformly skims over the top skimming edge.

D. Provide templates for corners or other conditions for shop fabrication to the manufacturer, per manufacturer's requirements. Field fabrication of corners and short radius sections is not permitted.

E. Gap width between individual grating sections shall not exceed the specified machined opening width or width between bars. Gap width between grating and other surfaces shall not exceed 5/16" (8mm).

F. The skimming edge elevation at the face of the pool wall shall be within 1/8" +/- of the pool static water elevation and must provide continuous skimming around the entire pool perimeter.

G. Install manufacturer's fasteners to anchor grating. Space fasteners as indicated in drawings. Locate fasteners more frequently if required by code or manufacturer requirements.

H. Protect grating from damage and concrete splatter. Clean grating of all dirt, debris, concrete splatter, and staining per manufacturer's instructions. Replace grating that becomes permanently marked, damaged, or stained during the construction process.

END OF SECTION 131142

SECTION 131145 - POOL RAIL GOODS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Rail Goods
   1. Hand rails
   2. Grab rails
   3. Ladders
   4. Wave Pool Ladders
   5. Therapy Rails
   6. Stanchions

B. Accessories
   1. Wedge Anchors
   2. Compression Anchors
   3. Escutcheons

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

1.3 REFERENCES

1.4 DESCRIPTION OF WORK

A. Fabrication and installation of hand rails, grab rails, ladders, wave pool ladders, therapy rails, stanchions and accessories required for installations.

1.5 QUALITY ASSURANCE

A. Refer to General Requirements and Division 01 of the Specifications for additional requirements.

1.6 SUBMITTALS

A. Refer to General Requirements and Division 01.

B. Submittals required:
   1. Hand Rails
   2. Grab Rails
   3. Ladders
   4. Wave Pool Ladders
   5. Therapy Rails
   6. Stanchions
   7. Stanchion Sockets
   8. Anchors
   9. Escutcheon Plates

C. Provide care and maintenance instructions, embracing the operation functions and maintenance processes involved in connection with the complete system, including routine maintenance and cleaning. Provide information regarding maintenance practices and products which may be detrimental to the products.

D. Printed and bound operating, installation, and service manuals.

1.7 SUBSTITUTIONS

A. Refer to General Requirements and Division 01.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Refer to General Requirements and Division 01.

1.9 WARRANTIES

A. Pool Equipment
1. Manufacturer's Standard Warranty

PART 2 - PRODUCTS

2.1 GENERAL

A. All rails and ladder components and anchors shall be designed to meet or exceed the structural loads required by IBC Chapter 16 or local code, whichever is greater.

B. All rails and ladder dimensions shall be in accordance with the current edition of the applicable State and local code/s.

C. Provide the equipment scheduled, and any necessary fittings, anchors, and connectors as required and not provided by the manufacturer. The equipment shall be the manufacturer and model number listed or a pre-approved equal. Although unit quantities are shown, it is the installing contractor's responsibility to verify and provide actual quantities required.

D. The following manufacturers have been pre-approved as capable of providing products meeting this specification. Note that custom material/size/finish may be required from some of the manufacturer's listed to meet these specifications.
1. Spectrum Aquatic, 800-791-8056
2. SR Smith LLC, 800-824-4387
3. Paragon Aquatics, 888-KDI-SWIM

2.2 MATERIALS OF CONSTRUCTION

A. Hand Rails, Grab Rails
1. All rail products specified in this section shall be 316L stainless steel.
2. All rail goods with a grip surface (handrails, grab rails) shall be 1.50" OD.
3. Provide rail material with 0.120 wall thickness.
4. The surface of the rails shall be polished to a minimum 500 grit mirror finish and passivated according to ASTM A967.
5. Final coating of steel shall be per manufacturer's standard treatment procedure. All welds shall be finished, polished, and passivated to blend and match the rail finish.

B. Ladders, Wave Pool Ladders
1. All rail products specified in this section shall be 316L stainless steel.
2. All rail goods with a grip surface shall be 1.90” OD.
3. Provide rail material with 0.120 wall thickness.
4. The surface of the rails shall be polished to a minimum 500 grit mirror finish and passivated according to ASTM A967.
5. Final coating of steel shall be per manufacturer’s standard treatment procedure. All welds shall be finished, polished, and passivated to blend and match the rail finish.
6. Ladder frames shall be fabricated with smooth, wrinkle-free bends.
7. All steps shall have raised non-skid rubber insert treads. The width of the steps is as follows:
   a. Ladders 5”
8. Ends of all steps shall be curved to fit the OD of the ladder frames.
9. The bolts for attaching the ladder steps shall have smooth, rounded heads and the underside of the head shall be curved to fit the OD of the tubing.
10. Cross-braces shall be notched and welded to the ladder frames.
11. Joints shall be cleaned and blended to match the finish of the pipe.
12. Ladder connections at lower ends shall be as shown on drawings.
13. See details on drawing for additional information and dimensions.

C. Therapy Rails
1. All rail products specified in this section shall be 316L stainless steel.
2. Shall be 1.90” OD, 0.065” wall thickness
3. The surface of the therapy rails shall be polished to a minimum 500 grit mirror finish and passivated according to ASTM A967.
4. Final coating of steel shall be per manufacturer’s standard treatment procedure.
5. Supply with return ends.

D. Stanchions (Backstroke and activity)
1. All rail products specified in this section shall be 316L stainless steel.
2. Shall be 1.90” OD, 0.145” wall thickness
3. The surface of the stanchions shall be polished to a minimum 500 grit mirror finish and passivated according to ASTM A967.
4. Final coating of steel shall be per manufacturer’s standard treatment procedure.
5. Stanchions shall be 4’-6” or 8’-0” tall and provided with a 2” ring on the top surface and a 2” ring on sliding collar.

E. Wedge Anchors
1. Rail Anchors shall be corrosion resistant, sized to accept the rail dimensions specified and a minimum of 4” deep. For anchors greater than 4” deep, contractor shall verify adequate concrete thickness at the anchor points.
2. Stanchion Sockets shall be corrosion resistant, minimum 6” deep and designed to accept a 1.90” OD stanchion.

F. Escutcheon Plates
1. Provide escutcheon plates for each anchor location, sized to match rail diameter.
2. Shall be rail manufacturer’s round, stamped 316L Stainless Steel escutcheon.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Manufacturer’s Installation Instructions
1. All equipment of this section shall be installed in accordance with industry standards and comply with manufacturer’s installation instructions/recommendation. The contractor shall notify the engineer in writing of any discrepancies between the contract documents and the manufacturer’s instruction. This notification shall include a request for clarification prior to installation.

B. Install equipment true and level.

C. Equipment shall be installed secure, with no “play” or movement when shaken.

D. Rails goods shall be clean, free of dirt and contamination, and polished prior to turnover to owner.

E. Protect Equipment from damage during installation and up to substantial completion. Repair or replace damaged parts.

END OF SECTION 131145

SECTION 131146 - POOL EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pool Equipment
   1. Pool fittings, deck, maintenance, and safety equipment.

B. Pool Specialty Equipment
   1. Spray and play equipment manufactured for use in swimming pools and/or spray pads.

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

1.3 REFERENCES

A. Specialty Equipment
   1. Equipment submitted shall be designed by manufacturer to meet all federal, state, and local requirements.
   2. Equipment manufacturer shall meet applicable requirements of Consumer Product Safety Commission, ASTM, UL, and other applicable standards.
   3. Comply with ASTM F2461-09, standard practice for manufacture, construction, operation, and maintenance of aquatic play equipment.

1.4 DESCRIPTION OF WORK

A. Refer to General Requirements and Division 01 of the Specifications for additional requirements.

1.5 QUALITY ASSURANCE

A. Refer to General Requirements and Division 01 of the Specifications for additional requirements.

1.6 SUBMITTALS

A. Refer to General Requirements and Division 01.

B. Submittals required:
   1. Pool Fittings and Equipment
   2. Deck Equipment
   3. Safety Equipment
   4. Maintenance Equipment
   5. Pool Specialty Equipment
      a. Provide detailed Shop Drawings of equipment being installed, including but not limited to:
         1) Location
         2) Flow rates

3) Safety equipment

C. Provide a typed sheet of Operating Instructions, embracing the operation functions and maintenance processes involved in connection with the complete system, including routine maintenance, start-up, and winterization requirements.

D. Printed and bound operating, installation, and service manuals.

1.7 SUBSTITUTIONS

A. Refer to General Requirements and Division 01.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Refer to General Requirements and Division 01.

1.9 WARRANTIES

A. Pool Equipment
1. Manufacturer's Standard Warranty

B. Pool Specialty Equipment
1. Manufacturer's Standard Warranty – 2-year minimum

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide the equipment scheduled on the drawings, and any necessary fittings, anchors, and connectors as required and not provided by the manufacturer. The equipment shall be the manufacturer and model number listed or a pre-approved equal. Although unit quantities are shown for value engineering purpose, it is the installing contractor's responsibility to verify actual quantities required.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Manufacturer's Installation Instructions
1. All equipment of this section shall be installed in accordance with industry standards and comply with manufacturer's installation instructions/recommendation. The contractor shall notify the engineer in writing of any discrepancies between the contract documents and the manufacturer's instruction. This notification shall include a request for clarification prior to installation.

B. Install equipment true and level.

C. Protect Equipment from damage during installation and up to substantial completion. Repair or replace damaged parts.

END OF SECTION 131146

SECTION 131160 - POOL QUARTZ AGGREGATE FINISH

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Includes but is not limited to the complete installation of a quartz aggregate finish as designated in the plans and specifications within strict accordance to manufacturer instructions and listed references.

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

1.3 REFERENCES

A. The following latest edition reference specifications, guides and standards shall become part of this Specification as if herein written. If provisions conflict, the more stringent provisions shall apply.
   1. National Plasterer's Council "Pool Plaster Technology", Phone # 866-483-4672, www.mpconline.org
   2. National Spa and Pool Institute "Start Up Do's and Don'ts for Newly Plastered Swimming Pools; Why You Should Use Plaster in Your Swimming Pool; Care Tips for New Swimming Pool Plaster and Technical Manual", Phone # 703-838-0083.

1.4 QUALITY ASSURANCE

A. The installer shall provide documentation providing a minimum of five (5) successful installations of similar scope and complexity with current contact information and phone number.

B. The installer shall be a member of the National Plasterer's Council in good standing.

C. The installer shall provide documentation/certification that the laborer's performing the work on site have been factory trained by the pool finish manufacturer.

D. The installer shall provide a letter of reference from the pool finish manufacturer indicating installer is a manufacturer certified applicator.

E. The installer shall have the right to reject the concrete surface if it does not meet the manufacturers requirements for a suitable subgrade. Installation of the pool finish indicates acceptance of surface by the applicator with regards to future warranty claims.

1.5 SUBMITTALS

A. Refer to General Requirements and Division 01.

B. Submit product literature and sample colors for Quartz Aggregate Finish and manufacturer approved bond coat forty (40) days prior to use. Quartz Aggregate material shall be listed in the material submitted.

C. Submit all documents required above for experience and qualification.

D. Provide three (3) 3'x3' onsite mock-ups of varying grades of coarseness for Owner's approval. The pool contractor is responsible to coordinate approval of mock ups prior to the quartz aggregate pool finish installation.

1.6 SUBSTITUTIONS

A. Refer to General Requirements and Division 01.

1.7 DELIVERY, STORAGE, AND HANDLING

A. If material is stored, it must be in a cool, dry area, protected from the elements.

1.8 WARRANTIES

A. It shall be noted that the pools may be subject to be drained for prolonged periods of time for normal maintenance and cleaning.

B. Provide Manufacturer's Product Warranty on the Quartz Aggregate Pool Finish Product. The pool finish manufacturer shall acknowledge that the pool(s) are subject to be drained completely for winterization and periods during normal maintenance and shall guarantee the pool finish for five (5) years covering any defects caused by product failure.

C. Provide Special Project Application Warranty on the Quartz Aggregate Finish Application. The pool finish installer shall acknowledge that the pool(s) are subject to be drained completely for winterization and periods during normal maintenance and shall guarantee the pool finish application for two (2) years covering any defects caused by the application of the product not limited to: abnormal cracks (other than closed shrinkage cracks that may appear), discoloration, hollow spots and de-lamination.

D. Special Project Warranty on Concrete Structure and Special Aggregate Finish: The Pool Contractor shall guarantee for two (2) years repair of the special aggregate finish covering any defects, cracks and/or leaking in the pool shell.

PART 2 - PRODUCTS

2.1 ACCEPTABLE PRODUCTS AND MANUFACTURERS

A. Sun Stone by:

B. CLI Industries, Inc.

C. P.O. Box 593704

D. Orlando, FL 32859,

E. (407) 851-2660.

F. www.clindustries.com

G. Approved Equal

2.2 INSPECTION/MEETINGS AND PREPARATION

A. Schedule a pool finish pre-installation conference before applying the pool finish.
   1. Attendees: Manufacturer's representative, Pool Finish Installer, Contractor and its superintendent and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the work.
   2. Agenda: Review the manufacturer's application instructions and discuss items of significance that could affect progress and installation, including but not limited to the following:
      a. Construction schedule
      b. Critical work sequencing
      c. Accessibility
      d. Designation of responsible personnel qualified to do the work
      e. Concrete surface preparation requirements
      f. Bond coat curing and application
      g. Pool Finish application and surface preparation
      h. Finishing methods as recommended by the manufacturer to include exposing the aggregate
      i. Verify and discuss proposed work force is adequate to complete the installation as recommended by the manufacturer
      j. Verify pool mechanical and chemical system is prepared for immediate start up after filling the pool
   3. Record significant discussions and agreements and disagreements of the conference, and the approved schedule. Promptly publish and distribute any issues or discrepancies to the Architect/Engineer prior to installing the pool finish.

PART 3 - EXECUTION

3.1 PREPARATION

A. All pool finish work must strictly follow manufacturer installation guidelines, references and recommendations.

B. Environmental conditions must comply with manufacturer's requirements, and finish may not be applied to frozen or frost laden surfaces or when the temperature is 40 degrees F or due to fall to 40 degrees within 24 hours.

C. The filtration and chemical system must be ready for startup and operating immediately after the pool is filled for pool finish curing per manufacture instruction.

D. The pool finish applicator shall coordinate with the pool shell concrete contractor, specific concrete finish requirements for the pool finish application.

E. It is the applicator's responsibility to ensure that the concrete substrate is adequate for proper bonding of pool finish in accordance with manufacturer recommendations.

F. Prepare all pool surfaces to receive the quartz aggregate finish per manufacturer recommendation.

G. A brush or roll on bonding coat produced and approved by the pool finish manufacturer is required to be applied to the entire pool structure where the pool finish is to be applied. The manufacturer's approved bond coat must be installed and cured in accordance with manufacturer instructions prior to applying the quartz aggregate finish. No exceptions. Do not apply any waterproofing agent/s to the concrete substrate. The bond coat shall be placed directly on the concrete substrate.

H. Adding any supplements to the manufacturer's pre-bag mix is strictly prohibited unless manufacturer's approved written documentation is submitted and is pre-approved by the pool Architect/Engineer.

3.2 APPLICATION

A. All pool finish work must strictly follow manufacturer installation guidelines, references and recommendations.

B. Apply the quartz aggregate finish so that it is flush with the pool gutter, tiles and other embedded items as detailed in the plans and specifications.

C. The pool finish must be installed to a thickness and tolerance between 3/8” to 1/2” or as recommended by the manufacturer.

D. Finish quartz aggregate in a workmanlike fashion. Trowel surface smooth. Proceed with application to natural breaks.

E. No hollow areas, discolored or delaminated areas will be acceptable, any and all hollow areas must be chipped out and repaired, patching shall be done in a quality workmen’s like fashion. If hollow spots are detected where individual patching required will reduce the overall aesthetic value, it will be the Architect/Engineers discretion to have an entire area between breaks removed and replaced.

F. All pool floors and horizontal surfaces shall have a slip resistant finish. Slip resistance shall meet Dynamic Coefficient of Friction (DCOF) value of WET:> 0.42. Abrasive resistance shall meet a DCOF value of WET:>0.60.

G. The contractor is responsible for all brushing/cleaning, chemical monitoring and other requirements set forth by the manufacturer installation and curing instructions. This shall not be the responsibility of the owner.

H. The installing contractor shall guaranty the finish to be free of sharp edges and splatter that may cause cuts on swimmers’ feet.

END OF SECTION 131160

SECTION 131161 - POOL CERAMIC TILE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Porcelain Ceramic Pool Tile

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

1.3 REFERENCES

A. The following latest edition reference specifications, guides and standards shall become part of this Section as if herein written. If provisions conflict, the more stringent provisions shall apply.
1. ANSI A108 – Specifications for Installation of Ceramic Tile
2. ANSI A137.1 – Tile Grade Requirements
3. ASTM C-150, Type 1 – Portland Cement
4. ASTM C-206, 7 Type S – Hydrated Lime
5. ASTM C-144 - Sand
6. ANSI A118.1 – Dry Set Mortar
7. TCA 759 – Dry Set Mortar
8. ANSI A118.3 – Epoxy Adhesive
9. TCNA – Tile Council of North America, Handbook for Ceramic, Glass, and Stone Tile Installation, latest edition
10. ISO 13007 – International Standards Organization; Classification for Grouts and Adhesives.

1.4 SUBMITTALS

A. Refer to General Requirements and Division 01.

B. Submit product data and samples for each tile product indicated.

C. Submit shop drawings for approval before ordering tile. Include the following:
1. Plan, elevations, and sections of pool tank and deck.
2. Indicate tile layout, patterns, color, expansion joints, junctions with dissimilar materials and setting details.

D. Plans of all tile marking showing exact locations and positions of individual tiles.

E. Maintenance data: Include routine maintenance and stain removal methods.

F. Provide five copies of submittals.

1.5 SUBSTITUTIONS

A. Refer to General Requirements and Division 01.

1.6 DELIVERY, STORAGE AND HANDLING

A. Refer to General Requirements and Division 01.

B. Deliver all products to job in manufacturer's unopened containers with grade seals unbroken and labels intact.

C. Keep tile cartons dry.

1.7 QUALITY ASSURANCE

A. Single source responsibility:
1. Obtain each type and color tile material from single source.
2. Obtain setting and grouting materials from one manufacture to ensure compatibility.
3. Obtain membrane from same manufacturer as setting material or from manufacturer approved by setting material manufacturer to ensure compatibility.
4. Furnish fifteen (15) year guarantee from installation material manufacturer. This guarantee is inclusive of installation materials, finish product, and labor.

B. Manufacturer Qualifications:
1. Tile: Minimum five (5) years' experience in manufacture of tile products.
2. Setting Materials: Minimum ten (10) years' experience in manufacture of setting and grout materials specified.

C. Installer Qualifications: Specializing in tile work having a minimum of 5 years successful documented experience with finish work comparable to that required for this project.

D. Certifications:
1. Submit "Master Grade Certificate" for each shipment, type, and composition of tile, signed by tile manufacturer and installer with requirements of ANSI A137.1.
2. Submit manufacturers certifications that tile, setting materials, adhesives, and grouts are suitable for intended use in submerged, swimming pool environment.

E. Field Samples:
1. Sample Installation:
   a. For final review of each type of installation, construct sample panel of approximately 100 square feet.
   b. Install in location as directed by Architect and approved by Owner's Representative.
   c. Show workmanship of finished work and construction techniques including installation and incorporation of waterproofing membrane. Where a particularly difficult detail or technique is required, or where special sizes or shapes of product are needed, they shall be included in sample panel.
   d. Approved field samples will serve as project standard and may remain as part of the work.

F. Pre-Installation Conference:
1. Require attendance of General Contractor, Pool Contractor, Tile Installer and Installers of related work. Review installation procedures and coordination required with related and adjacent work. Hold meeting at least one week prior to commencing work of this section. Publish meeting minutes within 5 days of meeting, distribute minutes to participants, copy Architect.
2. Meeting agenda shall include, but is not limited to:
   a. Surface preparation
   b. Tile and installation material compatibility
   c. Edge protection, transition and pre-fabricated movement joint profiles
   d. Waterproofing techniques
   e. Crack Isolation techniques
   f. Environmental requirements
   g. Finish protection

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's unopened containers, fully identified with brand, name, type and grade. Comply with requirements in ANSI A137.1 for labeling sealed tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location. Protect materials from contamination, dampness, freezing or overheating in accordance with manufacturer's instructions.

C. Broken, chipped, warped, stained or damaged tile will be rejected.

D. Store liquid latexes in unopened containers and protect from freezing.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Comply with requirements of referenced standards and recommendations of material manufacturers for environmental conditions before, during, and after installation.

B. Do not begin installation until construction in spaces is complete and ambient temperature and humidity conditions are consistent with standards and manufacturers written instructions.

C. Ventilate spaces receiving tile in accordance with manufacturer's instructions.

1.10 WARRANTIES

A. Contractor shall provide written materials and installation warranty, executed by the contractor, Installer and Manufacturer, agreeing to repair or replace tile that fails in material or workmanship within the specified warranty period to Architect/Engineer prior to filling pool with water.
   1. Warranty Period: Two (2) years after Substantial Completion, or manufacturer's system warranty, if longer.
   2. Warranty Period: Fifteen (15) years after Substantial Completion, or manufacturer's system warranty, if longer

PART 2 - MATERIALS

2.1 GENERAL

A. ANSI Standard for Ceramic Tile: Provide tile that complies with ANSI 137.1 for types, compositions, and grades of tile indicated.

B. ANSI Standard for Tile Installation Materials: Provide materials that comply with ANSI standards referenced in "American Standard Specifications for the Installation of Ceramic Tile" with products and materials indicated for setting and grouting.

C. Furnish ceramic tile required as follows. Colors shall be as selected by Owner and Architect.

D. Furnish all tiles required for special markings and lettering in conformance with the drawings and applicable Codes, including depth markings and no diving markers.

E. Racing lane tile edges shall be installed flush with finish pool floor.

F. Target tile shall be installed flush with finish pool wall.

G. Use surface bullnose on pool edge where required for proper trim and as directed on the drawings.

2.2 POOL CERAMIC TILE

A. Indoor Pool Ceramic Tile
   1. Agrob Bucthtal, Dal-Tile - Keystone or equal as scheduled.
      a. Provide impervious tile with water absorption rate of less than .5% per ASTM C373. Sizes, types, and slip resistance as scheduled, see end of this section [PL101].
      b. Color as selected by Owner/Architect (see Architect's tile selection schedule).
      c. Increase the slip resistance of all endwall target tile with the addition of 7.5% by weight abrasive grains.
      d. Provide special shapes, bullnose and other tile as required.

2.3 MORTAR, GROUT AND ADHESIVE MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements herein, provide products from one of the following manufacturers or an approved equal:
   1. Custom Building Products, Huntington Beach, CA.
   2. Laticrete International, Inc., Bethany, CT.
   3. MAPEI Corporation, Deerfield Beach, FL.

2.4 MORTAR MATERIALS: THICK SET

A. Latex – Portland Cement Mortar: Thick Set (ANSI A118.4)

B. Description: Two component system; latex additive water emulsion added to Portland cement mortar in place of water or replacing part of the water. The dry-set mortar must be pre-blended and must be specified by the latex manufacturer for use with the particular latex additive. Use amount of liquid latex recommended by latex additive manufacturer.

C. Acceptable Products:
   1. Thick Bed Mortar mixed with Patching & Leveling Latex Additive, by Custom Building Products
   2. Laticrete 226 thick bed mortar mixed with Laticrete 3701 Mortar Admix, by Laticrete International.
   3. MAPEI, 4 to 1 Mud Bed Mix mixed with MAPEI, Planicrete AC, by MAPEI Corporation.

2.5 MORTAR MATERIALS: THIN SET AND SLURRY BOND COAT

A. Improved Modified Dry-Set Cement Mortar: Thin Set (ANSI A118.15)

B. Description: Two component system; latex additive water emulsion added to Portland cement mortar in place of water or replacing part of the water. The dry-set mortar must be pre-blended and must be specified by the latex manufacturer for use with the particular latex additive. Use amount of liquid latex recommended by latex additive manufacturer.

C. Acceptable Products:
   1. Laticrete 254 Platinum thin set mortar by Laticrete International.
   2. Keralastic System consisting of Keralastic polymer additive and Kerabond dry-set mortar by MAPEI Corporation.

2.6 EPOXY GROUT

A. Multi-component, factory prepared, 100 percent epoxy resin and hardener with sand or mineral filler material. (ANSI A118.3)

B. Acceptable Products:
1. CEG-Lite by Custom Building Products
2. Laticrete SpectraLock Pro Grout by Laticrete International.
3. Kerapoxy CQ by MAPEI Corporation.

2.7 ELASTOMERIC JOINT SEALANT

A. Provide as required by TCNA guidelines, and as indicated on drawings, conforming to ASTM 920 and ASTM C 794

B. Acceptable products:
1. Commercial 100% Silicone Sealant by Custom Building Products
2. Latasil by Laticrete International
3. Mapesil by MAPEI Corporation

2.8 ANTI-FRACTURE/ WATERPROOFING MEMBRANE

A. Multi-component, factory prepared, anti-fracture/ waterproofing membrane system comprised of a self-curing liquid rubber polymer

B. Acceptable Products:
1. RedGard by Custom Building Products
2. Laticrete Hydroban by Laticrete International.
3. Mapelastic AquaDefense by MAPEI Corporation.

2.9 WALL PATCH & RENDER MORTAR

A. Quick-Setting, Fiber-Reinforced, Cementitious Patch and Render Mortar.

B. Acceptable Products:
1. Custom Float Bedding Mortar by Custom Building Products
2. Laticrete 3701 Fortified Mortar Bed by Laticrete International
3. Planitop 330 Fast by MAPEI Corporation.

2.10 MISCELLANEOUS MATERIALS

A. Temporary protective coating: Provide product that is formulated to protect exposed surfaces of tile against adherence of mortar and grout, is compatible with tile and mortar/grout products, and is easily removable after grouting is completed without damaging grout or tile.
1. Grout release in form of manufacturers standard propriety liquid coating that is specially formulated and recommended for use as a temporary protective coating for tile.

B. Acceptable Products:
1. Aqua Mix Grout Release by Custom Building Products
2. Stonetech Grout Release by Laticrete International.
3. UltraCare Grout Release by MAPEI Corporation.

C. Epoxy Grout Haze Remover.

1. Aqua Mix Non-cement Grout Haze Remover
2. Stontech Epoxy Grout Haze & Coating Stripper by Laticrete International
3. UltraCare Epoxy Grout Haze Remover by MAPEI Corporation

2.11 MIXING MORTAR AND GROUT

A. Mix mortars and grouts in accordance with manufacturer’s instructions.

2.12 EXTRA MATERIALS

A. Supply extra 5% of each color of flat and trim in clean marked cartons for Owner's use.

PART 3 - EXECUTION

3.1 ACCEPTABILITY OF SURFACES

A. Before tiling, check area to be tiled for acceptability as follows:
   1. Surface medium-rough texture.
   2. All surfaces to be tiled shall be free of dust, rust, paint, from oil or other release coatings.
   3. Provision for ladders and other embedments at proper locations.
   4. Concrete true to line, level, plumb and curvature.
   5. Width, depth and length will permit finished accuracy of markings and dimensions.
   6. Verify surfaces for compatibility with tile setting material manufacturer’s requirements prior to installation.

3.2 ENVIRONMENTAL CONDITIONS

A. Protect all newly tiled areas.

B. Maintain temperature at 50 degrees F minimum during tile work and for seven days after completion or furnish protection as approved by the Architect/Engineer.

3.3 PREPARATION

A. Clean substrates.

B. Wet down or wash dry, dusty surfaces and remove excess water immediately prior to tile applications.

C. Install waterproofing membrane at pools: All Pools

D. Install slurry bond coat.

E. Do not seal substrate unless required by manufacturer.

F. Prime substrate if required by manufacturer.

3.4 INSTALLATION

A. Tile installation, General

1. Install tile materials in accordance with ANSI A137.1, other reference ANSI or TCNA specifications, and TCNA “Handbook For Ceramic, Glass, and Stone Tile Installation”, except for more stringent requirements of manufacturer or these specifications.
2. Cut and fit tight to protrusions and vertical interruptions.
3. Work tile joints uniform in width, subject to variance in tolerance in tile size. Make joints watertight, without voids, cracks, excess mortar or grout.
4. Prepare surface, fit, set, bond, grout and clean in accordance with applicable requirements of ANSI standards and Tile Council of North America.
5. Floors and walls: dry set: TCNA F113, F115, and W202E.
6. Comply with tile setting material manufacturer’s installation requirements.
7. Tile bond coat coverage: Minimum 95% contact area with tile and substrate.

B. Thin set method
1. Apply mortar or adhesive with notched trowel using scraping motion in single direction to work material into good contact with surface to be covered. Back bed tiles with mortar. Maintain 95 percent coverage on back of tile and fully bed all corners.
2. Apply only as much mortar or adhesive as can be covered within allowable windows as recommended by mortar or adhesive manufacturer or while surface is still tacky.
3. Set tile in place and rub or beat with small beating block.
4. Beat or rap tile to ensure proper bond and also to level surface of tile.
5. Align tile to show uniform joints and allow to set until firm.
6. Clean excess mortar or adhesive from surface of tile with wet cheesecloth while mortar is fresh.
7. Sound tile after setting. Replace hollow sounding tiles.

C. Thick Set Method
1. Apply slurry bond coat.
2. While the slurry bond coat is wet, spread the mortar and compact well.
3. While slurry bond coat is wet and sticky, set tile in place and beat in well.
4. Beat or rap tile to ensure proper bond and also to level surface of tile.
5. Align tile to show uniform joints and allow to set until firm.
6. Clean excess mortar or adhesive from surface of tile with wet cheesecloth while mortar is fresh.
7. Sound tile after setting. Replace hollow sounding tiles.
8. Maintain ambient temperature above 50 F and below 100F for 72 hours after installation.

D. Grouting
1. Allow tile to set a minimum of 72 hours before grouting.
2. If bonding materials are rapid setting, follow manufacturer’s recommendations.
3. Install in accordance with grout manufacturer’s recommendations and ANSI A108.10.
4. Pack joints full and free before mortar takes initial set.
5. Clean excess grout from surfaces per manufacturer recommendations, as work progresses.

3.5 LAYOUT

A. Align all joints to give straight uniform grout lines.

B. Observe exact minimum length per dimensions shown on Contract Drawings.

C. Observe exact minimum width per dimensions shown in Contract Drawings.

D. Observe +/- 1/16" maximum finish elevation tolerance on all gutter edges.

E. Provide expansion joints per TCNA EJ171.

3.6 WORKMANSHIP

A. Supply first-class workmanship in all tile work.

B. Use all products in strict accordance with recommendations and directions of manufacturer.

C. Proportion all mixes in accordance with latest ANSI Standard Specifications.

D. Smooth all exposed cut edges.

E. Gutter edges shall not vary from level or true plane more than 1/8" of pool static water level.

3.7 CLEANING

A. Clean excess mortar from surface with water as work progresses.

B. Clean tile surface as thoroughly as possible on completion of grouting, preform cleaning while mortar is fresh and before it hardens on surfaces.

