

***PROJECT MANUAL FOR
UNIVERSITY OF WISCONSIN STEVENS POINT
MARATHON COUNTY
FIELDHOUSE PLUMBING AND POOL PIPING
REPLACEMENT PROJECT***

***FOR
MARATHON COUNTY***

JANUARY 21, 2020

PREPARED BY:

AQUATIC DESIGN SOLUTIONS, LLC

***17921 FULDA TRAIL
LAKEVILLE, MN 55044***

DOCUMENT 000105

CERTIFICATION OF WORK

UNIVERSITY OF WISCONSIN STEVENS POINT – MARATHON COUNTY
WAUSAU, WISCONSIN

All Work for Project:

DOCUMENT 000110

TABLE OF CONTENTS

<u>DOCUMENT NO.</u>	<u>TITLE</u>	<u>NO. OF PAGES</u>
000105	Certification Page	1
000110	Table of Contents	1
000115	List of Drawings	1
001116	Invitation to Bid.....	2
002114	Instruction to Bidders	3
002145	Bidders Proof of Responsibility	3
004100	Bid Form	3
007200	General Conditions	8
007310	Marathon County Standard Terms and Conditions	5
007320	Supplementary Conditions	3
009113	Addenda	1
 <u>SECTION NO.</u> <u>DIVISION 1 - GENERAL REQUIREMENTS</u>		
011113	Summary of Work	5
011490	Contract Considerations	3
013113	Project Coordination	4
013300	Submittal Procedures	6
014500	Quality Control	3
015000	Temporary Facilities and Controls	2
016000	Product Requirements.....	3
017000	Contract Closeout Requirements.....	4
017500	Starting and Adjusting	3
 <u>DIVISION 2</u>		
024119	Select Interior Demolition	5
 <u>DIVISION 13</u>		
131500	Swimming Pool General.....	1
131670	Pool Pipe and Pipe Fittings.....	5
131680	Swimming Pool Valves	3
131690	Swimming Pool Supports and Anchors	5
131700	Pool Circulation and Filtration Equipment	5
 <u>DIVISION 22</u>		
220500	Common Work Results for Plumbing.....	22
220523	General Duty Valves for Plumbing Piping	6
220553	Identification for Plumbing Piping and Equipment.....	4
220719	Plumbing Insulation.....	13
221116	Domestic Water Piping.....	10
221429	Sump Pumps	4

END OF DOCUMENT

DOCUMENT 000115

LIST OF DRAWINGS

PART 1 - GENERAL

1.01 DRAWING LIST

- A. Plan Drawings for this project are to be considered an integral part of this Contract and consist of the following:

CONTRACT DRAWING

Sheet Number

POOL PIPING DEMO PLAN
POOL PIPING PLAN
PLUMBING DEMOLITION PLAN
PROPOSED PLUMBING PLAN

PL1
PL2
P1
P2

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF DOCUMENT

DOCUMENT 00 11 16

OFFICIAL NOTICE TO VENDORS
MARATHON COUNTY, WISCONSIN
REQUEST FOR BIDS

Marathon County is issuing a request for bids to solicit qualified contractors for the University of Wisconsin Stevens Point – Marathon County - Fieldhouse Plumbing and Pool Piping Replacement Project. Following is a scope for the project:

- o Demolition of existing pool plumbing.
 - o Provide new PVC piping, new connections to existing piping, and new PVC pool valves.
 - o Provide new piping supports and hangers.
 - o New flow meters.
 - o New pool autofill systems.
 - o New surge tank overflow piping.
 - o Demolition of existing plumbing, existing hot water heating tank, existing heating system pump and existing sump pump.
 - o Provide new domestic hot water storage tanks with pumps and hot water heat exchanger. All controls/electrical shall be provided for all new equipment.
 - o Provide new sump pump.
- ***UWSP-Marathon County-Fieldhouse Plumbing and Pool Piping Replacement, 600 S 7th Ave Wausau, WI 54401***

Interested firms may obtain a copy of the Request for Bid from the Facilities and Capital Management Department, 1000 Lakeview Drive, Suite 300 Wausau, WI 54403, or on the Marathon County Website **www.co.marathon.wi**.

A Mandatory Pre Bid Meeting for interested firms has been scheduled for this project, at 10:00 AM, January 30, 2020 at the UWSP Wausau Campus Fieldhouse, 600 S 7th Street Wausau, Wisconsin 54401. Visitors will have to park in the parking lot in Marathon Park or the lot south of the Fieldhouse. We will meet in the lobby just inside the east entry of the Fieldhouse.

Bids shall be submitted to Craig Christians, at the FCM Department at the address indicated above. The envelope containing the Proposals shall bear the name and address of the interested firm and the notation "**UWSP-Marathon County-Fieldhouse Plumbing and Pool Piping Replacement.**"

All bids must be received in writing (faxed or emailed will not be accepted) at the Marathon County Facilities and Capital Management Department at 1000 Lakeview Drive, Suite 300 Wausau, WI 54403 no later than 2pm, February 13, 2020. Bids received after that date and time will NOT be accepted. Actual receipt by said time is required and deposit in the mail is insufficient.

Bids shall remain firm once submitted and may not be withdrawn for a period of ninety (90) days, subject to provisions for correction of error in the proposal as contained in section 3.05 (1) (g) of the procurement code.

SECURITY DEPOSIT:

Bids shall be accompanied by a security deposit in the form of a Bid Bond or certified check in the amount of no less than 10 percent of the Bid Sum. Endorse the Bid Bond or certified check in the name of the Owner as obligee, signed and sealed by the Contractor as principal and the Surety.

After a Bid has been accepted, all securities will be returned to the respective Bidders. For the accepted Bidder, the security deposit will be returned after execution of the Contract. If no contract is awarded, all security deposits will be returned. Include the cost of the Bid security in the Bid Sum.

Marathon County reserves the right to reject, in whole or in part, any and all bids; to waive any technical deficiencies in the bids; to accept the bid and award final contract to the responsible offeror determined to be the most advantageous to Marathon County. The contract shall be awarded in accordance with the terms and conditions of section 3.05 (2) (g) of the procurement code. This solicitation may be canceled if doing so is determined to be in the best interests of Marathon County. Upon award of the contract, all submitted documents become subject to the Open Records Law of the State of Wisconsin.

The General Code of the County of Marathon contains various procurement policies which are applicable to this proposed procurement. These include prohibitions against gratuities and kickbacks.

By: Craig Christians, Facility Planner
Facilities & Capital Management Dept.

SECTION 00 21 14
INSTRUCTIONS TO BIDDERS

1. SUMMARY

1.2 WORK IDENTIFIED IN THE CONTRACT DOCUMENTS

A. The work will be done under single lump sum contract.

1.3 CONTRACT TIME

- A. The project shall begin immediately upon execution of contract documents. Work on site shall not begin until May 26, 2020.
- B. Due to daily usage of the project area throughout the duration of the project, performance of the work under this Contract must be done in accordance of the defined project schedule.
- C. The project shall be Substantially Completed not later than August 1, 2020 inclusive of lead times for materials ordered for the project. Final completion shall be no later than August 15, 2020.

2. BID DOCUMENTS AND CONTRACT DOCUMENTS

2.1 DEFINITIONS

- A. Bid Documents: Contract Documents supplemented with Instructions to Bidders and Bid Form identified herein.
- B. Contract Documents: Defined in General and Supplementary Conditions.
- C. Bid, Offer, or Bidding: Act of submitting a Bid.
- D. Bid Sum: Monetary sum identified by the Bidder in the Bid Form.

2.2 CONTRACT DOCUMENTS IDENTIFICATION

- A. The Contract Documents are identified by the project name University of Wisconsin Marathon County Pool Plumbing and Piping Upgrades as provided by Aquatic Design Solutions, LLC.

2.3 AVAILABILITY

- A. Bid Documents may be reviewed at the office of the Owner.
- B. Electronic sets of Bid Documents can be obtained by each Bidder upon request.
- C. Bid Documents are made available only for the purpose of obtaining Bids for this project. Their use does not grant a license for other purposes.

2.4 EXAMINATION

- A. Bid Documents may be viewed at the office of the Owner.
- B. Upon receipt of Bid Documents verify that documents are complete. Notify Owner should the documents be incomplete.
- C. Immediately notify the Owner upon finding discrepancies or omissions in the Bid Documents.

2.5 QUERIES/ADDENDA

- A. Direct questions by e-mail only (verbal answers are not binding on any party) to the following:
Jody Dahms, Aquatic Design Solutions, LLC, (952) 356-6047, jody.dahms@aquaticdesignsolutionsllc.com
- B. Addenda may be issued during the Bidding period. All Addenda become part of the Contract Documents. Include resultant costs in the Bid Sum.
- C. Clarifications and requests for determination of equal products must be received by Owner in writing not less than 4 days before date set for receipt of Bids. The written reply, if any, will be in the form of an Addendum issued to all appropriate Bidders.

2.6 PRODUCT/SYSTEM SUBSTITUTIONS

- A. Substitute products will be considered if submitted prior to the time listed in 2.5.C - 4 days prior to bid date to be reviewed by the owner and noted as "approved equal".
- B. The submittal shall provide sufficient information to determine acceptability of such products.
- C. Provide complete information on required revisions to other Work to accommodate each substitution, the value of additions to or reductions from the Bid Sum, including revisions to other Work.
- D. Provide Products as specified unless substitutions are submitted in this manner and subsequently accepted.

2.7 REPRESENTATIONS

- A. By submitting a bid, the Bidder represents that:
- B. Bidder has visited the Project Site and is familiar with the conditions at the site which affect the Contract Sum and the performance of the Work.
- C. All Bid Sums are based on the materials, products, requirements, equipment and systems required by the contract Documents, unless any exceptions or deviations are indicated on the Bid Form.
- D. Bidder agrees to comply with provisions related to conflicts, as specified in the Supplementary Conditions, unless any exceptions or deviations are indicated on the Bid Form.

3. SITE ASSESSMENT

3.1 SITE EXAMINATION

- A. The Contractor shall visit the project site before submitting a Bid and carefully examine the Contract Documents and their relationship to existing conditions to become thoroughly familiar with the requirements of the Work.
- B. A scheduled mandatory pre bid meeting is set for 10:00 AM, January 30th 2020. See invitation to bid for location.
- C. The Contractor will not be allowed extra compensation for work required by existing conditions for which through careful examination of the site the Contractor could have become informed prior to submitting a Bid.

3.2 SUBCONTRACTORS/SUPPLIERS/OTHERS

- A. The Owner reserves the right to reject a proposed Subcontractor for reasonable cause.
- B. The Contractor shall consult the specifications for each division of the Work to ascertain the extent of the Contractor's work. The Contractor, and the Subcontractors, shall confer and cooperate to serve the best interest of the Work as a whole.

4. BID ENCLOSURES/REQUIREMENTS

4.1 WITHDRAWAL OF BIDS

- A. Bidders may withdraw, modify or cancel submitted Bids only before the date and time established for the receipt of Bids. Submitted Bids may not be withdrawn, modified or canceled after such date and time.

4.2 BID FORM REQUIREMENTS

- A. Complete all requested information in the Bid Form.
- B. Refer to Document 00 72 00- General Conditions.
- C. Refer to Document 00 73 10- Marathon County Procurement Policy for insurance requirements.

4.3 FEES FOR CHANGES IN THE WORK

- A. Include in the Bid Form, the fees proposed for changes (both additions and deductions) in the Work.

5. BID ACCEPTANCE/REJECTION

5.1 DURATION OF BIDS

- A. Bids shall remain open to acceptance by the Owner for a period of time after the Bid closing date as identified on the Bid Form.

5.2 ACCEPTANCE OF BIDS

- A. The Contract, if awarded, will be awarded to the lowest responsible and responsive Bidder on the basis of the Base Bid, and full consideration of the selected Alternatives, as may be in the best interest of the Owner. In determining responsibility, the Owner will consider the scope of the work involved, time of delivery, competency of Bidder, his ability to render satisfactory service, and past performance.
- B. The Owner reserves the right to reject any or all Bids, or parts thereof, and to award to the Bidder who, in the judgment of the Owner, will best serve the County. A bid which has not been prepared according to the instructions set forth in the Request for Bids, or which does not include a price which is both adequate and reasonable on each and every item named in the bid, may be subject to rejection. Bids may be withdrawn or modified only as allowed pursuant to Section 3.05(1) (g) of the Marathon County Procurement Code.
- C. If two or more Bidders submit identical Bids, the Owner may make award to that Bidder of his choice, and such decision shall be final.
- D. Awards will not be made to any Bidder in default of a Contract with the Owner, or to any Bidder having as his agent or employee any individual previously in default or guilty of misrepresentation.
- E. Bid results may be published in construction periodicals.

5.3 BIDDER'S QUALIFICATIONS

- A. To demonstrate qualification for performing the work on this Contract, Bidders will be requested to submit written evidence of financial position, previous experience, current commitments, and license to perform the work in the location of the project.
- B. Bidder to fill out Document 00 21 45- Bidder's Proof of Responsibility and include with their Bid Form.

5.4 BIDBOND

- A. Bids shall be accompanied by a security deposit in the form of a Bid Bond or certified check in the amount of no less than 10 percent of the Bid Sum. Endorse the Bid Bond or certified check in the name of the Owner as obligee, signed and sealed by the Contractor as principal and the Surety.
- B. After a Bid has been accepted, all securities will be returned to the respective Bidders. For the accepted Bidder, the security deposit will be returned after execution of the Contract. If no contract is awarded, all security deposits will be returned. Include the cost of the Bid security in the Bid Sum.

5.5 PERFORMANCE ASSURANCE

- A. The accepted bidder before commencing the Work shall furnish a Performance Bond and Labor and Material Payment Bond to the Owner in the following amounts:
 - 1. The Performance Bond shall be in an amount equal to 100% of full amount of the Contract Sum as security for faithful performance of the obligations of the Contract Documents and prepared on AIA Document A312 or a standard surety bond form.
 - 2. The Labor and Material Bond shall be in an amount equal to 100% of full amount of the Contract Sum as security for the payment of all persons performing labor and furnishing materials for Contract.

SECTION 00 21 45
BIDDER'S PROOF OF RESPONSIBILITY

BIDDER. _____

TO: MARATHON COUNTY

DATED _____ **AND WHICH IS AN INTEGRAL PART OF THE**
BID FORM.

1.01 BIDDER'S PROOF OF RESPONSIBILITY SHALL SUBMITTED WITH THEIR BID FORM.

- A. On all contracts, the bidder must submit a full and complete statement, sworn to before an officer authorized by law to administer oaths, of financial ability, equipment and experience in the work prescribed and of such other matters as the Owner may require for the protection and welfare of the public (Section 66.0901(2), Wisconsin Statutes).
- B. The object of the questionnaire is not to discourage bidding or make it difficult for qualified bidders to file bids. Neither is it intended to discourage beginning contractors. It is intended to make it possible for the Owner to have exact information on financial ability, equipment and experience of the bidder involved so as not to award contracts to parties apparently not qualified to perform the Work.
- C. If the Owner is not satisfied with the sufficiency of the answers to the questionnaire and financial statement, it may disqualify the Bidder or require additional information (Section 66.0901(4), Wisconsin Statutes).
- D. Any questions regarding the information to be provided on this form should be directed to the Owner

1.02 STATEMENT OF BIDDER'S QUALIFICATIONS

- A. Name of Bidder: _____

Bidder's Address: _____
- B. Type of Organization (check one): Corporation _____ Partnership _____ Individual _____
Joint Venture _____ Other _____ If other, attach a brief statement describing the organization.
- C. When organized? _____
- D. If a corporation, when and where incorporated _____

- E. Attach a statement listing the corporate officers, partners or other principal members of your organization and detailing the background and experience of the principal members of your personnel, including the officers.
- F. How many years has your organization been engaged in the contracting business under the present firm name? _____
- G. General character of work performed by your firm?

- H. Attach a list of contracts on hand, for both public and private construction, including for each contract, the class of work, the contract amount, the percent completed, the estimated completion date, and the name and address of the Owner or contracting officer.

- I. Has your organization ever defaulted on a contract or failed to complete any work awarded to it?
Yes No . If so, attach a statement stating where and why.
- J. Has an officer or partner of your organization been an officer or partner of some other organization within the past 5 years that failed to complete a construction contract during that period?
Yes No _____. If so, attach a statement indicating the name of the individual, other organization and explain where and why.
- K. Has any officer or partner of your organization within the past 5 years failed to complete a construction contract handled in his/her own name? Yes _____No. _____. If so, attach a statement indicating the name of individual and explain where and why.
- L. Attach a list of the major projects your organization has completed within the past 3 years, including for each project: the class of work, the contract amount, the completion date, the name and address of the owner or contracting officer.
- M. Attach a list of major equipment which is available to your organization for the proposed work. Indicate type, model, age and condition.
- N. Attach a statement of your experience in the construction of work similar in nature and importance to this project.
- O. Credit available: Attach a letter from your bank(s) or other financial institution(s) advising line of credit set up for your organization.

1.03 NAME OF INSURANCE COMPANY AND NAME, ADDRESS AND TELEPHONE NUMBER OF AGENT

1.04 FINANCIAL STATEMENT:

A. Condition at close of business on	_____ , 20 __.
B. Assets	
1. Cash	\$ _____
2. Accotmts Receivable	\$ _____
3. Real Estate Equity	\$ _____
4. Materials in Stock	\$ _____
5. Equipment, Book Value	\$ _____
6. Furniture and Fixtures, Book Value	\$ _____
7. Other Assets	\$ _____
C. Liabilities	
1. Accounts, notes and interest payable	\$ _____
2. Other Liabilities	\$ _____
D. NET WORTH	\$ _____

The undersigned certifies that he is a Certified Public Accountant and that he knows by personal inspection of the books of account of the affiant contractor that the facts of the above financial statement are true and correct as of the closing date indicated.

Signature Certified Public Accountant

1.05 ADDITIONAL INFORMATION MAY BE SUBMITTED IF DESIRED.

- A. _____
- B. _____
- C. _____
- D. _____

1.06 DATED AT _____ THIS DAY OF _____, 20____.

State of _____

County of _____

_____, being duly sworn according to law, says
(Name of Contractor)

That he/she is of _____
(Name of Organization)

and that the answers to the foregoing questions and all statements contained herein are true and correct.

SIGNED _____

(Contractor)

Subscribed and sworn to before me this

_____ day of _____, 20_____

----- Notary Public

_____ Co. _____

My Commission expires _____

Business Phone: _____

Business Fax: _____

END OF SECTION

DOCUMENT 00 41 00

BID FORM

OWNER: Marathon County

PROJECT: University of Wisconsin Stevens Point - Marathon County
Fieldhouse Plumbing and Pool Piping Replacement

THIS BID IS SUBMITTED TO: Marathon County
1000 Lakeview Dr, Suite 300
Wausau, WI 54403

In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

- A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of all which is hereby acknowledged:

Addendum No.

Addendum Date

- B. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.
- C. Bidder does not consider that any further examinations, investigations, exploration, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.
- D. Bidder is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Bidding Documents.
- E. Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by ENGINEER is acceptable to Bidder.
- F. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

- G. Bidder further represents that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

Bidder shall complete the Work in accordance with the Contract Documents for the following prices:

A. CONTRACT BID:

Lump Sum Contract Price _____ (use words)
_____ (\$ _____) (use figures)

Bidder agrees that the Work will be substantially completed and ready for final payment in accordance with the Supplementary Conditions on or before the date indicated in the Agreement.

The terms used in this Bid with initial capital letters have the meanings indicated in the Instruction to Bidders, the General Conditions, and Supplementary Conditions.

The successful bidder will be required to sign a contract for the contract awarded.

Name of Contractor _____

Signature _____

Name (print) _____

Address _____

Phone Number _____

Email address _____

Date _____ Amount of bid bond _____

SUBMITTED on _____, 20 _____.

END OF DOCUMENT

DOCUMENT 00 72 00

GENERAL CONDITIONS

ARTICLE 1 - GENERAL PROVISIONS

1.1 THE CONTRACT

The Contract represents the entire and integrated agreement between the parties and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a written modification.

1.1.1 The Contractor's completed Bid Form shall be included in the Contract Documents.

1.2 THE WORK

The term "Work" means the construction and services required by the Contract Documents, and includes all other labor, materials, equipment and services provided by the Contractor to fulfill the Contractor's obligations.

1.3 THE INTENT

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.

1.3.1 All Work shown and specified is intended to be included in the Contract. Therefore, Work shown on the Drawings and not specified shall be included in the Contract, and Work identified in the Specifications and not shown on the Drawings shall be included in the Contract.

1.3.2 It shall be the responsibility of the Contractor to establish the extent of the work of each Subcontractor and each trade.

1.3.3 If a conflict in Contract Documents occurs the following shall apply:

1.3.3.1 Addenda or modifications of any nature to the drawings and specifications take precedence over the original Contract Documents.

1.3.3.2 Where a conflict occurs in the Documents, not reconciled by Addenda, the installation of greater quantity and better quality shall be provided.

1.3.3.3 Where a conflict occurs between the Specifications and the Drawings, not reconciled by Addenda, the installation of greater quantity and better quality shall be provided.

1.3.3.4 Where work or materials are shown or specified in more than one location in the contract documents which results in a duplication of work by more than one Contractor, the Contractors shall include the cost for such work or materials in their contracts and the Owner shall determine which Contractor shall provide the work or materials and which Contractor shall provide a credit to the Owner.

1.3.4 Drawings are in part diagrammatic, intended to convey the scope of the work, and indicate general arrangement of materials and equipment. Drawings are not necessarily to scale and the printed dimensions should be used, not scaled measurements. Each Contractor shall become familiar with all conditions affecting the Contractor's work and shall consult all construction drawings and specification sections.

1.3.5 All details and notes on the Drawings shall be considered to be typical and what is shown or noted in one instance shall apply to all similar and related instances whether or not the detail or note is repeated.

1.3.6 Small details and related material not usually drawn or specified, but necessary for the proper installation and completion of the Work, shall be furnished and installed by the Contractor without extra charge, the same as if specified in the Project Manual or shown on the Drawings.

1.3.7 These Drawings and Specifications are intended for use only for this Project on this site and should not be used for other projects on the same or different site.

1.4 THE OWNER

The Owner as referenced in the Contract Documents is Marathon County, also referred to elsewhere in the Contract Documents as “The County”. The agent for the County is the Marathon County Facilities & Capital Management Department.

1.5 THE CONTRACTOR

The term “Contractor” when used in any section of the specifications, means the Contractor who has a contract directly with the Owner.

ARTICLE 2 - OWNER

2.1 INFORMATION AND SERVICES REQUIRED OF THE OWNER

Except for permits and fees which are the responsibility of the Contractor under the Contract Documents, the Owner shall obtain and pay for other necessary approvals, easements, assessments and charges.

2.2 OWNER’S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work which is not in accordance with the Contract Documents, the Owner may direct the Contractor in writing to stop the Work until the correction is made.

2.3 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 seven day period after receipt of written notice from the Owner to correct such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies, correct such deficiencies. In such case, a Change Order shall be issued deducting the cost of correction from payments due the Contractor.

2.4 OWNER’S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

2.4.1 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.

2.4.2 The Contractor shall coordinate and cooperate with separate contractors employed by the Owner.

2.4.3 Costs caused by delays or by improperly timed activities or defective construction shall be borne by the party responsible therefore.

ARTICLE 3 - CONTRACTOR

3.1 EXECUTION OF THE CONTRACT

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

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Owner. Before commencing activities, the Contractor shall: (1) take field measurements and verify field conditions; (2) carefully compare this and other information known to the Contractor with the Contract Documents; and (3) promptly report errors, inconsistencies or omissions discovered to the Owner.

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.

3.3.2 The Contractor, as soon as practicable after award of the contract, shall furnish in writing to the Owner the names of subcontractors or suppliers for each portion of the Work. The Owner will promptly reply to the Contractor in writing if the Owner, after due investigation, has reasonable objection to the subcontractors or suppliers listed.

3.3.3 The Contractor shall have a qualified superintendent on the construction site at all times while work on the Project is being performed. The Owner shall have the right to review the qualifications of the Contractor's superintendent and reject the superintendent at Owner's discretion.

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, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work.

3.4.2 The Contractor shall deliver, handle, store and install materials in accordance with manufacturers' instructions.

3.5 WARRANTY

The Contractor warrants to the Owner that: (1) materials and equipment furnished under the Contract will be new and of good quality unless otherwise required or permitted by the Contract Documents; (2) the Work will be free from defects not inherent in the quality required or permitted; and (3) the Work will conform to the requirements of the Contract Documents.

3.5.1 Where warranties are specified in the individual specification sections for products, materials, systems, and equipment, provide the specified warranties from the supplier of the products, materials, systems, and equipment. In the event the specified warranties are not available from the suppliers, the Contractor shall provide the specified warranties unless the Contractor has stated an exception in the Bid Form.

3.6 PERMITS, FEES AND NOTICES

3.6.1 The Contractor shall obtain and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work.

3.6.2 The Contractor shall comply with and give notices required by agencies having jurisdiction over the Work. If the Contractor performs Work knowing it to be contrary to laws, statutes, and ordinances, building codes, and rules and regulations without notice to the Owner, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs.

The Contractor shall promptly notify the Owner in writing of any known inconsistencies in the Contract Documents with such governmental laws, rules and regulations.

3.7 SUBMITTALS

The Contractor shall promptly review, approve in writing and submit to the Owner Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents. Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents.

3.8 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, the Contract Documents and the Owner.

3.9 CUTTING AND PATCHING

The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

3.10 CLEANING UP

The Contractor shall keep the premises and surrounding area free from accumulation of debris and trash related to the Work.

3.11 INDEMNIFICATION

To the fullest extent permitted by law, the Contractor agrees to release, indemnify, defend, and hold harmless Marathon County, their officials, officers, employees and agents from and against all judgments, damages, penalties, losses, costs, claims, expenses, suits, demands, debts, actions and/or causes of action of any type or nature whatsoever, including actual and reasonable attorney's fees, which may be sustained or to which they may be exposed, directly or indirectly, by reason of personal injury, death, property damage, or other liability, alleged or proven, resulting from or arising out of the performance of contractor, its officers, officials, employees, agent or assigns. Marathon County does not waive, and specifically reserves its right to assert any and all affirmative defenses and limitations of liability as specifically set forth in Wisconsin Statutes, Chapter 893 and related statutes.

ARTICLE 4 - OWNER'S ADMINISTRATION OF CONTRACT

4.1 The Owner will provide administration of the Contract as described in the Contract Documents.

4.2 The Owner will visit the site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the Work.

4.3 The Owner will not have control over or charge of and will not be responsible for construction means, methods, techniques, procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility. The Owner will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

4.4 Based on the Owner's observations and evaluations of the Contractor's Applications for Payment, the Owner will review and certify the amounts due the Contractor.

4.5 The Owner will have authority to reject Work that does not conform to the Contract Documents.

4.6 The Owner will promptly review and approve or take appropriate action upon Contractor's submittals such as 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.

4.7 The Owner will promptly interpret and decide matters concerning performance under and requirements of the Contract Documents on written request of the Contractor.

- 4.8** Interpretations and decisions of the Owner 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.

ARTICLE 5 - CHANGES IN THE WORK

- 5.1** After execution of the Contract, changes in the Work may be accomplished by Change Order or by order for a minor change in the Work. The Owner, without invalidating the Contract, may 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.
- 5.2** A Change Order shall be a written order to the Contractor signed by the Owner to change the Work, Contract Sum or Contract Time.
- 5.3** The Owner will have authority to order minor changes in the work not involving changes in the Contract Sum or the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be written orders and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.
- 5.4** If concealed or unknown physical conditions are encountered at the site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, the Contract Sum and Contract Time shall be subject to equitable adjustment.

ARTICLE 6 - TIME

- 6.1** Time limits stated in the Contract Documents are of the essence of the Contract.
- 6.1.1** Contract time is identified in Document 00 73 20 – Supplementary Conditions.
- 6.2** If the Contractor is delayed at any time in progress of the Work 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, the Contract Time shall be extended by Change Order for such reasonable time as the Owner may determine.

ARTICLE 7 - PAYMENTS AND COMPLETION

7.1 CONTRACT SUM

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

7.2 APPLICATIONS FOR PAYMENT

- 7.2.1** At least thirty days before the date established for each progress payment, the Contractor shall submit to the Owner an itemized Application for Payment for operations completed in accordance with the Agreement. Such application shall be supported by such data substantiating the Contractor's right to payment as the Owner may reasonably require and reflecting retainage if provided for elsewhere in the Contract Documents.
- 7.2.2** 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 Payments have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or other encumbrances adverse to the Owner's interests.

7.2.2.1 Submit two (2) copies of each Application for Payment.

7.3 PROGRESS PAYMENTS

- 7.3.1** The Owner shall make payment in the manner provided in the Contract Documents.
- 7.3.2** The Contractor shall promptly pay each Subcontractor and material supplier, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such entities' portion of the Work.
- 7.3.3** The Owner shall not have responsibility for the payment of money to a Subcontractor or material supplier.
- 7.3.4** 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 requirements of the Contract Documents.

7.4 SUBSTANTIAL COMPLETION

- 7.4.1** Substantial Completion is the state 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.
 - 7.4.1.1 At the stated Substantial Completion of the Work, a Punch list comprised of the Contractor's list of Work to be completed and the Owner's additions to the list shall be issued.

7.5 FINAL COMPLETION AND FINAL PAYMENT

- 7.5.1.** Upon receipt of a final Application for Payment, the Owner will inspect the Work. When the Owner finds the Work acceptable and the Contract fully performed, Owner will promptly issue a final Payment.
 - 7.5.1.1. Completion or correction of all items on the punch list by the Contractor shall not waive the Owner's right to have other omissions and defects corrected at the Contractor's expense when such omissions and defects are discovered after completion of the Punch list items.
- 7.5.2** Final payment shall not become due until the Contractor submits to the Owner data establishing payment or satisfaction of obligations, such as receipts, claims, security interests or encumbrances arising out of the Contract.
- 7.5.3** 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 8 - PROTECTION OF PERSONS AND PROPERTY

8.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs, including all those required by law in connection with performance of the Contract. The Contractor shall promptly remedy damage and loss of property caused in whole or in part by the Contractor, or by anyone for whose acts the Contractor may be liable.

ARTICLE 9 - CORRECTION OF WORK

- 9.1** The Contractor shall promptly correct Work rejected by the Owner as failing to conform to the requirements of the Contract Documents. The Contractor shall bear the cost of correcting such rejected Work.
- 9.2** In addition to the Contractor's other obligations including warranties under the Contract, the Contractor shall, for a period of one year after Substantial Completion, correct work not conforming to the requirements of the Contract Documents.
- 9.3** If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it and the Contractor shall reimburse the Owner for the cost of correction.

ARTICLE 10 - MISCELLANEOUS PROVISIONS

10.1 ASSIGNMENT OF CONTRACT

Neither party to the Contract shall assign the Contract as a whole without written consent of the other.

10.2 TESTS AND INSPECTIONS

- 10.2.1** Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time.
- 10.2.2** If the Owner requires additional testing, the Contractor shall perform these tests.
- 10.2.3** The Owner shall pay for tests except for testing Work found to be defective for which the Contractor shall pay.

10.3 GOVERNING LAW

The Contract shall be governed by the law of the State of Wisconsin.

ARTICLE 11 - TERMINATION OF THE CONTRACT

11.1 TERMINATION BY THE CONTRACTOR

If the Owner fails to make payment when due or substantially breaches any other obligation of this Contract, following seven days' written notice to the Owner, the Contractor may terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, construction equipment and machinery, including reasonable overhead, profit and damages.

11.2 TERMINATION BY OWNER

- 11.2.1** The Owner may terminate the Contract if the Contractor:
- 11.2.1.1 persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
 - 11.2.1.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
 - 11.2.1.3 persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or
 - 11.2.1.4 is otherwise guilty of substantial breach of a provision of the Contract Documents.

11.2.2 When any of the above reasons exist, the Owner, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's survey, if any seven days' written notice, terminate employment of the Contractor and may:

11.2.2.1 take possession of the site and of all materials thereon owned by the Contractor; or 11.2.2.2 finish the Work by whatever reasonable method the Owner may deem expedient.

11.2.3 When the Owner terminates the Contract for one of the reasons stated in Subparagraph 11.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

11.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. This obligation for payment shall survive termination of the Contract.

11.2.5 The Contract may also be terminated by the Owner according to the provisions set forth in Section 00 73 10 "Marathon County Procurement Policy" in the Project Manual.

ARTICLE 12 – INSURANCE

12.1 CONTRACTOR'S INSURANCE

12.1.1 The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, insurance as set forth in Section 00 73 10 "Marathon County Standard Terms and Conditions" in the Project Manual.

END OF SECTION

MARATHON COUNTY STANDARD TERMS AND CONDITIONS

- 1.0 SPECIFICATIONS:** The specifications in any request for bids or proposal which forms the subject of this contract are the minimum acceptable. When specific manufacturer and model numbers are used, they are to establish a design, type of construction, quality, functional capability and/or performance level desired. When alternates are bid/proposed/provided, they must be identified by manufacturer, stock number, and such other information necessary to establish equivalency. Marathon County shall be the sole judge of equivalency. Contractors are cautioned to avoid bidding/proposing alternates to the specifications which may result in rejection of their bid/proposal.
- 2.0 DEVIATIONS AND EXCEPTIONS:** Deviations and exceptions from original text, terms, conditions, or specifications shall be described fully, on the Contractor's letterhead, signed, and attached to the response to request. In the absence of such statement, the bid/proposal shall be accepted as in strict compliance with all terms, conditions, and specifications and the Contractor shall be held liable.
- 3.0 ACCEPTANCE-REJECTION OF BIDS OR PROPOSALS:** Marathon County reserves the right to accept or reject any or all bids/proposals, to waive any technicality in any bid/proposal submitted, and to accept any part of a bid/proposal as deemed to be in the best interests of Marathon County. Bids/proposals MUST be date and time stamped by the office of the soliciting purchasing agent on or before the date and time that the bid/proposal is due. Bids/proposals date and time stamped in another office will be rejected. Receipt of a bid/proposal by the mail system does not constitute receipt of a bid/proposal by the purchasing agent's office.
- 4.0 METHOD OF AWARD:** Award of bids shall be made to the lowest responsible, responsive bidder unless otherwise specified. Award of proposals shall be subject to criteria set for in the request for proposal.
- 5.0 QUALITY:** Unless otherwise indicated in the request, all material shall be first quality. Items which are used, demonstrators, obsolete, seconds, or which have been discontinued are unacceptable without specific prior written approval by the Marathon County.
- 6.0 WARRANTY:** Unless otherwise specifically stated by the bidder/proposer, equipment purchased as a result of this request shall be warranted against defects by the bidder/proposer for one (1) year from date of receipt. The equipment manufacturer's standard warranty shall apply as a minimum and must be honored by Contractor.
- 7.0 DELIVERY:** Deliveries shall be F.O.B. destination freight prepaid and included unless otherwise specified. Failure of the Vendor to adhere to delivery schedules as specified or to promptly replace rejected materials shall render Contractor liable for all costs in excess of the contract price when alternate procurement is necessary. Excess costs shall include the administrative costs.
- 8.0 ORDERING:** Purchase orders shall be placed directly to Contractor by authorized departments or purchasing agents who have issued the request for bids or proposal. No other purchase orders are authorized.
- 9.0 PAYMENT TERMS AND INVOICING:** Marathon County normally will pay properly submitted Contractor invoices within thirty (30) days of receipt providing goods and/or services have been delivered, installed (if required), and accepted as specified.
- 9.1 Invoices presented for payment must be submitted in accordance with instructions contained on the purchase order including reference to purchase order number and submittal to the correct address for processing.
- 9.2 A good faith dispute creates an exception to prompt payment.
- 10.0 TAXES:** Marathon County and its departments are exempt from payment of all federal tax and Wisconsin state and local taxes on its purchases except Wisconsin excise taxes as described below. Marathon County, including all its departments, is required to pay the Wisconsin excise or occupation tax on its purchase of beer, liquor, wine, cigarettes, tobacco products, motor vehicle fuel and general aviation fuel. However, it is exempt from payment of Wisconsin sales or use tax on its purchases. Marathon County may be subject to other states' taxes on its purchases in that state depending on the laws of that state. Contractors performing construction activities are required to pay state use tax on the cost of materials.
- 11.0 CONTRACT INTEGRATION:** These Standard Terms and Conditions shall apply to any contract or order awarded

as a result of a request except where special requirements are stated elsewhere in the request; in such cases, the special requirements shall apply. The documents constituting the contract between Marathon County and Contractor are intended to be complementary so that what is required by any one of them shall be as binding as if called for by all of them. In the event of any conflicting provisions or requirements within the several parts of the Contract Documents, they shall take precedence in the following order: Change Orders (with the most recent taking precedence); Contract Document Amendments; the Contract Document as described in this signed Agreement; Request for Proposal Addenda; Request for Proposal; and Firm's Proposal. Any terms of any other documents concerning this agreement are superseded by the terms set forth herein.

12.0 APPLICABLE LAW AND COMPLIANCE: This contract shall be governed under the laws of the State of Wisconsin. Contractor shall at all times comply with and observe all federal and state laws, local laws, ordinances, and regulations which are in effect during the period of this contract and which in any manner affect the work or its conduct. Marathon County reserves the right to cancel this contract if Contractor fails to follow the requirements of s. 77.66, Wis. Stats., and related statutes regarding certification for collection of sales and use tax.

13.0 SAFETY REQUIREMENTS: All materials, equipment, and supplies provided to Marathon County must comply fully with all safety requirements as set forth by the Wisconsin Administrative Code and all applicable OSHA Standards.

13.1 Contractor shall execute and maintain its work so as to avoid injury or damage to any persons or property. Contractor shall comply with the requirements and specifications relating to safety measures applicable in particular operations or kinds of work. In carrying out its work, Contractor shall, at all times, exercise all necessary precautions for the safety of employees appropriate to the nature of the work and the conditions under which the work is to be performed and be in compliance with all applicable federal, state and local statutory and regulatory requirements including Wisconsin Labor Code and the U.S. Department of Transportation Omnibus Transportation Employee Testing Act, including the obligation to conduct safety inspections to verify said compliance by its employees, agents, and/or subcontractors.

13.2 Contractor is specifically notified that it is subject to federal requirements listed under Title 29, Chapter 15 of the United States Code (Occupational Health and Safety Act) by virtue of its contract with Marathon County, a public entity. Contractor shall provide a similar notice to all its subcontractors.

13.3 SAFETY DATA SHEET: If any item(s) on an order(s) resulting from this award(s) is a hazardous chemical, as defined under 29CFR 1910.1200, provide one (1) copy of a Material Safety Data Sheet for each item with the shipped container(s) and one (1) copy with the invoice(s).