C. Before acid cleaning, saturate with clean water all grout joints in areas to be cleaned.

D. Use manufacturers suggested products for cleaning off grout film.

E. Remove temporary protective coating by method recommended by coating manufacturer. Trap and removing coating to prevent it from clogging drains.

3.8 PROTECTION

A. Prohibit traffic from tile finish for 72 hours after installation.

B. Protect work so that it will be without any evidence of damage or use at time of acceptance.

C. Allow tile finish to set for 14 days prior to submerging tile.

3.9 TILE SCHEDULE

A. See Tile schedule, following [on PL101], for tile information.

END OF SECTION 131161

SECTION 131413 - SLIDE REFINISH

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SLIDES DESCRIPTION

A. Slide A: Open Slide.

1.3 PROJECT SCOPE

A. Scope of Work: Following are the specifications and requirements for the refinishing of a one body slide flume. All bidders will be required to make a detailed on-site inspection to fully understand and document the slide conditions and the resurfacing.
   1. Re-caulk all flume seams.
      a. Remove all caulk from all seams and re-caulk all seams.
   2. Gelcoat slide interiors.
      a. Gel-coat entire interior fiberglass flumes and exterior shoulders and splash extensions and repair minor chips, scratches and blemishes.
   3. Paint exterior fibrous strand matt finish of entire flume exterior.
      a. Provide paint colors per owner color selection.
   4. Refer to General and Supplementary conditions.

1.4 QUALITY ASSURANCE

A. All bidders shall have a minimum of five (5) projects with a proven five (5) year record of competence and experience in the restoration of similar slides of this size and complexity.

B. The contractor shall provide proof of competency and an updated contact list with current information and/or letters of recommendation from past clients of having successfully completed repairs of similar slides for a minimum of 5 slides of similar size and complexity.

C. Performance Criteria: Certain sections of the Specifications contain performance criteria rather than product descriptions. It shall be the obligation of the Contractor to ensure that all criteria are satisfied, and the burden or proof of conformance shall rest with the Contractor. The Architect/Engineer shall require complete past performance records and, if required, inspection trips of similar facilities to substantiate conformance with these criteria. The Architect/Engineer shall be sole judge of conformance, and the Contractor is cautioned that he will be required to bid and provide a finished product meeting all stated criteria.

D. All work of this Section shall be performed solely by the qualified slide repair contractor and repaired to industry standards.

E. The contractor in providing their bid warrants that they are licensed to do work in the project's state and municipality and holds appropriate professional registrations, certifications, permits and/or other requirements having jurisdiction.

F. Qualification of Workmen: At least one (1) person who is thoroughly familiar with the materials, methods and equipment being utilized shall be present at all times during the construction to direct and monitor the work.

G. The contractor shall indemnify and hold harmless the architect and the owner from any and all actions caused by or related to the repair, fabrication and installation of the work of the work.

1.5 ADDITIONAL BID DOCUMENT REQUIREMENTS

A. Additional Bid Document Requirements – Submit the following with completed Bid Forms:
1. The contractor shall provide written proof of competency and an updated contact list with current information and/or letters of recommendation from past clients of having successfully completed repairs of similar slides for a minimum of 5 slides of similar size and complexity.
2. Contractor is required to visit the site and review existing conditions, access for equipment required to do the work prior to bidding and shall include all costs for such equipment and access in their bid.
3. Contractor to provide proof of insurance, liability and workman's comp to satisfy the Rockford Park Districts Insurance Requirements.

1.6 EXISTING SITE CONDITIONS

A. The contractor is responsible to familiarize themselves with the existing body slide flume, site conditions and access for equipment required to do the work prior to bidding and shall include all costs for such equipment and access in their bid.

1.7 USE OF SITE

A. General
1. The contractor will restrict his construction to the general area shown on the drawing.
2. Access and egress shall be coordinated with the Owner and controlled so as not to conflict with the normal operations of the facility.

1.8 JOB CONDITIONS

A. Protection:
1. Use all means necessary to protect existing work and, in the event of damage, immediately make all repairs and replacements necessary, subject to approval of the Architect/Engineer and at no additional cost to the owner.

B. Store Products:
1. Contractor shall assume full responsibility for the protection and safe keeping of products under this contract stored on the site.

1.9 SUBMITTALS

A. Submit in accordance with Division 0.

B. Submit documentation as outlined under subsection 1.3 A "Quality Assurance".

C. Submit paint finish color samples and paint finish information and cut sheets.
1. Color Selection: Colors will be selected by owner from a full range of colors as supplied by the contractor. Each slide flume will be finished in a separate color.

D. Submit gel-coat finish sample.
   1. Contractor to provide 12” x 12” mock up sample of the final gel coat finish with each color selection for Owner’s for approval for each color.
   2. Color Selection: Colors will be selected by owner from a full range of colors as supplied by the contractor.

E. Qualifications of Contractors Foreman or Superintendent.

1.10 STORAGE OF MATERIALS

A. Store materials on platforms off ground; protect materials against the elements. Handle and store materials in a manner to prevent intrusion of foreign material. Protect all material hereinafter specified until used. Any material which has deteriorated, or which has been damaged shall not be used.

1.11 GUARANTEE/WARRANTY

A. All workmanship and materials are to be warranted for a period of 2 years.

B. Installer to provide a minimum 5-year warranty for all exterior paint adhesion.

PART 2 - PRODUCTS

2.1 FIBERGLASS FLUME FINISH MATERIALS

A. Gel Coat:
   1. Polyester-based gel coat material with U.V. inhibitors
   2. Manufacturer: Cook Composites-Polymers (CCP) “Polycor” series, or equal.
   3. Color: Color shall be integral to the gel coat with UV inhibitors. Riding surface color shall match the exterior/underside surface color. Provide color samples and verify color selection with owner.

B. Exterior Fiberglass Flume Paint Finish - Paint finish shall only be applied to the rough exterior/underside fiberglass surfaces, as indicated on drawings, and shall not be applied to gel coat finishes.
   1. Paint Materials: Two Part- Aliphatic Poly-Siloxane Epoxy Paint. High Solids epoxy siloxane. Include primer as recommended by the manufacturer.
   2. Manufacturer: Sherwin - Williams Poly-siloxane XLE - 80, or equal

C. Joint Adhesive Sealant: Fiberglass joint connections shall be made watertight using waterproof non-shrink caulking with suitable adhesion to fiberglass. Silicone sealants will not be permitted.
   1. Joint sealant/adhesive material: Premium-grade, high-performance, moisture-cured, 1-component, polyurethane-based, non-sag elastomeric sealant.
   2. Products:
      a. Sikaflex®-1A with Sikaflex Primer 449,
      b. 3M 5200,
      c. Alternative manufacturers standard to the slide manufacturer specifications and approved as equivalent by architect/engineer

PART 3 - EXECUTION

3.1 GENERAL

A. The performance of this work shall comply with the following governing and regulatory authorities.

1. Department of Labor (OSHA).
2. State Department of Public Health.
3. All State and Local Building Codes.
4. Any other agency that has legal jurisdiction.

3.2 INSPECTION

A. Prior to installation of the work of this Section, carefully inspect the installed slide and promptly inform the Owner's Representative of any repairs required beyond the scope of work described above.

3.3 FLUME RESURFACING - RE-GELCOAT INTERIOR

A. All finish work must strictly follow industry standards, references and recommendations.

B. The contractor is responsible for adequately protecting adjacent existing structures as required from overspray or damage.

C. Repair all defects such as voids, cracks, chips, delaminations, high spots, bad joints, holes and fractures are to be repaired using proper materials.

D. Fiberglassing over seams within the riding surface is not permitted.

E. Surface Preparation
1. Sand entire gel coat surface with 100 grit sand paper or as prescribed in gel coat manufacturer's preparation guidelines to provide a mechanical bond surface for the new gelcoat to adhere.
2. Remove caulking from all slide joints to ¼ inch minimum below slide surface, clean, lightly sand and blow out all joints with compressed air followed by washing with acetone.
3. Clean entire surface of dust and debris by means of pressure wash followed by acetone wash.
4. Take appropriate steps to control overspray by means of overspray canopy.

F. Gel Coat Placement
1. Gel coat shall not be reduced or modified from the manufacturer's formulation by adding monomers.
2. Gel coat shall be applied with an airless spray system in increments of 5 mils or less per layer (rolling or brushing is not permitted).
3. Apply gelcoat by means of spray coat application to cleaned and prepped surface, to a total thickness of 20 to 24 mils wet, usually achieved by application of two spray coats. State of the art spray equipment is utilized allowing excellent control of the entire spray process and catalyzing of the gelcoat. Final coat uses an additive as a flow agent and UV protectant.
4. Entire surface is to be de-burred (small bits of organic debris often find their way into the uncured gelcoat, creating tiny burrs that must be removed) and any imperfect areas smoothed and touched up.
5. Wet sand gelcoat surface to a 600 to 1000 grit followed by a power buffing to produce a smooth glossy finish.
6. Apply primer and joint adhesive sealant in between each flange connection. Tool finish sealant to leave a smooth, leak-free joint/seam.
7. Flume joints shall be properly connected so as to avoid abrupt edges that may cause irritation.
8. Sanding within the slide surface should be minimized to maintain adequate gel coat thickness and gloss. Any sanded areas shall be polished to a high gloss until undetectable.
9. All flumes shall be properly cleaned and surfaces smooth finished, and complete with all the necessary sections prior to use of the slide.
10. Final gel coat thickness (Including existing gel-coat thickness) is to be 20-25 mils thick as measured using a "wet film thickness gauge" (minimum of two locations per flume segment). Record thickness results in close-out documents as required in section 3.4 "Owner Instruction and Close Out".

11. The sprayed surface is to be sanded free of SAG (“orange peel”), wrinkles, porosity pinholes, craters, fisheyes, and airborne debris.

G. Additional Gel Coat Materials
1. Supply 1 quart of matching colored gel coat for each slide flume and color to accommodate minor touch up and repairs.

3.4 EXTERIOR FIBERGLASS FLUME PAINT FINISH MATERIALS.

A. Paint finish shall only be applied to the rough exterior/underside fiberglass surfaces and shall not be applied to gel coat finishes.

B. Apply primer and paint finish as recommended by paint manufacturer.

C. Extra Stock:
1. Provide 2 gallons of matching paint for each color to accommodate future touch-up and repairs.

3.5 FLUME BUFFING, POLISHING AND WAXING

A. All finish work must strictly follow industry standards, references and recommendations.

B. The existing gel-coat surface is to be buffed to a “glass like” finish consistent per industry standards.

C. Flumes shall be inspected by owner or owner’s representative to ensure a smooth blemish free finish prior to acceptance of work.

D. The contractor is responsible for adequately protecting adjacent existing structures as required from damage and buffing compound residue.

3.6 REPAIR OF MINOR CHIPS, CRACKS, SCRATCHES AND BLEMISHES

A. All finish work must strictly follow industry standards, references and recommendations.

B. All minor chips, cracks, scratches and blemishes shall be repaired as necessary with fiberglass and/or gel coat. The final finish is to be blended, sanded and buffed as necessary to match the remainder of the slide flume finish.

3.7 OWNER INSTRUCTION/CLOSE OUT

A. The contractor shall deliver two complete sets of maintenance instructions bound together in a complete manual for the owner. Including, but not limited to the following:
1. Written narrative on the slide finish maintenance.
2. Written warranty and contact information.
3. Written maintenance information and recommended maintenance program.
4. The Contractor shall provide the Owner with unit price for complete yearly slide finish maintenance services, including all labor and materials required.
5. Water balancing, flow adjustments and commissioning for operations to be performed by the slide designer/engineer. Required flow adjustments and settings to be marked and recorded.
6. Written slide certification by slide manufacturer/designer.

3.8 CLEAN UP AND PROTECTION

A. After work of this section has been completed, clean-up work area and remove all equipment, excess materials, and debris. Protect slide from damage until time of final completion. Remove and replace finishes that are chipped, cracked, abraded, improperly adhered, or otherwise damaged.

B. At turnover to Owner, Contractor shall be responsible for, but not limited to, the following:
1. Cleaning all sanding debris, overspray and other construction related materials off adjacent areas.
2. Remove all old unused slide components of site.
3. Repairing of any damaged items related to work.
4. Cleaning and waxing the of new slide flume work.
5. Re-establish all disturbed areas to prior condition.

END OF SECTION 131413

SECTION 20 05 01
INTRODUCTORY STATEMENT

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. The requirements of Instructions to Bidders, General Conditions, and Division 1 apply to all work herein.

B. In addition to conforming to the documents listed in Paragraph A above, the work performed by the Plumbing, Fire Protection, and Heating, Ventilating and Air Conditioning (HVAC) Contractors shall conform to all provisions of Sections 20 00 00 through 20 99 99 as included in this Specification. The Plumbing, Fire Protection, and Heating, Ventilating and Air Conditioning Contractors are each to consider the word "Contractor" when used in these Sections to mean themselves.

C. All Plumbing, Fire Protection, and Heating, Ventilating and Air Conditioning Contractors must read the entire Specification and all divisions therein because they will be responsible for Work described in other Sections where reference is made to "Mechanical Contractor" or other commonly used terminology that implies the Plumbing Contractor, Fire Protection Contractor, or Heating, Ventilating and Air Conditioning Contractor.

D. Plumbing Contractor shall provide temporary water, unless otherwise assigned in Division 1. Heating, Ventilating and Air Conditioning Contractor shall provide temporary heat, unless otherwise assigned in Division 1.

E. All work included under this heading is subject to the Bidding Requirements, General Conditions, and Division 1 General Requirements written for this entire Specification, whether attached to this Part or not, and the Contractor is notified to refer thereto as an integral part of the work.

F. Fire Protection Contractor shall provide temporary or permanent standpipes with or without a water supply when the work of the building progresses more than 40 feet above the lowest level of fire department vehicle access, unless otherwise assigned in Division 1.

1.02 APPLICABLE SECTIONS

A. Contractors shall perform work described in the preceding paragraphs, the General Conditions, Division 1 and in the following Sections (as included):

1.	Fire Protection:	Sections 20 00 00 through 20 99 99
		Sections 21 00 00 through 21 99 99
2.	Plumbing:	Sections 20 00 00 through 20 99 99
		Sections 22 00 00 through 22 99 99
3.	HVAC:	Sections 20 00 00 through 20 99 99
		Sections 23 00 00 through 23 99 99

B. Contractors are required to coordinate their work with that described in other Sections, and therefore, must familiarize themselves with the entire set of Specifications.

1.03 RESPONSIBILITY

A. The Engineer's efforts under this contract are aimed at designing a project that will be safe after full completion. The Engineer has no expertise in, and assumes no responsibility for, construction means and methods, nor job site safety during construction. These are exclusively the Contractor's responsibility. The Engineer may process or approve Contractor submitted means or methods that may contain information related to construction methods or safety issues. The Engineer may also participate in meetings where such issues might be discussed. Such processing or participation shall not be construed as voluntary assumption by the Engineer of any responsibility for safety procedures.

END OF SECTION

SECTION 20 05 05
PLUMBING, FIRE PROTECTION, AND HVAC GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish all materials, labor, tools, and equipment to complete and leave ready for operation all Fire Protection, Plumbing and Heating, Ventilating and Air Conditioning (HVAC) systems.

B. By submitting a Bid, the Contractor certifies that:
1. The Contractor has visited the site and is satisfied that they understand all site conditions that may affect the Bid price, with the sole exception of those items which they specifically are taking exception to in writing in the Bid.
2. The Contractor fully understands the make-up, construction, and operation of all systems and equipment they are bidding on and has included in the price all materials, supplies, accessories, and services necessary to make these systems complete and operational, whether such materials, supplies, and services are explicitly shown on the Drawings or included in these Specifications or only implied by the clear intent of these Documents that the Contractor provide a complete and fully operational system as part of the scope of work undertaken by this Contractor.

C. These General Requirements are in addition to the other requirements referenced elsewhere within these Specifications.

1.02 ENVIRONMENTAL GUIDELINES

A. Comply with all Project Requirements in Division 01 for Construction Waste Management.

B. Minimize the use of virgin materials and minimize waste during construction.

C. Use low-VOC mastics and sealants.

1.03 STANDARDS OF QUALITY

A. Provide quality work conforming to the best accepted practice and standards of the trade. Further definition of quality is given by reference to various laws, codes, standards, and regulations.

B. All laws and codes having jurisdiction over this project are deemed to be included in their entirety as a part of these Specifications. Also, any other laws, codes, standards, or regulations referenced herein are deemed to be included in their entirety.

C. If a conflict occurs between the Drawings, the Specifications, and the applicable codes, immediately call the conflict to the attention of the Architect before bids are submitted. The Architect will determine which interpretation shall take precedence. Conflicts not brought to the Architect's attention before bids are due shall be priced by the Contractor to include the most expensive, highest quality alternative.

D. Material and equipment installed under this Contract shall be new, undeteriorated, and of a quality not less than the minimum specified. All equipment shall be certified, listed, and labeled by UL. If UL does not certify an associated piece of equipment, then certification by another nationally recognized testing laboratory such as CTL shall be permissible. If equipment is of a type that no testing lab lists nor labels, then a safety evaluation must be performed at the supplier's expense by the inspecting authority or another federal, state, or municipal agency.

E. The following codes apply to this work (as approved and amended by the Authority Having Jurisdiction including all applicable sections of interim agreements in effect at the time of permit issuance):
   1. Local
      a. Building Code
      b. Fire Code
   2. State of Ohio
      a. Ohio Building Code
      b. Energy Conservation Code
      c. Mechanical Code
      d. Plumbing Code
      e. Boiler Code including ASME Boiler and Pressure Vessel Code Section I, "Power Boilers," and Section IV, "Heating Boilers"
      f. Elevator Code
      g. Pressure Piping Code
      h. Fire Code
   3. National
      a. National Fire Protection Association (NFPA) Codes as listed in subsequent Sections and Article 101
      b. Power Piping ASME B31.1
      c. Refrigeration Piping ASME B31.1
      d. International Fuel Gas Code (IFGC)
      e. All applicable OSHA Requirements
      f. All applicable EPA Requirements
      g. Industrial Risk Insurers (IRI)
   4. Health Care
      a. HEW
      b. HUD
      c. JCAHO
      d. NFPA Codes as listed in subsequent sections and Article 101
      e. State Health Department requirements
      f. State long-term care facilities licensure regulations and State Health Department requirements

F. Work must be performed by licensed Contractors as required by Local and State Codes.

G. Methods and materials must be certified where noted in the individual Specification Sections.

H. All equipment and appliances must bear a tag or label of an Approved Testing Agency. Review Local Code requirements.

I. Work must comply with City of Troy, Ohio; Ohio Building, Mechanical, Plumbing, and Fire Codes. Unless otherwise noted, the latest enforced code edition shall apply to this work.

1.04 CONTRACT DRAWINGS

A. Only the printed, stamped, AHJ approved, 2-dimensional documents shall be used and relied upon for construction purposes. 3-dimensional models are not a part of the contract drawings.

B. Drawings are schematic and show approximate locations and extent of work. Exact locations and extents must be coordinated with other Contractors and verified in the field. Coordination of the final fabrication drawings and final coordination of the installation in the field is the Contractor's responsibility. The Contractor is to take the design to the next level of detail, knowing exactly what equipment and materials they are going to provide, and build the project on the basis of that equipment and other approved Shop Drawings.

C. The Drawings indicate required size and points of termination of pipes and ducts and suggests proper routes to conform to structure, avoid obstructions, and preserve clearances. However, it is not intended that Drawings indicate all necessary offsets, and the Contractor shall, without further instructions or additional cost to the Owner, make the installation in such a manner as to conform to structure, avoid obstructions, preserve headroom, and keep openings and passageways clear.

D. When the work as indicated on the Contract Drawings exceeds the minimum required by any code, standard, requirement, rule, or regulation, the Contract Drawings shall govern the design and installation of the work.

E. Significant deviations from Drawings must be approved by the Architect.

F. Up to the time of roughing in, the Architect reserves the right to make minor changes in location that do not require additional labor or material. No cost shall be added to the Contract for a minor change. The Architect shall determine what is a "significant" and what is a "minor" change.

1.05 BIM MODELS

A. The Engineer has created a Building Information Model (BIM) using Revit software to produce two-dimensional Construction Documents. The BIM Level of Development (LOD) for the Engineer’s purposes varies by system and components and may include LOD 200 and 300 elements in accordance with industry standards and the Standard of Care for design professionals.

B. The Contractor is required to develop BIM documentation for collaboration, clash detection, fabrication and record drawings tasks. BIM documentation for the Contractor’s use and for coordination purposes shall be further developed from the two-dimensional Contract Drawings in accordance with the Contractor’s means and methods. If the Engineer’s model is used as a basis for the Contractor’s effort, the Contractor shall recognize that the Contractor is responsible for developing the BIM further, in accordance with the requirements of the Contract Documents.

C. Some components may be required by the Contract Documents that are not represented in the BIM. Such components include, but are not limited to, steam traps, water hammer arrestors, trap primers (including piping from the trap primer to the floor drains), final connections to plumbing fixtures and equipment (including all required valves and accessories), etc. Piping required to be sloped may not be shown in the model as sloped. The contractor is required to slope the piping in accordance with the Construction Documents and the building code.

D. If there is a conflict between what appears to be indicated in the BIM and what is represented on the 2-dimensional drawings, the 2-dimensional drawings shall take precedence.

1.06 ABBREVIATIONS AND SYMBOLS

A. Listed below are titles and abbreviations used in the Specification. Not all may necessarily apply to this work.

1. AABC Associated Air Balance Council
2. ADA Americans with Disabilities Act
3. ADC Air Diffusion Council
4. AGA American Gas Association
5. AMCA Air Movement and Control Association
6. ANSI American National Standards Institute
7. ARI Air Conditioning and Refrigeration Institute
8. ASA Acoustical Society of America
9. ASHRAE American Society of Heating, Refrigerating, and Air Conditioning Engineers
10. ASME American Society of Mechanical Engineers
11. ASSE American Society of Sanitary Engineers
12. ASTM American Society for Testing and Materials
13. AWWA American Water Works Association
14. BAS Building Automation System
15. CGA Compressed Gas Association
16. CISPI Cast Iron Soil Pipe Institute
17. EJMA Expansion Joint Manufacturers Association, Inc.
18. EPA Environmental Protection Agency
19. FM Factory Mutual
20. HVAC Heating, Ventilating, and Air Conditioning
21. MSS Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.
22. NEBB National Environmental Balancing Bureau
23. NEC National Electrical Code
24. NEMA National Electrical Manufacturers Association
25. NFPA National Fire Protection Association
26. NSF National Sanitary Foundation
27. OAC Ohio Administrative Code
28. OBC Ohio Building Code
29. ODH Ohio Department of Health
30. ODMH Ohio Department of Mental Health
31. ODOE Ohio Department of Energy

32.	ODOT	Ohio Department of Transportation
33.	OSHA	Occupational Safety and Health Administration
34.	PDI	Plumbing and Drainage Institute
35.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association
36.	TAB	Testing, Adjusting, and Balancing
37.	UL	Underwriters' Laboratories

B. The abbreviations are shown on Drawings. For further abbreviations, Contractor shall refer to the symbols list shown in the latest ASHRAE Fundamentals Handbook.

1.07 DEFINITIONS

A. Applicable definitions listed by Ohio Building Codes apply to this work.

B. "The Authority Having Jurisdiction" shall refer to any duly authorized governmental body or public utility and/or their agents having jurisdiction over the work as provided under this Contract.

C. "Concealed": Embedded in or installed behind walls, within partitions, above suspended ceilings, in trenches, in tunnels, below floor slabs, and within crawl spaces. Items within mechanical rooms are not considered "concealed."

D. "Contractor": Means the Contractor whose scope of work is described within Divisions 20, 21, 22, or 23.

E. "Ductwork": Duct and fittings, dampers, vanes, controls, hangers, bracing, insulation and other items required or necessary.

F. "Exposed": Not installed underground or "concealed," as defined previously. In full view, all items within a mechanical room are considered "exposed."

G. "Furnish": To purchase and deliver products to the project site and make ready for installation.

H. "Install": To take furnished products, assemble, erect, secure, connect, and place into operation.

I. "Piping": Pipe, fitting, flanges, valves, controls, specialties, hangers, concrete inserts, bracing, insulation, and other items required or necessary.

J. "Products": Includes materials, systems, and equipment.

K. "Provide": To furnish, erect, install, and connect to make completely ready for regular operation.

L. "Work": The providing of products for entire Contract.

1.08 PERMITS, FEES, AND NOTICES

A. Secure and pay for all permits and governmental fees, bonds, licenses, and inspections necessary for the proper execution and completion of the work. Refer also to specific permit requirements in other Sections of Divisions 20, 21, and 22 (as included) and in Division 1.

B. Give notice and comply with all laws, ordinances, rules, regulations, and lawful orders of any public authority bearing on the performance of the work.

C. The Plumbing, HVAC, and Fire Protection Contractors shall arrange for inspection of the work by the Code Authority having jurisdiction.

D. If the Contractor performs any work knowing that work to be contrary to such Laws, Ordinances, Rules and Regulations, and without notice to the Architect, the Contractor shall assume full responsibility for and shall bear all costs associated with such work.

1.09 EXAMINATION OF SITE

A. Certain existing conditions affect the manner or sequence of work performance. Review existing services, structures, and operating schedules to facilitate installation of the Work. Coordinate scheduling of the work with existing operations.

B. Visit the site of the proposed project and familiarize yourself with all the conditions which might affect the work. After the Contract is signed, no allowance will be made for lack of knowledge of project conditions.

C. Prior to bidding the project, verify and reconcile work required by the Contract Documents with conditions at the Site.

D. Should any discrepancies be noted during the Bidding Period, notify the Architect immediately, in writing, to permit the issuance of an addendum to prevent misunderstandings at a later date.

1.10 UTILITIES

A. Prior to construction, locate any existing utilities within the project limits. Make minor relocations to permit installation of work. Advise the Architect immediately of major conflicts on a site plan layout to permit modifications of the Contract Documents and submit to the Architect for review prior to any excavation. Where existing utilities conflict with new work, mark and identify proposed modifications on the site plan layout.

B. Record locations of all concealed utilities on the Record Drawings.

C. Coordinate any utility service shutdown or outages with the Architect and the Owner. Shutdowns shall conform to all utility company requirements. Avoid inconveniencing the Owner, and provide temporary service during the curtailment, as required by the Architect or Owner. Provide five (5) working days (minimum) advanced notice to the Owner for any required utility outages.

D. At least two (2) working days prior to construction in an area in which underground utility facilities may be located, notify the Project Engineer, the registered utility protection service, and the Owner of each underground utility facility listed here:
   1. Utilities Protection Service
      Phone: 1-800-362-2764
   2. Columbia Gas of Ohio
      New Business Team
      290 West Nationwide Blvd.
      Columbus, Ohio 43215
      Phone: 1-800-440-6111
   3. City of Columbus Water Department
      Mr. Burly Dunn, Line Location
      910 Dublin Road
      Columbus, Ohio 43215
      Phone: 614-645-7788
   4. City of Columbus Storm/Sanitary
      Division of Sewage & Drainage
      90 West Broad Street
      Columbus, Ohio 43215
      Phone: 614-645-8156
   5. Division of Construction
      910 Dublin Road
      Columbus, Ohio 43215
      Phone: 614-645-6441

1.11 CONTRACTOR DESIGN/DETAILING

A. The Contractor is required to include the design of component parts, subsystems, and installation details as required by the Specifications, as indicated on the Drawings, and as required for a complete and operating installation. This design work shall be done after all equipment manufacturers and material types have been selected from those allowed by the Specifications. If required by the Specifications, submit design calculations for review. Obtain the services of qualified personnel to perform this design and detailing. The Contractor's design and detailing does not relieve the Contractor from complying with the Contract Documents.

1.12 RECORD DRAWINGS

A. Maintain at the job site one (1) copy of Drawings, which shall be used exclusively for recording the location of all installed work.

B. Record deviations in locations of concealed piping, valves, all buried or concealed utility services (water, gas, fire, manholes, etc.), dimensioned from a fixed control point, including depth of bury at start of gas line, at each change of direction as required for further reference. Minor piping variations need not be recorded. Record Addendum and Change Order Items.

C. Record deviations necessary to incorporate equipment different from the Design Base equipment.

D. At completion of the project, deliver Record Drawings and Coordination Drawings to the Architect.

E. For large, complex electrical equipment, supply and post at, on, or near the equipment, all electrical power and control drawings. Provide framed glass or plastic protection for the Drawings.

F. Diagrams and Operating Instructions: Post complete diagrams and operating instructions for all control systems near the related equipment. Provide framed glass or plastic protection for the Drawings and operating instructions. When multiple equipment rooms exist in a building, these diagrams shall be required at each piece of equipment. Additionally, post or make available in the main equipment room a complete set of diagrams.

G. Refer to Division 1, Section 01 74 01, "Execution Requirements," for additional requirements.

1.13 WARRANTY

A. Contractor shall warranty equipment, workmanship, and materials for one (1) year from date of Substantial Completion. If defects develop within this warranty period, and upon receiving written notice from the Architect or Owner, Contractor shall remedy the defects and reimburse the Owner for all damage to other work caused either by the defects or during the work of correcting the defects.

B. Refer also to Division 1 and any individual Sections that define the starting date of the warranty period or discuss either additional warranty requirements or extended warranties beyond the standard period. At the contractor's expense, any typical manufacturer's warranty period for equipment shall be extended as required to begin the specified time frame at the actual Substantial Completion date.

1.14 COORDINATION

A. Coordinate work carefully with the work of all other Contractors.

B. Consult all contract documents that may affect the locations of any piping and make minor adjustments in location to secure coordination.

C. Before proceeding, coordinate drilling, welding, etc., and method of attachment to columns, joists, beams, girders, etc., with Structural Engineer and General Trades Contractor.

1.15 TEMPORARY UTILITIES

A. Refer to Division 1, General Requirements.

B. Any and all equipment used for temporary building operation during construction shall be contingent on a plan submitted by the Contractor and approved by the Construction Manager and the Engineer. The criteria shall include, but not be limited to, the following:
   1. All necessary controls shall be in place and functional.
   2. All equipment safeties shall be functional.

3. The equipment shall not be operated without the design filters in place and the filters shall be changed in accordance with the criteria on the Air Filter Schedule. Refer to Section 23 41 05 Filters for more information.
4. Maintenance of the equipment shall be as recommended by the manufacturer and shall be the responsibility of the Contractor.
5. The operation of the units for construction shall not affect the required warranty terms and times at the completion of the building.