14.0 INSURANCE REQUIREMENTS: Contractor shall not commence work under this contract until all insurance required under this paragraph is obtained, and such insurance has been approved Marathon County, nor shall Contractor allow any subcontractor to commence work on their subcontract until all similar insurance requirements have been obtained and approved.

14.1 Maintain worker's compensation insurance as required by Wisconsin Statutes, for all employees engaged in the work. In case any work is sublet, Contractor shall require the subcontractor similarly to provide statutory Workers' Compensation Insurance for all of the latter's employees, unless such employees are covered by the protection afforded by Contractor.

14.2 **General Liability, Professional Liability and Property Damage Insurance.** Contractor shall secure and maintain in force throughout the duration of this contract such General Liability, Professional Liability (if necessary), and Property Damage Insurance as shall protect itself and any subcontractor performing work covered by this contract from claims for damages for personal injuries including accidental death, as well as from claims for property damage, which may arise from operations under this contract, whether such

operations be by Contractor, or by any subcontractor or by anyone directly or indirectly employed by either of them; and the amount of such insurance shall be as follows:

- Comprehensive General Liability \$1,000,000 per occurrence and \$2,000,000 in aggregate for bodily injury and Property Damage.
- Professional Liability Coverage, \$1,000,000 per occurrence and \$2,000,000 in aggregate.
- Automobile Liability \$1,000,000 per occurrence and \$2,000,000 in aggregate for bodily injury and property damage.
- Excess Liability Coverage, \$1,000,000 over the General Liability and Automobile Liability Coverage.
- If aircraft are used in conjunction with this project, \$2,000,000 per occurrence and in aggregate for bodily injury and property damage.

14.3 Marathon County reserves the right to require higher or lower limits where warranted.

14.4 Marathon County reserves the right to require additional security, including, but not limited to, bid bonds or performance bonds as specifically set forth in its request for bids or proposals.

14.5 **PROOF OF INSURANCE:** Contractor shall furnish the County with a Certificate of Insurance countersigned by a Wisconsin Resident Agent or Authorized Representative of the insurer indicating that Contractor meets the insurance requirements identified above. The Certificates of Insurance shall include a provision prohibiting cancellation of said policies except upon 30 days prior written notice to the County and specify the name of the contract or project covered. The Certificate of Insurance shall be delivered to the Authorized Purchasing Agent, with a copy of the Certificate of Insurance to be delivered to the Marathon County Risk Manager for approval prior to the execution of this contract. Upon renewal of the required insurance, and annually thereafter, the County shall receive a new Certificate of Insurance for three years after completion of the project. The Certificates shall name Marathon County as an additional insured and describe the contract by name and or identification number in the "Description of Operations" section of the form.

15.0 CANCELLATION / TERMINATION: Marathon County reserves the right to:

15.1 **NONAPPROPRIATION OF FUNDS.** Cancel any contract in whole or in part without penalty due to non-appropriation of funds or for failure of the Contractor to comply with terms, conditions, and specifications of this contract.

15.2 Terminate this contract, for the County's convenience, at any time by a notice in writing from the County to Contractor by certified mail. If the Contract is terminated by the County as provided herein, Contractor shall be paid an amount which bears the same ratio to the total compensation as the services actually performed bear to the total services of Contractor covered by this Contract, unless payments of compensation have previously been made.

16.0 CONTRACT MODIFICATIONS: The scope of the services to be performed under this Contract may be amended or supplemented by mutual written agreement between the parties to the Contract. This amendatory provision shall not operate to prevent Marathon County from exercising its reserved right to establish reasonable time schedules for any of the work or services to be performed by or deliveries to be received from Contractor hereunder. Furthermore, this amendatory provision shall not operate to prevent the County from canceling any of the services not yet performed or any deliveries not yet made at the time notice is given to Contractor of the cancellation of such services or portion of the work to be performed hereunder.

17.0 ASSIGNMENT: No right or duty in whole or in part of the scope of work under this contract may be assigned or delegated without the prior written consent of Marathon County.

18.0 PATENT INFRINGEMENT: The Contractor selling articles to Marathon County as described herein guarantees the articles were manufactured or produced in accordance with applicable federal labor laws. Further, that the sale or use of the articles described herein will not infringe any United States patent. The Contractor covenants that it will at its own expense defend every suit which shall be brought against Marathon County (provided that such contractor is promptly notified of such suit, and all papers therein are delivered to it) for any alleged infringement of any patent

by reason of the sale or use of such articles, and agrees that it will pay all costs, damages, and profits recoverable in any such suit.

19.0 PUBLIC RECORDS ACCESS: Marathon County is a political subdivision of the State of Wisconsin and as such is subject to the Wisconsin Public Records Law. It is the policy of Marathon County to maintain an open and public process in the solicitation, submission, review, and approval of procurement activities. Bid openings are public unless otherwise specified. Evaluations of responses to requests for proposals are subject to further discussion, clarification and negotiation. Records of bids and responses to requests for proposal will not be available for public inspection prior to issuance of the award of the contract.

20.0 PROPRIETARY INFORMATION: Any restrictions on the use of data contained within a response to request, must be clearly stated in the bid/proposal itself. Proprietary information submitted in response to a request will be handled in accordance with the Wisconsin Public Records Law. Proprietary restrictions normally are not accepted. However, when accepted, it is Contractor's responsibility to defend the determination in the event of an appeal or litigation.

20.1 Data contained in a bid/proposal, all documentation provided therein, and innovations developed as a result of the contracted commodities or services cannot be copyrighted or patented. All data, documentation, and innovations become the property of Marathon County.

20.2 Any material submitted by Contractor in response to Marathon County's request that the vendor considers confidential and proprietary information and which qualifies as a trade secret, as provided in s. 19.36(5), Wis. Stats., or material which can be kept confidential under the Wisconsin Public Records Law, must be identified and include citation to the specific provisions of law that preclude disclosure and any factual or background information necessary to establish that the identified provisions of the law apply to that particular information. Bid/proposal prices cannot, under any circumstances, be held confidential.

20.3 In the event Marathon County becomes involved in litigation due to Contractor's refusal of permission to release information identified as confidential or proprietary, Contractor agrees to indemnify, defend and hold harmless Marathon County for any costs associated with said litigation.

21.0 CONFIDENTIALITY OF MARATHON COUNTY'S DATA: In the event work conducted under this contract requires Contractor to have access to Marathon County's database via Internet, direct contact or other connection to allow the provision of installation, support and maintenance services, Contractor agrees to keep all such data confidential and to execute any reasonable agreement to assure Marathon County that Contractor will comply with all state and federal confidentiality laws and/or regulations. These restrictions herein shall survive the termination of this contract, regardless of the reason for termination, and shall continue in full force and effect and shall be binding upon Contractor or its agents, employees, successors, assigns or subcontractors. Contractor shall defend and incur all costs, if any, for actions that arise as a result of noncompliance by Contractor, its agents, employees, successors, assigns and subcontractors regarding the confidentiality restrictions herein.

22.0 PROMOTIONAL ADVERTISING / NEWS RELEASES: Reference to or use of Marathon County, any of its departments, agencies or other subunits, or any county official or employee for commercial promotion is prohibited. News releases pertaining to this procurement shall not be made without prior approval of Marathon County. Release of broadcast e-mails pertaining to this procurement shall not be made without prior written authorization of Marathon County's purchasing agent.

23.0 MUTUAL HOLD HARMLESS/INDEMNIFICATION: Contractor hereby agrees to release, indemnify, defend, and hold harmless Marathon County, its officials, officers, employees and agents from and against all judgments, damages, penalties, losses, costs, claims, expenses, suits, demands, debts, actions and/or causes of action of any type or nature whatsoever, including actual and reasonable attorney's fees, which may be sustained or to which they may be exposed, directly or indirectly, by reason of personal injury, death, property damage, or other liability, alleged or proven, which is determined to be caused by the negligent or intentional acts or omissions of Contractor's officers, officials, employees, agents or assigns. Marathon County hereby agrees to release, indemnify, defend, and hold harmless Contractor, its officials, officers, employees and agents from and against all judgments, damages, penalties, losses, costs, claims, expenses, suits, demands, debts, actions and/or causes of action of any type or nature whatsoever, including actual and reasonable attorney's fees, which may be sustained or to which they may be exposed, directly or indirectly, by reason of personal injury, death, property damage, or other liability, alleged or proven, which is determined to be caused by the negligent or intentional acts or omissions of Marathon County's officers, officials, employees, agents or assigns. Marathon County does not waive, and specifically reserves, its rights to assert any and all affirmative defenses and limitations of liability as specifically set forth in

Wisconsin Statutes, Chapter 893 and related statutes.

- 24.0 FORCE MAJEURE:** Neither party shall be in default by reason of any failure in performance of this Agreement in accordance with reasonable control and without fault or negligence on their part. Such causes may include, but are not restricted to, acts of nature or the public enemy, acts of the government in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and unusually severe weather, but in every case the failure to perform such must be beyond the reasonable control and without the fault or negligence of the party.
- 25.0 GRATUITIES AND KICKBACKS:** It shall be unethical for any person to offer, give, or agree to give any elected official, employee or former employee, or for any elected official, employee or former employee to solicit, demand, accept, or agree to accept from another person, a gratuity or an offer for employment in connection with any decision, approval, disapproval, recommendation, preparation or any part of a program requirement or a purchase request, influencing the contents of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceedings or application, request for ruling, determination, claim or controversy, or other particular matter, pertaining to any program requirement or a contract or subcontract, or to any solicitation or proposal therefore. It shall be unethical for any payment, gratuity, or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor or a higher tier subcontractor or any person associated therewith, as an inducement for the award of a subcontract, or order.
- 26.0 DISPUTE RESOLUTION:** This Contract and the performance of the parties' obligations hereunder will be governed by and construed and enforced in accordance with the laws of the State of Wisconsin, including conflict of law provisions. Contractor consents to personal jurisdiction in the State of Wisconsin. The venue of any action hereunder shall be in Marathon County, Wisconsin. If a dispute related to this agreement arises, all parties shall attempt to resolve the dispute through direct discussions and negotiations. If the dispute cannot be resolved by the parties, and if all parties agree, it may be submitted to either mediation or arbitration. If the matter is arbitrated, the procedures of Chapter 788 of the Wisconsin Statutes or any successor statute shall be followed. If the parties cannot agree to either mediation or arbitration, any party may commence an action in court as set forth above. If a lawsuit is commenced, the parties agree that the dispute shall be submitted to alternate dispute resolution pursuant to §802.12, Wis. Stats., or any successor statute. Unless otherwise provided in this contract, the parties shall continue to perform according to the terms and conditions of the contract during the pendency of any litigation or other dispute resolution proceeding.
- 27.0 INDEPENDENT CONTRACTOR STATUS:** The parties hereto agree that Contractor, its officers, agents and employees, in the performance of this Contract, shall act in the capacity of an independent contractor and not as an officer, employee or agent of Marathon County. The Contractor shall not be entitled to any of the rights, benefits, salaries, wages or fringe benefits which employees of Marathon County are eligible to receive. No federal, state, or local taxes or social security deductions or contributions shall be made by Marathon County on behalf of the Contractor. Neither Marathon County nor Contractor will represent itself as the agent or legal representative of the other or as partner or joint venture for any purpose whatsoever, and neither shall have any right to create or assume any obligation of any kind, express or implied, for or on behalf of the other in any way whatsoever. Furthermore, Contractor agrees to take such steps as are necessary to ensure that each of its subcontractors, if any, will not be considered to be an agent, servant, joint venture with, or partner of, Marathon County.
- 28.0 NON-DEBARMENT CLAUSE:** Contractor hereby certifies that neither it nor any of its principal officers or officials has ever been suspended or debarred, for any reason whatsoever, from doing business or entering into contractual relationships with any governmental entity. Contractor further agrees and certifies that this clause shall be included in any subcontract of this contract. . Marathon County also reserves the right to cancel this contract with any federally debarred contractor or a contractor that is presently identified on the list of parties excluded from federal or State of Wisconsin procurement and non-procurement contracts.
- 29.0 STATEMENT OF COMPLIANCE:** Contractor has carefully reviewed Marathon County's required contract language, as set forth in the Request for Proposal/Bid pertaining to termination of contract, change orders, gratuities and kickbacks, non-appropriation of funds, hold harmless/indemnification, insurance requirements/proof of insurance, dispute resolutions, and non-debarment, and is in full compliance with all statements and requirements.

30.0 WAIVER/SEVERABILITY: No waiver of any default hereunder shall be deemed as a waiver of any prior or subsequent default of the same or other provisions of this contract. If any provision of this contract is held invalid by a court of competent jurisdiction, such invalidity shall not affect the validity or operation of any other provision and said provision shall continue to apply to the extent allowed by said court or, if not so allowed, be deemed severed from this contract entirely.

END OF DOCUMENT 007310

DOCUMENT 007320

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions shall be supplement requirements for all the Contracts on the project. The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings indicated below, which are applicable to both the singular and plural thereof.

SC 1

Contractor shall meet the following requirements for substantial and final completion.

- A. No extension of the Contract Times will be allowed for additional Work unless such additional Work adversely affects the Contractor's ability to meet the Contract Times.
- B. No extension of the Contract Times will be allowed for any delays, interferences, disruptions, and the like whether beyond or within the Contractor's control, unless such delay interference, disruption, or the like actually impedes the Contractor's ability to progress with a critical portion of the Work thereby adversely affecting the Contractor's ability to meet the Contract Times.
- C. Work on the site can begin on May 26, 2020.
- C. Contract Times:
 - 1. Substantial Completion: Contract shall be substantially completed by August 1, 2020.
 - 2. Final Completion:: Contract shall have final completion by August 15, 2020.

SC 2

- A. The Contractor shall be required to schedule and otherwise plan for normal weather conditions during the Contract Times. No extension of the Contract Times will be allowed for any delays emanating from or otherwise accountable to normal weather conditions including varying levels of wind, temperature extremes, rain, snow, hail, and other forms of precipitation, and any other weather condition that could reasonably be anticipate.

SC 3

- A. Include as "additional insured's" on Contractors liability insurance.
 - 1. Aquatic Design Solutions, LLC
17921 Fulda Trail

Lakeville, MN 55044

SC 4

- A. Within five days after the Bid opening and before the Notice of Award, the apparent successful bidder shall identify the following subcontractors, suppliers and others, if the Contractor is not going to do the work, supply the material or provide the service himself:
1. Mechanical subcontractor
 2. Electrical subcontractor
 3. Swimming pool equipment suppliers

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF DOCUMENT

DOCUMENT 00 91 13

ADDENDA

FILE ADDENDA HERE

END OF DOCUMENT

SECTION 01 11 13

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Project; Work covered by Contract Documents.
- B. Contracts.
- C. Administrative and procedural Sections applicable to all Contracts.
- D. Work under one prime Contract.

1.02 RELATED DOCUMENTS AND SECTIONS

- A. Document 000110 – Table of Contents. When stated that “All Documents” or “All Sections” are included, see Table of Contents for Documents and Sections required under each Division.
- B. Document 000115 - List of Drawings. Lists drawings included in various contracts.
- C. Section 01019 - Contract Considerations.

1.03 PROJECT - WORK COVERED BY CONTRACT DOCUMENTS

- A. Work of the one Prime Contract comprises the Project for the construction of the UWMC Renovation Project.

1.04 CONTRACTS

- A. Perform Work of Prime Contract under a lump sum contract with the OWNER.
- B. Work of Contract is identified in the following Articles and on the Drawings.

1.05 CONTRACT

- A. Work of contract generally comprises the following:
 - 1. Demolition of existing pool piping.
 - 2. Providing new PVC piping, new connections to existing piping, and new PVC pool valves.
 - 3. Provide new piping supports and hangers.
 - 4. New flow meters.
 - 5. New pool autofill systems.

6. New surge tank overflow piping.
 7. Demolition of existing plumbing, existing hot water heating tank, existing heating system pump, and existing sump pump.
 8. Provide new domestic hot water storage tanks with pumps and hot water heat exchanger. All controls/electrical shall be provided for all new equipment.
 9. Provide new sump pump.
- B. Bidding Requirements, Contract Forms and Conditions of Contract.
1. All Documents.
- C. Division 1 - General Requirements:
1. All Sections
- D. Division 13 - Pool
1. All Sections
- E. Division 22 - Plumbing
1. All Sections
- F. Drawings
1. See Document 000115, List of Drawings.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 14 90

CONTRACT CONSIDERATIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Schedule of Values.
- B. Application for Payment.
- C. Change procedures.
- D. Alternate Bids.
- E. Time limits for construction operation.

1.02 RELATED SECTIONS

- A. Document 00300 - Bid Form.
- B. Section 01300 - Submittals.
- C. Section 01400 - Quality Control.
- D. Section 01600 - Material and Equipment.

1.03 SCHEDULE OF VALUES

- A. Submit typed schedule on Application and Certificate on EJCDC C-620 (2002 Edition) for Payment Continuation Sheet. CONTRACTOR's electronic media printout will be considered as an alternate to EJCDC document.
- B. Submit Schedule of Values in duplicate within 20 days after date of OWNER-CONTRACTOR Agreement.
- C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of major specification Section. Identify site mobilization, bonds and insurance.
- D. Include as a separate line item the amount of each Allowance specified.
- E. Include within each line item, directly proportional amount of CONTRACTOR's overhead and profit.

- F. Revise schedule to list Change Orders, with each Application for Payment. List each change order as a single line item or as approved on individual basis.

1.04 APPLICATIONS FOR PAYMENT

- A. Submit three (3) copies of each application.
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
- C. Payment Period: Application for payment shall be to ENGINEER by the 10th day of the month. The OWNER shall approve application on the 20th of each month and payment shall be sent out the 10th of the next month.
- D. Waiver of Liens to be filed for previous application for payment. This shall include all subcontractors and suppliers. Contractor shall not be paid unless all previously paid work has lien waivers.

1.05 CHANGE PROCEDURES

- A. ENGINEER will advise of minor changes in Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions by letter.
- B. ENGINEER may issue Proposal Request which includes detailed description of a proposed change with supplementary or revised Drawings and specifications, or change in Contract Time. CONTRACTOR will prepare and submit estimate within an appropriate time to maintain project schedules.
- C. CONTRACTOR may propose change by submitting request for change to ENGINEER, describing proposed change and its full effect on Work. Include statement describing reason for change, and effect on Contract Sum/Price and Contract Time with full documentation and statement describing effect on Work by separate or other contractors. Document requested substitutions in accordance with Section 01600.
- D. Stipulated Sum/Price Change Order: Based on Proposal Request and CONTRACTOR's price quotation or CONTRACTOR's request for a Change Order as approved by ENGINEER and price quotation.
- E. Construction Change Directive: ENGINEER may issue a directive, on letterhead form authorizing CONTRACTOR to proceed with change in Work, for subsequent inclusion in a Change Order. Letter will describe changes in Work, and designate method of determining change in Contract Sum/Price or Contract Time.
- F. Execution of Change Orders: ENGINEER will issue Change Orders for signatures of parties as provided in Conditions of Contract.

1.06 ALTERNATES

A. There are no Alternates for this project.

1.07 TIME LIMITS FOR CONSTRUCTION OPERATIONS

A. The CONTRACTOR shall confine his construction activities according to General Requirements of the contract in front end specifications.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 31 13

PROJECT COORDINATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Coordination.
- B. Field engineering.
- C. Cutting and patching.
- D. Preconstruction conference.
- E. Progress meetings.

1.02 RELATED SECTIONS

- A. Section 011113 - Summary of work.

1.03 COORDINATION

- A. Coordinate scheduling, submittals, and Work of various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work of separate Sections in preparation for Substantial Completion and for portions of Work designated for OWNERS partial occupancy.

- F. After OWNER occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of OWNER's activities.
- G. Coordinate construction with the other contractors and OWNER.

1.04 FIELD ENGINEERING

- A. OWNER has established reference points. Refer to site survey.
- B. CONTRACTOR shall locate and protect survey control and reference points, as required for work, and coordination of work to interface with other Contracts.
- C. Control datum for survey is that established by OWNER provided survey as shown on Drawings.
- D. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices, as required for work.
- E. CONTRACTOR is responsible for laying out his own work.

1.05 CUTTING AND PATCHING

- A. Employ skilled and experienced installers to perform cutting and patching for work requiring same.
- B. Execute work by methods which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.
- C. Cut rigid materials using masonry saw or core drill.
- D. Restore Work with new products in accordance with requirements of Contract Documents.
- E. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- F. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- G. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

1.06 PRECONSTRUCTION CONFERENCE

- A. ENGINEER will schedule a conference after Notice of Award.
- B. Attendance Required: OWNER, ENGINEER and CONTRACTORS.
- C. Agenda:
 - 1. Execution of OWNER-CONTRACTOR Agreement, if not completed.
 - 2. Submission of executed bonds and insurance certificates, if not completed.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of Subcontractors, list of products, Schedule of Values, and progress schedule, if not completed.
 - 5. Designation of personnel representing the parties in Contract, and the ENGINEER.
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
 - 7. Record Drawing responsibilities.
 - 8. Scheduling.
 - 9. Scheduling activities of OWNER.
 - 10. Contract and alternates summary of work of all contracts.

1.07 PROGRESS MEETINGS

- A. ENGINEER/OWNER will schedule meetings throughout progress of Work at appropriate intervals needed.
- B. The ENGINEER/OWNER will conduct meetings, prepare agenda, preside at meetings, record minutes, and distribute copies within five days to participants, and those affected by decisions made.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, ENGINEER, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems which impede planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.

12. Effect of proposed changes on progress schedule and coordination.
13. Record drawing review.
14. Other business relating to Work.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Proposed products list.
- D. Shop drawings.
- E. Product data.
- F. Samples.
- G. Manufacturer's instructions.
- H. Manufacturer's certificates.

1.02 RELATED SECTIONS

- A. Section 01019 - Contract Considerations
- B. Section 01400 - Quality Control
- C. Section 01700 - Contract Closeout

1.03 SUBMITTAL PROCEDURES

- A. Provide each submittal with letter of transmittal.
- B. Sequentially number the transmittal forms. Resubmittals to have original number with alphabetic suffix.
- C. Identify Project, CONTRACTOR, Subcontractor or supplier; pertinent Drawing sheet and detail numbers(s), and specification Section number, as appropriate.
- D. Apply CONTRACTOR's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with requirements of Work and Contract Documents.

- E. Schedule submittals to expedite the Project, and deliver to ENGINEER. Coordinate submission of related items.
- F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of completed Work.
- G. Provide space for CONTRACTOR and ENGINEER review stamps.
- H. Revise and resubmit submittals as required, identify changes made since previous submittal.
- I. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.
- J. All submittals from all contractors shall be submitted for review within 45 days of receiving the signed contracts.

1.04 CONSTRUCTION PROGRESS SCHEDULES

A. SCHEDULING

- 1. CONTRACTORS shall provide their own schedule for performance of the work. Schedule shall be submitted to ENGINEER for approval prior to start of work.

B. FORMAT

- 1. Prepare a construction schedule in the Critical Path Method using scheduling software.

C. FLOAT

- 1. Float is a jointly owned, expiring Project resource available to both parties as needed to meet Project completion dates.
- 2. Pursuant to the contract's float sharing requirements, no time extensions will be granted nor delay damages paid until a delay occurs which impacts the project's critical path, consumes all available float or contingency time available and extends the work beyond the contract completion date.
- 3. In the event the CONTRACTOR submits a CPM schedule, which shows the Project Completion date prior to OWNER's date for the Project Completion, the difference in days between CONTRACTOR's projected completion data shall become the duration of a new activity described as "Project Float" which shall be the immediate predecessor to the final completion milestone in CONTRACTOR's CPM schedule. OWNER will not take OWNERSHIP of the project until the Contract Completion date.

E. CONTENTS

1. The Schedule shall have sufficient detail to monitor and evaluate the progress of the work.
2. The Project Schedule shall include the following:
 - a. All construction work including mobilization, demobilization, setup time, lags, etc.
 - b. Procurement of products and submittal of shop drawings and samples.
 - c. Review time for submittal of shop drawings and samples. Allow 10 working days for review unless noted otherwise.
 - d. Fabrication time.
 - e. Delivery time.
 - f. Installation of OWNER-supplied products.
 - g. Testing, start-up, and training.
 - h. Weather-affected activities.
 - i. Outages or interruptions of utilities required to perform work.
 - j. Demolition or removal work.
 - k. Work activity descriptions, activity durations and sequence of work.

F. SCHEDULES

1. Schedule activity durations shall be in working days using a five-day week with holiday allowances. Construction activity durations shall not exceed 20 working days or a value in excess of \$25,000 with the exception of production schedules of major equipment delivery activities, unless waived by OWNER. Where durations are more than 20 days or \$25,000 in value, subdivide work to satisfy this requirement.
2. Resources and costs will be loaded based upon a linear distribution only. Front-end loaded schedules will not be allowed. The description of each activity should be specific enough to allow OWNER to determine exactly what scope of work each activity represents.
3. When preliminary schedule is complete, OWNER will perform an evaluation for duration of work under contract. If evaluation shows CONTRACTOR's schedule will not work, CONTRACTOR shall work with OWNER to develop a schedule that reflects compliance with Contract requirements.
4. CONTRACTOR's Construction schedule shall begin with the date of issuance of the Notice to Proceed and conclude with the date of Final Completion of the project.

G. REVIEW AND EVALUATIONS

1. OWNER approval of schedules will not relieve any CONTRACTOR of obligation to complete the Work in accordance with the Contract Documents. OWNER approval of submitted schedules shall not make the OWNER liable for time or cost overruns resulting from shortcomings in the schedules.

H. TIME EXTENSIONS

1. If the OWNER finds a CONTRACTOR is entitled to an extension of time, the CONTRACTOR shall prepare a revised schedule incorporating the approved time extension.
2. When contract time adjustments are required due to; job conditions, weather, technical complications, strikes, delays caused by OWNER, and other unforeseeable conditions; the CONTRACTOR shall revise the construction schedule at not additional cost of OWNER.

I. SUBMITTALS

1. An updated schedule shall be submitted to the OWNER for review with every payment request as a requirement for payment request to be processed.

J. UPDATING

1. The Critical Path Method precedence network shall represent the history of completing activities as well as the CONTRACTOR's current plan for completion of the Work.
2. OWNER and CONTRACTOR shall review schedule at each progress meeting. The CONTRACTOR shall revise schedule to incorporate progress meeting changes made to schedule.
3. When milestone dates or project completion date will not be met, the responsible CONTRACTOR shall, at not additional cost to the OWNER, take one or more of the following actions; increase manpower, increase work periods, or take other action to eliminate the work backlog.

K. DISTRIBUTION

1. Following joint reviews, approved, updated and monthly payment request schedules, distribute these copies of schedules to other Prime contractors, Subcontractor, suppliers, Engineer, OWNER, and other concerned parties.
2. Recipients of the schedules shall, within 5 days after receipt of schedule, submit a written report, outline the problems anticipated by projections shown in schedules.

L. FAILURE TO SUBMIT SCHEDULES

1. The OWNER places very high priority on the construction schedule. The construction schedules are required by the Contract Documents.

1.05 PROPOSED PRODUCTS LIST

- A. Within 5 days after date of OWNER-CONTRACTOR Agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product, when different from those specified.

- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.06 SHOP DRAWINGS

- A. Submit shop drawings electrically in pdf format to ENGINEER.
- B. After review by ENGINEER the shop drawings shall be returned in electronic pdf format. CONTRACTORS shall distribute copies to appropriate parties and in accordance with Procedures for Record Documents described in Section 01700 - Contract Closeout.

1.07 PRODUCT DATA

- A. Submit product data electrically in pdf format to ENGINEER.
- B. Mark product data to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to Project.
- C. After review by ENGINEER the product data shall be returned in electronic pdf format. CONTRACTORS shall distribute copies to appropriate parties and in accordance with Procedures for Record Documents described in Section 01700 - Contract Closeout

1.08 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Submit samples of finishes from full range of manufacturers' color group selected, textures, and patterns for ENGINEER's selection.
- C. Include identification on each sample, with full Project information.
- D. Submit samples specified in individual specification Sections; samples will be retained by ENGINEER.

1.09 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.10 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturers' certificate to ENGINEER for review, in quantities specified for Product Data.
- B. Indicate material or project conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to ENGINEER.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 45 00

QUALITY CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Quality assurance and control of installation.
- B. Reference Standards.
- C. Field samples.
- D. Inspection and testing laboratory services.
- E. Manufacturers' field services and reports.

1.02 QUALITY ASSURANCE AND CONTROL OF INSTALLATION

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

1.03 REFERENCE STANDARDS

- A. Conform to reference standard by date of issue current on date for receiving bids.
- B. Obtain copies of standards when required by Contract Documents.
- C. Should specified reference standards conflict with Contract Documents, request clarification from ENGINEER before proceeding.

- D. Contractual relationship of parties to Contract shall not be altered from Contract Documents by mention or inference otherwise in any reference document.

1.04 FIELD SAMPLES

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

1.05 INSPECTION AND TESTING LABORATORY SERVICES

- A. OWNER will appoint and employ services of an independent firm to perform testing.
- B. The independent firm will perform tests and other services specified in individual specification Sections and as required by the ENGINEER.
- C. Testing and source quality control may occur on or off the Work Site. Perform off-site testing as required by the ENGINEER.
- D. Reports will be submitted by the independent firm to the OWNER, ENGINEER and CONTRACTOR, indicating observations and results of tests and indicating compliance or non-compliance with the Contract Documents.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance with incidental labor as requested. Notify ENGINEER and independent firm as requested 48 hours prior to expected time for operations requiring services. Make arrangements with independent firm and pay for additional samples and tests required for CONTRACTOR'S use.
- F. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the ENGINEER. Payment for re-testing will be charged to the CONTRACTOR by deducting testing charges from the Contract sum.

1.06 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. Submit qualifications of observer to ENGINEER 10 days in advance of required observations. Observer subject to approval of ENGINEER.
- B. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site

conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment and as applicable, and to initiate instructions when necessary.

- C. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Submit report in duplicate within 20 days of observation to ENGINEER for review.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Temporary Utilities.
- B. Temporary Controls.
- C. Construction Facilities: Access, parking, progress cleaning.
- D. Cleaning and Restoration.
- E. Items listed herein apply equally to all contracts unless indicated as a responsibility of a single contract.

1.02 RELATED SECTIONS

- A. Section 01700 - Contract Closeout

1.03 TEMPORARY UTILITIES

- A. Electricity
 - 1. OWNER will pay cost of energy used. Exercise measures to conserve energy.
- B. Telephone Services
 - 1. CONTRACTOR shall provide and pay for services which they require.
- C. Water Service
 - 1. OWNER will pay cost of water used at the site. The Owner shall not pay for off-site water being brought to the site.
- D. Sanitary Facilities
 - 1. CONTRACTORS shall be allowed usage of one designated restroom in building. CONTRACTORS shall be responsible for maintaining restroom.

1.04 TEMPORARY CONTROLS

- A. Barriers
 - 1. Provide barriers to prevent unauthorized entry to construction areas to allow for OWNER's continued use of site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
 - 2. Provide protection for plant life at exterior of building. Replace damaged plant life.
 - 3. Protect vehicles, equipment, stored materials, site and structures from damage.

- B. Fencing
 - 1. Temporary fence any work area, storage area, or hatch area on exterior of building with 4'-0" high snow fence.
- C. Protection of Installed Work
 - 1. Protect installed Work and provide special protection where specified in individual specification Sections.
 - 2. Provide temporary and removable protection for installed Products. Control activity in immediate work areas to minimize damage.

1.05 CONSTRUCTION FACILITIES

- A. Access
 - 1. Owner shall direct CONTRACTORS for entry door locations. CONTRACTORS shall be responsible to keep doors locked when building is closed. CONTRACTORS shall minimize impact to building as building shall be in use by OWNER. Coordinate locations with OWNER, ENGINEER and other contractors.
- B. Parking
 - 1. CONTRACTORS shall be allowed parking in fair grounds property to west of school site. CONTRACTORS may be allowed to park at building for deliveries only and shall be coordinated with Owner.
 - 2. CONTRACTORS shall be responsible for the replacement of damage to pavements caused by their activities in areas not otherwise affected by work on this project.
- A. Storage
 - 1. CONTRACTORS shall store all materials and equipment for project in the work area in basement of building in pool equipment room.

1.06 CLEANING AND RESTORATION

- A. Progress Cleaning
 - 1. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
 - 2. Remove debris and rubbish from pipe chases, plenums, crawl spaces, and other closed or remote spaces, prior to enclosing space.
 - 3. Remove waste materials, debris, and rubbish from site periodically and dispose off-site.
- B. Removal of Utilities, Facilities, and Controls
 - 1. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Substantial Completion.
 - 2. Clean and repair damage caused by installation or use of temporary work.
 - 3. Restore facilities used during construction to original condition.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Product options.
- E. Substitutions.

1.02 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of Work. Products may also include existing materials or components required for reuse.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- C. Provide interchangeable components of same manufacturer, for similar components.

1.03 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.04 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.

- B. For exterior storage of fabricated products, place on sloped supports, above ground.
- C. Provide off-site storage and protection when site does not permit on-site storage or protection.
- D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- E. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

1.05 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit request for substitutions for any manufacturer not named.

1.06 SUBSTITUTIONS

- A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during bidding period to requirements specified in this Section.
- B. Substitutions may be considered when product becomes unavailable through no fault of CONTRACTOR.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A Request constitutes representation that Bidder or CONTRACTOR:
 - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 - 2. Will provide same warranty for Substitution as for specified product.

3. Will coordinate installation and make changes to other Work which may be required for Work to be complete with no additional cost to OWNER.
 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 5. Will reimburse OWNER for review or redesign services associated with re-approval by authorities.
 6. Proposed substitution will function as well or better than original specified product.
 7. Will remove at no cost to OWNER if in the opinion of the ENGINEER product does not function properly.
- E. Substitutions will not be considered when they are indicated or implied on shop drawings or product data submittals, without separate written request, or when acceptance will require revision to Contract Documents.
- F. Substitution Submittal Procedure:
1. Submit electronic request for Substitution for consideration. Limit each request to one proposed Substitution.
 2. Submit shop drawings, product data, and certified test results attesting to proposed product equivalence.
 3. ENGINEER will notify CONTRACTOR, in writing, of decision to accept or reject request.

PART 2 – PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 70 00

CONTRACT CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.
- E. Operation and maintenance data.
- F. Warranties.
- G. Spare parts and maintenance materials.

1.02 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for ENGINEER's inspection.
- B. Provide submittals to ENGINEER and OWNER that are required by governing or other authorities.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.03 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces.
- C. Clean equipment and fixtures to sanitary condition.
- D. Clean or replace filters of operating equipment.
- E. Clean debris from rooms and site.

- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.04 ADJUSTING

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.05 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of following record documents; record actual revision to Work (REQUIRED OF ALL CONTRACTS):
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other Modifications to Contract.
 - 5. Reviewed shop drawings, product data, and samples.
- B. Store Record Documents separate from documents used for construction.
- C. Record information concurrent with construction progress.
- D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and Modifications.
- E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. All changes and revisions, including change orders, to Drawings.
 - 2. Details not on original Contract Drawings.
- F. Submit documents to ENGINEER with claim for final Application for Payment.

1.06 OPERATION AND MAINTENANCE DATA

- A. Submit ONE set prior to final inspection, bound in 8-1/2 x 11 inch text pages, three-D side ring capacity expansion binders with durable plastic covers. Submit ONE set in pdf format on CD.
- B. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Contents: Prepare Table of Contents for each volume, with each Product or system description identified, type on white paper.
- E. Part 1: Directory, listing names, addresses, and telephone numbers of ENGINEER, CONTRACTOR, Subcontractors, and major equipment suppliers.
- F. Part 2: Operation instruction, arranged by system process flow for each system.
 - 1. Organize as follows using diagrams and text as required. Reference equipment maintenance/ cuts in Part 3 to assist explanation.
 - a. System identification.
 - b. Annual system start-up procedure.
 - c. System shut-down procedure for each type periodic cleaning or maintenance and its corresponding system start-up procedure following cleaning/maintenance cycle.
 - d. Annual shut-down procedure.
 - e. Operating characteristics of systems: to be compiled after testing and balancing to true conditions.
 - f. Trouble-shooting of systems and recommended procedures.
- G. Part 3: Maintenance instruction, arranged by system and further subdivided to individual equipment. Index listing, name of equipment or product, supplier providing said equipment and name, address and phone number of installer of said equipment or product. Provide for each listed equipment or product:
 - 1. Parts list for each component.
 - 2. Operating instructions.
 - 3. Maintenance instructions.
 - 4. Maintenance instruction for finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.

- H. Part 4: Project documents and certificates, including following:
 - 1. Shop drawings and product data for items not indicated in Part 3 reports, provided by independent agencies.
 - 2. Certificates of registration, etc.
- I. Part 5: Photocopies of warranties, bonds and insurance certificate performed in compliance with specific requirements.
- J. Submit one copy of complete volumes in final form 15 days prior to final inspection. Copy will be returned after final inspection, with ENGINEER comments. Revise content of documents as required prior to final submittal.
- K. Submit final volumes revised, within ten days after final inspection.

1.07 WARRANTIES

- A. Provide notarized copies.
- B. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.
- C. Provide Table of Contents and assemble in binder with durable plastic cover.
- D. Submit prior to final Application for Payment.
- E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.08 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.
- B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 75 00

STARTING AND ADJUSTING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Starting systems.
- B. Demonstration and instructions.
- C. Testing, adjusting, and balancing.

1.02 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify ENGINEER and OWNER seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of responsible manufacturer's representative and CONTRACTOR's personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. After system has been placed in operation and prior to acceptance, clean strainers, dirt pockets, orifices, valve seats and headers in fluid systems, to assure being free of foreign materials.
- I. Submit written report in accordance with Section 01 40 00 that equipment or system has been properly installed and is functioning correctly.

1.03 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to OWNER's personnel.
- B. Demonstrate Project equipment in cooperation with ENGINEER and qualified manufacturers' representatives who are knowledgeable about product used.
- C. For equipment or systems requiring seasonal operation, perform demonstration for start-up and shut-down.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with OWNER's personnel in detail to explain aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed upon time, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. Amount of time required for instruction on items of equipment and system is that required to acquaint OWNER's qualified operators and maintenance personnel.
- H. Contract Start Ups:
 - 1. CONTRACTOR shall supply the services of an experienced swimming pool operator instructor for a period of not less than 2 hours after the pool has been filled and initially placed in operation. During this period, the OWNER's designated representative shall be thoroughly instructed in all phases of the pool's operation. Prior to this instructor leaving the job, they shall obtain written certification from the OWNER's designated representative acknowledging that the instruction period has been completed and all necessary operating information has been provided.
 - 1. CONTRACTOR shall start up all new equipment/system prior to substantial completion. CONTRACTOR shall use this time to train OWNER's staff in start-up, operation, and shut-down procedures.