PART 2 PRODUCTS

2.01 DESIGN-BASE MANUFACTURERS

A. The Drawings and Specifications are based on the requirements and layouts of the equipment of the Design-Base Manufacturers. Design of equipment has been coordinated with the building and other Trades for these specific models and manufacturers of equipment. Where several manufacturers are listed, the first named is the Design-Base Manufacturer, unless specifically noted otherwise. Submit for final approval products of the listed manufacturers that are of performance and quality comparable to the Design-Base Manufacturer's products.

B. Where necessary, prepare new layouts to be used for other equipment listed. Adjust and coordinate the layouts with the equipment and service requirements and with Code-required working clearances that may have different dimensions or service requirements from the Design-Base Manufacturer's equipment. Verify that this equipment will fit and function in the indicated application and will coordinate with adjacent equipment for fit and clearances. Submit all new layouts as part of the shop drawing review.

C. Whenever the Contractor furnishes equipment or material other than that of the Design-Base Manufacturer, they are responsible for the cost and coordination of all modifications required not only for their work, but also for the work of all other Trades affected. Where changes to other Trades' work are required, the Contractor furnishing the equipment or material must include the additional costs of all such changes in their Bid, arrange with these other Trades for the changes, and compensate them accordingly.

2.02 APPROVED EQUALS

A. Equal (equivalent) components (articles, materials, forms of construction, equipment, fixtures, etc.) by manufacturers not listed but meeting the Specifications may be submitted to the Architect for approval and subsequent inclusion into the bidding documents. Submittal must be received no later than ten (10) working days before the bid date. If approved, such manufacturers will be listed in an addendum.

B. Submittals must include all of the following:
   1. Cover Letter: Company letterhead addressed to Architect. Indicate the following:
      a. Project name, project building name, project number, and phase or bid package if applicable
      b. Specification Section by number and title
      c. Specified Product
      d. Proposed Product

e. Deviations, if any, from Specified Product
f. List of attachments

2. Product Data: Manufacturer's literature, fully describing proposed product with exact item highlighted or clearly indicated.
3. Specifications: Manufacturer's Specifications with all modifications noted as required to show compliance with Bidding Documents.
4. Test Data: Where performance requirements are specified, submit laboratory tests to indicate compliance.
5. Samples: When required by Architect, submit appropriate samples of proposed product showing color, texture, construction and other attributes necessary for evaluation.

C. If the Contractor fails to comply with all of the preceding requirements and fails to provide all of the requested information, the submittal will not be reviewed.

2.03 SUBSTITUTIONS

A. Contractor may submit equipment and material substitutions of their choice, without prior approval, on the "Substitution Sheet" included in the Bid Schedule. Such substitutions will not form the basis of the award and may be considered only after selection of the lowest bidder furnishing "Standards" as specified.

2.04 MANUFACTURER'S DECLARATION

A. Submit a list of the suppliers to be used on this project within thirty (30) days of award of contract. Type this list on company letterhead and include the project title. Include all equipment listed in Section 20 05 15, "Submittals." Adjacent to each Specification Section number and product description, list the manufacturer and catalog number/type.

2.05 QUANTITIES

A. Equipment may be referred to either in these Specifications or on the Drawings, as singular or plural; Contractor is responsible for verifying the exact number of items required to complete their work.

2.06 OWNER-FURNISHED EQUIPMENT

A. The Owner will furnish certain items of equipment to the Contractor. The Contractor shall take delivery of such items and unload them from the truck at the job site.

B. The Contractor shall protect and store such items as part of this Contract.

C. The Contractor shall install these items in conformance with the requirements of the Specifications and Drawings and the supplier's recommended installation instructions.

PART 3 EXECUTION

3.01 CUTTING AND PATCHING

A. Unless otherwise required in the General Conditions and other Specification Sections, the Contractor shall include in their Bid the cost of all cutting and patching required for his/her work. Work must be accomplished in a neat and workmanlike manner that is acceptable to the Architect.

B. If necessary to cut into the work of other Trades, the other Trades shall do the cutting in at this Contractor's expense. Patching shall be done in the same fashion.

C. Cutting of structural support beams, joists, plates, precast, or other structural members is strictly prohibited without the specific written consent of the Architect and Structural Engineer. Use rotary drills where cutting holes through concrete, brick, plaster, or tile is necessary. Obtain approval of the Architect before proceeding with work.

D. All cutting and patching shall be done promptly, and all repairs shall be made as necessary to leave the entire work in good condition, including all cutting, fitting, and drilling of masonry, concrete, metal, wood, plaster, and other materials as specified or required for proper assembly, fabrication, installation, and completion of all work of the Contract.

E. Patching shall match adjacent materials and shall be accomplished only by tradesmen skilled in the respective craft required. Materials and equipment used in the patching work shall comply with the requirements of those Sections of the Specifications relating to material to be used in new construction. Contractor is not necessarily obliged to employ the General Trades Contractor to do patching. The HVAC, Plumbing, and Fire Protection Contractors shall incur all costs for cutting and patching necessary for their installation of their respective work.

F. Patch to match adjacent surface construction. Exception: Portions of the existing floor slab should be cut and removed by Contractor and replaced by the other Contractors is appropriate for the underfloor plumbing piping. Plumbing Contractor shall excavate and backfill for his/her own work.

G. Patch and repair holes in walls, ceilings and floors that are left as a result of removing ductwork, piping, or other mechanical elements or as necessary to install the work related to this project. Match adjacent surface conditions. Coordinate patching with architect and work of other trades.

H. Refer to Division 1 and Division 2 for additional requirements.

3.02 PAINTING AND RELATED WORK

A. Finish painting in areas of new construction and remodeled areas is the responsibility of the General Trades Contractor and is specified in Division 9.

B. Any other painting required by Sections of Division 20, 21, 22, or 23 is the responsibility of the respective HVAC, Plumbing, or Fire Protection Contractors. Such painting shall be done by a qualified tradesman skilled in the craft and shall meet the requirements of Division 9. Each Contractor is responsible for repainting of finished areas disturbed by their own cutting and patching. Finishes shall match existing conditions.

C. If factory-finished equipment has rusted or has been damaged, clean the equipment, spot prime it with zinc chromate, and finish it to the original quality and color.

D. Clean HVAC, Plumbing, and Fire Protection support steel and bare ferrous metal, remove all rust, apply primer, and paint in accordance with Division 9 Specifications.

E. Prime and finish all plywood mounting boards in accordance with Division 9 Specifications.

3.03 CLEANING

A. Upon completion of work, thoroughly clean of dirt, stickers, grease, rust, oil and other foreign matter, all material, fixtures and equipment furnished in this Contract. Prepare for finish painting, where painting is specified.

B. Clean galvanized piping and ductwork in exposed areas with diluted acetic acid.

C. Clean copper piping in exposed areas with fine emery cloth and solvent.

D. Clean all gauges, thermometers, traps, dirt legs, strainers and fittings.

E. Clean all insulation coverings.

F. Keep all areas as clean as possible during construction. Refer to Division 1 regarding additional requirements.

3.04 SCAFFOLDING, RIGGING, HOISTS, AND TRANSPORTATION

A. The Contractor shall provide scaffolding, staging, cribbing, tackle, hoists, and rigging necessary for placing their materials and equipment in their proper places in the Project.

B. The Contractor shall pay costs for transportation of materials and equipment to the job site and shall include such costs in their proposal. The Contractor shall pay costs for storage of materials and equipment if space is not available at the site and shall include such costs in their proposal.

C. Scaffolding and hoisting equipment shall comply with the requirements of applicable Federal, State, and Local Laws and Codes.

3.05 TESTS

A. The Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction may require portions of the work to be inspected, tested, or approved. These services shall be performed by approved agencies.

B. The Architect must receive notification of all scheduled tests and adjustments at least 72 hours before they are scheduled so they may witness the tests and adjustments. If the Contractor performs any test or adjustment without the Architect present or without proper notification, the Contractor may be required to perform the test or adjustment a second time at the Contractor's expense. To minimize inconvenience, all test schedules shall be coordinated with the Owner.

C. Secure required certifications of inspection, testing, or approval and include those in the Service Manuals. See Section 20 05 20, "Record and Information Manuals."

D. Test and secure approval after the piping installation has been completed, but before the piping has been concealed and before the pipe covering has been applied. Each system shall be tested as required by other Sections of this Specification. The piping shall be free of leaks at test pressure. If a leak appears, repair the line and any damage resulting from the leak at no additional cost to the Owner. The test shall be repeated until the system is proven to be free of leaks and properly anchored.

E. Should any of the work be covered up or enclosed before all required inspections are completed and approvals obtained, uncover the work as required and, after the work has been completely inspected and approved, make all repairs and replacements, with such materials and workmanship as are necessary for the approval of the Architect. Do so at no additional cost to the Owner.

3.06 TESTING PROCEDURES

A. Provide all tools, instruments, personnel, and equipment required to perform tests. Make all required temporary connections. Properly repair defects that develop under tests and repeat the tests. Do not caulk threaded joints, cracks, or holes. Repair leaks by tightening threaded joints or by replacing pipe, fittings, or equipment with new materials. Minor leaks in welded joints may be chipped out and rewelded.

B. Perform hydrostatic and air tests before piping is concealed or covered. Completely drain all systems after hydrostatic tests are performed.

C. Testing of service lines shall follow recommended practices. Remove all air from lines when testing with water pressure, to avoid false pressure readings.

3.07 INSPECTION

A. Check each piece of equipment in the system for defects. Verify that all parts are properly furnished and installed, that all items function properly, and that all adjustments have been made.

3.08 PROTECTION

A. Do not deliver equipment and material to the site until the work is ready to receive it, unless it can be protectively stored in a manner acceptable to the Architect.

B. During construction, protect all equipment and materials during construction from damage by weather, water, dirt, paint droppings, welding and cutting spatters, and other construction activities.

C. Elevate and protectively cover all materials or equipment stored outside.

D. Store inside all materials and equipment sensitive to weather or construction conditions. Where necessary, store sensitive equipment in a heated area.

E. During construction, cover all non-operating motors, bearings, and controls that are stored or installed in place.

F. Refer also to individual Specification Sections for specialized protection.

G. Immediately repair or replace damaged equipment or materials to the satisfaction of the Architect and at no additional cost to the Owner.

H. Protect the building and other Contractor's material and equipment from damage caused by your work. Protect floors from cutting oil and chips.

I. Use all necessary means to protect materials before, during, and after installation.

3.09 NOTIFICATION OF START-UP

A. Notify the Architect of the start-up schedule for all equipment. The Architect shall then notify the Owner.

3.10 WATER MANAGEMENT PROGRAM (WMP)

A. The Plumbing Contractor shall establish, manage and execute a Water Management Program for the plumbing and fire protection systems of the project from the beginning of construction through one (1) month after the building is occupied by the Owner. The purpose of the program is to manage the risk of biological contamination of the components of the potable water system such as Legionella.

B. The Contractor shall review the contract documents to determine factors and aspects of the systems that may relate to possible biological contamination such as Legionella but not limited to Legionella. These may be related to the arrangements, phasing and temporary operation of the plumbing and fire protection systems and to the equipment attached to these systems. Factors and equipment include, but are not limited to, the following:
1. Fountains
2. Whirlpools or spas
3. Misters
4. Ice machines
5. Other devices that release water aerosols into the building
6. Centralized potable water heating systems
7. Potable water or fire water storage tank, hot or cold
8. Other areas with stagnant potable water in any temporary or final condition
9. Healthcare Facilities

10. A facility that houses occupants over the age of 65.
11. Building height of ten (10) or more stories
12. Construction Phasing that results in stagnant water or water temperature variations in the systems

C. The Contractor shall identify piping, devices and equipment, and control locations, that require control measures. Monitoring, additional cleaning and additional disinfection should be provided for these locations.

D. Cleaning of the potable water system and components shall occur as the systems are constructed and a final cleaning, flushing, and disinfection shall take place before the systems are commissioned or started. If after the systems are filled, commissioned or started, the systems are shut down, become stagnant or the system temperature is not maintained below 65°F or above 140°F, the systems will be cleaned, flushed, and disinfected again before placing them back into service.

E. The Contractor shall document the protocol and procedures used to sanitize the systems, the disinfectant used, and the concentration achieved at branch terminals sampled throughout the systems.

3.11 PROTECTION FOR PUBLIC AND EMPLOYEES

A. Refer to Division 1, General Requirements.

3.12 TEMPORARY FIELD OFFICE AND MATERIALS STORAGE

A. Refer to Division 1, General Requirements.

3.13 USE OF EXISTING FACILITIES

A. Refer to Division 1, General Requirements.

3.14 DEMOLITION AND REMOVAL

A. Refer to Division 1, General Requirements.

END OF SECTION

SECTION 20 05 15
SUBMITTALS

PART 1 GENERAL

1.01 DESCRIPTION

A. For general requirements, refer to the GENERAL CONDITIONS and Division 1.

B. Materials and equipment installed in this work shall meet all the requirements of the Contract Documents and no materials or equipment shall be ordered until submittals are reviewed and approved by the Contractor, Architect, and Engineer.

C. Contractors assume all responsibility for changes required as a result of work performed, or equipment ordered, by the Contractor prior to submittal approval.

D. Submit complete copies of the catalog data or Drawings for each manufactured item of equipment and each component to be used in the work as required in the table below. Catalog data shall include specific performance data, utility requirements, service area required, material description, rating, capacity, working pressure, dimensional data, material gauge or thickness, wiring diagrams, brand name, catalog number, and general type.

E. Submittals reviewed by the Engineer shall not take precedence over the Contract Documents, and the Engineer's review shall not relieve the Contractor from the responsibility for complying with the Drawings or Specifications, nor from the responsibility for providing proper clearance and coordination with other Trades.

F. When submitted for review, all shop Drawings shall bear the Contractor's certification that he/she has reviewed, checked, and approved the shop drawings, that they have been coordinated with the requirements of the project and the provisions of the Contract Documents, and that he/she has verified all field measurements and construction criteria, materials, catalog numbers, and similar data. Submittals without a Contractor's approval will not be reviewed and will be returned.

G. Submittals shall include the complete package of equipment materials, piping, and insulation pertaining to that piece of equipment. A package of equipment requiring long lead times may be submitted earlier.

H. The Engineer's review and approval does not extend to means, methods, manners, techniques, sequences, procedure of construction or to safety precautions or programs incident thereto. This is solely the Contractor's responsibility.

I. Shop Drawings that are submitted, but are not required by the table below, will be returned without review.

J. Shop Drawings that are indicated to be provided for Record Purposes only will be returned without review.

1.02 CONTRACTOR'S RESPONSIBILITIES

A. Completely review and approve shop Drawings, product data, and samples prior to submittal.

B. Determine and verify:
1. Field measurements
2. Field construction criteria
3. Catalog numbers and similar data
4. Conformance with Specifications
5. Quantities

C. Coordinate each submittal with requirements of the work and the Contract Documents and other Trades.

D. Notify the Architect in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents. The Contractor must boldly note all deviations on the submittal.

E. Make submittals promptly in accordance with the approved schedule and in such sequence as to cause no delay in the work of the Contractor or any other Contractor.

F. Correct or change and then resubmit rejected submittals as required until approved. The Contractor must clearly note all revisions on resubmitted submittals. Resubmittals without the revisions noted may be returned without review.

G. Do not begin fabrication or work that requires submittals until approved submittals are returned.

1.03 CERTIFICATIONS

A. Provide:
1. Test Agency results verifying capacities, operating conditions and power requirements at design conditions. Test Agencies are to be hired by the Contractor at the Contractor's expense.
2. Manufacturer's Statement of Compliance with Standards discussed in individual Specification Sections.
3. Equipment labels indicating Certification requirements.
4. Quality standard designations on each unit piece, for example, each pipe length, pressure vessel, or valve.
5. Typed verification that noted mixes, chemical compositions, and testing procedures were complied with.
6. Other Certifications listed in other Sections of the Specifications.

1.04 REQUIRED SUBMITTAL INFORMATION (ALSO REFER TO DIVISION 1)

A. Submittal Transmittal
1. Provide the following information on the Transmittal Form for each submittal:
a. Project name
b. Specification number for each submittal item required in table below

c. Item description, as listed for each submittal item required in table below. Where equipment is identified by number or tag on the documents, use the same identification on the submittal.
d. Specification number and item description (b and c, preceding) for each submittal if more than one (1) submittal is sent under one (1) transmittal form.
e. Name, address, and telephone number of Contractor.
f. Bid package number.

2. Submittal transmittal forms not properly identified with the preceding information will be returned (without review) to the Contractor.

B. Shop Drawing Requirements

1. Shop Drawings – Provide catalog cuts, Drawings, warranties, motor efficiencies and power factor information (where applicable), wiring diagrams (where applicable), performance curves and characteristics. Shop drawings shall be submitted electronically in PDF file format and as described in Division 1. The submittals will be returned to the Contractor, who will make and distribute as many copies as needed. Only submittals with the approved stamp printed on them shall be permitted on the site.
2. Color Samples of the following items are to be provided:
   a. Cabinet Unit Heaters
   b. Finned Tube Radiation
   c. Louvers
   d. Convectors
   e. Panel Radiators
   f. Electric Finned Radiation

C. Submit ductwork layout shop Drawings for record purposes only after coordination between all Contractors has occurred. Drawings shall be at 1/4 inch equals 1 foot scale and shall include duct, top and bottom elevations with enlarged sections and elevation plans as necessary. Coordinate size and location of ductwork with structure, piping, lighting, equipment, conduit, bus ducts, ceiling construction, clear height above, and other items that may present a potential conflict. These Drawings will not be reviewed or returned.

D. Submit HVAC piping layout shop Drawings for record purposes only after coordination between all Contractors has occurred. Drawings to be a 1/4 inch equals 1 foot scale with enlarged sections and elevation plans as necessary. Identify all valve locations, as well as all piping and support elevations. Coordinate size and location of ductwork with structure, ductwork, lighting, equipment, conduit, bus ducts, ceiling construction, and Owner's desired clear headroom. These Drawings will not be reviewed or returned.

E. Certain Fire Protection Shop Drawings listed in the table below are to be provided to the Engineer for record purposes only. The final approval for these systems is by the Authority Having Jurisdiction (AHJ). Provide these submittals to the AHJ for their approval prior to installing work. The Engineer will not review or return these Drawings.

F. Each Contractor shall submit information on the equipment items as listed in the following table. Identify each item with Specification numbers.

Section #	Item	Provide for Approval	Provide for Record Purposes Only
	General Items for Plumbing, Fire Protection, and HVAC		
20 05 05	Suppliers and manufacturers list	X	
20 05 20	Record and information manuals	X	
20 05 45	Hangers, supports, and inserts (Non-Seismic)	X	
	Plumbing Contract Items		
22 42 01	Plumbing fixtures	X	
	HVAC Contract Items		
23 51 16	Vent piping, breeching, and stack	X	

END OF SECTION

SECTION 20 05 20
RECORD AND INFORMATION MANUALS

PART 1 GENERAL

1.01 RECORD DRAWINGS

A. Refer to Division 1 for general requirements as well as for specific information regarding Record (As-Built) Drawings. All drawings shall be provided in electronic PDF format.

1.02 OPERATION AND MAINTENANCE MANUALS

A. Refer to Division 1 for general requirements and for specific information regarding Operation and Maintenance Manuals, including required format(s) and quantity. If no such requirements are listed in Division 1, provide in electronic format. Submit one (1) copy of draft manual to the Architect for review and approval thirty (30) days before final inspection is due. After approval, submit three (3) approved manuals to the Owner and obtain receipt. (See Section 20 05 99, "Requirements for Contract Completion.")

B. Paper Copy Manuals shall be loose leaf, three-ring, heavy-duty hard-cover binders. Material shall be typewritten or printed and be fully legible. Each section shall be divided by labeled tabs.

C. Electronic Copy Manuals shall be PDF file format. Individual documents shall have filenames corresponding to specification sections and system names. Each document shall have bookmarks corresponding to the systems, subsystems, and equipment names. Use electronic files prepared by manufacturers where available.

D. The following items, together with any other necessary pertinent data, shall be included in each Manual:
   1. Each manual to be labeled on front cover with Project name, Contract, Contractor's name, Architect's name, Engineer's name, and date of Project Completion.
   2. Manufacturers' names, nearest factory representative (including postal and e-mail address, telephone and fax number), and model and serial numbers of components of systems.
   3. Name, postal and e-mail address, telephone and fax number of contact persons handling warranty work and issues.
   4. Operating instructions, including start-up and shut-down procedures.
   5. Maintenance and lubrication instructions, including routine and emergency service information and instructions.
   6. Parts list with numbers of replaceable items (such as couplings and packings). Include sources of supply, with postal and e-mail address, telephone and fax number.
   7. One (1) approved copy of each shop Drawing submitted.
   8. Temperature control diagrams.
   9. Valve charts.
   10. Written warranties.
   11. Belt sizes, types, and lengths.
   12. Wiring diagrams, as actually wired.
   13. Testing and balancing reports.

14. Copy of Owner's statement concerning completion of instruction period (see Section 20 05 99, "Requirements for Contract Completion").
15. Routine and 24-hour emergency service and repair information:
    a. Name, post and e-mail address and telephone and fax number of servicing agencies - routine and emergency.
    b. Names of personnel to be contacted for service arrangements - routine and emergency.

1.03 CONTROL DIAGRAM AND VALVE CHART

A. In the main Mechanical Room or location designated by Owner's Representative, mount approved copy in a neat frame with backing under glass or within a plastic jacket. The chart shall include a typed directory of all valve numbers (by system, describing location).

END OF SECTION

SECTION 20 05 45
HANGERS, SUPPORTS AND INSERTS

PART 1 GENERAL

1.01 DESCRIPTION

A. Provide hangers, supports, concrete inserts, threaded rods, framing steel, and hardware required for piping, ductwork, and equipment installed under this Division.

B. Install all necessary inserts, expansion shields, beam clamps, floor supports, and auxiliary steel.

C. For new concrete installations, furnish and install concrete inserts (when used or required) for the work. Coordinate with other Contractors as appropriate.

D. So as not to delay construction, the Plumbing, Fire Protection, and HVAC Contractors are responsible for correct locations, size, type, and installation of the concrete inserts for their work. Coordinate work with other Contractors as appropriate.

E. Pipes 8 inches and larger in size and main racked utilities shall be supported on pipe stanchions from the floor below, unless noted otherwise. Pipe stanchions shall be constructed with pipe, tube steel or rolled section columns, base plates or pipe flanges at the floor, and top plates, saddles, or cross members as required for the intended service.

F. A common support rack system may be utilized to support ductwork, piping, conduit and fire protection piping. The design and provision of the supports and hangers (racks) shall be the responsibility of the HVAC Contractor and shall be coordinated with all trades involved. The design shall account for all dimensions, spacing, and weights of all items supported. The contractor furnishing the supported item shall provide the appropriate system to fasten to the rack. If two levels of racks are required (ie. piping below ductwork) the lower rack shall be supported independently to structure, not from the rack supports above.

G. Install wall brackets where required. Provide pipe guides and anchors as required to properly control pipe movement. Method to suit job conditions. Refer to Section 20 05 40, "Piping Expansion, Noise and Vibration Isolation."

H. Support piping at pumps and equipment from floor, structure or walls, so that piping weight is not supported by pumps or by equipment. Install hangers with vibration isolator on all piping, ductwork, and equipment support in the room's housing mechanical equipment. See Section 20 05 80, "Vibration Isolators."

1.02 QUALITY ASSURANCE

A. All piping supports and parts shall conform to the latest requirements of the Code for Power Piping (ANSI B31.1) and MSS Standard Practice SP-58 and SP-69, except as supplemented or modified by the requirements of this Specification.

B. Components shall be selected and matched to the load imposed on them.

C. For ductwork supports, refer to SMACNA's "HVAC Duct Construction Standards Metal and Flexible" (latest edition).

D. Items specified in this Section that are used for fire suppression systems shall be UL listed, FM approved and NFPA approved for the usage.

1.03 MANUFACTURERS

A. Pipe Hangers: PHD, PHP, Michigan Hanger (Erico), Hilti, Kinetics, B-Line, Anvil, or Modern.

PART 2 PRODUCTS

2.01 HANGERS

A. Uninsulated Piping:
1. Steel or Plastic:
a. 1/2 Inch to 6 Inches: PHD Fig. 151, adjustable swivel ring, steel band, adjusting nut or Fig. 450 adjustable clevis, carbon steel yoke, U-strap, bolt and hex nuts.
b. 8 Inches to 16 Inches: PHD Fig. 470, adjustable clevis roller hanger, cast iron roll, carbon steel yoke, rod, and hex nuts.
c. 18 Inches to 24 Inches: PHD Fig. 470, adjustable clevis roller hanger, cast iron roll, carbon steel yoke, rod, and hex nuts. Structural reinforcement of building structure is required at attachment point.
d. 30 Inches to 36 Inches: Fig. 450 adjustable clevis, carbon steel yoke, U-strap, bolt, and hex nuts. Structural reinforcement of building structure is required at attachment point.
2. Copper:
a. Use copper-plated hangers as specified previously for sizes up to 6 inches.

B. Insulated Piping:
1. Cast Iron (Storm), Steel, Plastic or Copper:
a. All piping except steam and hot water piping, all sizes: PHD Fig. 450, adjustable clevis, carbon steel yoke, U-strap, bolt, and hex nuts. Provide thermal protector.
b. Hot Water Piping:
1) 1/2 Inch to 1 1/2 Inches: PHD Fig. 450, adjustable clevis, carbon steel yoke, U-strap, bolt, and hex nuts. Provide thermal protector.
2) 2 Inches to 16 Inches: PHD Fig. 475, adjustable roller, carbon steel yoke, cast iron roll, rod and hex nuts.
3) 18 Inches to 24 Inches: PHD Fig. 475, adjustable roller, carbon steel yoke, cast iron roll, rod and hex nuts. Structural reinforcement of building structure is required at attachment point.
4) 30 Inches to 36 Inches: Fig. 450 adjustable clevis, carbon steel yoke, U-strap, bolt, and hex nuts. Provide thermal protector. Structural reinforcement of building structure is required at attachment point.
c. Hanger size must be sufficient to accommodate pipe and insulation without compressing insulation.

2. Thermal Protector:
   a. Insulated saddle system consisting of a factory-assembled glass-reinforced polypropylene saddle and steel pipe spacer. Assembly conductivity must be less than 0.77 btuh-in./sf-hr°F, and shall be rated for at least 40 degrees F to 200 degrees F service. Anvil Figure 260 ISS, or equal by approved manufacturer.
   b. 6 inch long segments of 20 pcf molded fiberglass blocks Hamfab "H-block" or hardwood (oak) blocks supported by PHD Fig. 170, galvanized steel protection shield. Outdoor installations to be hardwood inserts, paraffin-coated. No softwood (pine) wood blocks or wooden dowels will be permitted. Provide a vapor barrier cover over inserts so that the insulation vapor barrier will not be broken.

C. Insulated Steam Piping:
1. PHD Fig. 470, adjustable steel yoke pipe roll.
   a. 1/2 Inch to 1 1/2 Inches: PHD Fig. 450, adjustable clevis, carbon steel yoke, U-strap, bolt, and hex nuts. Provide thermal protector.
   b. 2 Inches to 16 Inches: PHD Fig. 470, adjustable steel yoke pipe roll. Provide thermal protector.
   c. 18 Inches to 24 Inches: PHD Fig. 470, adjustable steel yoke pipe roll. Structural reinforcement of building structure is required at attachment point. Provide thermal protector.
   d. 30 Inches to 36 Inches: Fig. 450, adjustable clevis, carbon steel yoke, U-strap, bolt, and hex nuts. Structural reinforcement of building structure is required at attachment point. Provide thermal protector.
2. Provide carbon steel pipe covering protection saddle, welded to pipe, PHD Fig. 650 series.

D. Sanitary and Vent Piping:
1. Cast Iron: PHD Fig. 450, adjustable clevis, carbon steel yoke, U-strap, bolt, and hex nuts.
2. Plastic: PHD Fig. 440, lightweight, adjustable clevis, carbon steel yoke, U-strap and bolt.

E. Vertical Piping:
1. Cast Iron, Plastic, or Steel Piping:
   a. 1/2 Inch to 10 Inches: Friction clamp with two point bearing, PHD Fig. 550 series at each floor level.
   b. 12 Inches to 14 Inches: Friction clamp with two point bearing, PHD Fig. 550 series at each floor level and Fig. 855 wall bracket at mid span of the floor height.
   c. 16 inches and above are to be support at base of riser by pipe stanchions from the floor below the riser or stack. Structural reinforcement of building structure is required at stanchion attachment point.
2. Copper Piping: Copper-plated friction clamp with two point bearing for sizes up to 6 inches, PHD Fig. 552.

F. Acid Waste and Vent Piping:
1. Glass Pipe: PHD Fig. 153, coated adjustable swivel ring, plastic coated steel band, adjustable nut.

2. Duriron Pipe over 2 Inches: PHD Fig. 505, adjustable swivel ring, malleable iron, split ring, self-locking. Provide PHD Fig. 450 for piping 2 inches and smaller. Piping larger than 14 inches shall be supported at base of riser by pipe stanchions from the floor below the riser or stack. Structural reinforcement of building structure is required at stanchion attachment point.
3. Plastic: PHD Fig. 440, light weight, adjustable clevis, carbon steel yoke, U-strap and bolt.

2.02 SPRING HANGERS

A. Refer to Section 20 05 80, "Vibration Isolators."

2.03 TRAPEZE HANGERS

A. Pre-engineered strut or angle iron of sufficient length to support pipes and insulation on individual hangers, roller supports, or saddles with insulation protectors as specified for hangers above; trapeze hanger rod diameter and quantity as required to support total piping load. Loading on any attachment point to the structure shall not exceed 1,000 lbs. Trapeze hangers are to be spaced to not exceed this maximum structural load.