1.04 TESTING, ADJUSTING, AND BALANCING

- A. CONTRACTOR to employ and pay for services of independent firm to perform testing, adjusting and balancing of system as called for in the Contract Documents.
- B. Reports to be submitted by independent firm to ENGINEER indicating observations and results of tests and indicating compliance or non-compliance with specified requirements and with requirements of Contract Documents.

- C. Pool recirculation systems shall be tested 2 weeks prior to substantial completion.
- D. A leak test on the pool vessels shall be completed prior to installation of the pool special aggregate finish installation. Tests shall be for a minimum of three consecutive days.

1.05 STATE AND LOCAL INSPECTIONS

- A. CONTRACTORS shall schedule all on-site inspections required for all approvals of construction and to receive final operation permit.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 024119

SELECTIVE INTERIOR DEMOLITION

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Selective interior demolitions and removals.

1.02 RELATED SECTIONS

- A. Not Applicable.

1.03 REFERENCES

- A. Not Applicable.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

3.01 QUALITY ASSURANCE

- A. Comply with applicable rules, regulations, codes, and ordinances of Local, State, and Federal Authorities.
- B. Comply with applicable rules and regulations of Public Utility Companies having jurisdiction over the Work.
- C. Obtain and pay for necessary permits, licenses, and certificates required.
- D. Give notices as required for and during performance of demolition work.
- E. Comply with local fire department requirements.
- F. State and local code requirements shall control the transportation to, and disposal of, demolition materials to a landfill.

3.02 PROTECTION OF EXISTING WORK AND FACILITIES

- A. Verify the locations of, and protect, any signs, paved surfaces, buildings, structures, landscaping, streetlights, utilities, and all other such facilities that may be encountered or interfered with during the progress of the Work and which are intended to remain or be salvaged. Take all measures necessary to safeguard all existing work and facilities which are outside the limits of the Work or items which are within the construction limits but are intended to remain.
- B. Provide and maintain adequate catch platforms, warning lights, barriers/barricades, guards, weather protection, dust protection, fences, planking, bracing, shoring, piling, signs, and other items required for proper protection.
- C. Provide protection for workmen, public, adjacent construction and occupants of existing building(s).
- D. Provide adequate fire protection.
- E. Provide protection for adjacent private property.
- F. Provide protection for vents, utility lines, sidewalks, light standards, hydrants, street signs, and fire alarm boxes.
- G. Provide new or make repairs to all damaged items which are not part of the Work on the project site or on adjacent property to Engineer's or Owner's satisfaction.
- H. Protect all material which is to be salvaged and/or remain.
- I. Make such explorations and probes as necessary to ascertain any required protection measures that shall be used before proceeding with demolition.
- J. The Owner assumes no responsibility for the continuation of conditions existing prior to the Bid. The Contractor shall have visited the sites and verified all conditions.

3.03 CONSTRUCTION LIMITS

- A. The Work of this Section shall be confined to the Construction Limits as indicated on the Drawings. In the absence of such a designation on the Drawings, the Work shall be confined to the minimum area reasonably necessary to undertake the Work as determined by the Engineer. All areas disturbed by the demolition Work, plus such additional areas as are disturbed by construction-related activities including construction access and storage shall be considered the "Construction Area".

3.04 SUBMITTALS

- A. Submit to Owner's Representative evidence of discontinuation of services to building or structures requiring removal from appropriate agencies.

3.05 RESPONSIBILITY FOR WORK

- A. The Contractor shall be responsible for:
 - 1. Removal of all items requiring salvage unless designated "To be removed by Owner."
 - 2. Coordinate activities to permit access by Owner and other trades required for the Work, enabling them to complete Work which is assigned to them.
 - 3. Accomplish all Work required by Drawings, including Work specifically noted plus additional work-related to specific work notes.
 - 4. Receive ownership of all material and equipment resulting from demolition operations, except items to be salvaged.
 - 5. Remove all material and equipment which is under Contractor's ownership and properly dispose of at appropriate off-site location of Contractor's choice. Pay all landfill disposal fees and any other disposal costs.

3.06 STORAGE OF SALVAGE MATERIALS

- A. The Contractor shall be responsible for the safe storage of all salvage materials until turned over to the Owner or reinstalled. Store salvaged materials where directed by Owner and/or where indicated on the Drawings until turned over to Owner or accepted by Owner following reinstallation.

3.07 MECHANICAL AND ELECTRICAL COMPONENTS

- A. Remove and/or demolish of all plumbing, mechanical and electrical components not requiring salvage or reuse called for demolition.

3.08 DISCONNECTION OF SERVICES

- A. Prior to starting removal and/or demolition operations, and where called for in the Project Documents, be responsible and coordinate disconnection of:
 - 1. Existing service piping and utilities, including but not limited to:
 - a. Hot water system to existing and proposed domestic water heater system. Coordinate with OWNER to insure building system continues to function.
 - b. Electrical connections.
 - c. Notify proper officials, persons or corporations owning same.
 - d. Cap all utilities requiring capping.

- B. Cut electrical systems in such a manner as to insure continued operation of the Owner's system.
- C. Disconnect services to equipment at unions, flanges, valves, or fittings wherever possible.
- D. Take all necessary precautions while dismantling piping containing hot water or other explosive or injurious fluids. Store such piping outdoors until fumes are removed.

3.09 REMOVAL OF ITEMS

- A. Items noted for removal shall be disposed of as follows:
 - 1. Where indicated to be turned over to Owner, deliver to location on property designated by Owner.
 - 2. Where to be incorporated in new Work:
 - a. Turn over to proper trade and section for reinstallation, or
 - b. Exercise care to insure that all items specified or designated on Drawings for reuse are carefully removed and stored until they can be reinstalled by trades reusing same.

3.10 CITY UTILITIES

- A. Be responsible for any public sidewalk, curb, gutter, or street paving damaged by any operation under this Contract. Be responsible for the repair of all items damaged by any operation under this contract, and be responsible for the repair of all damage in compliance with local municipality rules and regulations at no additional expense to the Owner.

3.11 DEMOLITION

- A. Conduct demolition work with minimum interference or roads, streets, driveways, sidewalks, and other facilities including adjacent building or structures and their occupants.
- B. Do not close or obstruct traffic on streets, nor close sidewalks, alleys, or driveways without proper city permit. Do not store materials in streets or walks.
- C. Properly barricade all streets, sidewalks, alleys, parking lots, or driveways which are not separated from the work activities by adequate distances to the satisfaction of the Engineer.
- D. Carry out vehicle loading as necessary, but not in locations that block traffic.

- E. No blasting or burning will be permitted on the site without written consent of the Owner. Obtain all necessary permits from the proper authorities prior to the start of Work.
- F. Conduct demolition operations and the removal of rubbish and debris to minimize dust. Sprinkle rubbish and debris with water as necessary to keep dust to a minimum.
- G. Immediately and completely remove demolition debris reaching a public or private roadway, parking lot, sidewalk, or other paved area.
- H. Take precautions to guard against movement, settlement or collapse of any surrounding construction designated to remain and be liable for such movement, settlement or collapse.
- I. Provide pumping equipment as required to keep mechanical room free of water.

END OF SECTION

SECTION 131500

SWIMMING POOL GENERAL

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Miscellaneous items related to pool construction.

1.02 MISCELLANEOUS ITEMS

- A. CONTRACTOR shall pay for all permits and plan review fees. Aquatic Design Solutions, LLC shall assist CONTRACTOR with submittal to state.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 131670

POOL PIPE AND PIPE FITTINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This section contains specifications for plumbing pipe and pipe fittings for swimming pool, whirlpool, and waterslide process piping and fittings for this project.

1.02 RELATED SECTIONS

- A. Section 13 1680 - Swimming Pool Valves.
- B. Section 13 1690 - Swimming Pool Supports and Anchors.

1.03 REFERENCES

- A. ASTM D1785 - Poly Vinyl Chloride (PVC) Plastic Pipe.
- B. ASTM D2321 - Underground Installation of Flexible Thermoplastic Sewer Pipe.
- C. ASTM D2241 - Poly Vinyl Chloride (PVC) Pressure-Rated Pipe (SDR Series).
- D. ASTM D2564 - Solvent Cements for Poly Vinyl Chloride (PVC) Plastic Pipe and Fittings.
- E. ASTM D2665 - Poly Vinyl Chloride (PVC) Plastic Drain, Waste and Vent Pipe Fittings.
- F. ASTM D2729 - Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings.
- G. ASTM D2774 - Recommended Practice for Underground Installation of Thermoplastic Pressure Piping.
- H. ASTM D2855 - Making Solvent Cemented Joints with Poly Vinyl Chloride (PVC) Pipe and Fittings.
- I. ASTM D3034 - Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings.
- J. ASTM D3139 - Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
- K. ASTM D3212 - Joints for Drain and Sewer Plastic Pipes Using Flexible Elastometric Seals.
- L. ASTM D3311 - Drain, Waste and Vent (DWV) Plastic Fitting Patterns.
- M. ASTM F656 - Primers for Use in Solvent Cement Joints of Poly Vinyl Chloride (PVC) Plastic Pipe and Fittings.
- N. AWWA C900 - Poly Vinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch, for Water Distribution.

1.04 SHOP DRAWINGS

- A. Schedule from the CONTRACTOR indicating the specification number of the pipe being proposed along with its type and grade if known at the time of submittal, and sufficient information to indicate the type of rating of fittings for each service.
- B. Statement from manufacturer on his letterhead that pipe furnished meets the specifications contained in this section.

1.05 QUALITY ASSURANCE

- A. Order all pipe with each length marked with the name or trademark of the manufacturer and type of pipe; with each shipping unit marked with the purchase order number, metal and alloy designation, temper, size and name of supplier.
- B. Any installed material not meeting the specification requirements must be replaced with material that meets these specifications without additional cost to the OWNER.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Promptly inspect shipments to insure that the material is undamaged and complies with specifications.
- B. Cover pipe to prevent corrosion or deterioration while allowing sufficient ventilation to avoid condensation. Do not store material directly on grade. Protect pipe, tube, and fitting ends so they are not damaged. Where end caps are provided or specified, take precautions so the caps remain in place. Protect fittings, flanges, and unions by storage inside or by durable, waterproof, above ground packaging.
- C. Off-site storage agreements will not relieve the CONTRACTOR from using proper storage techniques.
- D. Storage and protection methods must allow inspection to verify products.

1.07 DESIGN CRITERIA

- A. Use only new material, free of defects, rust and scale, and meeting the latest revision of ASTM, AWWA or CISPI specifications, as listed in this specification.
- B. Construct all piping for the highest pressures and temperatures in the respective system.
- C. Where weld fittings or mechanical grooved fittings are used, use only long radius elbows having a centerline radius of 1.6 pipe diameters.

PART 2 - PRODUCTS

2.01 POOL FILTRATION AND WATER TREATMENT SYSTEM PIPING

- A. Influent and Effluent Piping, Main Drain Piping; PVC plastic pipe ASTM D1785; socket-type PVC fittings ASTM D2467, conforming to the following schedule:
 - 1. Swimming pool: Schedule 40.
- B. Chemical Feed Tubing: PVC plastic tubing, Schedule D2740.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install pipe and fittings in accordance with reference standards, manufacturers recommendations and recognized industry practices.

3.02 PREPARATION

- A. Cut pipe ends square. Ream ends of piping to remove burrs. Clean scale and dirt from interior and exterior of each section of pipe and fitting prior to assembly.

3.03 ERECTION

- A. Install all piping parallel to building walls and ceilings and at heights which do not obstruct any portion of a window, doorway, stairway, or passageway. Where interferences develop in the field, offset or reroute piping as required to clear such interferences. Coordinate locations of piping with piping, ductwork, conduit, and equipment of other trades to allow sufficient clearances. In all cases, consult drawings for exact locations of pipe spaces, ceiling heights, door and window openings, or other architectural details before installing piping.
- B. Where copper or steel piping is embedded in masonry or concrete, provide protective sleeve covering of elastomeric pipe insulation.
- C. Maintain piping in clean condition internally during construction.
- D. Provide clearance for installation of insulation, access to valves and piping specialties.
- E. Provide anchors, expansion joints, swing joints and/or expansion loops so that piping may expand and contract without damage to itself, equipment, or building.
- F. Do not route piping through transformer vaults or above transformers, panelboards, or switchboards, including the required service space for this equipment, unless the piping is serving this equipment.
- G. Install all valves and piping specialties, including items furnished by others, as specified and/or detailed. Provide access to valves and specialties for maintenance. Make connections to all equipment, fixtures and systems installed by others where same requires the piping services indicated in this section.

3.04 SOLVENT WELDED PIPE JOINTS

- A. Install in accordance with ASTM D2855 "Making solvent Cemented Joints With PVC Pipe and Fittings". Saw cut piping square and smooth. Tube cutters may be used if they are fitted with wheels designed for use with PVC pipe and that do not leave a raised bead on pipe exterior. Support and restrain pipe during cutting to prevent nicks and scratches. Bevel ends 10-15 degrees and deburr interior. Remove dust, drips, moisture, grease and other superfluous material from pipe interior and exterior. Check dry fit of pipe and fittings. Reject materials which are out of round or do not fit within close tolerance. Use heavy body solvent cement for large diameter fittings.
- B. Maintain pipe, fittings, primer and cement between 40 and 100 degrees during application and curing. Apply primer and solvent using separate daubers (3" and smaller piping only) or clean natural bristle brushes about 1/2 the size of the pipe

diameter. Apply primer to the fitting socket and pipe surface to a depth of 4-5 thousandths. Apply solvent cement to the fitting socket and pipe in an amount greater than need to fill any gap. While both surfaces are wet, insert pipe into socket fitting with a quarter turn to the bottom of the socket. Solvent cement application and insertion must be complete in less than 1 minute. Minimum of 2 installers is required on piping 4" and larger. Hold joint for 30 seconds or until set. Reference manufacturers recommendations for initial set time before handling and for full curing time before pressure testing.

3.05 UNIONS AND FLANGES

- A. Install a union or flange at each connection to each piece of equipment and at other items which may require removal for maintenance, repair, or replacement. Where a valve is located at a piece of equipment, locate the flange or union connection the equipment side of the valve. Concealed unions or flanges are not acceptable.

3.06 PIPING SYSTEM LEAK TEST

- A. Conduct pressure test with test medium of water for all systems. On metal piping systems, test medium of air may be used with prior approval of ENGINEER. Where leaks occur, repair the area with new materials and repeat the test; caulking will not be acceptable.
- B. Test piping in sections or entire system as required by sequence of construction. Do not insulate or conceal pipe until it has been successfully tested. If required for the additional pressure load under test, provide temporary restrains at fittings or expansion joints. Backfill underground water mains prior to testing with the exception of valves which may be exposed to isolate potential leaks if thrust restrained. Entire test must be witnessed by ENGINEER.
- C. For hydrostatic tests use clean water and remove all air from piping being tested by means of air vents or loosening of flanges/unions. Measure and record test pressure at the high point in the system.
- D. For air tests, gradually increase the pressure to not more than one half of the test pressure; then increase the pressure in steps of approximately one-tenth of the test pressure until the required test pressure is reached. Examine all joints and connections with a soap bubble solution or equivalent method. The piping system exclusive of possible localized instances at pump or valve packing shall show no evidence of leaking.
- E. System will not be approved until it can be demonstrated that there is no measurable loss of test pressure during the test period and shall conform to the following criteria:

System	Test Pressure	Remarks	Duration
Below Ground, Swimming and Diving Pool Main Drain	20 psig	-	2 hr
Above Ground , Swimming and Diving Pool Process Piping	20 psig	-	8 hr
Clearwater Waste	10' water	-	2 hr

All pressure tests are to be documented on ENGINEER's form to be provided to the CONTRACTOR. CONTRACTOR shall request form prior to testing.

3.07 LABELING

- A. All piping in filter/mechanical room shall be labeled with the following:
1. Type of water.
 2. Direction of flow.

END OF SECTION

SECTION 131680

SWIMMING POOL VALVES

PART 1 - GENERAL

1.01 SCOPE

- A. This section includes valve specifications for swimming pool valves and swimming pool water makeup valves.

1.02 SUBMITTALS

- B. Schedule of all valves indicating type of service, dimensions, materials of construction, and pressure/temperature ratings for all valves to be used on the project. Temperature ratings specified are for continuous operation.

1.03 DESIGN CRITERIA

- A. Where valve types (ball, butterfly, etc.) are specified each valve type shall be of the same manufacturer unless prior written approval is obtained from the OWNER.
- B. Valves to be line size unless specifically noted otherwise.

PART 2 - PRODUCTS

2.01 SPECIALTY VALVES AND VALVE ACCESSORIES

- A. Gauge Valves:
 - 1. Use 1/4" ball valves. Needle valves and gauge cocks will not be accepted.

2.02 SWIMMING POOL VALVES

- A. PVC Ball Valves: 3 inches and smaller:
 - 1. True union PVC construction 12454-B ASTM D1784, solvent weld socket ends ASTM D2464, Teflon seat, EPDM seats and backing rings, 150 psig at 68°F. Asahi, George Fischer, Hayward, Nibco. Provide actuator-mounting bracket for control valves.
- B. PVC Butterfly Valves: 2-1/2" and larger:
 - 1. Molded PVC body, stainless steel shaft, EPDM resilient seal. Viton/EPDM seals, TFE bearings and bushing, rated for 150 psig at 75°F. Asahi, George Fischer, Hayward, Nibco. Provide actuator-mounting bracket for control valves.

- C. Provide 10 position locking lever handle actuators for butterfly valves 4 inches and smaller unless otherwise shown on drawings. Provide worm gear operators with external position indication for butterfly valves 8 inches and larger. Provide actuators where noted as control valves.
- D. Spring-loaded Check Valves:
 - 1. 2" and smaller: Bronze body, sweat or treaded ends, bronze trim, stainless steel spring, stainless steel center guide pin, Class 125, Teflon seat unless only bronze available, ConBrzCo 61 series, Mueller 203BP, Nibco S480Y, Val-Matic S1400 series.
 - 2. 2-1/2" and larger: Cast or ductile iron body, wafer, bronze trim, bronze or EPDM seat, stainless steel spring, stainless steel stem if stem is required, Class 125. APCO 300 or 600 series, Centerline CLC with full body option, Milwaukee 1800 series, Mueller Steam 101 AP or 105 AP, Nibco W910 or F910, Val-Matic 1400 or 1800 of 8000 series.
- E. Swimming Pool Water Makeup Valve:
 - 1. Cla-Valve or equal, provide 2 units with accessories for full operation of pool.

2.03 BRASS VALVES

- A. Select valves of the best quality and type suited for the specific service and piping system used. Minimum working pressure rating 120 psi stem or 150 psig W.O.G.
- B. Except as otherwise specified, all valves 3" and smaller shall be full port ball valves.

PART 3 - EXECUTION

3.01 GENERAL

- A. Properly align piping before installation of valves. Install and test valves in strict accordance with valve manufacturer's installation recommendations. Do not support weight of piping system on valve ends.+
- B. Mount valves in locations which allow access for operation, servicing and replacement.
- C. Install all valves with the stem in the upright or horizontal position. If possible, install butterfly valves with the stem in the horizontal position. Valves installed with the stems down will not be accepted.
- D. Prior to flushing of piping systems, place all valves in the full-open position.

3.02 SHUT-OFF VALVES

- A. Install shut-off valves at each piece of equipment, at each branch take-off from mains for isolation or repair and elsewhere as indicated.

3.03 BALANCING VALVES

- A. Install where indicated on the drawings for balancing of pumped systems.

3.04 DRAIN VALVES

- A. Provide drain valves for complete drainage of all systems. Locations of drain valves include low points of piping systems, downstream of riser isolation valves, equipment locations specified or detailed, other locations required for drainage of systems and elsewhere as indicated.

3.05 LABELING

- A. All valves inside filter/mechanical room and surge tank shall be tagged with non-corroding metallic tags with numbers.
- B. Numbers shall be a minimum of ¼" high, clear and legible.

3.06 UNIONS

- A. Provide unions adjacent to all tank and equipment and where required for disconnect and maintenance of equipment.

END OF SECTION

SECTION 131690

SWIMMING POOL SUPPORTS AND ANCHORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This section includes specifications for supports and anchors of all swimming pool, equipment, and materials.

1.02 REFERENCE STANDARDS

- A. MSS SP-58.
- B. MSS SP-59.

1.03 DESCRIPTION

- A. Provide all supporting devices as required for the installation of mechanical equipment and materials. All supports and installation procedures are to conform with the latest requirements of the ANSI Code for building piping.
- B. Do not hang any mechanical item directly from a metal deck or run piping so it rests on the bottom chord of any truss or joist, unless otherwise called for in the Contract Documents. Connect hangars to both the top and bottom chord of a truss.
- C. Fasteners depending on soft lead for holding power or requiring powder actuation will not be accepted.
- D. Support apparatus and material under all conditions of operation, including variations in weight of equipment and piping, to prevent excess stress, and allow for proper expansion and contraction.

1.04 SHOP DRAWINGS

- A. Schedule of all hanger and support devices indicating attachment methods and type of device for each pipe size and type of service.

1.05 DESIGN CRITERIA

- A. Materials and application of pipe hangers and supports shall be in accordance with MSS Standard Practice SP-58 and SP-69 unless noted otherwise.
- B. Piping connected to pumps, or other rotating or reciprocating equipment is to have vibration isolation supports for a distance of one hundred pipe diameters or three supports away from the equipment, whichever is greater. Standard pipe

hangers/supports as specified in this section are required beyond the 100 pipe diameter/3 support distance.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. B-Line, Grinnell, Pate, Piping Technology, Roof Products & Systems or approved equal.

2.02 STRUCTURAL SUPPORTS

- A. Provide all supporting steel required for the installation of mechanical equipment and materials, including angles, channels, beams, etc. to suspended or floor supported tanks and equipment. All of this steel may not be specifically indicated on the drawings.

2.03 PIPE HANGERS AND SUPPORTS

- A. Hangers For Pipe Sizes 1/2" Through 2":
 - 1. Galvanized steel, adjustable swivel ring, B-Line B3170NF, Grinnell 69 or 70.
 - 2. Galvanized steel, adjustable clevis, standard, B-Line B3100, Grinnell 260.
- B. Hangers For Pipe Sizes 2" And Larger:
 - 1. Galvanized steel, adjustable clevis, standard. B-Line B3100, Grinnell 260.
- C. Multiple or Trapeze Hangers:
 - 1. Galvanized steel channels with welded spacers and hanger rods.
- D. Wall Support:
 - 1. Galvanized steel welded bracket with hanger. B-Line 3060 Series, Grinnell 190 Series.
 - 2. Galvanized steel channels with pipe clamps.
- E. Vertical Support:
 - 1. Galvanized steel riser clamp. B-Line B3373, Grinnell 261.
- F. Floor Support:
 - 1. Galvanized steel pipe saddle, stand and bolted floor flange.

2.04 PIPE HANGER RODS

- A. Galvanized Steel Hanger Rods:
 - 1. Threaded both ends, threaded on end, or continuous threaded, complete with adjusting and lock nuts.

2. Size rods for individual hangers and tapeze support as indicate in the following schedule.
3. Total weight of equipment, including valves, fittings, pipe, pipe content, and insulation are not to exceed the limits indicated.

Maximum Load (Pounds)	Rod Diameter (Inches)
610	3/8
1130	1/2
1810	5/8
2710	3/4
3370	7/8
4960	1
8000	1-1/4

2.05 CONCRETE INSERTS

A. Poured in Place:

1. MSS SP-69 Type 18 wedge type to be constructed of a black carbon steel body with a removable malleable iron nut that accepts threaded rod to 7/8 inch diameter. Wedge design to allow the insert to be held by concrete in compression to maximize the load carrying capacity. B-Line B2505, Grinnell 281.
2. MSS SP-69 Type 18 universal type to be constructed of black malleable iron body with a removable malleable iron nut that accepts threaded rod to 7/8 inch diameter. B-Line B3014N, Grinnell 282.

B. Drilled Fasteners:

1. Carbon steel expansion anchors, vibration resistant, with ASTM B633 zinc plating. Use drill bit of same manufacturer as anchor. Hilti, Rawl, Redhead.

2.06 ANCHORS

- A. Use welding steel shapes, plates, and bars to secure piping to the structure.

2.07 EQUIPMENT STANDS

- A. Use structural steel members welded to and supported by pipe supports. Clean, prime and coat with three coat rust inhibiting alkyd paint or one coat epoxy mastic. Where exposed to weather, treat with corrosive atmosphere coatings.

2.08 CORROSIVE ATMOSPHERE COATINGS

- A. Use galvanized steel supports and anchor in pool equipment room.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Size, apply, and install supports and anchors in compliance with manufacturers recommendations.
- B. Install supports to provide for free expansion of the piping system. Support all piping from the structure using concrete inserts, beam clamps, ceiling plates, wall brackets, or floor stands. Fasten ceiling plates and wall brackets securely to the structure and test and demonstrate the adequacy of the fastening.
- C. Coordinate hanger and support installation to properly group piping of all trades.
- D. Where piping can be conveniently grouped to allow the use of trapeze type supports, use standard structural shapes or continuous insert channels for the supporting steel. Where continuous insert channels are used, pipe supporting steel. Where continuous insert channels are used, pipe-supporting devices made specifically for use with the channels may be substitute for the specified supporting devices provided that similar types are used and all data is submitted for prior approval.
- E. Perform welding in accordance with standards of the American Welding Society.
- F. All pipes hung from trusses shall be done as follows:
 - 1. Hangers shall be placed at panel points of trusses.
 - 2. Hangers shall be provided so that the hanger is connected to a minimum of four trusses, two on each side of the pipe.

3.02 HANGER AND SUPPORT SPACING

- A. Place a hanger within 12 inches of each horizontal elbow, valve, strainer, or similar piping specialty item.
- B. Use hangers with 1-1/2 inch minimum vertical adjustment.
- C. Where several pipes can be installed in parallel and at the same elevation, provide multiple or trapeze hangers.
- D. Support riser piping independently of connected horizontal piping.

- E. Adjust hangers to obtain the slope specified in the piping section of these specifications.
- F. Space hangers for pipe as follows:

Pipe Materials	Pipe Size	Max. Horizontal Spacing	Max. Vertical Spacing
Plastic	Swimming Pool process piping 1" dia. or less	3' - 0"	5' - 0"
Plastic	Swimming Pool process piping 1-1/2" dia or more	4' - 0"	6' - 0"

3.03 RISER CLAMPS

- A. Support vertical piping with clamps secured to the piping and resting on the building structure at each floor.

3.04 CONCRETE INSERTS AND CONTINUOUS INSERT CHANNELS

- A. Select size based on the manufacturer's stated load capacity and weight of material that will be supported. Locate continuous insert channels on 6'-0" maximum centers and 2'-0" from corners. Furnish inserts to the General Contractor for placement in walls. Use inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inch size. Where concrete slabs form finished ceiling, provide inserts that are flush with the slab surface.

3.05 ANCHORS

- A. Install where indicated on the drawings and details. Where not specifically indicated, install anchors at ends of principal pipe runs and at intermediate points in pipe runs between expansion loops. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

END OF SECTION

SECTION 131700

POOLS CIRCULATION AND FILTRATION EQUIPMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Provide and install required filtration equipment, accessories, attachments, and other items required to provide a complete working installation.

1.02 RELATED SECTIONS

- A. Section 13167 - Swimming Pool Pipe and Pipe Fittings
- B. Section 13168 - Swimming Pool Valves
- C. Section 13169 - Swimming Pool Supports and Anchors

1.03 SHOP DRAWINGS

- A. Shop drawings and product data shall be submitted.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Items of same function and performance are acceptable in conformance with Section 01600.

2.02 STRAINER

- A. Provide reducing FRP/PVC reducing hair and lint strainers with stainless steel baskets, NSF approved, as manufactured by Neptune Benson, or equal.
- B. Provide extra stainless steel basket for each strainer.
- C. Sizes: Contractor shall size strainers according to the pipe coming to the strainer and the pumps suction size. Refer to drawings.

2.03 POOL FLOW METERS

- A. FlowVis flow meters, provide per line size on plans up to 4" piping, or equal.
- B. Signet Flow Meter for line sizes 6" and larger, or equal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install according to manufacturer's requirements.

END OF SECTION

SECTION 220500 - COMMON WORK RESULTS FOR PLUMBING

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 REFERENCE STANDARDS

- A. Abbreviations of standards organizations referenced in other sections are as follows:

1.	AABC	Associated Air Balance Council
2.	ABMA	American Boiler Manufacturers Association
3.	ADC	Air Diffusion Council
4.	AGA	American Gas Association
5.	AIA	American Institute of Architects
6.	AMCA	Air Movement and Control Association
7.	ANSI	American National Standards Institute
8.	ARI	Air-Conditioning and Refrigeration Institute
9.	ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Eng.
10.	ASME	American Society of Mechanical Engineers
11.	ASTM	American Society for Testing and Materials
12.	AWWA	American Water Works Association
13.	AWS	American Welding Society
14.	CGA	Compressed Gas Association
15.	EPA	Environmental Protection Agency
16.	FM	Factory Mutual
17.	GAMA	Gas Appliance Manufacturers Association
18.	ICEA	International Cable Engineers Association
19.	IEEE	Institute of Electrical and Electronics Engineers
20.	IES	Illuminating Engineering Society of North America
21.	IRI	Industrial Risk Insurance
22.	ISA	Instrument Society of America
23.	MCA	Mechanical Contractors Association
24.	MICA	Midwest Insulation Contractors Association
25.	MSS	Manufacturer's Standardization Society of the Valve & Fitting Industry
26.	NBFU	National Bureau of Fire Underwriters
27.	NBS	National Bureau of Standards
28.	NEBB	National Environmental Balancing Bureau
29.	NEC	National Electric Code
30.	NEMA	National Electrical Manufacturers Association
31.	NFPA	National Fire Protection Association
32.	NSC	National Safety Council
33.	OSHA	Occupational Safety and Health Administration
34.	PDI	Plumbing and Drainage Institute

35. SMACMA Sheet Metal and Air Conditioning Contractors' National Association
36. UL Underwriters Laboratories
37. ASTM E814 Standard Test Method for Fire Tests of Through-Penetration Fire Stops
38. ASTM E84 Standard Test Method for Surface Burning Characteristics of Bldg. Materials
39. UL 1491 Fire Tests of Through-Penetration Firestops
40. UL 723 Surface Burning Characteristics of Building Materials

1.3 SUMMARY

A. This Section includes the following:

1. Alternates, unit prices and allowances.
2. Definitions
3. Submittals
4. Extra materials
5. Codes and permits
6. Authority having jurisdiction inspections
7. Insurance
8. Commissioning and testing
9. Guarantee / Warranty
10. Quality Assurance
11. Delivery, storage and handling
12. Coordination
13. Cutting and patching
14. Access Panels in walls and ceilings
15. System description
16. Existing conditions
17. Continuity of services and use of facility
18. Maintenance
19. Manufacturers
20. Access doors and frames for walls and ceilings
21. Pipe, tube, and fittings
22. Grout
23. Plumbing demolition
24. Material and workmanship
25. Equipment
26. Piping systems – common requirements
27. Pipe connections
28. Equipment installation – common requirements
29. Piping joint construction
30. Painting and touchup
31. Concrete bases
32. Erection of metal supports and anchorages
33. Erection of wood supports and anchorages
34. Grouting
35. Excavation and backfill
36. Protection and cleaning
37. Training
38. Building commissioning
39. Interruption of existing water or gas service

40. Start-up
41. Testing, adjusting and balancing
42. Final field observation

1.4 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
 1. ABS: Acrylonitrile-butadiene-styrene plastic.
 2. CPVC: Chlorinated polyvinyl chloride plastic.
 3. PE: Polyethylene plastic.
 4. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 2. NBR: Acrylonitrile-butadiene rubber.
- H. Basic Contract definitions are as follows:
 1. Provide: The term "provide" means "to furnish and install, ready for the intended use and in complete operating condition."
 2. Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."
 3. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Engineer," "requested by the Engineer," and similar phrases.
 4. Approve: The term "approved," where used in conjunction with the Engineer's action on the Contractor's submittals, applications and requests, is limited to the Engineer's duties and responsibilities as stated in the Conditions of the Contracts.
 5. Indicated: The term "indicated" refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar re-

quirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.

6. Contractor: The term "Contractor" shall carry the same meaning as "Plumbing Contractor" or "Division 22 Contractor".
7. Or Equal: The term "Or equal" shall carry the same meaning as "approved as equal by the Engineer"
8. Supplied: The term "supplied" shall carry the same meaning of provided.
9. Others: The term refers to another entity or another contractor other than the "Plumbing Contractor or "Division 22 Contractor"
10. Contract Documents: References to Contract Documents refers to a complete set of Drawings and Specifications for the entire Project. Drawings and Specifications are intended to supplement one another.
11. Dimensions: Arrangement of equipment, accessories, piping and ductwork on the Drawings is generally diagrammatic unless the Drawings include dimensions. Do not scale the Drawings. Field verify all dimensions at the site to locate new and existing work.
12. Furnish: To obtain, coordinate, submit the necessary drawings, deliver to the job site in new condition ready for installation, unload and unpack, and guarantee.
13. Responsibility: Where verbs such as "furnish", "provide", "install", or "use" appear in the Contract Documents, they mean, "The Plumbing Contractor shall furnish, provide, install, or use....." unless the requirement is introduced by a phrase, sentence or heading specifically identifying the requirement as the responsibility of someone else.

1.5 SUBMITTALS

A. General: Follow the procedures specified in Division 1 Sections.

B. Substitutions:

1. Submittal dates: For a period of up to seven (7) days prior to bid date, Engineer will consider written requests from bidders, manufacturers, and suppliers for substitution of products.
2. Submission: Submit a separate request for each product, supported with descriptions, drawings and samples as appropriate, including:
 - a. Comparison of the qualities of the proposed substitution with that specified. Standard features and options of the proposed substitution shall be clearly identified on the submittal.
 - b. Changes required in other elements of the work because of the substitution.
 - c. Availability of maintenance service, and source of replacement materials.
3. Substitution request constitutes a representation that bidder submitting request:
 - a. Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified.
 - b. Will provide the same warranties or bonds for the substitution as for the product specified.
 - c. Will coordinate the installation of an accepted substitution into the Work, and make such other changes as may be required to make the Work complete in all respects.

- d. Waives all claims for additional costs, under his responsibility which may subsequently become apparent.
4. Engineer Review: The Engineer will review requests for substitutions with reasonable promptness to judge the acceptability of the proposed substitution, and notify bidders by addendum the decision to accept the requested substitution. Substitution requests not indicated in addendums are considered rejected and not allowed.
5. Late Request for Substitutions: Requests for substitution received after bidding will not be considered except in such cases where it is necessary to make a substitution due to strikes, lockouts, bankruptcy, discontinuing of a product, etc. Requests for such substitutions of materials after award of contract shall be made in writing to Engineer and shall be made within ten days of date that Contractor ascertains he cannot obtain material or equipment specified.
6. Engineer's Acceptance: Engineer's acceptance of a substituted item applies only to the general quality and arrangement of the items substituted. Substituted items are still subject to compliance with the specification requirements and the shop drawing review process.
7. Cost Adjustment: Contractor to bear all added costs associated with substituted items, including costs incurred by other contractors. Cost savings associated with substitutions shall be refunded to the Owner.
8. Contractor is responsible for dimensional differences, weights, electrical requirements and any other resulting changes, when using equipment other than that scheduled on the Drawings. Contractor is responsible for any additional costs incurred as a result of substitutions, including other Contractors and Architect/Engineer fees.
9. Material and equipment not listed in the Specifications nor accepted in an Addendum will be removed and replaced at no cost or inconvenience to the Owner.

C. Shop Drawings:

1. Before ordering any equipment, review and stamp with submitting contractor approval, and submit to the Engineer the number of copies required for the contractor's use, plus (1) one copy to be retained by the Engineer.
2. The review of shop drawings by the Architect/Engineer shall not constitute agreement of any deviations from the plans and specifications and shall not relieve the Contractor from responsibility for errors or omissions.
3. Submit all shop drawings a maximum of 1 month from date of contract award.
4. Shop drawings shall be in hard copy or electronic copy format as follows:
 - a. All hard copy shop drawings shall be bound neatly by stapling or be contained in hard cover, 3-ring binders.
 - b. All shop drawings shall bear the submitting contractors approval stamp
 - c. Electronic copies (digital copies) of shop drawings shall be in Adobe Acrobat Portable Document Format - *.pdf format.
5. Submit for all equipment and systems as indicated in the respective specifications sections, marking each submittal with that specification section number. Mark general catalog sheets and drawings to indicate specific items being submitted and proper identification of equipment by name and/or number, as indicated in the contract documents.
6. Include project name, name of Architect, name of Engineer, contractor, sub-contractor, manufacturer, supplier and sales representative, include name, address, and phone

number for the sales representative. Clearly identify section number and description of equipment submitted.

7. Examine all shop drawings noting capacity, arrangement and physical dimensions. Clearly mark all relevant items on catalog data and cross-out unrelated information. Review and stamp shop drawing prior to submitting to the Engineer.
8. Before submitting electrically powered equipment, verify that the electrical power and control requirement for the equipment are in agreement with the schedules on the drawings. Include a statement of the shop drawing transmittal to the Architect/Engineer that the equipment submitted and the schedules are in agreement or indicate any discrepancies.
9. Refer to drawings and specifications for the additional required equipment that is to be submitted as part of the shop drawing submittals.
10. All shop drawings must be reviewed and accepted by the Engineer prior to fabrication and installation.
11. Submittals will be reviewed with the following actions:
 - a. NOEXCEPTIONSTAKEN - Indicates the Submittal appears to conform to the design concept of the Work and that the Contractor at their discretion, may proceed with fabrication and/or procurement and installation.
 - b. NOTEMARKING - Indicates that the Submittals, after noted corrections are made, would appear to conform to the design concept of the Work and that the Contractor, at his discretion, may proceed with fabrication and/or procurement and installation, if the corrections are accepted by the Contractor without an increase in Contract Sum or Time.
 - c. REVISE AND RESUBMIT - Indicates that the Submittal does not appear to conform to the specifications, and that the submittal needs to be changed to reflect the items noted. The Contractor shall not proceed with fabrication or procurement.
 - d. REJECTED - Indicates that the Submittal does not appear to conform to the specifications, and that a complete resubmittal is required. The Contractor shall not proceed with fabrication or procurement.
 - e. SEE ATTACHED COMMENTS - Indicates that the Submittals, after attached comments are made, would appear to conform to the design concept of the Work and that the Contractor, at his discretion, may proceed with fabrication and/or procurement and installation, if the corrections are accepted by the Contractor without an increase in Contract Sum or Time.
12. Allow a minimum of fourteen (14) calendar days for the Engineer to review the shop drawings. Time is from the receipt of drawings in the Engineers office until they are shipped out of the office.