2.04 SUPPORTS

A. Hanger for Individual Pipes:

Pipe Size	Max Pipe Support Spacing Copper Tube or Plastic Pipe	Max Pipe Support Spacing Steel Pipe	Structural Attachment Based on PHD Manufacturer	PHD Hanger Figure	Rod Size based on Hanger (Larger rods may be used)
Inches	Feet	Feet			Inch
3/4 or smaller	5 - copper 3 - plastic	6	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	151 or 450	3/8
1	6 - copper 3 - plastic	7	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	151 or 450	3/8
1 1/4	6 - copper 4 - plastic	9	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	151 or 450	3/8
1 1/2	8 - copper 4 - plastic	9	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	151 or 450	3/8
2	8 - copper 4 - plastic	10	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	151 or 450 or 470 or 475	3/8
2 1/2	9 - copper 4 - plastic	10	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	151 or 450 or 470 or 475	1/2
3	10 - copper 4 - plastic	10	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	151 or 450 or 470 or 475	1/2

Pipe Size	Max Pipe Support Spacing Copper Tube or Plastic Pipe	Max Pipe Support Spacing Steel Pipe	Structural Attachment Based on PHD Manufacturer	PHD Hanger Figure	Rod Size based on Hanger (Larger rods may be used)
Inches	Feet	Feet			Inch
4	10 - copper 4 - plastic	10	Concrete attachment plate Fig 903 Beam clamp fig 350 w/Fig 359 or Fig 360 w/Fig 359	151 or 450 or 470 or 475 or 505	5/8
5	10 - copper 4 - plastic	10	Concrete attachment plate Fig 903 Beam clamp fig 350 w/Fig 359 or Fig 360 w/Fig 359	151 or 450 or 470 or 475 or 505	5/8 or 3/4
6	10 - copper 4 - plastic	10	Concrete attachment plate Fig 903 Beam clamp fig 350 w/Fig 359 or Fig 360 w/Fig 359	151 or 450 or 470 or 475 or 505	5/8 or 3/4
8	10 - copper 4 - plastic	10	Concrete attachment plate Fig 903 Beam welded attachment Fig 900	151 or 450 or 470 or 475 or 505	7/8
10	10 - copper 4 - plastic	10	Concrete attachment plate Fig 903 Beam welded attachment Fig 900	450 or 470 or 475	7/8
12	10 - copper 4 - plastic	10	Concrete attachment plate Fig 903 Beam welded attachment Fig 900	450 or 470 or 475	7/8
14	4 - plastic	9	Concrete attachment plate Fig 903 Beam welded attachment Fig 900	450 or 470 or 475	1
16	4 - plastic	7	Concrete attachment plate Fig 903 Beam welded attachment Fig 900	450 or 470 or 475	1
18	4 - plastic	6	Concrete attachment plate Fig 903 Beam welded attachment Fig 900	450 or 470 or 475	1 or 1 1/8
20	4 - plastic	6	Concrete attachment plate Fig 903 Beam welded attachment Fig 900	450 or 470 or 475	1 1/4
24	Not Allowed	4	Concrete attachment plate Fig 903 Beam welded attachment Fig 900	450 or 470 or 475	1 1/4 or 1 1/2
30	Not Allowed	8	Concrete attachment plate Fig 903 Beam welded attachment Fig 900	450 or 480	1 1/4 or 1 1/2
36	Not Allowed	8	Concrete attachment plate Fig 903 Beam welded attachment Fig 900	450	1 1/2

For fire sprinkler systems, conform to latest NFPA standards required by OBC.

B. Beam Clamps:
   1. "C" Clamps: PHD Figs. 270 w/259, 350 w/359, 360 w/359, malleable iron body, steel pointed set screw with lock nut and a minimum of 11 gauge steel retainer strap. Beam clamps by themselves (C-clamps) are expressly prohibited. Provide retainer straps with all beam (C-Clamps). Consult with MSS SP-58 and SP-69 for C-Clamp identification.
   2. PHD Fig. 930 steel washer plate, double nutted with threaded rod.

C. Wall Brackets: PHD Fig. 850 (lightweight 750 lbs. load) or Fig. 855 (medium weight 1,500 lb. load), carbon steel, back plates and bolts. Wall brackets for horizontal piping runs are limited to 10 inch pipe size and smaller.

D. Hanger Rod on Wood Beams or Trusses: PHD Fig. 50 unwelded eye rods or PHD Fig. 55 welded eye rods with washer and lag bolt. Install lag bolt through entire beam or truss when load exceeds manufacturer's recommended load for lag bolt application. Piping loads on wood structures shall be limited to 600 lbs. Pipes 6 inches and larger in size and main racked utilities shall be supported on pipe stanchions from the floor below.

E. Pipe Supports on Roof: Support piping on roof with an engineered prefabricated system designed for installation without roof penetrations, flashing, or damage to the roofing material. The system shall consist of bases, made of high-density polypropylene plastics with UV Protection, a hot-dipped galvanized structural steel frame and suitable pipe hangers for the application. Nuts, threaded rods, and washers shall be hot-dipped galvanized, spring nuts and bolts for spring nuts will be electro-plated. System shall be custom designed to fit piping and conduit to be installed and the actual conditions of service.
   1. Bases: Injection molded high density/high impact polypropylene with UV-inhibitors and anti-oxidants, conforming to the following:
      a. Sized as required by loading conditions and as indicated on the Drawings, shop fabricated with inserts for square tubing or threaded rods as required.
      b. Chemical, insect, and moisture resistant.
      c. Flammability: No ignition after 10 minutes, 25 kW/m, when tested in accordance with ASTM D 1929.
      d. Bases for Mechanical Attachment: Sealant chamber around penetration point, with injection port for sealing after fastening; beveled lip for sealant bead around entire diameter.
   2. Steel Framing:
      a. Strut Types: 1 5/8 inch or 1 7/8 inch as required for loading conditions.
      b. Thickness: 12 gauge.
      c. Form: Roll-formed 3-sided or tubular shape, perforated with holes on three sides.
      d. Finish: Hot dip galvanize in accordance with ASTM A 123 after fabrication, free of roughness, whiskers, unsightly spangles, icicles, runs, barbs, sags, droplets, and other surface blemishes.
      e. Do not use tubing or tube steel.
   3. Pipe supports and hangers shall conform to MSS SP-58 and MSS SP-69 and as follows:
      a. Fabricate of carbon steel where framing is carbon steel; fabricate of stainless steel where framing is stainless steel; finished same as framing.
      b. Sizes 2 1/2 Inches and Smaller: Single roller supports for piping subject to expansion and contraction; 3-sided channels and pipe clamps.

c. Sizes 3 Inches and Larger: Rollers, clevis hangers, or band hangers, to allow for expansion and contraction without movement of the bases or framing and designed to reduce or eliminate the friction that would otherwise occur between the pipe and the roof membrane.

4. Warranty: 5 year limited warranty to repair or replace any products found to be structurally defective in material or workmanship.
5. Portable Pipe Hangers: PHP Systems and Design, or approved equal by MIRO.

F. Attachment to Concrete Structures: PHD, Fig. 903 concrete rod attachment plate.

G. Welded Beam Attachment: PHD, Fig. 900 concrete rod attachment plate.

2.05 INSERTS

A. In Concrete: PHD, Fig. 950 type insert, low carbon steel, for up to 600 lb. load.

B. In precast or already poured concrete: Hilti "Kwik Bolt TZ" concrete fasteners, or approved equal by ITW/Redhead. "Drop-in" type fasteners are not acceptable without written evidence of third-party testing indicating there is no measurable loss of an insert's tensile capacity when concrete cracking occurs where the insert is installed.

C. In hollow core concrete panels: Hilti “KWIK HUS-EZ” screw type anchor. Fastener shall be located only within the admissible zone location in accordance with the panel manufacturer’s recommendations.

2.06 FINISH

A. Unless otherwise noted, all hangers and supports to be standard black, except that hangers and supports for exposed exterior applications and applications subject to high humidity shall be hot-dipped galvanized.

PART 3 EXECUTION

3.01 PIPING INSTALLATION

A. Install necessary pipe hangers and supports to properly support all piping and to maintain piping uniformly level or vertical (3/4 inch maximum deflection). Hangers to be double-nutted.

B. Maximum spacing of piping supports shall be per Hanger Table included in this Specification. Provide additional hangers as follows:
1. On both sides of steel or brass, or cast metal valves for pipe sizes 6 inches and larger.
2. Horizontal DWV Plastic Piping: At branch connections and at each change of direction.
3. Vertical DWV Piping: At branch connections, at each change of direction, at each floor, and mid-story, for no more than a 10 foot vertical spacing. Provide additional supports as necessary to maintain piping alignment at the base.
4. Cast Iron Piping: Horizontal at intervals not in excess of the standard lengths of pipe used; vertical 15 foot maximum intervals, at base, and at each floor.

5. At each drop at a pump boiler, chiller or other major equipment item.
6. Fire Protection Piping: Locate and space per NFPA requirements.

3.02 DUCTWORK HANGER INSTALLATION

A. Install necessary hanger rods and angle iron support brackets to properly support ductwork, insulation, reinforcing, and external loads. Friction clamps are excluded as upper attachment devices.

B. Maximum spacing of supports to be as follows:

Rectangular Ducts

1/2 x Duct Perimeter (Inches)	Rod Diameter (Inches)	Spacing (Feet)
Less than 72	3/8	10
72 to 120	3/8	8
120 to 192	1/2	5

Round Ducts

Duct Diameter (Inches)	Rod Diameter (Inches)	Spacing (Feet)
Through 24	1/4	12
25 through 36	3/8	12
37 through 50	1/2	12

1. Use a pair of rods, one (1) on each side of ductwork. Rods to be uncoated, hot-rolled steel.
2. OPTION: 1 inch wide sheet metal straps may be used on sizes up to 22 inches wide (or 22 inches in diameter), one (1) sheet metal gauge (minimum) thicker than ductwork being supported.

C. Flexible cable hanger system (Gripple Standard Hanger type) may be used looped on solid round duct and with Duct Trapeze Hanger connection on rectangular duct in lieu of using hanging rods. Installation shall comply with manufacturer recommendations for weight and spacing. Maximum spacing of supports to be as follows:

Single Wall Rectangular Ducts

1/2 x Duct Perimeter (Inches)	Gripple Hanger # (qty.)	Maximum Spacing (Feet)
Less than 36	#2 (2)	10
36 through 72	#2 (2)	8

Double Wall Rectangular Ducts

1/2 x Duct Perimeter (Inches)	Gripple Hanger # (qty.)	Maximum Spacing (Feet)
Less than 36	#3 (2)	10
36 through 60	#3 (2)	8

Single Wall Round Ducts

Duct Diameter (Inches)	Gripple Hanger # (qty.)	Maximum Spacing (Feet)
Through 16	#2 (1)	12
17 through 36	#3 (1)	12

Double Wall Round Ducts

Duct Diameter (Inches)	Gripple Hanger # (qty.)	Maximum Spacing (Feet)
Through 12	#2 (1)	12
13 through 20	#3 (1)	12
21 through 36	#4 (1)	12

3.03 GENERAL INSTALLATION

A. Mechanical ducts and piping shall be supported directly to the building structure. The mechanical systems shall not utilize the ceiling grid system, nor shall the ceiling grid use the mechanical hanger system for support. Likewise, electrical devices such as lights, cameras, and the like shall be supported directly to building structure and shall not use the mechanical hanger system for support. The Contractor shall install hangers and supports located where they do not interfere with access to fire dampers, valves, and other mechanical equipment items.

B. Where necessary, the Contractor shall furnish and install proper angles or channels for hanger supports between joists. Weld to steel structural members.

C. Do not support hangers from roof deck.

D. Use inserts to avoid cutting concrete or masonry. To avoid burning metal deck, use top flange beam clips.

E. Vertical storm and waste stacks to rest firmly on masonry footings and be firmly supported at each floor.

F. The following hanger methods are not permitted:
1. Wood, lead, or plastic plugs
2. Perforated band iron
3. Hook chain supports
4. Baling wire, etc.
5. Powder-actuated anchors

G. Whenever possible, use supports, clamps, hangers, etc., designed especially for the equipment to be installed.

H. Where necessary, furnish and install proper angles or channels or support steel to reinforce the building structure or to spread out the load on the building structure. Weld to steel structural members or attach to concrete structures using inserts or concrete fasteners.

3.04 COORDINATION

A. Coordinate drilling, welding, etc., and method of attachment to columns, joists, beams, girts, etc., with Structural Engineer and other Contractors as appropriate before proceeding.

END OF SECTION

Hangers for Individual Pipes (Not SEISMIC)

Pipe Size	Pipe Material	Weight of Pipe per Foot	Weight of Water in Pipe per Foot	Total Weight per Foot	Pipe Support Spacing Copper and plastic Pipe	Pipe Support Spacing Steel Pipe	Weight on Each Support (Max 1500 lbs)	Structural Attachment Based on PHD Manufacturing.	Load Capacity of Attachment	Hanger PHD Fig Number	Rod Size based on Hanger (Larger rods may be used)	Load Capacity of Hanger and Rod
inches		lbs/LF	lbs/LF	lbs/LF	ft	ft	lbs		lbs		inch	lbs
3/4 or smaller	Sch 40 Steel	1.13	0.232	1.362	5	7	9.53	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	400	151 or 450	3/8	300
1	Sch 40 Steel	1.68	0.375	2.055	6	7	14.39	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	400	151 or 450	3/8	300
1-1/4	Sch 40 Steel	2.27	0.649	2.919	7	9	26.27	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	400	151 or 450	3/8	300
1-1/2	Sch 40 Steel	2.72	0.882	3.602	8	9	32.42	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	400	151 or 450	3/8	300
2	Sch 40 Steel	3.65	1.454	5.104	8	10	51.04	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	400	151 or 450 or 470 or 475	3/8	150
2-1/2	Sch 40 Steel	5.79	2.073	7.863	9	11	86.49	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	400	151 or 450 or 470 or 475	1/2	225
3	Sch 40 Steel	7.58	3.201	10.781	10	12	129.37	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	400	151 or 450 or 470 or475 or 505	1/2	310
3-1/2	Sch 40 Steel	9.11	4.287	13.397	12	12	160.76	Concrete insert Fig 951 or 950 Beam Clamp Fig 270 w/Fig 259	400	151 or 450 or 470 or 475 or 505	1/2	390
4	Sch 40 Steel	10.79	5.516	16.306	12	12	195.67	Concrete Attachment plate Fig 903 Beam Clamp Fig 350 w/Fig359 or Ffig 360 w/Fig 359	600	151 or 450 or 470 or 475 or 505	5/8	475
5	Sch 40 Steel	14.62	8.674	23.294	12	12	279.53	Concrete Attachment plate Fig 903 Beam Clamp Fig 350 w/Fig359 or Ffig 360 w/Fig 359	800	151 or 450 or 470 or 475 or 505	5/8 or 3/4	685
6	Sch 40 Steel	18.97	12.520	31.490	12	12	377.88	Concrete Attachment plate Fig 903 Beam Clamp Fig 350 w/Fig359 or Ffig 360 w/Fig 359	2710	151 or 450 or 470 or 475 or 505	5/8 or 3/4	780
8	Sch 40 Steel	28.55	21.680	50.230	12	12	602.76	Concrete Attachment plate Fig 903 Beam Welded Attachment Fig 900	3770	151 or 450 or 470 or 475 or 505	7/8	780
10	Sch 40 Steel	40.48	34.160	74.640	12	12	895.68	Concrete Attachment plate Fig 903 Beam Welded Attachment Fig 900	3770	450 or 470 or 475	7/8	965
12	Sch 40 Steel	53.52	48.500	102.02	12	10	1020.20	Concrete Attachment plate Fig 903 Beam Welded Attachment Fig 900	3770	450 or 470 or 475	7/8	1200

Hangers for Individual Pipes (Not SEISMIC)

Pipe Size	Pipe Material	Weight of Pipe per Foot	Weight of Water in Pipe per Foot	Total Weight per Foot	Pipe Support Spacing Copper and plastic Pipe	Pipe Support Spacing Steel Pipe	Weight on Each Support (Max 1500 lbs)	Structural Attachment Based on PHD Manufacturing.	Load Capacity of Attach -ment	Hanger PHD Fig Number	Rod Size based on Hanger (Larger rods may be used)	Load Capacity of Hanger and Rod
inches		lbs/LF	lbs/LF	lbs/LF	ft	ft	lbs		lbs		inch	lbs
14	Sch 40 Steel	63.44	58.640	122.08	12	9	1098.72	Concrete Attachment plate Fig 903 Beam Welded Attachment Fig 900	4960	450 or 470 or 475	1	1200
16	Sch 40 Steel	82.77	76.580	159.36	12	7	1115.45	Concrete Attachment plate Fig 903 Beam Welded Attachment Fig 900	4960	450 or 470 or 475	1	1200
18	Sch 40 Steel	104.67	96.930	102.6	8	6	1209.60	Concrete Attachment plate Fig 903 Beam Welded Attachment Fig 900	6230	450 or 470 or 475	1 or 1-1/8	1400
20	Sch 40 Steel	123.11	120.46	243.57	8	6	1461.42	Concrete Attachment plate Fig 903 Beam Welded Attachment Fig 900	8000	450 or 470 or 475	1-1/4	1600
24	Sch 40 Steel	171.29	174.23	345.52		4	1382.08	Concrete Attachment plate Fig 903 Beam Welded Attachment Fig 900	8000	450 or 470 or 475	1-1/4 or 1-1/2	1600
30	Sch 30 Steel	196.08	281.4	477.48		8	3819.84	Concrete Attachment plate Fig 903 Beam Welded Attachment Fig 900	8000	450 or 480	1-1/4 or 1-1/2	6000
36	Sch 40 Steel	282.35	405.24	687.59		8	5500.72	Concrete Attachment plate Fig 903 Beam Welded Attachment Fig 900	11630	450	1-1/2	9500

SECTION 20 05 65
EQUIPMENT, PIPING, AND DUCTWORK IDENTIFICATION

PART 1 GENERAL

1.01 DESCRIPTION

A. Identify by labels and tags the following items:
   1. Equipment such as water heaters, pumps, fire pumps, expansion tanks, air handlers, pumps, chillers, boilers, condensers, heat exchangers, control cabinets, and similar items.
   2. Piping and ductwork exposed in equipment rooms and accessible service areas.
   3. Piping and ductwork above accessible ceiling construction and near access panels in non-accessible ceiling construction.
   4. Piping in crawl spaces.
   5. Fire, smoke, and combination dampers shall be labeled with the following convention:
      a. Fire Dampers: FD-building abbreviation-floor-number
      b. Smoke Dampers: SD-building abbreviation-floor-number
      c. Combination Dampers: FSD-building abbreviation-floor-number
         1) A color-coded dot shall be placed on the ceiling tile grid at the location of the access panel for all dampers.

B. Install laminated plastic nameplates for equipment, and install color banding, flow arrows, and contents identification for piping.

1.02 COORDINATION

A. Coordinate with other Contractors to ensure that the identification used by all Trades is uniform in type, style, and appearance.

B. Coordinate all identification systems with any already existing.

1.03 MANUFACTURERS

A. Brady, Seton, Kolbi, Graphic Products, CALPICO, EMED, MSI, or Brimar.

PART 2 PRODUCTS

2.01 EQUIPMENT IDENTIFICATION

A. Engraved laminated plastic, white over black, sized for 3/4 inch high letters or numbers, Gothic style.

B. Refer to specification 22 61 13 “Medical Gas Piping System” for medical gas and vacuum system equipment labeling requirements.

2.02 PIPING AND DUCTWORK IDENTIFICATION

A. Provide vinyl adhesive labels or vinyl wrap-around markers. Match label background color to 2 inch color band.

B. Refer to specification 22 61 13 “Medical Gas Piping System” for medical gas and vacuum system piping labeling requirements.

C. Size to be as follows:

Outside Diameter of Pipe or Covering	Minimum Letter Height
3/4" to 1-1/4"	1/2"
1-3/8" to 2"	3/4"
2-1/8" to 7-7/8"	1-1/4"
8" to 10"	2-1/2"
Over 10"	3-1/2"

2.03 COLOR BANDS

A. Provide 2 inch wide (minimum) painted gloss enamel or vinyl tape color band on each pipe, completely wrapping the pipe circumference. See the “Identification Schedule" for band color.

2.04 FLOW ARROWS

A. Provide color-coded adhesive vinyl flow arrow on each pipe, secure flow arrows to pipe at each end of flow arrow with a color band, completely wrapping the pipe circumference. Match flow arrow color with color band.

B. Size to be as follows:

Outside Diameter of Pipe or Covering	Minimum Flow Arrow Size
3/4" to 1-1/4"	1-1/8" by 4"
1-3/8" to 2"	1-1/2" by 4"
2-1/8" to 7-7/8"	2-1/4" by 6"
8" and over	4" by 7"

C. In lieu of separate flow arrows, flow arrows may be incorporated into color bands. See "Identification Schedule" for band color, and match flow arrow color lettering color.

2.05 IDENTIFICATION SCHEDULE

A. Identify as follows:

Type of Service	2 Inch Color Band and Label Color	Lettering Color	Designation
FIRE PROTECTION			
Sprinkler	Red	White	SPR
Drain	Red	White	D
Dry pipe	Red	White	DP
PLUMBING			
Domestic cold water	Green	White	DCW
Domestic hot water (systems less than 140°F)	Yellow	Black	DHW
Domestic hot water return (systems less than 140°F)	Yellow	Black	DHWR
Domestic hot water (140°F systems)	Yellow	Black	DHW-140
Domestic hot water return (140°F systems)	Yellow	Black	DHWR-140
Domestic hot water (180°F systems)	Yellow	Black	DHW-180
Domestic hot water return (180°F systems)	Yellow	Black	DHWR-180
Natural gas	Yellow	Black	GAS
Tempered water	Yellow	Black	TW
Vacuum (non-medical)	Yellow	Black	VAC
Oxygen (non-medical)	Blue	White	OX
Storm	Green	White	STM
Emergency storm	Green	White	E-STM
Sanitary	Yellow	Black	SAN
Vent	Yellow	Black	V
Distilled water	Green	White	DW
Deionized water	Green	White	DE
Reverse osmosis water	Green	White	ROW
Acid waste	Yellow	Black	AW
Acid vent	Yellow	Black	AV
Fuel oil supply	Yellow	Black	FOS
Fuel oil return	Yellow	Black	FOR
Fuel oil vent	Yellow	Black	FOV
Propane gas	Yellow	Black	P
Compressed air	Blue	White	CA
Laboratory air (in medical facilities)	Yellow/white checker	Black	LAB AIR
Non-medical air (in medical facilities)	Yellow/white stripe	Black	CA

Type of Service	2 Inch Color Band and Label Color	Lettering Color	Designation
Lab vacuum (in medical facilities)	Black/white check	Black	LAB VAC
Grease	Yellow	Black	GRS
Automatic transmission fluid	Yellow	Black	ATF
Antifreeze	Yellow	Black	GLY
Gasoline	Yellow	Black	GASO
Acetylene	Yellow	Black	ACE
Argon	Yellow	Brown	ARG
Nitrogen	Blue	White	NITROGEN
Well water supply	Green	White	WWS
Well water discharge	Green	White	WWD
Helium	Brown	White	HE
Gear oil	Yellow	Black	GO
Motor oil	Yellow	Black	MO
Waste oil	Yellow	Black	WO
Chassis grease	Yellow	Black	CG
HVAC			
Heating water supply	Yellow	Black	HWS
Heating water return	Yellow	Black	HWR
Air conditioner condensate	Green	White	COND
Condenser water supply	Green	White	CS
Condenser water return	Green	White	CR
High pressure steam (xxx-psig systems)	Yellow	Black	HPS-xxx
Low pressure steam (systems 15 psig or less)	Yellow	Black	LPS
High pressure steam return (xxx-psig systems)	Yellow	Black	HPR-xxx
Low pressure steam return (systems 15 psig or less)	Yellow	Black	LPR
Condensate pump discharge	Yellow	Black	CPD
Refrigerant hot gas	Yellow	Black	HG
Refrigerant liquid	Yellow	Black	L
Refrigerant suction	Yellow	Black	S
Chilled water supply	Green	White	CWS
Chilled water return	Green	White	CWR
Heat pump condenser supply	Green	White	HPCS
Heat pump condenser return	Green	White	HPCR
HVAC DUCTWORK			
Supply air	Blue	White	Supply
Return air	Blue	White	Return
Exhaust air	Yellow	Black	Exhaust
Relief air	Blue	White	Relief
Outside air	Blue	White	Outside Air

Type of Service	2 Inch Color Band and Label Color	Lettering Color	Designation
Laboratory exhaust	Yellow	Black	Lab Exhaust

PART 3 EXECUTION

3.01 INSTALLATION

A. Attach equipment tags with screws. Exception where screws might damage equipment or ductwork, use compatible adhesive instead of screws.

B. Apply piping and ductwork identification only after finish painting is completed.

C. Provide service designations, flow arrow, and color banding at intervals of 15 feet (maximum).

D. Also identify piping at connections to equipment, at entrances to spaces, at valves, near access doors to pipe spaces, at branches from main, at each riser, and at both sides of the wall or barrier through which the piping passes.

E. Clean piping, duct, or insulation in area of labeling just before labeling of pipe, duct, or insulation.

F. Ensure that labels are readable from a normal standing position.

END OF SECTION

SECTION 20 05 70
DEMOLITION

PART 1 GENERAL

1.01 DESCRIPTION

A. Carefully inspect the entire project and verify with the Architect all items designated to be removed or to remain. Refer also to Division 1 for additional requirements.

B. Perform demolition work of all Plumbing, Fire Protection, and HVAC items as shown or described on the Drawings. Remove from the site all items designated as scrap.

C. Locate all existing utilities requiring removal and determine all requirements for disconnecting and capping.

D. Locate all existing active utilities designated to remain and determine the requirements for their protection.

E. Take care not to damage adjacent construction designated to remain.

F. Unless otherwise noted, carefully remove existing ceiling tiles and supporting structure as required to install or remove existing material and replace after work is completed. Any damaged ceiling tiles and supporting tiles shall be replaced by each Contractor at no additional cost to the Owner.

G. All demolished Plumbing, Fire Protection, and HVAC items in good condition are to remain the property of the Owner. Verify with the Owner's representative which demolished items are considered scrap and are to be removed from site.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.01 PREPARATION

A. Notify the Architect at least two (2) full working days prior to commencing work in a particular area.

B. Coordinate and schedule all work in a careful manner with all necessary consideration for the Owner, neighbors, and the public. Avoid interference with the use of, and passage to and from, adjacent areas and facilities designated to remain in use during demolition. Coordinate work with the other Contractors and Owner.

C. Before starting site operations, disconnect or arrange for the disconnection of all utilities or equipment designated to be removed. Perform all such work in accordance with the requirements of the utility company and the Owner.

D. Maintain in operating condition all active utilities designated to remain.

3.02 DEMOLITION

A. Demolish and remove equipment foundations and supports, piping, ductwork, abandoned utility lines, and all other existing items designated for removal as indicated on the Drawings and in these Specifications.

B. Do not use equipment or methods that will cause damage to adjacent construction designated to remain.

C. Plug or cap piping that Drawings or Specifications indicate will remain.

D. Plug or cap wall and floor sleeves not being reused. Refer to Section 20 05 35, "Sleeves, Seals, and Firestops."

E. Cap removed branch ducts close to mains with 24 gauge galvanized sheet metal.

3.03 RELOCATION

A. Remove and store until the construction is ready for their installation, all items designated to be relocated.

B. Clean all Plumbing, Fire Protection, and HVAC fixtures and equipment designated to be relocated after relocation is complete.

3.04 SALVAGE AND SCRAP

A. Maintain salvaged materials in good condition. Salvaged materials shall remain the property of the Owner. Salvaged materials not acceptable to the Owner shall be considered scrap and removed by the Contractor from the job site.

B. Tag and identify salvaged materials.

C. Coordinate with Owner's representative all Plumbing, Fire Protection, and HVAC items to be salvaged and stored on site as directed. Storage of salvaged items will be permitted only at specified areas. Provide weather covering of stockpiled salvage materials. The Owner shall remove salvaged and stored items from the site.

D. Remove all scrap items from the building and arrange for disposal in accordance with State and local regulations.

3.05 EXISTING EQUIPMENT TO REMAIN

A. Clean all Plumbing, Fire Protection, and HVAC fixtures and equipment designated to remain in the areas of construction.

3.06 HAZARDOUS MATERIALS

A. Contractors are cautioned to check premises for existence of hazardous materials such as paint with lead and asbestos in the form of pipe insulation or plaster. If materials that may present a health hazard to workers, occupants, or the public are encountered during the work, the Contractor shall do the following:
   1. Take immediate action to limit the exposure or hazardous condition.
   2. Cease work in the area until suspected hazardous material can be identified. Laboratory testing, if required, will be paid for by the Owner.
   3. Follow procedures and requirements of the governing authority (including, but not limited to, EPA and OSHA) regarding monitoring, removal and disposal of the hazardous material. Provide special equipment as required.
   4. Costs relating to special work or procedures used or required for performance of the work required to monitor, remove and dispose of hazardous materials will be borne by the Owner.

END OF SECTION

SECTION 20 05 99
REQUIREMENTS FOR CONTRACT COMPLETION

PART 1 GENERAL

1.01 DESCRIPTION

A. Refer to Division 1 for additional requirements. Following is a partial list of items that must be submitted as required before Contract Completion.
   1. All Plumbing, Fire Protection, and HVAC Contractors:
      a. Receipt for Operating Instructions and Service Manual
      b. Certificate of Equipment Demonstration
      c. Valve tags and charts
      d. Receipt for keys
      e. Warranties
      f. All required test reports as specified in other Sections
      g. All As-Built Drawings per Specifications
   2. Plumbing Contractor only:
      a. Certificate of Plumbing Inspection
      b. Certificate of Sterilization
      c. Certification that the solder or brazing used for entire new domestic water piping system is lead-free.
      d. Certificate from local fire department, Ohio EPA, or both that fuel storage tanks and equipment installation is acceptable.
      e. Medical Gas Certifications
   3. Fire Protection Contractor only:
      a. Fire Marshal's certification of inspection and acceptance
      b. Certification from local fire department that pipe threads are suitable for their equipment.
   4. HVAC Contractor only:
      a. Certificate of Inspection
      b. Air and water balance reports
      c. Contractor's Certificate of Operation of fire and smoke dampers

B. In addition to the written submittals, the following material shall also be submitted prior to Contract Completion. Submit a signed copy of the Certificate of Materials Receipt. (ATTACHED TO THE END OF THIS SECTION)
   1. Loose or spare parts as specified in other Sections.
   2. Spare parts as specified in this Section.

PART 2 PRODUCTS

2.01 SPARE PARTS

A. Furnish one complete set of the following spare parts:
   1. Gaskets for each pump
   2. Pump packing/mechanical seal for each pump
   3. Gaskets for manholes and handholes

4. Glass for each water gauge
5. All air filters (does not include air filters used during construction)
6. Special keys, wrenches, and similar required or special tools

PART 3 EXECUTION

3.01 OPERATIONAL TEST

A. At completion, operate the systems at least five (5) days, not necessarily consecutive, to demonstrate fulfillment of the requirements of the Contract. During this time, make adjustments so that equipment will perform as the manufacturer intended and systems will function as designed. Complete balancing before operating test is started.

B. Operate each system in every mode of operation and check the position of valves, dampers, and other devices for proper closure and switching.

C. Following completion of the testing described previously, sign and submit the Certificate of System Completion. (ATTACHED TO THE END OF THIS SECTION)

3.02 PERSONNEL INSTRUCTION

A. After all system operational tests have been completed, schedule an instruction period with the Owner. Instruct the Owner-designated personnel in the operation and maintenance of all systems and equipment. Use manuals to familiarize the Owner-designated personnel with equipment and procedures. Allow time as necessary for this instruction. Schedule time convenient for the Owner and the Architect.