D. Payment Request Breakdown:

1. For the purpose of establishing a schedule of values to be used for Application and Certification for Payments as defined in the General Conditions of the specifications, the items of plumbing work shall be broken down. Each item of schedule shall contain its proper share of overhead and profit and shall be broken into a labor and material figure.
2. Submit the schedule of values to the engineer prior to first payment request.

E. Project Record Documents:

1. As work progresses: Record changes or deviations from the contract drawings as follows:
 - a. Record location and elevation of underground buried piping.
 - b. Record as-built changes for plumbing work within the building that occur during the progress of construction and before the work is concealed. Record shall include such changes as:
 - 1) Relocation of valves or piping to avoid obstacles.
 - 2) Routing of piping overhead, in walls or exposed.
 - 3) Locations of balancing and service valves and shock absorbers.
 - 4) Sizes of piping.
 - 5) Revisions to plumbing system reflecting as-built conditions.
2. Location: The record drawings shall be maintained at the job site and be subject to review by the Owner or Engineer during the construction period. Prints for this purpose may be obtained from the Architect at cost. This record keeping requirement shall not be construed as authorization for the Contractor to make changes in the layout without definite instructions by the Architect/Engineer in each case.
3. Submission: Upon completion of the work, a set of drawings showing changes as noted on the record set of prints shall be submitted to the Engineer and Construction Manager.

F. Operating and Maintenance Manuals:

1. Submittal: At the completion of the contract submit to the Engineer two (2) sets of operating and maintenance manuals including parts lists bound into hard covered manuals for the electrical equipment. Each manual to include an electronic data disk of the entire operating and maintenance manual with folder structure and naming to match tabs in the manual. Manuals shall be labeled with the local supplier's name and address. Information not definitely applying to these particular pieces of equipment shall be crossed out or deleted from the submission. Information shall be included for equipment for which shop drawings have been provided.
2. All operations and maintenance data shall comply with the submission and content requirements specified under Division 1 General Requirements.
 - a. Approved shop drawings or product data sheets alone are not to be considered as acceptable maintenance material. Most items of equipment are shipped with installation/maintenance sheets included in the shipping package which shall also be included into the maintenance manual.
 - b. Assemble material in three-ring or post binders, using an index at the front of each volume and tabs for each system or type of equipment. In addition to the data indicated in the General Requirements, include the following information:
 - 1) Copies of all approved shop drawings
 - 2) Manufacturer's wiring diagrams for electrically powered equipment.
 - 3) Records of tests performed to certify compliance with system requirements.
 - 4) Certificates of inspection by regulatory agencies
 - 5) Parts lists for manufactured equipment
 - 6) Valve schedules

- 7) Lubrication instructions, including list/frequency of lubrication done during construction
- 8) Warranties
- 9) Additional information as indicated in the technical specification section.
- 10) Operating instruction for equipment
- 11) Recommended maintenance schedules and procedures for equipment
- 12) Recommended trouble shooting procedures for equipment
- 13) Settings/adjustments/calibrations for systems as required
- 14) Local equipment suppliers/ reps names, addresses, and telephone numbers
- 15) Equipment manufacturers names, addresses, and telephone numbers
- 16) Sub-contractors names, addresses, and telephone numbers
- 17) Test reports
- 18) Test and balance reports
- 19) System validation reports
- 20) Statement from Contractor that all incomplete items noted in Engineer's Final Field Observation Report have been completed
- 21) Statement from Owner confirming completion of Training
- 22) Refer to individual Specification Sections in for additional requirements

c. Special warranties.

G. Hazardous Materials: Disposal Certificates.

H. Welding certificates.

1.6 EXTRA MATERIALS

A. Refer to individual Specification Sections for extra materials to be provided to the Owner.

1.7 CODES AND PERMITS

A. The plumbing system shall be designed and installed in compliance with state code and local code for plumbing systems.

B. Obtain and pay fees for all licenses, plan review fees, required permits, and charges for use of outside services (i.e. inspecting agencies or delivery services) and use of property other than the site of the Work for storage of materials or other purposes.

C. Regular inspections shall be arranged by the Contractor as required by any and all regulations. All charges for inspections by regulating agencies of installations or review of plans and specifications shall be paid by the Contractor.

1.8 AUTHORITY HAVING JURISDICTION INSPECTIONS

A. Secure regular inspections as required by State and local regulations. Pay charges by regulating agencies for Drawings, Specifications, review of Drawings and Specifications, and the inspections of installations.

1.9 INSURANCE

- A. Procure and maintain such insurance required by law and additional insurance as specified in Division 0 or 1 or by Construction Manager.

1.10 COMMISSIONING AND TESTING:

- A. Provide field Commissioning and testing of plumbing systems as defined in individual 22 series Sections

1.11 GUARANTEE/WARRANTY

- A. The plumbing system installed under this contract shall be left in proper working order. Replace, without additional charge, new work or material which develops defects from ordinary use within one year unless a longer period is specified elsewhere, from date of acceptance by the Owner, except materials not furnished by the Contractor.
- B. New materials and equipment shall be guaranteed against defects in composition, design or workmanship. Guarantee certificates shall be furnished on special equipment, indicated.

1.12 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. All drawings, specifications and documents for this project shall be taken as a whole. Prior to installation, the Contractor shall be familiar with this project by carefully reviewing and comparing all documents that pertain to this project.
- D. In preparation of the contract documents, a reasonable effort has been made to provide layouts and connections based on selected and specified manufacturer's equipment. Since physical space, plumbing connections, equipment arrangements and other requirements may vary according to each manufacturer, the final responsibility for connections, initial access and proper fit is the responsibility of the Contractor.
- E. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the plumbing installations that follow.
 - 1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.
 - 2. Sleeves through fire rated floors and walls shall be non-combustible.

- F. Sequence, coordinate, and integrate installing plumbing materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
- G. Electrical Characteristics for Plumbing Equipment: Equipment of different electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.
- H. Regulatory Requirements: Compliance with the current adopted version of the applicable national, state, and local codes and referenced industry standards and specifications including:
 - 1. American Society of Mechanical Engineers Unfired Pressure Vessel Code
 - 2. American National Standards Institute (ANSI)
 - 3. Americans with Disabilities Act
 - 4. FGI Guidelines for Healthcare Facilities
 - 5. Municipal Water and Sewer Regulations
 - 6. National Electrical Code (NEC)
 - 7. National Fire Protection Association Codes (NFPA)
 - 8. Occupational Safety and Health Administration (OSHA)
 - 9. State and Local Building Codes
 - 10. State and Local Electrical Codes
 - 11. State and Local Fire Codes and Regulations
 - 12. State and Local Mechanical Codes
 - 13. State and Local Plumbing Codes
 - 14. State Industrial Commission Regulations
 - 15. State Elevator Code
 - 16. State Energy Code
 - 17. Uniform Federal Accessibility Standards
 - 18. Universities Code Offices are to be the Authority Having Jurisdiction.
 - 19. Meet or exceed all current applicable codes, ordinances and regulations for all installations. Promptly notify the Engineer, in writing, if the contract documents appear to conflict with governing codes and regulations.
 - 20. Higher quality of workmanship and materials indicated in the Contract Documents takes precedence over that allowed in referenced codes and standards.
- I. Agency Approvals: Demonstrated by seal, label, or stamp whenever these Specifications, referenced standards, or regulatory agencies require materials and equipment to conform to requirements of an inspection and testing agencies.
- J. Standard for Materials and Workmanship: New materials, free of defects, installed in accordance with manufacturer's current published recommendations, in neat manner, and in accordance with recognized standard industry practice.
- K. Equipment Nameplates: Permanently attached to each major equipment component including manufacturer's name, model and serial numbers, and address.
- L. Noise and Vibration: Limited to levels not objectionable to occupants and not detrimental to Owner operations, by balancing rotating and reciprocating equipment, and use of vibration isolating and noise abating products and installation procedures.

M. Layout of Work:

1. Install equipment and run pipes parallel with and at right angles to lines of building unless shown otherwise on Drawings.
2. Lay out Work and be responsible for lines, elevations and measurements required for installation. No additional compensation will be provided for lack of coordination and installation.
3. Offset piping as required for coordination and installation of work.
4. Prepare coordination drawings for ductwork, piping, and equipment.

1.13 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.14 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Verify that all devices are compatible for the surfaces on which they will be used. This includes, but is not limited to, plumbing fixtures installed in/on architectural surfaces.
- D. Coordinate work with other contractors prior to installation. Any installed work that is not coordinated and that interferes with other contractor's work shall be removed or relocated at the installing contractor's expense.
- E. Submit to the Architect/Engineer coordination drawings indicating that the plumbing work has been coordinated with other trades.

1.15 CUTTING AND PATCHING

- A. Each trade shall perform all cutting and patching necessary in order to perform his work unless such work has been delegated to the General Contractor. However, special permission shall be obtained from the Engineer before cutting structural members or finished material. All patching shall be performed in such manner as to leave no visible trace and to return the part affected to the condition of undisturbed work. Patching work shall be performed by persons experienced, skilled and licensed for the particular type of work involved. Inferior work will not be accepted. Pipe penetration through new or existing floors and walls, regardless of type of construction, should be done by rotary drill, wet or dry method. Use of a pneumatic impact tool is not acceptable. Contractor to contain water and dust to avoid damage to adjacent finishes, furniture and equipment.

- B. Pavements, sidewalks, roads and curbs shall be cut, patched, repaired and replaced as required to permit the installation of the work of each trade. Such cutting, patching, repairing and replacing shall be the responsibility of and paid for by the trade requiring the work.
- C. Each trade shall bear the expense of all cutting, patching, repairing, or replacing of the work of other trades required because of his fault, error, or tardiness or because of any damage done by him.
- D. Holes Through Masonry and Concrete:
 - 1. Each trade shall provide all holes and openings required for his work unless such holes and openings are shown to be provided on the architectural or structural drawings. Pay particular attention to openings required in pre-cast, pre-stressed, or post-tensioned slabs.
 - 2. Holes made in the field shall be core drilled large enough to allow all pipe insulation to continue uninterrupted. Holes in floors or exterior walls above grade shall include a steel pipe sleeve grouted watertight.
 - a. The above method shall be employed whenever holes are made on the job including holes required by change orders or because of omissions made inadvertently by the trade.
 - 3. Pipe openings in exterior walls below grade between earth areas and interior spaces shall include a steel pipe sleeve and a mechanical seal.
 - 4. Each trade shall be responsible for providing and disposing of water he uses in the core drilling operation. Such work shall be scheduled and other trades coordinated so that damage will not result from the use of water.
 - 5. Each trade shall be responsible for grouting air-tight any openings adjacent to his work to seal against the passage of air, smoke vapors or sound.
- E. Entry of Equipment
 - 1. Make all provisions for the entry of equipment provided under contract to the indicated locations. Provide all openings in the building, if necessary, and do all excavating, backfilling and repair necessary.
 - 2. Break down equipment as required to allow entry of equipment into the building.

1.16 SYSTEM DESCRIPTION

A. Design Requirements:

- 1. Division 22, and 23 Specifications and Drawings are complementary and together define scope of Work for mechanical systems.
 - a. Indicated Work includes furnishing all labor, material and equipment, which is necessary for successful operation of all mechanical systems as shown on drawings and as specified, except as such items as are specifically noted as being furnished under other sections of specifications.
 - b. Drawings and specifications are to be considered as supplementing each other. Work specified but not shown on drawings, or shown on drawings but not specified, shall be performed or furnished as though mentioned in both

specifications and drawings. If not otherwise directed, installation of all systems and equipment shall be in accordance with applicable codes and in accordance with manufacturer's installation instructions. Where work described in the specifications is in conflict with the work shown on the drawings, the contractor shall supply the greater quantity, quality and cost via the bid and contact the Engineer for clarification on direction prior to installation.

2. Mechanical Drawings are diagrammatic and are not intended to be scaled. Drawings are a graphic representation of contract requirements, produced according to best available standards to an optimum scale. Dimensions of work as indicated on plans are not guaranteed to be as-built dimensions. No measurements shall be scaled from drawings and used as a definite dimension for layout or fitting work in place.
3. Offsets, Fittings, and Accessories are not shown when precluded by Drawing production techniques or scales. Provide accessories and offset fittings required for completed installation of fully functioning and coordinating systems.
4. Clarifications: Requested from Engineer prior to bidding when Contractor is uncertain of requirements.

B. Performance Requirements:

1. Dimensions: Taken from Architectural and Structural Drawings, certified equipment drawings and from structure itself before fabricating Work.
2. Space Requirements: Verified and coordinated with other trades prior to fabrication and installation of Work. Give consideration to work by all contractors associated with the project and organize the work so that it will not interfere with work of other trades. Consult the drawings and specifications for work to be provided by other trades for correlating information, and the architectural and structural drawings for details, dimensions, foundations, pits, etc. The contractor shall verify all dimensions and conditions before starting their work.
3. Manufactured material specified or shown on drawings shall be installed or applied according to manufacturers' directions unless specifically designated otherwise.

1.17 EXISTING CONDITIONS

- A. Visit premises and determine existing conditions before submitting a proposal or bid.
- B. Before submitting a proposal or bid on the work outlined in this specification and accompanying drawings, each bidder shall examine the site and check as to the means of making connections to services and shall familiarize themselves with all the existing conditions and limitations. No additional compensation will be allowed because of the Contractor's misunderstanding as to the amount of work involved or his lack of knowledge of any site conditions that may affect his work. Any apparent variance of the plan or specification from the existing conditions at the site shall be called to the attention of the Engineer during the bid period so clarification can be made by addendum. Additional compensation will not be authorized because of conditions determinable prior to bidding without excavation, demolition, or precise measurement.
- C. The existence of any wires, conduits, pipes, ducts, or other facilities are shown in a general way only. It will be the responsibility of the Contractor to visit the site and make exact determination of the existence of any such facilities prior to the submission of his bid. It is

understood that he will be responsible for making the exact determination of the location and condition of such facilities.

1.18 MAINTENANCE

- A. Maintenance Service: During warranty period for defective workmanship and material.
 - 1. Emergency Service: Provide immediate, 24-hour response.
 - 2. Normal Service: Non-emergency service may be performed during normal working hours.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.

2.3 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PLUMBING DEMOLITION

- A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.
- B. The drawings do not necessarily indicate all the conditions, details, or work required. The Mechanical Contractor shall examine the building to determine the actual conditions and extent

of the work. Any details not clear to this Contractor shall be referred to the Architect/Engineer for clarification prior to bidding.

- C. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed or made obsolete by new work.
 - 1. Piping indicated to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - 2. Piping indicated to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - 3. Equipment indicated to Be Removed: Disconnect and cap services and remove equipment.
 - 4. Equipment indicated to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - 5. Equipment indicated to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

- D. Disposition of Removed Materials:
 - 1. Do not reuse removed materials unless explicitly permitted by Documents.
 - 2. Use of Owner's dumpsters for the disposition of any type of construction debris is not allowed.

- E. Equipment indicated to remain Owner's property:
 - 1. Place in storage location designated by Owner.

- F. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

- G. Where demolition work is to be performed adjacent to existing work that remains in an occupied area:
 - 1. Construct temporary dust partition to minimize the amount of contamination of the occupied space.
 - 2. Provide temporary connections necessary to permit the Owner to occupy areas of the building to remain in use during construction.

- H. Where pipe is removed and not reconnected to new work, cap end of existing services as if they were new work

3.2 MATERIAL AND WORKMANSHIP

- A. Provide new material and equipment, unless noted otherwise. Protect equipment and material from damage, dirt and the weather.

- B. Provide the highest quality workmanship and perform all work only by skilled mechanics. Install material and equipment in accordance with manufacturers' recommendations, instructions and current standards.
- C. The Engineer reserves the right to reject material or workmanship not in accordance with the Contract Documents, before or after installation.

3.3 EQUIPMENT

- A. Install material and equipment in accordance with the manufacturer's written instructions.

3.4 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors.
- M. Verify final equipment locations for roughing-in.

- O. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.
- P. All piping shall be run in the most direct and straight manner possible maintaining proper grading.
- Q. It is the intent of these plans and specifications that most piping be concealed. Where exposed, run as close to ceiling and/or wall as possible parallel with adjacent structural or architectural elements.
- R. Do not install piping in any switchgear, transformer, elevator equipment, telephone, or electrical equipment room, unless it is a branch serving that room.
- S. Do not install piping above switchboards, panelboards, control panels, motor control centers, etc.
- T. Arrange work to facilitate maintenance, repair or replacement of equipment. Provide access for devices that require maintenance. For concealed devices, verify that access panels are properly located and labeled.

3.5 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
- B. Drain Lines from Equipment:
 - 1. Unless otherwise noted, each item of equipment requiring a drain line or a conductor for liquid shall be provided an "open site" drain, such as a standpipe, floor drain, or a janitors sink. Direct connection to existing or new waste and vent stacks or rainwater leaders is not acceptable.
 - 2. Plumbing drain piping in finished spaces shall be copper, painted with aluminum paint. Provide a liquid trap in the piping to provide gas seal.
 - 3. Plumbing Contractor shall also provide drains on other items of equipment as noted in Miscellaneous Work. He shall provide a drain from the pan, which is part of the ventilating unit, even though the unit is provided by others. Piping shall be copper and include a "trap" and "vent".
 - 4. Heating system relief valves, blow-off valves, etc. shall be conducted to the nearest floor drain or receptor. Piping shall be black steel, neatly installed, and secured to wall or column.

3.6 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.7 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.

3.8 PAINTING AND TOUCHUP

- A. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.
- C. Refinish and touch up paint:
 - 1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
 - 2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
 - 3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.
 - 5. Paint exposed piping to match painted surfaces.

3.9 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 - 1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
 - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 - 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete."

3.10 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.11 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.12 GROUTING

- A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

3.14 PROTECTION AND CLEANING

- A. Protection
 1. Protect openings and equipment from obstruction, breakage, misuse, damage or blemishes.

Protect materials and equipment immediately upon receipt at the job site or immediately after they have been removed from their shipping containers. Unless noted otherwise, keep them clean and undamaged until final acceptance of the entire Project by the Owner. When a portion of the building is occupied by the Owner before substantial completion of the entire Project, make arrangements to transfer responsibility for protection and housekeeping for the occupied portion.

2. Protect pipe, duct and equipment openings with temporary plugs or caps. Keep openings covered until permanent connections are complete.
3. Contractor is responsible for any damage to mechanical equipment, materials or work until final acceptance of the entire project by the Owner.

B. Progress Cleaning:

1. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - a. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - b. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 - c. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - 1) Use containers intended for holding waste materials of type to be stored.
 - d. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
2. Site: Maintain Project site free of waste materials and debris.
3. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - a. Remove liquid spills promptly.
 - b. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
4. 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.
5. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
6. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
7. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Sections.
8. 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.
9. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable compo-

nents to ensure operability without damaging effects.

10. 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.

C. Final Cleaning:

1. Thoroughly clean plumbing materials, equipment and apparatus to be free of dust, dirt, rust, and foreign materials before acceptance at Substantial Completion.
2. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

3.15 TRAINING

- A. General: Instruct Owner's personnel in proper operation and maintenance of mechanical systems.
 1. Comply with Division 01 Section "Demonstration and Training."
- B. Classroom Sessions: Used to introduce Owner's operation, maintenance, and management personnel to manuals, drawings, and other documents and aids available to operate and maintain mechanical equipment and systems.
- C. Factory Specialists: Used in area of major equipment and systems to present sessions on their specific equipment and systems.
- D. Hands-On Training: Conducted concurrent with functional performance testing and commissioning.
- E. Include documentation of instructions in the Operation and Maintenance Manuals.
- F. Obtain a written statement from the Owner that his designated personnel have been instructed.