B. The instruction is to include the following:
1. Location of items of equipment and explanation of their use
2. Reference to service manual for record and clarity
3. Coordination of written and verbal instructions so that each is understood by personnel
4. Explanation of control system
5. Complete review of items in the manuals
6. Maintenance procedures to be followed by the Owner

C. At the completion of instruction, have all attendees sign the Certificate of System Completion. (ATTACHED TO THE END OF THIS SECTION)

END OF SECTION

CERTIFICATE OF MATERIAL RECEIPT

Project Name: _____

Date: _____

Contractor: _____

Contractor's Representative: _____

On the date listed previously, the following pieces of equipment, as required by the Project Specifications, were delivered to the Owner's representative:

Equipment	Quantity
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

(Attach a separate page for additional items)

Owner's Representative: _____ (PRINT)

_____ (SIGN)

CERTIFICATE OF SYSTEM COMPLETION

Project Name: _____

Contractor: _____

System: _____

Specification Section Number: _____

A. Manufacturer's Inspection and Approval (if required by specification section)

The previously identified system has been inspected and approved as meeting the manufacturer's written instructions for installation and operation.

Manufacturer's Representative: _____ Date: _____

B. Testing

The previously identified system has passed all testing required by the Project Specifications and has met the terms of the contract. Written test results are attached.

Contractor's Representative: _____ Date: _____

C. Equipment Demonstration

The previously identified system has been demonstrated to the following Owner's representatives:

Name	Title	Date	Signature
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

(ATTACH A SEPARATE PAGE FOR ADDITIONAL NAMES)

SECTION 22 42 01
PLUMBING FIXTURES

PART 1 GENERAL

1.01 DESCRIPTION

A. Provide new plumbing fixtures installed in place, complete with all supplies and waste trim as indicated on the Drawings.

B. Provide trim, fittings, chrome stops, chrome water supply piping and all accessories required for a complete installation.

C. Fixture connection sizes are shown on Drawings.

1.02 QUALITY ASSURANCE

A. Standards: American National Standards Institute (ANSI A112.19 and Z124), American Society of Sanitary Engineering (ASSE), National Sanitation Foundation (NSF), Plumbing and Drainage Institute (PDI), city and state plumbing and energy codes.

B. Unless otherwise noted, all fixtures of the same type shall be by the same manufacturer.

C. Exposed metal parts shall be chrome-plated unless otherwise noted. Fixtures and trim shall be free of defects. Provide white vitreous china or enamel fixtures, unless otherwise noted.

D. All faucets shall meet or exceed NSF 61, Section 9 drinking water standard and be so indicated on shop drawings or they will be rejected.

1.03 SUBMITTALS

A. Submit manufacturer's product data for all products specified in this section and shown on Drawings.

B. Shop Drawings: Each submittal shall be clearly marked with fixture designation number, model number, and indicate all required fittings, construction, color and rough-in requirements. Submit color charts when required.

C. The approved fixture's shop drawings shall be a part of the Owner's Manual.

1.04 DELIVERY, STORAGE AND HANDLING

A. Protection: Fixtures and trim shall remain crated and stored until installation to prevent moisture and dirt contamination and physical damage. Adequately protect installed fixtures from damage.

PART 2 PRODUCTS

2.01 PLUMBING FIXTURES AND ACCESSORIES

A. Refer to the Specifications and Drawings for specific catalog numbers and required fittings.

B. Fixture Manufacturers:
   1. Vitreous China Fixtures: American Standard, Sloan, Kohler, ToTo, or Zurn.

C. Fittings Manufacturers:
   1. Faucets: Chicago, Zurn, T&S Brass, Watersaver, American Standard, Symmons, Eljer, Speakman, Moen, or Kohler.
   2. Supplies and Stops: McGuire Mfg. Co., Central Brass, EBC, Dearborn, Bridgeport, Speedflex, T & S Brass, Chicago Faucet, Consolidated, Frost, Waterway, Sanitary Dash, Speedway, or Brass Craft.
   3. Fixture Traps: McGuire Mfg. Co., EBC, or Central Brass.

D. All trim and exposed piping to be chrome-plated unless noted otherwise.

E. All water rough-ins to fixtures shall be securely anchored within wall cavity or chase prior to being stubbed through wall.

F. Faucets to have ceramic disc cartridges or shall be supplied with renewable seats.

G. Supplies to lavatory shall be chrome plated brass flexible tube risers supplies with chrome plated brass solid (no plastic) handle / keyed stops. Use of braided stainless steel wrapped flexible supplies is prohibited.

H. Traps and tailpieces for lavatories shall be chrome plated cast brass with 17 ga. seamless tubular wall bends. Provide traps with cast brass slip nuts and metallic chrome plated shallow flange. Provide reducing washers as required.

2.02 COORDINATION

A. See Architectural Drawings for the exact location of plumbing fixtures.

B. Review approved millwork shop drawings from the General Trades Contractor. Coordinate location and size of countertop fixtures, casework and openings before ordering or proceeding with rough-in work.

C. Countertop lavatory and sink openings and cabinet base backs for drains and water supply stop valves shall be cut by the General Trades Contractor. Furnish templates and locate. Coordinate with General Trades Contractor and Architect.

D. Coordinate location and rough-in requirements with equipment requiring plumbing with General Trades Contractor, other Contractors, and Owner.

2.03 INSTALLATION

A. Install fixtures according to the manufacturer's written installation instruction.

B. Refer to Architectural Drawings for fixture mounting heights.

C. At new floor and wall-mounted plumbing fixtures, caulk between fixture, floor and wall with silicone caulking compatible with the wall paint. Refer to Division 7 of Specifications for specific requirements. Exception: Electric watercoolers - caulk top and side of basin only.

D. Install chrome plated brass escutcheons on waste and supply piping at walls, including piping in cabinets.

E. Install liquid-seal traps on all plumbing fixtures except as permitted by the plumbing code.

F. Install stops on all cold and hot water supplies to fixtures.

G. Thoroughly clean all fixtures of paper and dirt before final acceptance.

H. Provide all required seals, gaskets, nuts, bolts and washers.

I. Fixtures shall be carefully assembled and connected to the required plumbing inlets and outlets, and tested so fixtures will be functioning correctly when the Work is completed.

J. After the installation of the plumbing fixtures is completed, all connecting water pipes shall be flushed out through the fixtures to eliminate debris. Clean faucet and electric water cooler strainers and aerators. Refer to Specification Sections referring to Domestic Water Piping System, for sterilization of water lines.

K. Do not permit the use of installed plumbing fixtures by construction personnel without prior written consent by the Owner. Any of the installed fixtures or trim found damaged prior to final acceptance shall be removed and replaced by the Contractor at no additional cost to the Owner.

L. Adjust faucets with temperature limit stops for a maximum leaving temperature of 120 degrees F.

2.04 SPECIAL INSTALLATION INSTRUCTIONS

A. Insulate all water and drain piping that could come in contact with wheelchair occupants. Refer to Section 22 07 01, "Plumbing Insulation" and Drawings.

END OF SECTION

SECTION 23 05 01
HEATING, VENTILATING, AND AIR CONDITIONING

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish material, labor, tools, accessories, and equipment to complete test, adjust, start up, balance, and successfully run all HVAC systems of this Project as described in these Specifications and as shown on the Drawings.

B. Refer to Sections 20 00 00 through 20 99 99 (as included) for items of a general nature which apply to this portion of the Work. Sections 23 00 00 through 23 99 99 (as included) describe the HVAC work.

C. It is the intent that the HVAC Work be complete in every respect.

1.02 LICENSES

A. The installation of this HVAC work shall be made by a Contractor and craftsmen licensed by the Governing Authorities.

B. Obtain all permits and licenses required by Local Code Authorities having jurisdiction.

1.03 FEES

A. Unless otherwise noted, this Contractor shall pay for all permits, inspection fees, and other charges related to the installation and inspection of the HVAC work.

1.04 CODES, REGULATIONS, AND STANDARDS

A. Unless otherwise noted, the latest enforced Edition shall apply to this work.

1.05 HVAC ROUGH-INS

A. Provide service rough-ins and make final connections to equipment furnished by the Equipment Contractor or the Owner.

B. Provide piping, valves, ductwork, and specialties as required, and as specified under other Sections of these Specifications.

1.06 EQUIPMENT CONNECTIONS

A. Make final connections to equipment. Coordinate rough-in locations with other Contractors.

B. Refer to approved equipment drawings for exact rough-in sizes and locations.

END OF SECTION

SECTION 23 51 16
VENT PIPING, BREECHING, AND STACK

PART 1 GENERAL

1.01 DESCRIPTION

A. Provide venting system for products of combustion for the following low-heat appliances:
   1. Forced-Draft Gas-Fired
   2. Forced-Draft Gas/Oil-Fired

1.02 QUALITY ASSURANCE

A. Standards: Venting system shall be UL-listed.

1.03 SUBMITTALS

A. Submit vent and flue fabrication and layout shop drawings in accordance with Section 20 05 15, "Submittals." Coordinate size and location of flue with structure, piping, lighting, equipment, conduit, bus ducts, ceiling construction and clear height, and other items which may present a potential conflict.

B. Layout drawings shall be 1/4 inch equals 1 foot scale, minimum, with enlarged sections and elevations as necessary.

C. Submit draft calculations for the specific project conditions and coordinated route. Submit system products for approval, including fittings and terminations.

PART 2 PRODUCTS

2.01 SUPERFERRITIC STAINLESS STEEL VENT AND INTAKE PIPING AND STACK

A. The vent shall be of the single-wall factory-built type for use on condensing appliances or pressurized venting systems serving Category II, III, or IV appliances or as specified by the equipment manufacturer. System shall be listed to UL 1738 Standard.

B. Vent shall be listed for an internal static pressure of 6 inches w.g. and tested 15 inches w.g.

C. Vent shall be of double walled construction with an inner wall of super-ferritic stainless steel, 0.015 thickness for 6 inch to 12 inch diameters and -0.24 thickness for 14 inch to 24 inch diameters and an outer wall of 430 stainless steel. The air gap between the two walls shall be 1 inch.

D. All supports, roof or wall penetrations, terminations, appliance connectors, and drain fittings required to install the vent system shall be included.

E. Roof penetration pieces shall be UL listed and provided from the vent manufacturer.

F. All vent connections shall be secured by means of profiled connector bands with gear clamp tighteners. Joints shall be sealed with P077 sealant.

G. Vent and intake shall terminate in accordance with installation instructions and local codes.

H. Metalbestos, Metal-Fab, Van-Packer, Heat-Fab, or Ampco.

PART 3 EXECUTION

3.01 INSTALLATION

A. Comply with the manufacturer's recommendations, including the installation instructions supplied with the product, which are a part of the UL listing.

B. Complete flue system shall be installed in accordance with the building code, fire code and NFPA 54 and 211.

C. Seal positive pressure vents and B-vents with inner pipe joints with GE RTV-108 or Dow Corning RTV-732, RTV Silicone sealant. For stack temperature in excess of 600 degrees F, use Sauereisen No. 33 ceramic joint cement.

D. Coordinate all roof openings with General Trades Contractor, who will cut roof and weatherproof the finished installation.

E. Turn storm collar and flashing over to the General Trades Contractor for installation.

F. Extend flue top cap to a point at least 3 feet above the roof and at least 2 feet above any part of a building within 10 feet.

G. Provide ventilated roof thimble.

H. Provide a trap and drain piping to the nearest floor drain for all vent piping where there is a drainage fitting at the base of the stack. Comply with manufacturer recommendations for drain piping installation requirements.

END OF SECTION

SECTION 26 00 00
DIVISION 26 - ELECTRICAL INTRODUCTORY STATEMENT

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

A. The requirements of Instructions to Bidders, General Conditions, and Division 1 apply to all work herein.

B. In addition to conforming to the documents listed in Paragraph 1.01 A. above, the Work performed by the Division 26 Contractor shall conform to all provisions of Sections 26 00 00 through 26 99 99 as included in this Specification. The Division 26 Contractor is to consider the word "Contractor" when used in these Sections to mean himself/herself.

C. The Division 26 Contractor must read the Specifications of all divisions therein because they will be responsible for Work described in other Sections where reference is made to "Electrical Contractor."

D. All work included under this heading is subject to the Bidding Requirements, General Conditions and Division 1 General Requirements written for this entire Specification, whether attached to this Part or not, and the Contractor is notified to refer thereto as an integral part of the Work.

1.02 APPLICABLE SECTIONS

A. Contractor shall perform Work described in the preceding paragraphs, the General Conditions, Division 1 and in the following Sections (as included):

Electrical: Sections 26 00 00 through 26 99 99

B. Contractor is required to coordinate his/her work with that described in other Sections, and therefore, must familiarize themselves with the entire set of Specifications.

1.03 RESPONSIBILITY

A. The Engineer's efforts under this Contract are aimed at designing a project which will be safe after full completion. The Engineer has no expertise in, and takes no responsibility for, construction means and methods or job site safety during construction, which are exclusively the Contractor's responsibility. Processing and/or approving submittals made by the Contractor which may contain information related to construction methods or safety issues, or participation in meetings where such issues might be discussed must not be construed as voluntary assumption by the Engineer of any responsibility for safety procedures.

END OF SECTION

SECTION 26 00 05
DIVISION 26 GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish all materials, labor, tools and equipment to complete and leave ready for operation all electrical systems as called for in these Specifications or shown on the Drawings and any and all details essential to complete the work.

B. By submitting a bid, the Contractor certifies that:
1. He/she has visited the site and is satisfied that he/she understands all site conditions that may have an effect on his/her bid price.
2. He/she fully understands the makeup, construction, and operation of all systems and equipment he/she is bidding on, and that he/she has included in his/her price all materials, supplies, accessories, and services necessary to make these systems complete and operational.

1.02 REFERENCE

A. These General Requirements are in addition to the other requirements referenced in Section 26 00 00, "Introductory Division 26 Statement." They are not meant to replace them. In case of conflict, ask the Architect for interpretation.

B. The Contractor is responsible for becoming thoroughly familiar with all Drawings and Specifications prior to bidding so that all conditions of work are clear with regard to electrical requirements of equipment, mounting conditions, etc. Contractor shall study reflected ceiling plans, elevations, and details, etc.

C. The Division 26 Contractor is responsible for all electrical work shown, whether noted by his/her division or not, on all Drawings and Specifications in the entire construction documents package. In case of conflict, Contractor shall include greatest quantity of equipment, extent of work, and expense in his/her bid. If there is any question about scope, the bidder must bring his concerns to the attention of the Owner's representative during bidding.

1.03 STANDARDS OF QUALITY

A. Provide quality work conforming to the best accepted practices and standards of the trade. Further definition of quality is given by reference to various laws, codes, standards, and regulations. Refer also to the publications of NECA (National Electrical Contractors Association).

B. All laws and codes having jurisdiction over this project are deemed to be included in their entirety as a part of these Specifications. Also, any other laws, codes, standards, or regulations referenced herein are deemed to be included in their entirety.

C. If a conflict occurs between the Drawings and the Specifications, immediately call the conflict to the attention of the Architect at least ten (10) days before bids are submitted, so an addendum clarification may be issued. Conflicts not brought to the Architect's attention before bids are due, shall be priced by the Contractor to include the most expensive, highest quality and quantity of the conflicting items in question.

D. Material and equipment installed under this Contract shall be new, undeteriorated, and of a quality not less than the minimum specified. All equipment and conductors shall be certified, listed and labeled by UL. If UL does not certify an associated piece of equipment, then certification by another nationally recognized testing laboratory such as ETL shall be permissible. If equipment or conductors are of a type that no testing lab lists or labels, then a safety evaluation must be performed at the supplier's expense by the inspecting authority or another Federal, State or municipal agency.

E. The latest adopted editions of the following also apply to this work:
1. National Electrical Code, NEC
2. National Fire Protection Association Publications, NFPA
3. State Building Codes
4. City Codes
5. Americans with Disabilities Act (ADA)

1.04 CONTRACT DRAWINGS

A. Drawings are schematic and show approximate locations and the extent of work. Exact locations and extent must be coordinated with other Contractors and verified in the field. Coordination of the final fabrication drawings and final coordination of the installation in the field is the Contractor's responsibility. Contractor is to take the design to the next level of detail knowing exactly what equipment and materials he/she is going to provide and build the project based on that equipment and other approved shop drawings.

B. Significant deviations from Drawings must be approved by the Architect.

C. The Architect reserves the right to make minor changes in location which do not require additional labor or material up to the time of roughing-in without additional cost. No cost shall be added to the Contract for a minor change. The Architect shall determine what is "SIGNIFICANT" and what is a "MINOR" change.

1.05 DEFINITIONS

A. "Provide": To furnish and install.

B. "Concealed": Embedded in or installed behind walls and floors, within partitions, above suspended ceilings, or below grade.

C. "Exposed": Not installed underground or "concealed" as defined above.

D. "Contractor": Means the Division 26 Contractor.

E. "Furnish": To purchase and deliver products to the project site and make ready for installation.

F. "Install": To take furnished products, assemble, erect, secure, connect, and place into operation.

G. "Products": Includes materials, systems and equipment.

H. "Work": The providing of products for entire Contract.

1.06 PERMITS, FEES AND NOTICES

A. Unless otherwise excluded in the Contract Documents, secure and pay for all permits and governmental fees, licenses, and inspections necessary for the proper execution and completion of work.

B. Give notice and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority having jurisdiction on the performance of the work.

1.07 EXAMINATION OF SITE

A. Certain existing conditions may affect the manner or sequence of the performance of work. Review existing services and structures prior to bidding the work. Review operating schedules for existing systems and services. Coordinate the scheduling of the work with existing operations.

B. The Contractor is required to visit the site of the proposed project. After the Contract is signed, no allowance will be made for lack of knowledge of the project conditions.

C. Verify and reconcile work required by the Contract Documents with conditions at the site.

1.08 UTILITIES

A. Locate any existing utilities prior to construction. Advise the Architect immediately of major conflicts to permit modification of the Contract Documents.

B. Contractor shall record exact locations of all existing overhead and underground site utilities within the project limits on a site layout plan and submit to Architect for review prior to any excavation. Where existing utilities conflict with new work, proposed modifications shall also be marked and identified on the site layout plan.

C. Record locations of all concealed utilities on the Record Drawings.

D. Coordinate any utility service shutdowns or outages with the Architect and the Owner. Shutdowns shall conform to all utility company requirements. Avoid inconveniencing the Owner and provide temporary service during the curtailment, as required by the Architect or the Owner. Provide ten working days advance notice for any required utility outages.

E. At least ten (10) working days prior to construction in an area which may involve underground utility facilities, the Contractor shall notify the Project Engineer, the registered utility protection service and each underground utility company:
   1. Utilities Protection Service
      Phone 1-800-362-2764

1.09 ABBREVIATIONS

A. Abbreviations used in these specifications:

ADA	-	Americans with Disabilities Act
ANSI	-	American National Standards Institute
CBM	-	Certified Ballast Manufacturers
EIA	-	Electronic Industries Association
ETL	-	Electrical Testing Laboratories
FCC	-	Federal Communications Commission
ICEA	-	Insulated Cable Engineers Association
IEC	-	International Electro Technical Commission
IES	-	Illuminating Engineering Society
ITL	-	Independent Testing Laboratories
NEC	-	National Electrical Code
NECA	-	National Electrical Contractors Association
NEMA	-	National Electrical Manufacturers Association
NESC	-	National Electrical Safety Code
UL	-	Underwriters Laboratories

PART 2 PRODUCTS

2.01 DESIGN BASE MANUFACTURERS ("STANDARDS")

A. The Contract Documents are based on the requirements and layout of the equipment of the Design Base Manufacturer. Coordination of equipment with the building and with other trades has been made for these specific models and manufacturers of equipment. Where several manufacturers are listed, the first named is the Design Base Manufacturer, unless specifically noted otherwise. Products of the other listed manufacturers which are of comparable performance and quality to the Design Base Manufacturers may be submitted for review and approval per Section 26 00 15, "Submittals." Refer to 26 00 05, "Division 26 General Requirements," Paragraph 2.02, "Approved Equals" for products of manufacturers not listed.

B. Prepare new layouts for all non-Design Base Manufacturers equipment and adjust and coordinate these layouts with equipment dimensions or service requirements which may be different from those of the Design Base Manufacturer. Verify that this equipment will fit and function in the indicated application. Submit these layouts as part of the submittal review.

C. Whenever the Contractor furnishes equipment or material other than the Design Base Manufacturer specified, the Contractor is responsible for the cost and coordination of all modifications required not only for his/her work, but also for the work of all other Trades affected. Where changes to other Trades' work are required, this Contractor must include the additional costs of all such work in his/her bid and ultimately make arrangements with these other Trades for such changes and compensate them accordingly. Where changes to design are required, the Contractor shall submit such changes to the Architect for approval. The Contractor shall investigate potential conflicts such as the following:
   1. Physical dimensions and weights
   2. Code required working clearances
   3. Connecting pipe sizes
   4. Additional control and interlock wiring
   5. Lug size and quantity
   6. Increased wire size, fuse size, and motor control equipment size
   7. Increased ventilation requirements
   8. Battery capacity
   9. Sound levels of audible devices
   10. Increased withstand and interrupting ratings of downstream equipment due to differences in overcurrent protective device characteristics

2.02 APPROVED EQUALS (EQUIVALENT) PRODUCTS

A. Equal (equivalent) components (articles, devices, materials, forms of construction, fixtures, etc.) by manufacturers not listed but meeting the specifications may be submitted to the Architect for consideration and possible inclusion into the bidding documents. Submission must be received no later than ten (10) working days before bid date. If approved, such manufacturers will be listed in an addendum.

B. Submittals must include all of the following:
   1. Cover Letter: Company letterhead; addressed to Architect. Indicate the following:
      a. Project name, project number, and phase or bid package if applicable
      b. Specification Section by number and title
      c. Specified Product
      d. Proposed Product
      e. Deviations, if any, from Specified Product
      f. List of attachments
   2. Product Data: Manufacturer's literature, fully describing proposed product with exact item clearly indicated.
   3. Specifications: Manufacturer's specifications with all modifications noted as required to show compliance with Bidding Documents.
   4. Test Data: Where performance requirements are specified, submit laboratory tests to indicate compliance.

C. Failure to comply with and provide all of the above requirements will result in the submission not being reviewed.

2.03 QUANTITIES

A. Equipment may be referred to either in these Specifications or on the Drawings, as singular or plural; Contractor is responsible for verifying the exact number of items required to complete his/her work.

2.04 OWNER FURNISHED (CONTRACTOR INSTALLED) EQUIPMENT

A. Certain items of equipment may be furnished by the Owner to the Contractor. The Contractor shall take delivery of such items and unload them from the truck at the job site.

B. The Contractor shall protect and store such items as part of this Contract.

C. The Contractor shall install these items in conformance with the requirements of the Specifications and Drawings and the supplier's recommended installation instructions.

2.05 ACCESS DOORS

A. Install junction boxes, remote ballasts, etc. in locations where they will be accessible. Where not possible, Division 26 Contractor shall pay General Contractor to install access doors for electrical equipment. Coordinate all access door types and locations with the Architect.

2.06 RECORD (AS-BUILT) DRAWINGS

A. Contractor shall maintain at the job site, one (1) copy of Drawings which shall be used exclusively for recording the location of all installed work not extraneous information such as field notes. Neatly record all information with red pen.

B. Record deviations in locations of concealed conduit, equipment, lighting, outlets, manholes, etc., dimensioned from a fixed control point, including depth of bury, at each change of direction, at each change of slope and as required for further reference. Minor variations need not be recorded. Addendums, Change Orders, Field Work Orders, Supplemental Instructions and other pertinent changes of record shall be recorded. These changes shall be reviewed monthly for conformance.

C. Record deviations made necessary to incorporate equipment different from the Design Base equipment.

D. Record deviations as noted above.

E. At completion of the project, Contractor shall deliver "As-Built" Drawings and Coordination Drawings to the Architect for review and approval with regard to completeness. This submission shall consist of the job site "As-Built" Drawings in electronic format and as PDF files. Following approval, provide a full-plotted set as well as the electronic version and original.

F. Refer to Division 1 for additional requirements.

PART 3 EXECUTION

3.01 PAINTING AND RELATED WORK

A. Finish painting in areas of new construction is the responsibility of the General Trades Contractor and is specified in Division 9.

B. Any other painting, required by Sections in Division 26, is the responsibility of the respective Division 26 Contractor. It shall be done by a qualified tradesman skilled in the craft and shall meet the requirements of Division 9. Each Contractor is responsible for repainting of finished areas disturbed by his/her own cutting and patching.

C. Factory-finished equipment which has rusted or has been damaged shall be cleaned, spot primed with zinc chromate, and finished to the original quality and color by the Contractor.

D. Support steel shall be cleaned, rust removed, primed, and painted.

3.02 CUTTING AND PATCHING

A. Unless otherwise required in General or Special Conditions, Contractor shall perform all cutting and patching required for his/her own work. Work must be accomplished in a neat and workmanlike manner, acceptable to the Architect.

B. If necessary to cut into work of other Trades, it shall be done by other Trades at this Contractor's expense. Patching shall be similarly executed.

C. Cutting of structural support beams, joists, plates, or other structural members is strictly prohibited without the specific written consent of the Architect. Use rotary drills where cutting holes through concrete, brick, plaster, or tile is necessary. Obtain approval of the Architect before proceeding with work.

D. All cutting and patching shall be done promptly and all repairs shall be made as necessary to leave the entire work in good condition, including all cutting, fitting, and drilling of masonry, concrete, metal, wood, plaster, and other materials as specified or required for proper assembly, fabrication, installation, and completion of all work of the Contract.

E. Patching shall match adjacent materials and shall be accomplished only by tradesmen skilled in the respective craft required. Materials and equipment used in the patching work shall comply with requirements of those Sections of the Specifications relating to material to be used in new construction.

3.03 SCAFFOLDING, RIGGING, HOISTS AND TRANSPORTATION

A. The Contractor shall provide scaffolding, staging, cribbing, tackle, hoists, and rigging necessary for placing of his/her materials and equipment in their proper places in the project.

B. The Contractor shall pay costs for transportation of materials and equipment to the jobsite and shall include such costs in his/her proposal.

C. Scaffolding and hoisting equipment shall comply with requirements of applicable Federal, State, and Local Laws and Codes.

3.04 CLEANING

A. Upon completion of work, all material and equipment furnished in this Contract shall be thoroughly cleaned of labels, dirt, grease, rust, oil and other foreign matter. Prepare for finish painting, where painting is specified.

3.05 TESTS

A. The Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction may require portions of the work to be inspected, tested, or approved. These services shall be performed by approved agencies.

B. The Architect (and Owner's representative) must be notified of all scheduled tests and adjustments at least 72 hours before they are scheduled so that he/she may witness same. Obtain confirmation of attendance or absence for each test. If the Contractor performs any test or adjustment without the Architect present, or without proper notification, the Contractor may be required to perform the test or adjustment a second time. All test schedules are to be coordinated with the Owner to minimize inconvenience.

C. The Contractor shall bear all costs of such inspections, tests, or approvals.

D. Required certifications of inspection, testing, or approval shall be secured by the Contractor and included in the Record and Information Manuals. See Section 26 00 20, "Record and Information Manuals."

3.06 WARRANTY OF WORK

A. The Contractor shall warrant all work for a period of one (1) year from date of Contract Completion against defects in materials, equipment, and workmanship. All manufacturer warranties shall begin on date of Contract Completion also.

B. The Contractor will be required to make all repairs or changes which, in the opinion of the Owner, are necessary as the result of defective materials, equipment, or workmanship.

C. The Contractor shall, promptly upon receipt of notice from the Owner, and without expense to the Owner, replace all defective work with suitable materials and equipment.

D. Failure by the Contractor to promptly respond to warranty service calls can be sufficient reason for the Owner to have the defects corrected at the expense of the Contractor.

E. Refer to Division 1 for additional guarantee requirements.

F. Refer to other Specification Sections for extended warranty requirements.

3.07 TEMPORARY POWER

A. Provide temporary electrical power to be used for construction purposes by all Contractors in accordance with Division 1. Provide all fixtures, wiring, and equipment, and make all connections required for temporary electrical service during the construction period; coordinate all power and lighting requirements with the various trades. Provide power to contractor job trailers, and power and lighting on the construction site. Contractor to pay for energy consumption, and any utility company charges to establish service.

1. Temporary Service Panels: Provide a minimum of one (1) 100 Ampere rated service panel in a location or locations within 200 feet of all building work areas; include as many such panels as required to meet 200 foot maximum distance. Provide all wiring and raceways required for service connection and branch circuit wiring connecting each panel to the serving utility and to the following electrical loads; obtain all permits required.
2. Lighting: Provide minimum of 5 footcandles of illumination in all building work areas where construction work is being accomplished; increase illumination to 50 footcandles for painting, plastering and other interior fine finish work.
3. Outlets: Provide duplex receptacle outlets on 100 foot centers maximum; arrange and locate so that no work area of the building is more than 100 feet from a 120 volt outlet; allow no more than five (5) outlets on any 20 Ampere circuit.
4. Power Circuit Breaker: Provide one 100 Ampere, 208 volt, 3 phase or 240 volt, 1 phase circuit breaker in each panel for power equipment.

END OF SECTION

SECTION 26 00 10
COORDINATION BETWEEN TRADES

PART 1 GENERAL

1.01 DESCRIPTION

A. The Division 21, 22, 23, 26, 27 and 28 Contractors shall coordinate their rough-in, service, and control requirements with each other. Division 26 Contractor shall review all control Drawings to coordinate exact number and locations of temperature control panels as well as to provide proper starters (including necessary time delays, auxiliary contacts, etc.).

B. Division 26 Contractor shall coordinate all of his/her work with the General Trades Contractor for location of all devices, luminaires and equipment prior to rough-in.

C. All wiring required to power Division 21, 22, 23, 27 and 28 equipment shall be installed by the Division 26 Contractor, including 120 volt to temperature control panels. The Division 26 Contractor shall be responsible for all wiring from the fire alarm control panel.

D. If motors and/or equipment are furnished by other divisions, which require larger or smaller starters, safety switches, circuit breakers, fuses, and/or branch circuit conductors than indicated, the Contractor furnishing the motors or equipment shall reimburse the Division 26 Contractor for any cost differential of providing different sized equipment.

E. All electrical devices furnished as a part of Division 21, 22, 23, 27 and 28 equipment, and installation requirements of all electrical work done by Division 21, 22, 23, 27 and 28 Contractors shall conform to the applicable sections of Division 26.

F. Division 26 Contractor shall coordinate with other Contractors prior to installation of switchboards and panelboards to insure requirements of NEC Article 110 and 408 are met. The Contractor violating this requirement shall be responsible for the cost of all modifications required to comply to the satisfaction of the inspection agency for failure to meet the above code requirements.

G. Final operation of equipment provided under Division 21, 22, 23, 27 and 28 shall be the responsibility of the respective Division 21, 22 or 23 Contractor.

H. Division 26 Contractor shall coordinate in particular with Divisions 8, 10, 11, 12, 13, and 14 Contractors for specific requirements for door hardware, kitchen equipment, elevators, pool, theatrical equipment, window shades, etc.

I. Division 26 Contractor shall provide a safety switch for every mechanical piece of equipment that he/she is providing power for.

J. Division 26 Contractor is responsible for all electrical work shown on all documents within the bid set.

END OF SECTION

SECTION 26 00 15
SUBMITTALS

PART 1 GENERAL

1.01 DESCRIPTION

A. Refer to the GENERAL CONDITIONS and Division 1 for general requirements.

B. Materials and equipment installed in this work shall meet all the requirements of the Contract Documents and no materials or equipment shall be ordered until submittals are reviewed and approved by the Architect and Engineer.

C. Submit complete catalog data or shop drawings for each manufactured item of equipment and all components to be used in the work, including specific performance data, material description, rating, capacity, working pressure, dimensional data, material gauge or thickness, wiring diagrams, brand name, catalog number, and general type.

D. Catalog data for equipment reviewed by the Engineer shall not take precedence over the requirements of the Contract Documents. The review of the Engineer shall not relieve the Contractor from the responsibility for deviations from Drawings or Specifications, nor from the responsibility for providing proper clearance and coordination with other Trades.

E. When submitted for review, all shop drawings shall bear the Contractor's signed certification that he/she has reviewed, checked, and approved the shop drawings, that they have been coordinated with the requirements of the project and with the provisions of the Contract Documents, and that he/she has verified all field measurements and construction criteria, materials, catalog numbers, and similar data. Annotations shall be in red ink.

F. Each required Specification Section submittal shall be complete with all required information included in one PDF file. External web links are not permitted. Include a transmittal cover page indicating Specification Section name and number.

G. Submittals shall be sent to shopdrawings@korda.com.

1.02 CONTRACTOR'S RESPONSIBILITIES

A. Complete review of shop drawings, product data, and samples prior to submission.

B. Determine and verify:
1. Field Measurements
2. Field Construction Criteria
3. Catalog Numbers and Similar Data
4. Conformance with Specifications

C. Coordinate each submittal with requirements of the work and the Contract Documents.

D. Include a letter in the front of the submittal of any deviations in the submittals from the requirements of the Contract Documents.

E. Make submittals and resubmittals, if necessary, promptly in accordance with the approved schedule and in such sequence as to cause no delay in the work or in the work of any other Contractor, or the project as a whole.

F. Make any corrections or changes in rejected submittals as required by the Architect and resubmit until approved.

G. Begin no fabrication or work which requires submittals until approved submittals are returned.

1.03 INCORPORATION OF SUBMITTALS INTO RECORD AND INFORMATION MANUALS

A. Refer to Section 26 00 20, "Record and Information Manuals."

1.04 CERTIFICATIONS

A. Provide:
1. Test Agency results verifying capacities, operating conditions and power requirements at design conditions
2. Manufacturer's Statement of Compliance with Standards discussed in individual Specification Sections
3. Equipment labels indicating Certification requirements
4. Quality standard designations on each unit piece
5. Typed verification that noted mixes, chemical compositions, and testing procedures were complied with
6. Other Certifications listed in other Sections of the Specifications

1.05 REQUIRED SUBMITTAL INFORMATION

A. Submittal Transmittal
1. Provide the following information on the Transmittal Form for each submittal:
   a. Project name and address.
   b. Specification number, as listed for each submittal item required in Paragraph 1.05C below.
   c. Item description, as listed for each submittal item required in Paragraph 1.05C below. Where equipment is identified by number or tag on the documents, same shall be indicated on the submittal.
   d. Specification number and item description (b and c, above) for each submittal if more than one submittal is sent under one transmittal form.
   e. Name, address and telephone number of Contractor.
   f. Bid package number (if applicable).
2. Submittal Transmittal Forms not properly identified with the above information will be returned (without review) to the Contractor.

B. Refer to the following letter key:

KEY FOR REQUIRED SUBMITTALS:

A. Shop Drawings and/or Layout Drawings
B. Product Data Sheets
C. Installation, Operation, and Maintenance Instructions
D. Reports or Test results
E. Typed Statement
F. Typed Verification of Compliance with Certification Requirements
G. Motor Efficiencies and Power Factor
H. Wiring Diagrams

C. Submit information on equipment items as listed below.

SECTION #	CONTRACT ITEM	SUBMITTALS REQUIRED
26 00 20	RECORD AND INFORMATION MANUALS	A, B, E, F, H, C
26 08 40	ELECTRICAL TESTS, ADJUSTMENTS, INSPECTIONS	D
26 27 26	WIRING DEVICES AND PLATES	B
26 28 13	FUSES	B
26 28 16	SAFETY SWITCHES	B, C
26 51 14	LUMINAIRES	B

D. After approval, one (1) copy shall be returned to the Contractor. Contractor shall make prints of the approved transparencies and reproductions of all other shop drawing information as necessary for his/her use and for inclusion in the Record and Information Manuals.

END OF SECTION

SECTION 26 00 20
RECORD AND INFORMATION MANUALS

PART 1 GENERAL

1.01 REFERENCE

A. Refer to Division 1 for general requirements and for specific information regarding Record (As-Built) Drawings and quantity required.

1.02 SUBMITTALS

A. Submit one (1) copy of draft manual to the Architect for review and approval thirty (30) days before final inspection is due.

B. After approval, submit three (3) approved manuals to the Owner and obtain receipt. (See Section 26 00 99, "Requirements for Contract Completion.")

PART 2 PRODUCTS

2.01 MANUALS

A. Manuals shall be loose leaf, three-ring, hard-cover binders. Material shall be typewritten or printed and be fully legible. Each section shall be divided by labeled tabs.

B. The following items, together with any other necessary pertinent data, shall be included in each Manual:
1. Each manual shall be labeled on front cover with project name, Contract, Contractor's name, Architect, Engineer, and date of project completion.
2. Manufacturers' names, nearest Factory Representative, and model and serial numbers of components of systems
3. Operating instructions, start-up and shutdown procedures
4. Maintenance instructions

5a. Routine and 24 hour emergency service/repair information:
   a. Name, address and telephone number of servicing agency
   b. Names of personnel to be contacted for service arrangements

5. Parts list with numbers of replaceable items, including sources of supply
6. Manufacturers' literature describing each piece of equipment
7. One (1) approved copy of each submittal
8. Written warranties
9. Certificate of Material Receipt and Certificate of System Completion
10. One (1) typewritten directory for each panelboard as installed
11. Record (As-Built) Drawings
12. Certificate of Final Inspection signed by Building Authority having jurisdiction
13. Test results

14. Coordination analysis (see Section 26 00 80, "Power System Coordination Analysis")
15. Video recordings of all equipment demonstrations and training sessions

END OF SECTION

SECTION 26 00 55
SLEEVES, SEALS, AND FIRESTOPS

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish and install sleeves for conduit penetrations through masonry and concrete construction or where conduit passes through walls exposed and through smoke or fire rated separations.

B. Provide watertight, fire rated seals and firestopping as specified herein.

1.02 QUALITY ASSURANCE

A. Firestopping materials shall be classified by UL as "fill, void or cavity materials" and "through penetration firestop systems."

B. Firestopping materials shall conform to both Flame (F) and Temperature (T) ratings as tested by nationally accepted test agencies per ASTM E-814 or UL 1479 Fire Tests of Through-Penetration Firestops.
   1. The F rating shall be a minimum of one (1) hour, but not less than the fire resistance rating of the assembly being penetrated.
   2. Conduct the fire test with a minimum positive pressure differential of 0.01 inches of water column.

C. Firestopping equipment used shall be in accordance with the Manufacturer's written installation instructions.

D. Firestopping materials shall be expanded to fill cavities or provide adhesion to substrates that will maintain seal under normal expected movements of substrates.

1.03 SUBMITTALS

A. For Review:
   1. Manufacturer's product data sheets indicating product characteristics, performance and limiting criteria
   2. Manufacturer's installation instruction for each type of seal or firestop required by the project
   3. Written certification that firestopping systems meet firestopping requirements specified herein

B. To be included in Record and Information Manuals:
   1. One (1) copy of each approved submittal

1.04 MANUFACTURERS

A. Seals
1. Link-Seal by Thunderline Corporation
2. CSD Sealing Systems
3. O-Z/Gedney Inc.

B. Firestopping Materials
1. Hilti
2. Tremco Sealants & Coatings
3. 3M Fire Protection Products
4. Dow Corning
5. CSD Sealing Systems

PART 2 PRODUCTS

2.01 SLEEVES

A. Sleeve material through floors and walls shall be machine cut rigid galvanized steel conduit.

B. Sleeves installed in new construction shall have welded flange at mid-point of sleeve which functions as a water barrier and anchor collar.

C. At the Contractor's option, steel wall sleeves by Link-Seal may be provided.

2.02 SEALS

A. Modular Mechanical Type
1. Seals shall consist of interlocking synthetic rubber links shaped to continuously fill the annular space between conduit and sleeve.
2. Seal assembly shall have steel bolts and nuts and rubber sealing element for service and environment under which assembly will be used. Seal shall have a pressure resistance rating of 20 psig.

B. Sealing Plug Type
1. Seals shall consist of two (2) identical piece plugs made of synthetic rubber with one edge flanged, serrated profile on the outside and a series of ridges on the inside which compress and assures a tight seal. Seal shall have a pressure resistance of 15 psig at the plug base and 30 psig at the flange. Rubber grade shall be suitable for the service and environment under which sealing plug will be used.

2.03 WATERTIGHT SEALS

A. Modular mechanical type watertight seals shall have zinc galvanized bolts and nuts with EPDM rubber sealing element. Seals shall be Link-Seal, Type C.

B. Sealing plug type watertight seals shall be made of EPDM rubber. Seals shall be by CSD Sealing Systems.

2.04 FIRE RATED SEALS

A. Modular mechanical type fire rated seals shall have zinc galvanized bolts and nuts with silicone rubber sealing element which provides a three hour fire resistance rating.

B. Sealing plug type fire rated seals shall be made of FRR rubber for three hour fire resistance rating.

2.05 FIRESTOP MATERIALS

A. Use only firestop products that have been UL 1479, ASTM E-814 tested for specific fire rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

B. Cast-in-place firestop devices are installed prior to concrete placement for use with non-combustible and combustible plastic pipe (closed and open piping systems), or electrical cable bundles, penetrating concrete floors.

C. Sealants, foams or caulking materials for use with non-combustible items including rigid steel conduit and electrical metallic tubing (EMT).

D. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including PVC jacketed, flexible cable or cable bundles and plastic pipe.

E. Foams, intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles.

F. Non curing, re-penetrable intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles.

G. Wall opening protective materials for use with UL listed metallic and specified nonmetallic outlet boxes.

H. Non curing, re-penetrable materials shall be used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways.

I. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

PART 3 EXECUTION

3.01 APPLICATION

A. Provide sleeves for all conduit penetrations through walls, and through floors where above ground level. Sleeves are not necessary for slab-on-grade penetrations. (Refer to 26 00 30, Concrete Foundations, Supports, and Envelopes, for concrete collar requirements.)

B. Provide one (1) spare sleeve of equal size in any floor or wall area where more than three (3) conduits penetrate floor or wall.

3.02 INSTALLATION

A. Sleeves
1. Carefully coordinate and check locations of sleeves immediately before and after each concrete pour and masonry installation.
2. Give the General Trades Contractor locations and sizes of all openings required for the installation of sleeves before construction of masonry or concrete walls is started. If it becomes necessary to cut into new work because of the failure of this Contractor to notify the General Trades Contractor, then the General Trades Contractor shall do any necessary cutting and patching required at this Contractor's expense.
3. Cut sleeves through walls flush with each surface. Unused sleeves shall extend beyond wall surface and be provided with caps.
4. Cut sleeves 3 1/2 inches above finished floors. Joint between sleeve and floor shall be caulked to be watertight. Bottom of sleeve to be cut flush.
5. Core drill holes for sleeves in existing construction.
6. Patching shall be by the General Trades Contractor at this Contractor's expense.

B. Seals and Firestops
1. Clean surfaces and substrates of dirt, oil, loose materials and other foreign materials which may affect the proper bond or installation of seals and firestops.
2. Do not apply seals and firestops to surfaces previously painted or treated with a sealer curing compound or similar product. Remove coatings as required in compliance with Manufacturer's instructions. Provide primers, as required, which conform to Manufacturer's recommendations for various substrates and conditions.
3. Follow Manufacturer's written instructions for installation of seals and firestops.
4. Install firestops with sufficient pressure to fill seal holes, voids, and openings to ensure an effective smoke seal and to maintain the fire resistance rating of the assembly.
5. Tool or trowel exposed surfaces. Remove excess firestop material promptly as work progresses and upon completion.
6. Unused sleeves shall be filled with and surrounded by firestop material. Sleeve ends shall be capped. Blind sealing plugs may be used at Contractor's option.
7. Install watertight seals for all below grade penetrations of conduit into the building.
8. Install fire rated seals in all fire rated walls and floors.

3.03 INSPECTION

A. Examine seals and firestops to ensure proper installation and full compliance with this Specification. Work shall be accessible until inspection and approval by the applicable code authorities.

B. Correct unacceptable seals and firestops and provide additional inspection to verify compliance with this specification at no additional cost.

END OF SECTION

SECTION 26 00 99
REQUIREMENTS FOR CONTRACT COMPLETION

PART 1 GENERAL

1.01 DESCRIPTION

A. The following material must be submitted prior to Contract Completion:
   1. Spare parts
   2. Record and Information Manuals
   3. Accessories and miscellaneous equipment
   4. Keys for equipment

B. Contractor shall use only the attached forms for Material Receipt and System Completion.

1.02 SUBMITTALS

A. To be included in Record and Information Manuals:
   1. Certificate of Material Receipt for all required spare parts
   2. Certificate of System Completion for each system when required by individual Division 26 Specifications

PART 2 PRODUCTS

2.01 SPARE PARTS

A. Furnish spare parts and devices as required by Division 26 Specifications.

PART 3 EXECUTION

3.01 SPARE PARTS AND KEYS

A. Deliver spare parts and keys to Owner's Representative. Obtain a signed copy of the Certificate of Material Receipt (ATTACHED TO THE END OF THIS SPECIFICATION SECTION).

3.02 MANUFACTURER'S INSPECTION

A. Arrange for inspection and approval by Equipment Manufacturer where required by Division 26 Specifications. Provide Manufacturer Representative's signature on the Certificate of System Completion (ATTACHED TO THE END OF THIS SPECIFICATION SECTION).

3.03 OPERATIONAL TEST

A. At completion, Contractor shall operate the systems for a period of at least seven (7) days, to demonstrate fulfillment of the requirements of the Contract. During this time, adjust equipment so that it will perform as the Manufacturer intended, and so that systems will function as designed. Contractor shall sign the Certificate of System Completion (ATTACHED TO THE END OF THIS SECTION).

3.04 EQUIPMENT DEMONSTRATION

A. After all system operational tests have been completed, schedule an instruction period with the Owner. Instruct designated personnel in the operation and maintenance of all systems and equipment. Use manuals to familiarize Owner with equipment and procedures. Allow time as necessary for this instruction. Schedule a time convenient for the Owner and the Architect. All training sessions shall be videotaped for the Owners use in instructing future employees.

Instruction shall include:
1. Location of all components of the system and explanation of their function
2. Programming procedures for computer-based equipment
3. Maintenance and repair procedures
4. Review of documents in Record and Information Manuals

At the completion of instruction, have all attendees sign the Certificate of System Completion.

END OF SECTION

CERTIFICATE OF MATERIAL RECEIPT

PROJECT NAME: _____

DATE: _____

CONTRACTOR: _____

CONTRACTOR'S REPRESENTATIVE: _____

On the above listed date, the following pieces of equipment, as required by Division 26 Specifications, were delivered to the Owner's Representative:

	Equipment	Quantity
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

(Attach a separate page for additional items)

Owner's Representative: _____ (PRINT)

_____ (SIGN)

CERTIFICATE OF SYSTEM COMPLETION

PROJECT NAME: _____

CONTRACTOR: _____

SYSTEM: _____

SPECIFICATION SECTION NUMBER: _____

A. MANUFACTURER'S INSPECTION AND APPROVAL (If required by Specification Section)

The above listed system has been inspected and approved as meeting the Manufacturer's written instructions for installation and operation.

Manufacturer's Representative: _____ Date: _____

B. TESTING

The above listed system has passed all testing required by Division 26 Specifications and has met the terms of the Contract. Written test results are attached.

Contractor's Representative: _____ Date: _____

C. EQUIPMENT DEMONSTRATION

The above listed system has been demonstrated to the following Owner's Representatives:

NAME	TITLE	DATE	SIGNATURE
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

(ATTACH A SEPARATE PAGE FOR ADDITIONAL NAMES)

SECTION 26 05 10
WIRE AND CABLE

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish and install all electrical conductors for service entrance, feeder and branch circuit wiring and control wiring.

B. Refer to other Division 26 Specification Sections for additional wiring requirements.

1.02 QUALITY ASSURANCE

A. Wire and cable furnished shall be in accordance with the following standards where applicable:
1. UL Standard 44 for rubber insulated wires and cables
2. UL Standard 83 for thermoplastic insulated wires and cables

B. Wire and cable shall be in accordance with applicable NEC Articles.

C. Wire and cable shall be identified by surface markings indicating manufacturer, size, metal type, voltage rating, UL listing and cable type.

1.03 SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: Indicate type, use, location, and termination locations.

C. Field quality-control reports.

1.04 MANUFACTURERS

Subject to compliance with requirements, provide products by one of the following:

A. Conductors
1. Cerrowire LLC
2. Encore Wire Corporation
3. General Cable, Prysmian Group
4. The Okonite Company
5. Service Wire Company
6. Southwire Company

B. Connectors and Splices
1. Burndy, Hubbell
2. Ideal Industries, Inc.
3. ILSCO

PART 2 PRODUCTS

2.01 TYPE "THHN/THWN-2" WIRING

A. Wire shall be single conductor annealed uncoated copper with PVC insulation and nylon jacket. Insulation shall be heat and moisture resistant with light stabilized jacket. Wire shall be rated 600 volt, 90 degree C in dry locations, 75 degree C in wet locations.

B. Conductors No. 10 AWG and smaller may be solid; No. 8 AWG and larger shall be stranded. Where stranded conductors of sizes 12 and 10 are used, appropriate crimp terminations shall be provided on the ends of each conductor for making connections to wiring devices, switches, etc.

2.02 TYPE "XHHW-2" WIRING

A. Wire shall be single conductor annealed uncoated copper with heat and moisture resistant thermosetting cross-linked polyethylene insulation. Wire shall be rated 600 volt, 90 degree C in dry locations, 75 degree C in wet locations.

B. Wire shall be single conductor, uncoated aluminum with XLPE insulation and compressed compacted stranded conductor. Aluminum shall be General Cable Stabiloy AA-8030 alloy, or equal by Southwire.

2.03 TYPE "SOW-A" CORD

A. Cord shall be extra hard usage duty with flexible stranded copper conductors with 90 degree C EP rubber insulation enclosed by a 90 degree C thermosetting jacket that is resistant to oil, ozone, abrasion, and high temperature. Cord shall have a 600 volt rating.

2.04 CONNECTORS AND SPLICES DESCRIPTION

A. Factory-fabricated connectors splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated.

B. Splices in No. 10 AWG and smaller wire shall be made with insulated connectors with metallic coil springs and contoured wings such as 3M "Scotchlok," Ideal Company "Wing Nut," Thomas & Betts Company "Piggy" connectors, or with mechanically-crimped sleeves as manufactured by T & B or Ideal Company, which shall be insulated with pressure sensitive vinyl plastic electrical tape equal to Scotch No. "33" or No. "88." Push wire or incline connectors are not acceptable.

C. All taps, terminations or splices, size No. 8 and larger shall be made with bolted-type pressure or compression connectors. Connectors shall be compatible with the conductor material. Insulate connectors with electrical tape to 150% of the insulating value of the conductor insulation. The tape shall have insulating properties equivalent to the conductor.

D. All splices located in exterior junction boxes shall be made with waterproof splice kits.

E. Lugs shall be one piece, seamless, designed to terminate conductors specified in this Section. Material shall be compatible with the conductor material. Two hole with standard barrels and compression terminations.

PART 3 EXECUTION

3.01 APPLICATION

A. Service entrance conductors for underground installations in raceways shall be Type "XHHW-2."

B. All branch circuits, feeders and control wiring shall be Type "THHN/THWN-2."

C. Unless otherwise noted, minimum wire size for power branch circuits shall be No. 12 AWG and for control and auxiliary systems No. 14 AWG. Wire size for branch circuit homeruns shall be as indicated in the panelboard schedules. Remainder of branch circuit shall be No. 12 AWG, unless noted otherwise.

D. Type "SOW-A" shall be used for cord drops and portable appliance connections such as make up connections to shop or kitchen equipment. Hard service cord with stainless steel, wire mesh, strain relief device at terminations to suit application.

E. All conductors shall be copper, unless specifically noted on the Drawings, where conductors may be aluminum XHHW-2 wiring. Terminations on both ends shall be made with aluminum alloy, long barrel, one or two holes, high compression crimp lug connectors on cleaned ends protected with anti-corrosion joint compound. Cable ampacity and conduit size shall be in accordance with National Electrical Code tables. All switchboards, panelboards, safety switches, transformers, etc. shall come factory prepared with appropriate bus terminators to accept high compression crimp lug connectors. Equipment shall have sufficient wire bending space.

F. Aluminum conductors shall only be used for feeders to electrical equipment.

3.02 INSTALLATION

A. Install electrical cables, wires and connectors as indicated, in compliance with Manufacturer's written instructions, applicable requirements of NEC and NECA'S "Standard Installation," and in accordance with recognized industry practices.

B. Coordinate cable and wire installation work with electrical raceway and equipment installation work, as necessary for proper interface.

C. No wire may be pulled until masonry and concrete is in place. Free ends and loops at boxes and enclosures are to be pushed back in box and protected by blank covers or other means until the interior painting and decorating work is completed.

D. Leave at least 6 inches of free conductor at all outlets except where conductors are intended to loop without joints through outlets for luminaires or wiring devices hookups.

E. Wire color and code shall be used as follows:

	120/208 Volt
Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Ground	Green
Isolated Ground	Green w/White Stripe

F. All circuits shall have separate neutral conductors run for each phase conductor. Provide separate neutral conductor between each dimmer and load.

G. Number of branch circuit conductors in a conduit including switch legs and neutral conductors shall not exceed nine (9) conductors. Conductors shall be derated in accordance with NEC Article 310 when more than three (3) current carrying conductors are installed in a raceway.

H. Branch circuits shall be connected as numbered on the Drawings. Test and permanently tag by circuit number each circuit phase conductor in panelboard gutter before connecting to panelboard. Numbered adhesive tapes may be used at Contractor's option. Group neutral conductor and associated phase conductors with cable ties.

I. Where a feeder or branch circuit exceeds the terminating lug size, the Contractor shall use an appropriate adapter fitting to reduce cable size. Cutting of conductor strands is not permitted.

J. ground fault circuit breaker wiring shall be installed in separate conduits from all other wiring.

K. Use pulling means, including fish tape, cable or rope, and manufacturer approved compound or lubricant which will not damage raceway or deteriorate insulation. Do not exceed manufacturer’s recommended maximum pulling tensions and sidewall pressure values.

L. Branch circuit conductor splices shall be kept to a minimum. Feeder conductors shall have no splices.

M. Any equipment having multiple power connections shall have a warning label attached to each source where it connects to the equipment.

N. Subsequent to wire and cable hookups, energize circuitry and demonstrate functioning in accordance with requirements.

O. Division 26 Contractor shall provide cords and plugs for equipment furnished by General Trades Contractor which is intended or shown for connection to a receptacle but not furnished with the equipment.

P. Cables shall be supported inside of conduits and pullboxes as required by NEC in vertical risers. Provide pullboxes located as required – coordinate locations with Owner's representative.

Q. Each conduit in a parallel run shall contain all phases and neutral and equipment grounding conductors as a set. Phase conductors shall not be run in separate conduits.

3.03 CONDUCTOR SIZING

A. Branch circuit conduit routing is not shown on the plans and is left to the discretion of the Contractor. Minimum wire size for 20A, 120 volt branch circuits shall be as follows, unless specifically noted on the Drawings:

Conductor Size	Maximum Conductor Length
#12 AWG	100 feet
#10 AWG	150 feet
#8 AWG	250 feet
#6 AWG	400 feet

B. Wire size for under floor ducts shall be #8 AWG (minimum).

C. Do not purchase nor install cabling to equipment with VFD's until lug size can be verified with actual equipment submittals. If cabling size shown is larger than the lug can accommodate, provide a disconnect switch or wireway at equipment and reduce cabling to maximum size that fit into the lugs.

3.04 TESTING

A. Refer to Section 26 08 40, "Electrical Tests, Adjustments, Inspection."

B. Prior to energization, test cable and wire for continuity of circuitry and for short circuits.

END OF SECTION

SECTION 26 05 26
GROUNDING & BONDING

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish and install a complete grounding system as shown on the Drawings and specified herein. Provide all accessories as necessary for a complete system.

B. All components of the electrical system shall be grounded and bonded including: raceways, enclosures, receptacles, motors, controllers, panelboards, contactors, luminaires, and all other electrical components and subsystems.

1.02 REQUIREMENTS

A. The Division 26 Contractor shall work with the Division 27 Contractor. The Division 26 Contractor shall be responsible for the grounding system and include the telecommunications grounding listed in 26 05 27, Section 1.02.B.1. All applicable requirements listed in 26 05 27 shall be provided.

1.03 QUALITY ASSURANCE

A. All equipment shall be UL listed and labeled and in accordance with applicable NEMA and ANSI Standards and NEC Article 250.

1.04 MANUFACTURERS

A. Exothermic Weld
   1. Cadweld by ERICO Products, Inc.
   2. Ultraweld by Harger

PART 2 PRODUCTS

2.01 DRIVEN GROUND ROD

A. Ground rod shall be copper-clad steel, 3/4 inch minimum diameter, 10 foot length.

2.02 CONDUCTORS, CLAMPS AND CONNECTORS

A. Refer to Section 26 05 10, "Wire and Cable."

2.03 EXOTHERMIC WELD

A. Exothermic welds shall be powdered copper oxide and aluminum to form a molded homogeneous copper joint connection between the copper conductor and the material being bonded to.

PART 3 EXECUTION

3.01 INSTALLATION

A. System Grounding Connections
1. The service entrance conductors shall be grounded in accordance with NEC Article 250.24. The grounding electrode conductor shall be connected to the grounded service conductors at the terminal or bus at the main service disconnecting means. A grounding connection shall not be made to any grounded circuit conductor on the load side of the service disconnecting means.

B. Enclosure and Equipment Grounding
1. Metal enclosures or raceways for conductors or equipment shall be grounded.
2. Exposed noncurrent-carrying metal parts of fixed equipment likely to become energized shall be grounded.
3. Exposed noncurrent-carrying metal parts of structures, motor frames, enclosures for motor controllers, and luminaires shall be grounded.

C. Method of Grounding
1. Equipment grounding connections at service equipment shall be made by bonding the equipment grounding conductor to the grounded service conductor and the grounding electrode conductor.
2. The grounding electrode conductor shall connect the equipment grounding conductors, the grounded service conductors and the service entrance enclosures to the grounding electrode.
3. A main bonding jumper shall connect the equipment grounding conductors and the service equipment enclosure to the grounded conductor within the service equipment.
4. Provide separate green insulated equipment grounding conductors for all feeders and branch circuits.

D. Bonding
1. Bonding shall be provided and conform to all requirements of NEC Article 250 V and VII.

E. Grounding electrode system shall consist of all of the following components exothermically bonded together:
1. The main domestic water service pipe ahead of any meter, and within 5 feet of entry into building.
2. Ufer Ground – 20 foot minimum length of re-bar, or Bare No. 4/0 cable embedded within concrete footer, with No. 4/0 cable extended to single point grounding buss bar.
3. The Steel Frame of the Building - At a column nearest to the service entrance equipment and at a point accessible to view.

4. Driven Ground Rods - Two ground rods, installed vertically into earth near the service entrance point and spaced 20 feet apart, with top 8 feet encased with low resistivity backfill.

F. Exterior luminaires and poles shall be grounded by the use of a manufacturer supplied ground lug or pigtail or by the use of ground clips fastened in bare metal that is free of paint. Poles shall be grounded to an equipment grounding conductor. Poles shall also have a driven ground rod installed at the bottom of their base excavation and bonded to pole.

G. Motor terminal boxes shall be grounded by the use of a manufacturer supplied ground lug or by drilling and tapping a hole for a ground screw. Remove paint prior to making the connection.

H. Metal roofing and metal veneer siding shall be bonded to building steel or nearest grounding system connection with No. 6 AWG conductor every 100 feet.

I. A No. 2 AWG ground jumper shall be installed around water meters and water heaters.

J. Metal piping systems such as natural gas, hot water, pool systems, shall all be bonded to the grounding electrode system with No. 2 AWG conductors.

3.02 GROUNDING SYSTEM TESTING

A. Soil Resistivity
1. Measure soil resistivity and record

B. Grounding System Resistance
1. Ground system resistance measurements shall be taken and submitted to the Architect for approval before energizing equipment. Measurements shall be taken in dry weather, not less than 48 hours after rainfall.
2. The test method used shall be the fall-of-potential method described in IEEE Standard 142. If it is not possible to use the fall-of-potential method, then the slope method of Dr. George Tag shall be used.
3. Documentation shall include the following information:
   a. Sketch of site showing building, ground connection and test locations
   b. Location in feet of all test spikes
   c. Graphs showing all recorded data plotted
   d. A minimum of ten (10) data points shall be recorded

3.03 GROUNDING SYSTEM ADJUSTMENT

A. Where grounding system resistance test results are above 25 ohms, install additional driven ground rods spaced 20 feet apart until such a reading is achieved.

END OF SECTION

SECTION 26 05 29
HANGERS AND SUPPORTS

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish and install complete hangers, supports and concrete inserts as required for the installation of conduits, cabinets, transformers and equipment installed under Division 26.

B. Provide all beam clamps, expansion anchors, threaded rod, framing steel and hardware as required.

1.02 QUALITY ASSURANCE

A. All equipment shall be UL listed and labeled and in accordance with applicable NEMA and ANSI Standards.

1.03 MANUFACTURERS

A. Hangers, Supports and Inserts
1. GTE/Unistrut International Inc.
2. Flex-Strut
3. Kindorf/Midland Ross Corporation
4. Grinnell
5. Tufstrut - Pilgrim Technical Inc.

PART 2 PRODUCTS

2.01 MATERIALS

A. Conduits or raceways shall be securely supported and anchored with proper devices, using lead shields in walls or sides of beams, expansion shields or other approved type device for direct down-pull loads. Minerallac type hanger shall be limited to above ceilings. Holes made in walls or ceilings for use with anchoring devices shall be covered by large steel washers. Include special hangers, as required. Minerallac type fittings shall not be permitted within 8 feet of the floor surface where exposed raceways are installed.

B. Hangers shall be individual ring or clevis type, one hole straps or multiple trapeze hangers.

2.02 STRUCTURAL ATTACHMENTS

A. Concrete: Use Grinnell Fig. 285, or equal, Light Weight concrete insert for loads up to 400 lbs., or Grinnell Fig. 282, or equal, Universal Concrete insert for loads up to 1430 lbs.

B. Steel Beams: Where pipe size is 2 inches or less, use Grinnell Figure 87 or equal, Malleable iron C-Clamp and Retaining Clip. Where pipe size is over 2 inches, use Grinnell Figure 229, or equal.

C. Intermediate Attachments: Continuous threaded rod shall be used wherever possible. No chain, wire or perforated strap shall be used. Up to 2 inches trade size pipe use 3/8 inch (minimum) rod, 2 1/2 inches and larger use 1/2 inch (minimum) rod.

D. Pipe Attachments: For steel pipe use Grinnell Figure 115 Ring and Turnbuckle Adjuster, or Figure 260 Clevis.

PART 3 EXECUTION

3.01 INSTALLATION

A. Conduits shall be supported to meet the conditions as required using proper type and size straps, clamps, and hangers.

B. Exposed conduits shall be installed parallel with or at right angles to building structure, fastened at least every 8 feet and at both sides of each outlet, except at one side only of conduit terminating outlets. Conduits shall be installed tight to structure and beams/joists. Coordinate exposed conduit routing with Architect prior installation.

C. Conduit risers shall be supported with friction clamps with two point bearing anchored to building construction and at every floor.

D. The following hanger methods are not permitted:
1. Wood plugs
2. Perforated band iron
3. Hook chain supports
4. Bailing wire, etc.
5. Minerallacs where previously mentioned
6. Friction type clamps, such as hammer on clips

E. Whenever possible, use supports, clamps, hangers, etc., designed especially for the equipment to be installed.

F. The maximum permitted load on hanger rod, plain or all-thread, shall be as follows:
1. 1/4 inch size - 750 pounds
2. 3/8 inch size - 1000 pounds
3. 1/2 inch size - 2000 pounds
4. 5/8 inch size - 3000 pounds
5. The minimum size hanger rod permitted is 1/4 inch size.

G. Any supports exposed to weather, shall be cleaned, primed and painted.

END OF SECTION

SECTION 26 05 33
CONDUIT AND FITTINGS

PART 1 GENERAL

1.01 DESCRIPTION

A. Provide complete grounded conduit systems for all electrical conductors.

B. All conduits shown on the Drawings shall meet NEC fill requirements for the conductors enclosed.

C. Conduit raceway systems shall be made mechanically tight and electrically continuous throughout. All metal raceway systems shall be grounded.

D. Refer to Section 26 05 43, "Underground Raceways" for all conduits located within or below slab-on-grade floors, and exterior to the building foundation.

1.02 QUALITY ASSURANCE

A. All equipment shall be UL listed and labeled and in accordance with applicable NEMA and ANSI Standards.

B. Conduit shall be in accordance with applicable NEC Articles.

PART 2 PRODUCTS

2.01 RIGID (RMC) AND INTERMEDIATE METAL CONDUIT (IMC)

A. Conduit shall be steel, hot dipped zinc galvanized (minimum 0.0008 inch thick) inside and out, with circular cross section, uniform wall thickness, continuously welded seams and chamfered threaded ends. Conduit shall be furnished in 10 foot standard lengths.

2.02 ELECTRICAL METALLIC TUBING (EMT)

A. EMT shall be zinc galvanized (minimum 0.0008 inch thick) inside and out, with circular cross section, uniform wall thickness and continuously welded seams. EMT shall be furnished in 10 foot standard lengths.

2.03 FLEXIBLE METAL CONDUIT (FMC)

A. Conduit shall be steel or aluminum, hot dipped zinc galvanized inside and out and made from one continuous length of high grade strip of uniform weight and thickness shaped into interlocking convolutions with smooth interior and exterior surfaces. Conduit shall be provided in standard coil lengths.

2.04 LIQUID-TIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Conduit shall be hot dipped zinc galvanized inside and out and made from one continuous length of high grade steel strip of uniform weight and thickness shaped into interlocking convolutions with smooth interior and exterior surfaces. Conduit shall be provided in standard coil lengths.

B. Conduit shall have a continuous PVC jacket enclosing it.

2.06 CONDUIT FITTINGS

A. All RMC, IMC, and EMT fittings shall be galvanized steel. Connectors and couplings shall be threaded, set screw or compression type, concrete-tight.

B. Conduit bodies shall be threaded steel type. Provide neoprene cover gaskets for conduit body covers exposed to the weather.

C. Expansion fittings shall be O-Z/Gedney Type "AX" for RMC and Type "TX" for EMT. For IMC applications, a 15 inch minimum length of RMC shall be used with a Type "AX" expansion fitting. Provide O-Z/Gedney Type "BJ" bonding jumpers at all expansion fittings.

D. Sealing fittings shall be Crouse Hinds Type EYD or Appleton Type EYD, with drain.

E. RMC and IMC conduit bushings shall be of the insulated type with phenolic thermosetting insulation molded to a hot dipped galvanized steel body of the threaded type.

F. EMT fittings shall be of the insulated throat type. Fittings larger than 2 1/2 inches shall have threaded bushings installed as described in Paragraph E above.

G. Conduits larger than 1 inch shall have grounding type bushings.

2.07 ROOF PENETRATIONS

A. Use prefabricated pipe flashing of ultra-violet resistant EDPM rubber with ribbed aluminum base.

B. Pate, Shipman, or Thy-Curb.

2.08 ROOF SUPPORTS

A. Rooftop conduit supports shall be UL listed for glue down installation.

PART 3 EXECUTION

3.01 APPLICATION

A. All conduit shall be rigid metal conduit, unless noted otherwise below, minimum 3/4 inch trade size.

B. EMT may only be used in these locations:
1. Within interior partitions and exterior walls
2. Above suspended ceilings inside building
3. Exposed above 9 feet A.F.F. inside building (except in wet, hazardous, or corrosive locations)
4. Exposed above electrical equipment in electrical and mechanical rooms.

C. Intermediate metal conduit may be used at the Contractor's option in lieu of rigid steel conduit within the building interior.

D. Flexible metal conduit up to 6 feet in length shall be used for connections to lighting fixtures. A green grounding conductor shall be installed in each flexible conduit as specified in Section 26 05 26, "Grounding." All runs shall be terminated in insulated flexible conduit fittings in accordance with NEC. Minimum size to be 1/2 inch.

E. Liquid tight flexible metal conduit (up to 3 feet in length) and appropriate fittings shall be used for connections to motors, engine/generators, and vibrating equipment. A green grounding conductor shall be installed in each flexible conduit as specified in Section 26 05 26, "Grounding." All runs shall be terminated in insulated flexible conduit fittings in accordance with NEC. Minimum size to be 1/2 inch.

F. EMT shall not be installed on the underside of metal roof decking.

G. RMC conduit shall be used on roofs with appropriate expansion fittings.

3.02 INSTALLATION

A. Generally, all conduits shall be concealed with runs installed parallel and perpendicular to walls and floor. Exposed conduits below 9 feet will be permitted only in electrical and mechanical rooms. Anywhere else at the discretion of the Architect or where specifically noted on the Drawings. In these cases, install conduit escutcheon plates around conduit penetration, sized to cover the conduit sleeve. Submit proposed routing of exposed conduits in finished spaces with Architect prior to installation.

B. Branch circuit conduits shall not be run within concrete floors except for short runs to floor boxes.

C. Conduit shall be securely and rigidly fastened in place with approved pipe straps, wall brackets, conduit clamps, conduit hangers, threaded C-clamps, or ceiling trapeze. C-clamps and beam clamps shall have strap or rod-type retainers.

D. Conduit support fastenings shall be by:
   1. Wood screws to wood
   2. Toggle bolts in hollow concrete masonry units
   3. Expansion bolts in concrete or brick
   4. Machine screws, welded threaded studs on steel work
   5. Nail-type nylon anchors or threaded studs driven by a powder charge and provided with lock washers and nuts for concrete, brick or steel work
   6. Conduit shall not be supported using wire or nylon ties.

E. In areas without ceilings, conduits shall be run as high as possible attached to the structure of the roof, or of the floor deck above. Do not attach directly to the metal deck. Conduits shall be run next to walls as inconspicuously as possible. In finished areas exposed to public view without ceilings, all work shall be installed in an aesthetically acceptable manner. The Architect reserves the right to require the Contractor to make changes as necessary to equipment installation that is unsuitable for public view due to poor workmanship.

F. Install conduit sleeves for all conduit penetrations through floors, masonry walls, and fire rated walls. Refer to Section 03 30 00, "Concrete" for spacing requirements. Sleeves shall be spaced a sufficient distance apart to maintain fire ratings as required by the UL Fire Resistance Construction Manual.

G. Conduit shall be independently supported from elements of the building and shall not rest on, nor be supported from suspended ceilings. Boxes shall be fastened to structure independently from conduit system. Conduits shall not be attached to metal decking forming the roof or floor slab above.

H. Do not install conduits within poured concrete construction above grade, unless to flush floor outlets.

I. Lay out conduit system to avoid crossing building expansion joints. Where crossings are necessary, use expansion fittings.

J. All conduits shall be continuous from outlet to outlet or junction box, and installed complete before pulling conductors. Swab conduits free of dirt, grease and moisture before pulling conductors.

K. Install bushings on all RMC and IMC conduit ends. Install insulated throat fittings on all EMT conduit ends. Fasten conduit to boxes and cabinets using locknuts. Provide two (2) locknuts where required by the NEC, where insulating bushings are used and where bushings cannot be brought into firm contact with the box.

L. All conduits entering or leaving refrigerated or moisture-laden spaces shall be sloped away from equipment and secured with sealing fittings. Secure conduits with threaded hubs to prevent air circulation and condensation.

M. Do not install conduits beneath nor above equipment generating heat such as boilers, heat exchangers or water heaters.

N. Provide a high strength pull cord in all empty conduits, and cap ends.

O. Maintain minimum clearances of 6 inches from parallel hot water piping and 4 inches from crossovers.

P. Provide conduit sleeves, seals and firestops in accordance with Section 26 00 55, "Sleeves, Seals and Firestops."

Q. Provide expansion joints in conduits run on roofs and exterior to building above grade. Provide proper roof flashing and sealing when penetrating roofs.

R. Do not exceed four (4) 90 degree bends in any conduit run without a pulling point. Provide pullboxes as required. Locate pullboxes in accessible areas. Coordinate locations with all other building Trades.

S. Roof support steel shall be galvanized.

END OF SECTION

SECTION 26 05 34
OUTLET BOXES

PART 1 GENERAL

1.01 DESCRIPTION

A. Outlets shall be provided for devices, luminaires, motors, and equipment connections, systems equipment connections, special outlets, and as otherwise required.

B. Outlet boxes shall be of sufficient size to provide free space for all conductors enclosed in the box. Boxes shall be not less than the minimum size required by NEC Article 314 for the number and size of conductors contained within.

1.02 QUALITY ASSURANCE

A. All equipment shall be UL listed and labeled and in accordance with applicable NEMA and ANSI Standards.

PART 2 PRODUCTS

2.01 OUTLET BOXES

A. Interior Outlet Boxes: Provide galvanized flat rolled sheet steel interior outlet wiring boxes, of types, shapes and sizes, including box depths, to suit each respective location and installation; construct with stamped knockouts in back and sides, and with threaded screw holes with corrosion-resistant screws for securing box covers and wiring devices.

B. Interior Outlet Box Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, fixture studs, cable clamps, and metal straps for supporting outlet boxes, which are compatible with outlet boxes being used and fulfilling requirements of individual wiring situations. Choice of accessories is Installer's option.

C. Weatherproof Outlet Boxes: Provide corrosion-resistant cast aluminum, weatherproof outlet wiring boxes, of types, shapes and sizes, including depth of boxes, with threaded conduit ends, cast-metal face plates with spring-hinged waterproof caps suitably configured for each application, including face plate gaskets and corrosion-resistant fasteners.

D. Luminaire outlet boxes shall be standard 4 inch octagonal, minimum 1 1/2 inches deep.

E. Flush device boxes in masonry walls to be masonry boxes designed for the purpose, or 4 inch square boxes with raised covers designed for masonry.

F. Wiring device boxes for surface conduit work and located in potentially damp areas shall be FS series cast aluminum boxes.

G. Where outlet boxes are to be cast in concrete slabs, they shall be boxes designed for concrete installation.

H. Flush device boxes shall be 4 inch square, 2 1/8 inch deep boxes with plaster covers or gangable 2 1/2 inch deep boxes. Shallow 1 1/2 inch deep gangable boxes may be used only in demountable partitions and in other walls too thin for standard depth boxes.

I. Flush boxes for low voltage cabling shall be 4 11/16 inches square x 2 1/8 inches deep for 3/4 inch conduits. Boxes shall be 4 11/16 inches square x 3 1/4 inches deep for 1 inch conduits. Boxes shall be 5 inches square and 2 7/8 inches deep for 1 1/4 inch conduits.

J. Unless otherwise noted, all television and monitor locations shall use a recessed TV box for both power and low-voltage. Basis of design is Legrand TV2MW with equivalents by Leviton, Hubbell, Carlon, and Arlington.

PART 3 EXECUTION

3.01 INSTALLATION

A. All outlet boxes upon which luminaires are to be installed shall be equipped with 3/8 inch fixture studs. All outlet boxes shall be installed vertically plumb within 3 degrees.

B. All boxes shall be rigidly supported from building structure independent of the conduit system. Boxes cast into masonry or concrete are considered to be rigidly supported. Framing members of suspended ceiling systems shall not be permitted as a support.

C. Flush boxes shall finish within 1/4 inch of surface of non-combustible materials. Boxes shall not project beyond finished surfaces.

D. Flush luminaires in lay-in ceilings shall have branch circuit conduit terminated in a junction box above ceiling, but accessible through ceiling opening and located at least one foot away from the luminaire. Pre-wired incandescent luminaires may have the branch circuit conduit terminate in the luminaire junction box provided the box is sized sufficient for the wire and UL labeled for 90 degrees C wire.

E. Locations of all outlets are approximate. Final location shall be verified with the Architect in the field prior to installation.

F. Install knockout closures for unused openings.

G. Outlet boxes installed on opposite sides of a fire rated wall shall have a minimum of 24 inch spacing between adjacent boxes.

H. All outlet boxes shall use stud to stud box brackets with far side supports.

I. "Through-wall" type boxes shall not be used.

J. Boxes shall not be installed in a "back-to-back" manner. Boxes shall be spaced at least 10 inches apart where in opposite walls within the same stud cavity, unless a sound absorptive barrier is placed between boxes.

END OF SECTION

SECTION 26 05 35
PULL AND JUNCTION BOXES

PART 1 GENERAL

1.01 DESCRIPTION

A. Pull or junction boxes shall be provided in all raceway systems where required to avoid an excessive number of bends, to facilitate wire pulling, or to afford required access to the raceway system. Maximum distance between boxes in raceway systems shall not exceed 100 feet.

B. Pull and junction boxes shall provide adequate space and dimensions for the installation of conductors in accordance with NEC Article 314.

1.02 QUALITY ASSURANCE

A. All equipment shall be UL listed and labeled and in accordance with applicable NEMA and ANSI Standards.

PART 2 PRODUCTS

2.01 PULL AND JUNCTION BOXES

A. Pull and Junction Boxes: Provide galvanized code-gauge sheet steel junction and pull boxes, with screw-on covers, of types, shapes and sizes, to suit each respective location and installation. Minimum size shall be 4 inch square, 2 1/8 inch deep box.

B. Concealed pull or junction boxes shall be flush in finished walls, located near the floor and provided with flush type covers; blank device plates in case of outlet type boxes and flat plates prime painted and secured with flat head screws in the case of larger boxes. Surface junction boxes in utility areas shall be without knockouts, shall have close fitting screw covers and shall be finished in medium gray enamel.

C. Boxes exposed to the weather shall be weatherproof type as required by NEC.

D. Bushings, Knockout Closures and Locknuts: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and malleable iron conduit bushings, offset connectors, of types and sizes to suit respective uses and installation.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install pull and junction boxes, complying with Manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation," and in compliance with recognized industry practices.

B. Coordinate installation of electrical boxes and fittings with wire/cable and raceway installation work.

C. Pull and junction boxes shall be located in utility areas or above accessible ceiling systems wherever possible. Boxes located in exposed areas shall be brought to the attention of the Architect prior to installation.

D. Pull and junction boxes shall be sized in accordance with the NEC for both contained conductors and conduit entrances and exits.

E. Fasten boxes rigidly to structural surfaces, or solidly imbed electrical boxes in concrete or masonry.

F. Boxes not otherwise accessible in ceilings and walls shall be made accessible by an access panel.

G. Provide watertight boxes, slip expansions or bonding jumpers where dictated by construction conditions.

END OF SECTION

SECTION 26 05 43
UNDERGROUND RACEWAYS

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish and install all items necessary for a complete installation of underground and under slab raceway systems herein specified and as shown on the Drawings.

1.02 QUALITY ASSURANCE

A. All equipment shall be UL listed and labeled and in accordance with applicable NEMA and ANSI Standards.

B. Concrete work shall conform to the requirements of ACI 301-89.

C. Refer to Section 03 30 00, "Cast-in-Place Concrete."

D. Refer to Section 26 00 25, "Excavation, Backfill, and Protection of Utilities" for backfill requirements.

PART 2 PRODUCTS

2.01 RACEWAY AND FITTINGS

A. PVC conduit shall be rigid non-metallic, Schedule 80 heavywall, UL approved for direct earth burial.

B. Rigid galvanized steel conduit and associated fittings shall be the same as specified under Section 26 05 33, "Conduit and Fittings."

C. Fiberglass conduit and associated fittings shall be the same as specified under Section 26 05 23, “Conduit and Fittings”.

D. PVC conduit fittings shall be slip joint type with cement furnished and recommended by the Manufacturer.

E. Conduit elbows shall be rigid metal and be long radius type.

2.02 CONCRETE ENVELOPES FOR RACEWAYS

A. Concrete used for the encasement of raceways shall have a 28 day compressive strength of 3000 psi. Refer to Section 03 30 00, "Cast-in-Place Concrete" for information concerning concrete to be furnished under this Section.

B. Colored Concrete
   1. Cement color shall be 95% pure mineral oxide (90% pure iron oxide) finely milled to pass a 325 mesh. Carbon added for darker shades shall be wettable and shall not exceed 3% of the weight of portland cement. Color pigments shall be light fast, wettable, weather resistant, alkali resistant, and free of deleterious fillers and extenders.
   2. Color shall be Solomon Grind #140 or equal.

PART 3 EXECUTION

3.01 APPLICATION

A. Underground raceways shall be rigid galvanized steel conduit or Schedule 80 heavywall PVC. Use rigid galvanized steel only for:
   1. Raceways underneath electric equipment pads
   2. Terminal pole risers
   3. All elbows (45 degrees and greater)
   4. Metering conduit
   5. Additionally, where noted on the Drawings
   6. Long sweep sch 80 radius elbows are acceptable in lieu of RGS.

B. Underground raceways shall be encased in a concrete envelope for the following installations:
   1. Secondary voltage electric service entrance raceways between service transformer and service entrance equipment

C. Underground branch circuit raceways shall be a minimum of 1 inch.

D. Raceways larger than 1 1/2 inch shall be run at 30 inches below finished grade or floor slab.

3.02 INSTALLATION

A. All raceways shall have ends capped during construction to prevent entrance of mud or solids. Seal active raceways entering building from underground raceway system. Cap spare raceways. Mark ends of future raceways with a stake at ground surface. Provide pull cord in all spare raceways.

B. Raceways shall be placed and sloped so that water will not enter into the building through them. Provide a pullbox in conduit runs to prevent water ingress where necessary.

C. For conduits located under slab-on-grade concrete floors, conduits shall be routed in a single layer. Where necessary for conduits to be routed in a stacked arrangement, concrete envelope shall be provided to prevent voids in the ductbank. In areas of high conduit concentration, such as under electrical switchgear, complete concrete backfill of excavation shall be provided to avoid compromising support of concrete floor.

D. Refer to Section 26 00 55, "Sleeves, Seals and Firestops" for raceways installed through below grade walls and floors.

E. Spacers shall be used to provide a minimum 7 1/2 inch separation between adjacent centers of raceways in ductbanks as shown in the National Electrical Code for all conduits, both exterior, and within the limits of the building foundation, regardless of voltage. Ductbanks shall be limited to only two (2) conduits wide arrays unless at ends of runs where turning up into electrical equipment.

F. Unless otherwise noted on the Drawings, underground raceways systems shall be installed 30 inches below finished grade to top of raceways. Coordinate with other site utilities and run deeper, if necessary. Always run below gas lines.

G. Where trench depths are noted on the Drawings, depths shall be considered to mean buried depth to top of underground raceways.

H. PVC raceways, where not encased in concrete, shall snake from side to side of trench for expansion relief.

J. Where noted, concrete encased underground raceways in trenches shall have a 3 inch minimum concrete envelope between any raceway and edge of envelope.

K. Underground raceways installed below footings shall be concrete encased for full width and height of trench, extending 1 foot beyond each edge of footing.

L. Raceway envelopes shall be installed by monolithic pour method and vibrated in place to insure flow into voids and complete encasement of raceways. Raceways shall be bundled with twine on plastic spacers not over 5 feet on center and providing minimum conduit separation of 7 1/2 inches of center. Use steel reinforcing rods for alignment side stakes and support bottom of raceways on plastic base spacers not over 5 feet on center. Keep bottom of trench clean of debris and water. Envelope may be poured with side forms or "neat" excavated trench walls. Reinforce envelopes with rebar and wire ties.

M. Identification
   1. Location of underground raceways shall be identified with underground warning tape. Refer to Section 26 00 25, "Excavation, Backfill and Protection of Utilities" for warning tape requirements.
   2. Concrete encased primary and secondary service raceway envelope shall be placed using colored concrete. Mix color pigment with the concrete at a rate of approximately 4.5 lbs. per sack of cement. In no case shall the pigment weight exceed 10% of the weight of cement.

N. Underground raceways run between equipment locations within the building shall be run within the confines of the building foundation walls.

O. Raceways installed for parallel feeder conductors shall be installed so that each run is the same length as the others.

P. Raceways shall not be run in same trenches with underfloor plumbing. Where crossing, conduits shall be run before piping.

END OF SECTION

SECTION 26 05 53
ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.01 NAME PLATES

A. Furnish and install equipment identification nameplates on all pieces of electrical equipment including, but not limited to:
   1. Safety Switches
   3. Panelboards
   5. Lighting Contactors
   6. Each Switch, Circuit Breaker, Spare, and Space in Distribution Panelboards and Switchboards

   Identify and label all existing circuits and equipment that are located within the contract construction area.

B. Nameplates shall state the equipment name and number or letter as shown on the Drawings; voltage and phase; HP, ampacity or KW size; and source of power. Identification shall be as shown in the following examples:

   3. Panel "P1"
      208/120 Volt, 3 Phase
      225 Ampere
      Powered from Transformer T1
   4. Electric Water Heater "EWH-1"
      208 Volt, 3 Phase
      4 KW
      Powered from Panel P1

C. In junction boxes, identify each set of circuit conductors by permanent ink on plastic tags with circuit number, voltage and phase, wire size, source, and load information.

D. Refer to Section 26 05 10, "Wire and Cable" for color code identification of wire and cable.

E. Refer to Section 26 24 20, "Panelboards" for branch circuit identification.

F. Refer to Section 27 10 00, "Structured Cabling System" for identification of communication wiring system cable and equipment.

1.02 JUNCTION BOX IDENTIFICATION

A. Junction boxes in conduit runs shall be color coded and labeled as to the system that they have within. Each system shall have a different color or labeling scheme used. Do not color code in finished areas without ceilings.

B. Electrical power and lighting branch circuit junction boxes shall be painted, but labeled with the circuit numbers contained within. Labeling may be done with paint stencils or permanent black felt-tip markers.

PART 2 PRODUCTS

2.01 NAMEPLATES

A. Nameplates shall be laminated plastic with letter type a minimum of 1/4 inch high.

B. Color of nameplates shall be white with black letters for normal power systems and red with white letters for emergency power systems.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install nameplates on equipment using cadmium plated, steel, self-tapping screws or rivets.

B. Nameplates shall be installed on the front cover or trim of each piece of equipment. Where not possible, install on wall next to equipment using hollow-wall anchors.

C. Horsepower, ampacity, or kilowatt values shall be taken from the equipment as delivered in the field, not from the Drawings.

3.02 EXISTING EQUIPMENT IDENTIFICATION

A. Provide nameplates on all existing equipment within building as listed in Paragraph 1.01.A. of this Specification Section.

B. Provide updated panelboard directories in all existing panelboards within building as required for new panelboards per Section 26 24 20, "Panelboards," Paragraph 3.01.

END OF SECTION

SECTION 26 07 10
VOICE/DATA SYSTEMS RACEWAY

PART 1 GENERAL

1.01 DESCRIPTION

A. Division 26 Contractor shall furnish and install outlet boxes, conduits, for voice/data systems raceways.

B. Conduit stub-ups shall be provided in rooms with lay-in acoustic tile ceilings. In all other rooms, provide continuous conduit runs to nearest lay-in ceiling in corridors or directly to telecom rooms.

PART 2 PRODUCTS

2.01 OUTLET BOXES AND PLATES

A. Outlet boxes shall be 4 11/16 inches square by 3 1/4 inches deep with one (1) gang plaster ring installed. Outlet boxes shall accommodate 1 inch conduit as required.

B. Refer to Section 26 05 34, "Outlet Boxes."

2.02 CONDUITS

A. Conduits from voice/data outlet boxes shall be minimum 1 inch.

B. All conduits run to displays or projectors must be 1 1/4 inch minimum or larger if shown on drawings.

2.03 PULL BOXES

A. Pull boxes shall be of the following minimum dimensions for conduit sizes as shown:
1. 1 inch conduit – 6" W x 12" L x 3" D
2. 1 1/4 inch conduit – 12" W x 12" L x 4" D

B. Pull boxes shall be galvanized or baked enamel steel with screw covers.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide conduit stub-ups from each outlet location to above accessible ceiling space. Provide continuous conduits across exposed areas or areas of inaccessible ceilings. Provide conduits between isolated areas of accessible ceilings to provide a continuous pathway for wiring from main equipment location to each device. Floor outlets in slab on grade shall have conduits run up nearest column or wall to above accessible ceiling. Poke through type outlets shall have conduits run to above ceiling of main corridor on the floor below.

B. All conduit elbows shall have the following minimum bend radius:

1 inch conduit - 9 inches
1 1/4 inch conduit - 12 inches

C. Conduits for outlets shown exterior to the building shall be continuous from the outlet box back to the telecommunications room for the use of exterior rated cable.

D. All conduits shall have a pull cord installed. Restore all fire ratings of walls, floors, and ceilings penetrated by conduits.

E. Provide a pull box in each conduit run that exceeds 100 feet in length. All pull boxes shall have straight through conduit entrance and exit. Pull boxes shall be installed in accessible locations.

F. Conduit runs shall have a maximum of two 90 degree bends.

G. Provide a blank coverplate on all outlet boxes without completed devices.

.

END OF SECTION

SECTION 26 08 40
ELECTRICAL TESTS, ADJUSTMENTS, INSPECTION

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish equipment and perform as necessary all testing as required herein and called for in other Division 26 Specification Sections. Perform adjustments of equipment as required. Arrange for inspections by the authority having jurisdiction.

1.02 QUALITY ASSURANCE

A. Testing equipment shall be UL listed and specially manufactured and appropriate for the intended type of testing to be performed.

B. All testing shall be witnessed by Owner's Representatives. Provide five days advance notice.

1.03 SUBMITTALS

A. For Review:
   1. Test results form (attached to the end of this Section) with all recorded data sheets and graphs

B. To be included in Record and Information Manuals:
   1. One (1) copy of each approved submittal
   2. Final Certificate of Inspection

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.01 TESTING

A. Amperage Phase Balance
   1. Test and record amperage of each phase at main switchboard, each branch distribution panel, and all lighting and appliance panels.

B. Continuity of Conduit System
   1. Test each run of metallic conduit for continuity of ground return path.

C. Conductor Insulation Leakage
   1. Test each run of 600 volt cable for insulation leakage. Use the short-time method with readings taken at 30 and 60 seconds. Record results for conductors used for switchboard and panelboard feeders.

D. Grounding System Resistance
   1. Test and record grounding system resistance. Refer to Section 26 05 26, "Grounding" for test procedure.

E. Operating Voltage
   1. Measure and record operating voltage at main switchgear and all panelboards with all systems in building operating normally.

F. Dielectric Strength
   1. Provide megger test of all transformers to verify dielectric strength.
   2. No load/low load loss for medium voltage transformers.

3.02 ADJUSTMENTS

A. Amperage Phase Balance
   1. Where Contractor has deviated from panelboard circuit arrangement as shown on the Drawings, perform a phase balancing within the panelboard by rearranging the position of selected circuit breakers. Record the changed circuits on the "As-Built" Drawings.

B. Continuity of Conduit System
   1. Where the resistance of a conduit run is greater than two (2) ohms, disassemble all connections, clean, and reassemble to obtain an acceptable reading.

C. Conductor Insulation Leakage and Impedance
   1. Where insulation leakage is above Manufacturer's stated values, replace conductor.

D. Grounding System Resistance
   1. Refer to Section 26 05 26, "Grounding" for procedure for grounding system resistance adjustment.

E. Operating Voltage
   1. Adjust taps of all high voltage, service and dry-type transformers when loaded voltage readings drop below nominal system voltages. Final voltage shall be at nominal or above.

F. Other Adjustments
   1. Refer to Division 26 Specification Sections for additional adjustments.

3.03 INSPECTION

A. Inspection shall be performed by:
   1. Local authorized inspection agency, or
   2. State division of Inspection

B. Contractor shall arrange for periodic and final inspections in a timely manner and with due regard for the work of other Contractors and the Construction Schedule.

C. Include final Certificate of Inspection in the Record and Information Manuals.

END OF SECTION

TEST RESULTS FORM

PROJECT NAME:

CONTRACTOR:

SYSTEM:

SPECIFICATION SECTION NUMBER:

TYPE OF TEST:

EQUIPMENT USED:

WEATHER CONDITIONS:

TEMPERATURE:

HUMIDITY:

PART OF SYSTEM TESTED:

SUMMARY OF TEST:

PERSON PERFORMING TEST:_____ DATE: _____

CONTRACTOR'S REPRESENTATIVE:_____

(Attach Recorded Testing Data Sheets To This Form)

CERTIFICATE OF SYSTEM APPROVAL

PROJECT NAME:_____

CONTRACTOR:_____

SYSTEMS COMPONENT:_____

SPECIFICATION SECTION NUMBER:_____

A. APPROVAL (If required by specification section)

The above listed system has been inspected and approved as meeting the specified instructions for installation.

Owner's Representative:_____ Date:_____

B. EQUIPMENT DEMONSTRATION

The above listed system has been demonstrated to the following Owner's Representatives:

	NAME	TITLE	DATE	SIGNATURE
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

(ATTACH A SEPARATE PAGE FOR ADDITIONAL NAMES)

SECTION 26 27 26
WIRING DEVICES AND PLATES

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish and install wiring devices and plates as specified herein and as shown on the Drawings.

B. Specialty switches and outlets required for auxiliary systems shall be specified under those Sections or as shown on the Drawings.

C. All devices shall be ganged together where shown grouped on the Drawings.

D. All normal power devices shall be the same color.

1.02 QUALITY ASSURANCE

A. All equipment shall be UL listed and labeled and in accordance with applicable NEMA and ANSI Standards.

B. All wiring devices and plates shall be furnished by one of the Manufacturers listed. No mixing of Manufacturer's products shall be permitted unless otherwise noted herein or on the Drawings.

1.03 SUBMITTALS

A. For Review:
1. Product data sheets for wiring devices and plates

B. To be included in Record and Information Manuals:
1. One (1) copy of each approved submittal

1.04 MANUFACTURERS

A. Wiring Devices (except dimmers) and Plates
1. Cooper
2. Hubbell

B. Dimmers and Plates
1. Lutron

C. Cover Assemblies
1. TayMac Corporation
2. Intermatic Inc.
3. Carlon Electrical Products

D. Occupancy Sensors
   1. Watt Stopper Inc.
   2. Sensorswitch

E. Emergency Lighting Switch Bypass Device
   1. Bodine
   2. WattStopper

PART 2 PRODUCTS

2.01 SWITCHES

A. Switches shall conform to NEMA Heavy Duty Standards and shall be Specification Grade, general use AC quiet type, 20 Ampere, 120-277 volt, back and side wired with white handles, unless noted otherwise.

B. Lock type switches shall be 20 Ampere, 120-277 volt, back and side wired Corbin lock type, with stainless steel flush plate. Furnish two (2) keys with each lock type switch. All locks shall be keyed alike.

C. Pilot light switches shall be Specification Grade, general use AC quiet type, 20 Ampere, 120-277 volt, back and side wired with clear handle.

D. Momentary contact switches shall be SPDT 2 circuit, 3 position, center "off," 20 Ampere, 120-277 volt, side wired with white handles.

2.02 DIMMERS

A. Wall Mounted LED Slide Dimmer Switches
   1. Wall dimmer switch shall be 120/277 volt operation for LED fixtures, decora style, slide dim levels from 0-100%, separate on/off push button switch; 0-10 volt dimming control wires for “sink” mode.
   2. Lutron Maestro

B. Wall Mounted LED Slide Dimmer/Vacancy Sensor
   1. Wall dimmer/vacancy sensor shall be same as 2.02A above, but have integral PIR sensor for light turn off after sensor time out.

2.03 RECEPTACLES

A. All convenience and power receptacles shall conform to NEMA Extra Heavy Duty Standards and shall be Specification Grade, grounding type.

B. Convenience duplex receptacles shall be 20 Ampere, 125 volt, back and side wired, 3 wire grounding, UL listed as complying with the requirements of NEC Article 250.146, NEMA 5-20R configuration.

C. Ground-fault circuit-interrupting (GFCI) duplex receptacles shall be 20 Ampere, 125 volt "feed-through" type, NEMA 5-20R configuration, self testing.

D. Tamper resistant duplex receptacles shall be 20 Ampere, 125 volt, 3 wire grounding, UL listed in accordance with NEC 406.11 and 210.52, NEMA 5-20R configuration.

E. Weatherproof Duplex Receptacles shall be 20 Ampere, 125 volt or 250 volt, UL listed as weather resistant type per NEC 406.

F. All receptacles shall be white, unless on emergency power, in which case receptacles shall be red.

G. Refer to the Drawings for specification of specialty receptacles.

2.04 PLATES

A. Plates for flush devices in interior partitions shall be stainless steel.

B. Plates for flush devices on concrete block walls shall match others but be "Jumbo" plates.

C. Plates for voice/data communication boxes shall match wiring device plates in material, and be as specified in Section 27 10 00, "Structured Cabling System."

D. Plates for devices in surface fittings shall be cadmium plated steel surface covers. Covers shall fit without overlap and have round corners.

E. Plates for specialty receptacles required for auxiliary systems shall be satin stainless steel, furnished and specified with the device.

F. Plates for future system outlets shall be blank plates matching device plates in quality and finish.

2.05 COVER ASSEMBLIES

A. Wiring devices in wet locations shall have hinged, gasketed cast aluminum coverplates of a color matching adjacent wall finish.

B. Wiring devices subject to wet locations while in use shall be provided with NEMA 3R cover assemblies UL listed for wet locations while in use. Cover assemblies shall use a vertically-lifting "canopy" to protect the wiring device(s). Cover assemblies shall be standard size, one (1) or two (2) gang as required with gaskets between the hinged cover and mounting plate/base to assure proper seal.

2.06 OCCUPANCY SENSORS

A. Ceiling mounted low voltage dual technology occupancy sensors shall contain both PIR and ultrasonic technologies, adjustable 15 second to 15 minute time delay, integrated adjustable light level sensor, adjustable sensitivities, LED indicator for both technologies, isolated relay, 24 VDC operable, 277 volt power pack, 1200 square feet - wide angle coverage. Watt Stopper DT-200L, white color. Provide minimum one (1) power pack for every room.

B. Wall mounted line voltage passive infrared occupancy sensor shall have adjustable 30 second to 30 minute time delay, manual off switches for bilevel lighting control, integrated adjustable light level sensor, adjustable sensitivity, LED indicator, 900 square feet - 180 degree coverage. Color shall be white.

PART 3 EXECUTION

3.01 APPLICATION

A. Provide outlets as noted on the Drawings and herein described.

B. Provide GFCI type outlets in all bathrooms, anywhere within 6 feet of sinks, lavatories, mop basins, in pool and pool equipment rooms, and in all exterior locations.

C. Provide GFCI type outlets for all 120 volt devices located in kitchens and other food preparation rooms.

D. Provide weatherproof covers on GFCI outlets in pool and pool equipment rooms. Provide weatherproof "in use" covers on GFCI outlets exterior to the building.

E. Provide tamper resistant devices in all rooms and areas where children under eight (8) years old may be present.

F. Provide 30 mA GFCI type outlets for heat trace type or ice melting gutter heating tape.

3.02 INSTALLATION

A. Install wiring devices as indicated, in compliance with the 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 installation of wiring devices with other work, including painting, electrical box and wiring work, as necessary.

C. Install wiring devices only in electrical boxes, which are clean, free from excess building materials, dirt and debris.

D. All devices shall be connected to conductors using the side wiring terminal screw connections with conductor bend in a circle for maximum surface contact. Devices with voltages higher than 120 volt shall have two (2) layers of electrical tape applied over the exposed side terminals. Provide electrically continuous, tight grounding connections for wiring devices, as required by NEC Article 250.

E. Delay installation of wiring devices and wall plates until after painting work is completed. Wiring devices may be installed prior to painting where protective plastic covers are used. All wiring devices and covers shall be clean and free of paint upon completion of work.

F. Upon installation of wall plates and receptacles, advise other Contractors regarding proper and cautious use of convenience outlets. At time of Contract Completion, replace those items which have been damaged, including those burned and scored by faulty plugs.

G. Install matching device plates on all devices. Devices shown grouped on the Drawings shall be ganged together with one plate.

H. Ceiling mounted occupancy sensors shall not be installed within 3 feet of an HVAC diffuser. Provide lens shields as required to prevent nuisance operation of occupancy sensors. Locate or aim sensors so they sense all areas of the room, but not out the doorway.

I. Install engraved flush switch plates at all locations indicating function of switches for special applications and at every location where more than two switches are ganged together. Engraved switch plates shall have 1/8 inch black filled letters.

J. Provide permanently installed barriers between switches ganged in outlet boxes where the voltage between adjacent switches exceeds 300 volts.

K. Run neutral conductor to all dimmers.

L. Receptacle plates shall be labeled with permanent marker on the back with panelboard and circuit number.

M. All unused outlet boxes shall have blank coverplates installed.

N. Wiring from ground-fault circuit-interrupters shall not occupy the same raceways with wiring from non-ground-fault interrupting type devices.

O. Occupancy sensors to be initially set at 75% maximum sensitivity and 5 minute time delay. Locate all occupancy sensor power packs and slave packs above lay-in ceiling at room entry location.

P. Tamper resistant duplex receptacles shall have their coverplates attached with tamper proof screws.

Q. Wiring devices shall be installed with grounding pin on top.

3.03 OCCUPANCY SENSOR OPERATION VERIFICATION

A. Contractor shall verify proper operation of every occupancy sensor in building at completion of project. Provide appropriate masking on sensor where line-of-site extends out of room and causes nuisance operation when room is vacant.

3.04 SPARE PARTS

A. Furnish spare occupancy sensors in a quantity of 5% of total (of each type) used in building (minimum of two (2) of each type).

C. Two screwdrivers for any specialty fasteners used.

3.05 TESTING

A. Prior to energizing circuitry, test wiring devices for electrical continuity, short circuits, and proper polarity connections.

B. Verify that occupancy sensors are turning off lighting when spaces are unoccupied. Each sensor shall be tested for proper operation with HVAC system operational.

END OF SECTION

SECTION 26 28 13
FUSES

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish and install fuses as herein specified and sized as shown on the Drawings.

B. Provide all accessories as specified.

C. All fuses shall be provided by the same Manufacturer.

1.02 QUALITY ASSURANCE

A. All equipment shall be UL listed and labeled and in accordance with applicable NEMA and ANSI Standards.

1.03 SUBMITTALS

A. For Review:
1. Product data sheets of fuses and accessories
2. Fuse curves and selectivity ratio charts

B. To be included in Record and Information Manuals:
1. One (1) copy of each approved submittal
2. Certificate of Material Receipt

1.04 MANUFACTURERS

A. Fuses
1. Bussmann
2. Littelfuse
3. Mersen

PART 2 PRODUCTS

2.01 FUSES - 600 AMPERES AND BELOW

A. Fuses shall be rated 600 volt for nominal 480 volt systems and 250 volt for nominal 240 or 208 volt systems. Fuses shall be UL Class RK, current limiting, 200,000 Ampere interrupting rating, dual element, with minimum time delay of 10 seconds at 500 percent rating.
1. Bussmann LPN-RK (250 volt) or LPS-RK (600 volt)

B. Motor control circuits shall use 600 volt, UL Class CC, current limiting, 200,000 Ampere interrupting rating, single element, non-time delay fuses.
   1. Bussmann

2.02 FUSE REDUCERS

A. Fuse reducers shall be Bussmann 200-R or 600-R Series.

2.03 SPARE FUSE CABINET

A. Spare fuse cabinet shall be heavy 0.080" gauge aluminum wall mountable cabinet with internal shelves, 30" x 24" x 12", locking handle with cylinder type lock.

B. Bussmann SFC

PART 3 EXECUTION

3.01 INSTALLATION

A. Install fuses in all fusible devices with name and fuse size facing outward.

B. Install spare fuse cabinets in main electrical room. Provide a list of all spare fuse sizes, types and quantities on inside of door.

C. Install fuse reducers in equipment where required.

3.02 SPARE PARTS

A. Provide spare fuses in the following quantities:
10% of quantity used (minimum three (3)) of each
voltage and current rating and UL Class

B. Refer to Section 26 00 99, "Requirements for Contract Completion."

END OF SECTION

SECTION 26 28 16
SAFETY SWITCHES

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish and install safety switches where shown on the Drawings, and where required including all accessories and mounting hardware.

1.02 QUALITY ASSURANCE

A. All equipment shall be UL listed and labeled and in accordance with applicable NEMA and ANSI Standards.

1.03 SUBMITTALS

A. For Review:
   1. Product data sheets of safety switches

B. To be included in Record and Information Manuals:
   1. One (1) copy of each approved submittal

1.04 MANUFACTURERS

A. Safety Switches
   1. Square D Company
   2. Cutler-Hammer Electric Corporation
   3. Siemens Energy & Automation, Inc.
   4. General Electric Company

B. AC manual toggle disconnect switch
   1. Leviton

C. Equipment shall be furnished by the Manufacturer supplying major components of the electrical distribution system.

PART 2 PRODUCTS

2.01 SAFETY SWITCHES - NON-FUSIBLE

A. Safety switches shall have heavy-duty, single-throw, quick-make, quick-break, visible knife blade operators mounted in hinged cover steel enclosure. Lugs shall be listed for 75 degrees C ampacity aluminum or copper wire.

B. Switches shall be clearly labeled for "ON" and "OFF" handle positions. Cover shall have defeatable safety interlock with handle to prevent inadvertent opening when in the "ON" position. Handle shall be pad lockable in the "OFF" position.

C. Safety switches to be horsepower rated 600 volt AC.

D. Switches shall have ground lug kit and neutral when required.

2.02 SAFETY SWITCHES - FUSIBLE

A. Fusible safety switches shall be as specified in Paragraph 2.01 and with the following additional features:
   1. Safety switches rated 600 Amperes and less shall have spring reinforced, plated fuse clips with rejection feature for Class R fuses.
   2. Safety switches rated larger than 600 Amperes shall have provisions for Class L fuses.
   3. Short circuit-interrupting rating shall be 200,000 Amperes RMS symmetrical.
   4. Safety switches to be horsepower rated 240 volt AC for 208 or 240 volt usage, and 600 volt AC for 480 volt usage.

2.03 AC MANUAL TOGGLE DISCONNECT SWITCHES

A. Toggle disconnect switch shall be snap switch with copper mechanism, silver alloy contacts, 10,000 Ampere withstand rating, in a NEMA 1 enclosure. 1, 2, or 3 pole with amperages of 30 to 60 Amperes, as required for load connected.

PART 3 EXECUTION

3.01 APPLICATION

A. Provide the following NEMA rated enclosure types in these locations:
   1. Interior - 1
   2. Exterior - 3R

B. Provide AC manual toggle disconnect switch in NEMA 1 enclosure for disconnecting means located at instantaneous electric water heaters.

3.02 INSTALLATION

A. Use flexible conduit to and from safety switches where vibration isolation is required.

B. Install safety switches securely to building structure. Install safety switches on freestanding metal framing system support where mounting to building structure is not feasible or where shown on the Drawings. Framing system shall be galvanized steel.

C. Safety switches located downstream of variable frequency drives shall have auxiliary control power interlock switch on handle. Run wiring to variable frequency drives.

D. Provide fuses sized in accordance with Equipment Manufacturer's data plate.

E. Provide nameplates in accordance with Section 26 05 53, "Electrical Identification."

F. Touch-up all scratches on enclosure after installation.

END OF SECTION

SECTION 26 51 14
LUMINAIRES

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish and install luminaires, LED modules, and drivers as herein specified and shown on the Drawings.

B. Luminaire Manufacturer and model numbers shall be as scheduled on the Drawings. Luminaires not bearing a letter symbol shall match adjacent luminaire in space.

C. All LED modules and drivers for a given luminaire type shall be by the same Manufacturer.

1.02 QUALITY ASSURANCE

A. All equipment shall be UL listed and labeled and in accordance with applicable NEMA and ANSI Standards.

1.03 SUBMITTALS

A. For Review:
   1. Luminaires
      a. Product data sheets for each fixture.
      b. Lamp product data sheets for each fixture.
      c. LED driver or power supply product data sheets for each fixture.
   2. Construction Drawings for custom luminaires

B. To be included in Record and Information Manuals:
   1. One (1) copy each of approved submittal
   2. Certificate of Material Receipt

1.04 MANUFACTURERS

A. Luminaires
   1. Refer to Luminaire Schedule on the Drawings.

B. LED/LED Module
   1. Osram/Sylvania Corporation
   2. Philips Lighting Company
   3. Cree

C. LED Driver
   1. Emergency
      a. Bodine Company
      b. Iota Engineering Company
      c. Chloride Systems

PART 2 PRODUCTS

2.01 LED LUMINAIRES

A. Luminaires shall be as scheduled on the Drawings.

B. Recessed LED luminaires shall have integral thermal protection.

C. LED luminaire shall be rated for installation/ambient temperature from -40 degrees C to +40 degrees C.

D. LED luminaire shall be modular in design with the ability to replace individual components without having to replace the entire luminaire.

E. LED luminaire shall have a minimum CRI of 80.

2.02 LED/LED MODULE

A. Unless specifically indicated otherwise per the luminaire schedule, all LED lamp colors shall be 4000K.

B. LED/LED Module shall be rated for a minimum of 50,000 hours of life at 85% output (L85).

C. LED/LED Modules shall originate from a common manufactured batch source.

D. LED/LED Modules shall adhere to LED package manufacturer guidelines, certification programs, and test procedures for thermal management.

2.03 LED DRIVER

A. LED driver shall have a rated life of a minimum of 50,000 hours.

B. Driver shall be FCC Part 15 compliant, UL 8750.

C. Driver shall meet ANSI C62.41 category A surge protection standards up to and including 4 kV.

D. Driver shall have a power factor greater than 0.90.

E. Emergency LED drivers shall be integral mounted, ninety (90) minute capacity, sealed maintenance free nickel cadmium battery and integral charger, operate at rated lumen output of fixture or next highest lumen output available providing no less than 50% of the standard lumen output, and have remote mountable charging indicator light and test switch. Led drivers shall feature a self-diagnostic circuit that automatically tests unit and reports failure with an audible and visual alarm. (Bodine BSL Series or equivalent)

2.04 LUMINAIRE ACCESSORIES

A. Luminaires located in mechanical and electrical rooms, shops, workrooms, and gymnasiums shall have appropriate guards provided with each luminaire.

B. Luminaires located in gypsum board (drywall) or plaster ceilings shall have appropriate plaster rings provided with each luminaire.

C. Luminaires provided by the Manufacturer with cords attached shall be coordinated by the Division 26 Contractor so that cord lengths are of appropriate lengths for each luminaire installation.

D. Luminaires shall be provided with all required mounting hardware for a complete installation.

PART 3 EXECUTION

3.01 APPLICATION

A. LED dimming drivers shall be provided in luminaires as required to provide dimming as shown on the Drawings.

B. Each driver shall have a disconnecting means located within 24 inches of the driver.

3.02 INSTALLATION

A. Luminaires shall be securely mounted to elements of the building structure such that they will be square, plumb, and rigid, and will not fall or sag. Flush luminaires shall be furnished with installation provisions compatible with the suspended acoustical system furnished by the General Trades Contractor. This Contractor shall verify the actual suspension system to be used and make all adjustments in luminaire installation provisions.

B. All open type troffers shall be shipped from the Manufacturer with the louver enclosed in plastic wrap. The Contractor shall install the luminaires with the plastic wrap intact and only remove the wrap after the work environment is clean. Contractor shall patch any holes in the wrap to keep dirt out of the luminaire during construction.

C. All luminaires mounted in suspended acoustical tile ceilings shall be securely attached to the ceiling grid system by removable grid clips or fasteners. Recessed "can" type luminaires shall have bar hangers attached to the ceiling grid system.

D. All luminaires mounted on suspended acoustical tile ceilings shall be mounted to junction boxes with bar hangers attached to the ceiling grid system. In addition, luminaires heavier than ten (10) pounds shall have hangers attached to the ceiling grid system.

E. All luminaires that are wall mounted or surface mounted to other than suspended acoustical tile ceilings shall be attached to outlet boxes that are securely supported to the building structure and UL listed for luminaire support.

F. All surface mounted and recessed luminaires installed in suspended acoustical tile ceilings, shall have a supplemental support means attached to the building structure consisting of chain or cable, installed with 6 inches of slack. This support means shall be attached from the structure to the luminaire at each end and shall be capable of suspending the luminaire in the event the ceiling grid at the luminaire is removed.

G. Clean both inside and outside surfaces of luminaires after installation. No luminaires shall be installed until the painting work of the General Trades Contractor is completed. Damaged, deformed or defective luminaires are to be replaced.

H. All luminaires are to be in working order at the time of Contract Completion. This Contractor shall replace all defective LED components with new LED components up until the time of Contract Completion.

I. Prewired flush luminaire shall have minimum 90 Degree C wiring. Junction box capacity shall be sufficient for the circuit wiring requirements.

J. Furnish all required installation accessories for the luminaires as required for specific location whether or not included in the Manufacturer's catalog number. Such accessories include plaster frames, rings, flanges, canopies, stem hangers, and suspension straps. REFER TO ARCHITECTURAL ROOM TREATMENT SCHEDULE.

K. Designated night light, emergency egress, and exit signage luminaires shall be connected ahead of any switching.

L. Install LED emergency drivers integrally within the luminaire if possible; otherwise, remote mounted from the luminaire to building structure above ceiling. Install test switch/charging light plate in ceiling tile next to luminaire. Wet, outdoor, or hazardous location luminaires shall have their emergency drivers installed within the confines of the building in a heated non-hazardous area.

M. Luminaires provided by the Manufacturer with cords attached shall be coordinated by the Division 26 Contractor to assure adequate cord length for each individual luminaire installation.

O. Coordinate exact wiring requirements to luminaire ballasts with Manufacturer.

P. Flexible conduit or cord run down to suspended luminaires shall be installed along side of the suspension chain and neatly attached along its entire length.

Q. Fixture whips shall be of a minimum size as specified in Section 26 05 10, "Wire and Cable" and Section 26 05 33, "Conduit and Fittings".

3.04 WARRANTY

A. LED luminaires and emergency drivers shall have a Manufacturer's full warranty for five (5) years.

B. LED boards shall not deviate beyond two (2) SDCM from initial color during warranty period, or manufacturer shall provide replacement boards at no cost.

END OF SECTION

SECTION 26 90 01
SPECIAL REQUIREMENTS FOR WATER FEATURES

PART 1 GENERAL

1.01 DESCRIPTION

A. Provide the following inside pool equipment room and at pool :
   1. Conduits shall be fiberglass or PVC coated steel. Boxes shall be fiberglass or PVC coated steel with gasketed covers.
   2. Outlets shall be GFCI with flip lid weatherproof covers.
   3. All fasteners, hangers, supports, and cable shall be of fiberglass or stainless steel.
   4. An equipotential grounding system shall be provided around pool. Provide a bare #2 copper conductor ground loop around each pool within the concrete within 3 feet of the water edge. Bond to each of these metal items with #6 conductor.
      a. Gutter drains
      b. Rebar every 10 feet
      c. Stanchions
      d. Steps
      e. Grab rails
      f. Handrails
      g. Pool piping

PART 2 PRODUCTS

A. Refer to appropriate Sections in these Specifications.

PART 3 EXECUTION

3.01 INSTALLATION

A. Bond equipotential grounding system to main grounding system in building.

END OF SECTION

SECTION 27 10 00
STRUCTURED CABLING

PART 1 GENERAL

1.01 DESCRIPTION

A. This document describes the product and execution requirements related to furnishing and installing the Structured Cabling System as shown on the Drawings and specified herein.

1.02 SCOPE OF WORK

A. Provide outlets where shown on the drawings; horizontal cabling to the nearest TR; hangers and supports; termination and testing; installation of patch panels into existing racks.
B. Unless noted otherwise on the Drawings, for all 4 pair Category cable, this project shall use T568B termination for eight (8) position modular jack pair assignments as specified per the ANSI/TIA 568-C wiring standard.

C. Test and label the entire installation as specified and required by the codes and standards.

D. All hangers and support material shall be galvanized or stainless steel, rust free material.

1.04 SUBMITTALS

A. Product Data Sheets
   1. All products matching existing manufacturer and brand of equipment.
   2. Copies of all certifications

PART 2 PRODUCTS

2.01 HORIZONTAL CABLING

A. Copper Station Cabling from the TR to the work area jack shall be:
   1. Category 6, UTP, 4 pair, plenum rated approved manufacturers:
      a. Belden 3613
      b. BerkTek LanMark 1000
      c. Mohawk AdvanceNet
      d. Superior Essex DataGain Cat 6+
   2. Category 6a, UTP, 4 pair, plenum rated approved manufacturers:
      a. Belden 10GXS13
      b. BerkTek LanMark 10G2
      c. Mohawk GigaLAN 10 Reduced Diameter
      d. Superior Essex 10GainXP
   3. Category 6, UTP, 4 pair, OSP rated approved manufacturers
      a. Belden OSP6U 0101000
      b. BerkTek LANmark 6 OSP UTP
      c. Mohawk LAN-Trak 6 OSP M57622

d. Superior Essex CMR/CMX Cat 6

B. Copper station cabling from the TR shall be terminated in an eight (8) position Category 6 modular jack using T568B termination for eight (8) position modular jack pair assignments.

C. Cabling for wireless access point shall be two Category 6a cables with a 25 foot figure 8 service loop for each AP (unless otherwise noted).

2.02 MTR AND TR CONNECTIONS

A. Horizontal Copper station cabling from the TR shall be terminated in an eight (8) position modular jack using T568B termination for eight (8) position modular jack pair assignments.

B. Patch panels for Category 6 cables shall be:
1. Belden Category 6 KeyConnect 6+
2. Leviton eXtreme 6+
3. Ortronics Category 6

C. Patch panel for Category 6a cables shall be:
1. Belden Category 6A KeyConnect 10GX
2. Leviton eXtreme 6a
3. Ortronics Category 6a

D. Patch panel shall be standard or modular type punchdown patch panels.

2.03 WORK AREA OUTLETS

A. Work area faceplates for flush devices in interior partitions shall be stainless steel.

B. Work area faceplates for flush devices on concrete block walls shall match others but be "Jumbo" plates.

C. Work area jacks for Category 6 cables shall be:
1. Belden Category 6+ KeyConnect 6+
1. Leviton eXtreme 6+
2. Ortronics Category 6

D. Work area jacks for Category 6a cables shall be:
1. Belden Category 6a KeyConnect 10GX
2. Leviton eXtreme 6a
3. Ortronics Category 6a

E. Wall Phone Plate, stainless steel, single gang, one-port shall be:
1. Belden AX104230
2. Leviton eXtreme 6+
3. Ortronics Category 6

F. Wireless 2-port surface mount box for connection shall be Leviton 41089-2WP or equivalents by Ortronics, Panduit, and Belden.

2.12 WORK AREA EXTENSIONS TO DEVICE

A. Patch Cords shall be manufactured and supplied by the manufacturer of the connectivity and shall be rated for the same performance specifications as the cabling and connectivity being utilized.

B. Unless otherwise indicated on the Drawings, the Contractor shall provide two cables for each work area outlet data jack (one for work area outlet and one for TR) and one cable for each wall phone jack (for TR only). Of the cables provided, the Contractor shall supply 25% of the cables as 3 feet (1 meter), 50% as 10 feet (3 meters), and 25% as 15 feet (5 meters). Refer to the Technology Drawings for any specific quantities and lengths that may override these criteria. Category 6a patch cords shall be used for category 6a connectivity.

C. Unless otherwise noted, mounting and installing of work area equipment such as computers, phones printers, etc. are not part of the SCC's scope of work under this Specification.

2.13 HANGERS AND SUPPORTS

A. J-Hooks
1. J-hooks shall be at least 1 inch hook size, minimum.
2. J-hooks shall not be over 4 inch hook size (for locations requiring 100 4-PR Category 6 cables or more, use basket tray).
3. J-hooks shall be manufactured from Spring Steel. Securable to wall, beam, threaded rod, unistrut, or pipe.
4. May utilize multi-tier configuration.
5. J-hooks shall have no sharp edges.
6. Approved J-Hook Manufacturers:
   a. Cooper B-Line J-hook
   b. ERICO, type Cable Cat 21 and 32
   c. Mag Daddy or approved equivalent

PART 3 EXECUTION

3.01 HORIZONTAL CABLING INSTALLATION

A. Provide labor, supervision, and materials as required for a complete installation of the horizontal cabling system that includes, but is not limited to, cabling from the TR to the work area, pulling, supporting, terminating, labeling, and testing.

B. Cables shall be installed in continuous lengths from origin to destination (no splices) except for transition points, or consolidation points.

C. Exception to ANSI/TIA 568-C distance limitations for horizontal category 6 cables. Extending Ethernet and POE Ethernet cabling distances beyond the 100 meter limit is permitted using Ethernet extenders for devices such as CCTV cameras, wireless access points, and IP blue light telephones. The cable must be tested to the extender manufacturer's specifications. Only use this exception where noted on the drawings.

3.02 WORK AREA INSTALLATION

A. Provide labor, supervision, and materials as required for a complete installation of work area that includes, but is not limited to, terminating cable, placing the jacks and modules, faceplates, labeling and testing.

B. Upon completion of the project, clean work area and leave ready for move-in; remove all marks, fingerprints, trash, and other debris from area.

3.03 HANGERS AND SUPPORTS INSTALLATION

A. J-hooks shall be securely fastened to wall, steel, or pipe and shall not be spaced more than 4 feet on center.

3.04 CABLE ROUTING

A. Avoid electromagnetic interference (EMI) by routing all structured cabling a minimum of:
1. 4 feet from 480 volt motors and transformers
2. 12 inches from electrical power distribution cables
3. 6 inches from lighting

B. Horizontal cable shall not exceed 90 meters.

C. Conduits shall have no more than an equivalent of two (2) 90 degree bends allowed in any single run between junction boxes.

3.05 TESTING

A. Provide a copy of the unaltered certification test reports to the Engineer in both hardcopy and electronic format. The Contractor shall also provide a copy of the associated Cable Tester's Database Management Software with unedited soft copy.

B. Upon completion of the balanced twisted-pair cable installation, perform copper cable certification tests on the complete channel for every cable, included but not limited to:
1. Wire map
2. Length
3. Attenuation
4. Near End Cross Talk (NEXT)
5. Attenuation to Crosstalk Ratio (ACR-F)
6. Propagation Delay and Delay Skew
7. Return Loss
8. Power Sum Near End Cross Talk (PSNEXT)

9. Power Sum Equal Level Far End Cross Talk (PSELFEXT)
10. Insertion Loss

C. Test shall be performed to published standards, including but not limited to, the latest revisions of ANSI/TIA 568-C, ISO/IEC 11802 and other applicable standards at the time of installation.

D. All UTP/ScTP field testers shall be factory calibrated each calendar year by the field test equipment manufacturer as stipulated by the manuals provided with the field test unit. The calibration certificate shall be provided to the Engineer for review prior to the start of testing.

3.06 WARRANTY

A. The SCC shall provide a minimum twenty (20) year extended Product and Applications Warranty on parts and labor from the Connectivity Manufacturers (certified Contractor Program).

END OF SECTION