3.16 BUILDING COMMISSIONING

- A. Coordinate required commissioning work of this section with Owner's Commissioning Agent and other commissioning-related sections for commissioning requirements and roles required in this project.
- B. Provide assistance as required support commissioning activities

3.17 START-UP

- A. Before start-up, lubricate, charge, and fill systems as specified and according to Manufacturer's instructions.
- B. Test plumbing systems as specified in Sections governing their installation.
- C. Perform testing, adjusting and balancing in accordance with that Section.
- D. Operate equipment and systems in all their operating modes, to verify proper operation, prior to

final field observation and Owner instructions. Notify the Engineer, in writing, that all systems have been tested and are functioning and operating properly.

3.18 TESTING, ADJUSTING AND BALANCING

- A. Attend pre-testing conference as scheduled by Testing, Adjusting and Balancing Contractor.
- B. Provide assistance to Test, Adjusting and Balancing Contractor by making adjustments to system and system components required for achieving design performance.
- C. If acceptable performance of any test is not achieved, make the necessary corrections and the test shall be repeated until acceptable performance is achieved.

3.19 FINAL FIELD OBSERVATION

- A. A final field observation of the mechanical systems will be required before Contract Closeout. Request a final observation by the Engineer after all systems are fully completed and operational. The Engineer will schedule a field observation and generate a list of items to be corrected or completed before Contract Closeout.

END OF SECTION 220500

SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Bronze ball valves.
2. Iron ball valves.
3. Bronze lift check valves.
4. Bronze swing check valves.

B. Related Sections:

1. Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
2. Section 221116 "Domestic Water Piping" for valves applicable only to this piping.
3. Section 221319 "Sanitary Waste Piping Specialties" for valves applicable only to this piping.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve indicated.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 2. ASME B31.1 for power piping valves.
 - 3. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 and NSF 372 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set ball valves open to minimize exposure of functional surfaces.
 - 4. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as the largest of the upstream or downstream piping unless otherwise indicated.
- D. Valve Actuator Types:
 - 1. Hand Lever: For quarter-turn valves NPS 6 and smaller.
- E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:

1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.

F. Valve-End Connections:

1. Flanged: With flanges according to ASME B16.1 for iron valves.
2. Solder Joint: With sockets according to ASME B16.18.
3. Threaded: With threads according to ASME B1.20.1.

G. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.; Apollo Valves.
 - b. Crane Co.; Crane Valve Group; Crane Valves.
 - c. Hammond Valve.
 - d. Milwaukee Valve Company.
 - e. NIBCO INC.
 - f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig.
 - c. CWP Rating: 600 psig.
 - d. Body Design: Two piece.
 - e. Body Material: Bronze.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Stainless steel.
 - i. Ball: Stainless steel, vented.
 - j. Port: Full.

B. Two-Piece, Standard-Port, Bronze Ball Valves with Chromium Plated Ball:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.; Apollo Valves.
 - b. Crane Co.; Crane Valve Group; Crane Valves.
 - c. Hammond Valve.
 - d. Milwaukee Valve Company.
 - e. NIBCO INC.
 - f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig.
 - c. CWP Rating: 600 psig.
 - d. Body Design: Two piece.
 - e. Body Material: Bronze.
 - f. Ends: Threaded or Soldered.
 - g. Seats: RPTFE.
 - h. Stem: Stainless steel.
 - i. Ball: Chromium steel.
 - j. Port: Standard

2.3 IRON BALL VALVES

A. Class 125, Iron Ball Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Valve, Inc.
 - b. Conbraco Industries, Inc.; Apollo Valves.
 - c. Kitz Corporation.
 - d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
 - a. Standard: MSS SP-72.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Split body.
 - d. Body Material: ASTM A 126, gray iron.
 - e. Ends: Flanged.
 - f. Seats: PTFE or TFE.
 - g. Stem: Stainless steel.
 - h. Ball: Stainless steel.
 - i. Port: Full.

2.4 BRONZE SWING CHECK VALVES

A. Class 150, Bronze Swing Check Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Hammond Valve.
 - d. Milwaukee Valve Company.
 - e. NIBCO INC.

- f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- 2. Description:
 - a. Standard: MSS SP-80, Type 4.
 - b. CWP Rating: 300 psig.
 - c. Body Design: Horizontal flow.
 - d. Body Material: ASTM B 62, bronze.
 - e. Ends: Threaded.
 - f. Disc: PTFE or TFE.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Lift Check Valves: With stem upright and plumb.

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball valves.
 - 2. Pump-Discharge Check Valves:
 - a. NPS 3 and Smaller: Bronze swing check valves with bronze disc.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
 - 1. For Copper Tubing, NPS 3 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
 - 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
 - 3. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.

3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

- A. Pipe NPS 2 and Smaller:
 - 1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
 - 2. Ball Valves: Two piece, full port, bronze with stainless-steel trim.
 - 3. Bronze Swing Check Valves: Class 125, nonmetallic disc.
- B. Pipe NPS 2-1/2 and Larger:
 - 1. Ball Valves: Two piece, solder-joint ends, standard port, bronze with chromium trim.
 - 2. Ball Valves: Two piece, threaded ends, standard port, bronze with chromium trim.
 - 3. Ball Valves: Two piece, flanged, full port, Iron with stainless-steel trim.

END OF SECTION 220523

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Equipment labels.
2. Pipe labels.
3. Valve tags.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- C. Valve numbering scheme.
- D. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
 2. Letter Color: Black.
 3. Background Color: White.
 4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number.
- C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
 2. Lettering Size: At least 1-1/2 inches high.

2.3 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 2. Fasteners: Brass wire-link chain.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

- A. Locate pipe labels where piping is exposed or above accessible and non-accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 1. Near each valve and control device.
 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 5. Near major equipment items and other points of origination and termination.
 6. Spaced at maximum intervals of 25 feet along each run.
- B. Pipe Label Color Schedule:
 1. Domestic Cold Water Piping:
 - a. Background Color: Green.
 - b. Letter Color: White.
 2. Domestic Hot Water Piping:
 - a. Background Color: Green.
 - b. Letter Color: White.
 3. Non-potable Water
 - a. Background Color: Yellow
 - b. Letter Color: Black
 4. Drain Water:

- a. Background Color: Green.
- b. Letter Color: White.

3.4 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
 - 1. Valve-Tag Size and Shape:
 - a. Domestic Cold Water: 1-1/2 inches, round.
 - b. Domestic Hot Water: 1-1/2 inches, round.
 - c. Natural Gas: 1-1/2 inches, round.
 - 2. Valve-Tag Color: White.
 - 3. Letter Color: Black
 - a. Cold Water: Black.
 - b. Hot Water: Black.
 - c. Natural Gas: Black.

END OF SECTION 220553

SECTION 220719 - PLUMBING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes insulating the following plumbing piping services:
 - 1. Domestic cold-water piping.
 - 2. Domestic hot-water piping.
 - 3. Supplies and drains for handicap-accessible lavatories and sinks.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied, if any).

1.4 QUALITY ASSURANCE

- A. Comply with the following applicable standards and other requirements specified for miscellaneous components:
 - 1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.5 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping and equipment Installers for piping and equipment insulation application. Establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for required maintenance space.

1.6 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required. Insulation application may begin on segments that have satisfactory test results.

- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in Piping Insulation and Equipment Insulation schedules in Part 3 for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Mineral-Fiber, Preformed Pipe Insulation:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Johns Manville; Micro-Lok.
 - b. Knauf Insulation; 1000-Degree Pipe Insulation.
 - c. Owens Corning; Fiberglas Pipe Insulation.
 - 2. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- G. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semi rigid board material with factory-applied ASJ complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; CrimpWrap.
 - b. Johns Manville; MicroFlex.
 - c. Knauf Insulation; Pipe and Tank Insulation.
 - d. Owens Corning; Fiberglas Pipe and Tank Insulation.

2.2 INSULATING CEMENTS

- A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Ramco Insulation, Inc.; Super-Stik.
- B. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Ramco Insulation, Inc.; Ramcote 1200 and Quik-Cote.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
 - b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
- C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
 - b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-20.
- D. PVC Jacket Adhesive: Compatible with PVC jacket.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 739, Dow Silicone.
 - b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
 - c. Speedline Corporation; Polyco VP Adhesive.

2.4 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. FosterBrand,SpecialtyConstructionBrands,Inc.,abusinessofH.B.Fuller Company;30-80/30-90.
 - b. VimascoCorporation;749.
 - 2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
 - 5. Color: White.
- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. ChildersBrand,SpecialtyConstructionBrands,Inc.,abusinessofH.B.Fuller Company;CP-10.
 - b. FosterBrand,SpecialtyConstructionBrands,Inc.,abusinessofH.B.Fuller Company;46-50.
 - c. VimascoCorporation;WC-1/WC-5.
 - 2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 4. Solids Content: 60 percent by volume and 66 percent by weight.
 - 5. Color: White.

2.5 LAGGING ADHESIVES

- A. Description: Comply with MIL-A-3316C, Class I, Grade A, and shall be compatible with insulation materials, jackets, and substrates.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. ChildersBrand,SpecialtyConstructionBrands,Inc.,abusinessofH.B.Fuller Company;CP-50AHV2.
 - b. FosterBrand,SpecialtyConstructionBrands,Inc.,abusinessofH.B.Fuller Company;30-36.
 - c. VimascoCorporation;713and714.
 - 2. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over pipe insulation.
 - 3. Service Temperature Range: 0 to plus 180 deg F.

4. Color: White.

2.6 SEALANTS

A. Joint Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Permanently flexible, elastomeric sealant.
3. Service Temperature Range: Minus 100 to plus 300 deg F.
4. Color: White or gray.

B. ASJ Flashing Sealants, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.

2.7 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.8 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Johns Manville; Zeston.
 - b. Proto Corporation; LoSmoke.
 - c. Speedline Corporation; SmokeSafe.
2. Adhesive: As recommended by jacket material manufacturer.

3. Color: White.
4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

2.9 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. ABI, Ideal Tape Division; 428 AWF ASJ.
 - b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
 - c. Compac Corporation; 104 and 105.
 - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
 2. Width: 3 inches.
 3. Thickness: 11.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. ABI, Ideal Tape Division; 491 AWF FSK.
 - b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
 - c. Compac Corporation; 110 and 111.
 - d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.
 2. Width: 3 inches.
 3. Thickness: 6.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. ABI, Ideal Tape Division; 370 White PVC tape. b. Compac Corporation; 130.

c. VentureTape;1506CWNS.

2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

2.10 SECUREMENTS

- A. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

2.11 PROTECTIVE SHIELDING GUARDS

- A. Protective Shielding Pipe Covers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Insul-Tect Products Co.; a subsidiary of MVG Molded Products.
 - b. McGuire Manufacturing.
 - c. Truebro; a brand of IPS Corporation.
 - d. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.
2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
1. Verify that systems to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system and equipment as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.

3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.
 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above-ambient services, do not install insulation to the following:
1. Testing agency labels and stamps.
 2. Nameplates and data plates.
 3. Manholes.
 4. Handholes.
 5. Cleanouts.

3.4 PENETRATIONS

- A. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 4. Seal jacket to wall flashing with flashing sealant.
- B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- C. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
1. Comply with requirements in Division 7 for firestopping and fire-resistive joint sealers.

D. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 7.

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation of same material and thickness as used for adjacent pipe.
4. Insulate valves using preformed fitting insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape

insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION ON PIPES, VALVES AND FITTINGS

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.7 FIELD-APPLIED JACKET INSTALLATION

A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

3.8 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.9 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

1. NPS 1 and Smaller: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
2. NPS 1-1/4 and Larger: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

B. Domestic Hot Water:

1. All Pipe Sizes: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- C. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:
 1. All Pipe Sizes: Insulation shall be the following:
 - a. Protective Shielding: Manufactured plastic wraps complying with ADA requirements.

3.10 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. Piping, Exposed:
 1. All exposed piping with insulation shall be jacketed with PVC, white.

END OF SECTION 220719

SECTION 221116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Domestic water piping under the building slab and aboveground domestic water pipes, tubes, and fittings inside buildings.

1.3 ACTION SUBMITTALS

- A. Product Data: For transition fittings and dielectric fittings.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article in Part 3 for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14 and NSF 61.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
- B. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- D. Copper Unions:
 - 1. MSS SP-123.
 - 2. Cast-copper-alloy, hexagonal-stock body.
 - 3. Ball-and-socket, metal-to-metal seating surfaces.
 - 4. Solder-joint or threaded ends.

2.3 PEX TUBE AND FITTINGS

- A. PEX Distribution System: ASTM F 877, SDR 9 tubing.
- B. Fittings for PEX Tube: ASTM F 1807, metal-insert type with copper or stainless-steel crimp rings and matching PEX tube dimensions.

2.4 PEX-AL-PEX TUBE AND FITTINGS

- A. PEX-AL-PEX Distribution System: ASTM F 1281 tubing.
- B. Fittings for PEX-AL-PEX Tube: ASTM F 1281, metal-insert type with copper or stainless-steel crimp rings and matching PEX-AL-PEX tube dimensions.

2.5 PEX-AL-HDPE TUBE AND FITTINGS

- A. PEX-AL-HPDE Distribution System: ASTM F 1986 tubing.
- B. Fittings for PEX-AL-HDPE Tube: ASTM F 1986, metal-insert type with copper or stainless-steel crimp ring and matching PEX-AL-HDPE tube dimensions.

2.6 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials:
 - 1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
 - 2. Full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys.
- D. Flux: ASTM B 813, water flushable.
- E. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.7 TRANSITION FITTINGS

- A. General Requirements:
 - 1. Same size as pipes to be joined.
 - 2. Pressure rating at least equal to pipes to be joined.
 - 3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

- C. Sleeve-Type Transition Coupling: AWWA C219.

2.8 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

- B. Dielectric Flanges:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Capitol Manufacturing Company; member of the Phoenix Forge Group.
 - b. Central Plastics Company.
 - c. Matco-Norca.
 - d. Watts; a division of Watts Water Technologies, Inc.
 - e. Wilkins; a Zurn company.
- 2. Standard: ASSE 1079.
- 3. Factory-fabricated, bolted, companion-flange assembly.
- 4. Pressure Rating: 125 psig minimum at 180 deg F.
- 5. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

- C. Dielectric Nipples:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Elster Perfection Corporation.
 - b. Grinnell Mechanical Products; Tyco Fire Products LP.
 - c. Matco-Norca.
 - d. Precision Plumbing Products, Inc.
 - e. Victaulic Company.
- 2. Standard: IAPMO PS 66.
- 3. Electroplated steel nipple complying with ASTM F 1545.
- 4. Pressure Rating and Temperature: 300 psig at 225 deg F.
- 5. End Connections: Male threaded or grooved.
- 6. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Comply with requirements in Division 31 for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved by Engineer.
- B. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.
- C. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 221119 "Domestic Water Piping Specialties."
- D. Install domestic water piping level and plumb.
- E. Rough-in domestic water piping for water-meter installation according to utility company's requirements.
- F. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- G. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- H. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- I. Install piping to permit valve servicing.
- J. Install any piping, valves and specialties that require servicing or access for operation, above lay-in ceilings or above access panels, to be within reach through the openings of the ceiling grid and access panel. Exception is where the ceiling cavity can be accessed fully and permanent means have been provided for work to be performed entirely above the ceiling.
- K. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- L. Install piping free of sags and bends.
- M. Install fittings for changes in direction and branch connections.
- N. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- O. Install pressure gages on suction and discharge piping for each plumbing pump and packaged booster pump and locations as indicated on the drawings. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping."

- P. Install thermometers on outlet piping from each water heater and locations as indicated on the drawings. Comply with requirements for thermometers in Section 220519 "Meters and Gages for Plumbing Piping."
- Q. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- R. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- S. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- E. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- F. Joints for PEX Piping: Join according to ASTM F 1807.
- G. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
 - 1. Fittings for NPS 1-1/2 and Smaller: Fitting-type coupling.
 - 2. Fittings for NPS 2 and Larger: Sleeve-type coupling.

3.5 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric nipples.
- C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges or nipples.

3.6 HANGER AND SUPPORT INSTALLATION

- A. Add paragraph for seismic restraints if required for project. Comply with requirements for pipe hanger, support products, and installation in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
 - 1. Vertical Piping: MSS Type 8 or 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
 - 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
 - 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 - 4. NPS 2-1/2: 108 inches with 1/2-inch rod.
 - 5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
- E. Install supports for vertical copper tubing every 6 feet.
- F. Install vinyl-coated hangers for PEX piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1 and Smaller: 32 inches with 3/8-inch rod.
- G. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to plumbing fixtures and equipment.
 - 1. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
 - 2. Equipment: Cold- and hot-water-supply piping as indicated. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."
- B. Label pressure piping with system operating pressure.

3.9 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Piping Inspections:
 - a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
 - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
 - c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
 - d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
 - 2. Piping Tests:
 - a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.

- c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
 - f. Prepare reports for tests and for corrective action required.
- B. Domestic water piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.10 ADJUSTING

- A. Perform the following adjustments before operation:
- 1. Close drain valves, hydrants, and hose bibbs.
 - 2. Open shutoff valves to fully open position.
 - 3. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 - 4. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 - 5. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 - 6. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
- 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 - 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.

- c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.
- B. Clean non-potable domestic water piping as follows:
- 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 - 2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- C. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.
- D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Under-building-slab, domestic water, building-service piping, NPS 4 to NPS 8 and larger, shall be one of the following:
 - 1. Mechanical-joint, ductile-iron pipe; standard-pattern, mechanical-joint fittings; and mechanical joints.
 - 2. Push-on-joint, ductile-iron pipe; standard-pattern, push-on-joint fittings; and gasketed joints.
- D. Aboveground domestic water piping, NPS 2 and smaller, shall be one of the following:
 - 1. Hard copper tube, ASTM B 88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.
 - 2. PEX tube, NPS 1 and smaller; fittings for PEX tube; and crimped joints.
 - 3. PE-AL-PE tube, NPS 1 and smaller; fittings for PE-AL-PE tube; and crimped joints
 - 4. PEX-AL-PEX tube, NPS 1 and smaller; fittings for PEX-AL-PEX tube; and crimped joints.
- E. Aboveground domestic water piping, NPS 2-1/2 to NPS 8, shall be one of the following:
 - 1. Hard copper tube, ASTM B 88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.

3.13 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Shutoff Duty: Use ball valves for piping NPS 2 and smaller. Use ball valves with flanged ends for piping NPS 2-1/2 and larger.
 - 2. Drain Duty: Hose-end drain valves.

- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

END OF SECTION 221116

SECTION 221429 - SUMP PUMPS

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. Submersible sump pumps.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Wiring Diagrams: For power, signal, and control wiring.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For pumps and controls, to include in operation and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. UL Compliance: Comply with UL 778 for motor-operated water pumps.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Retain shipping flange protective covers and protective coatings during storage.
- B. Protect bearings and couplings against damage.
- C. Comply with pump manufacturer's written rigging instructions for handling.

PART 2 - PRODUCTS

2.1 SUBMERSIBLE SUMP PUMPS

A. Submersible, Fixed-Position, Double-Seal Sump Pumps:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bell & Gossett Domestic Pump; ITT Corporation.
 - b. Goulds Pumps; ITT Corporation.
 - c. Grundfos Pumps Corp.
 - d. Liberty Pumps.
 - e. Little Giant Pump Co.
 - f. Weil Pump Company, Inc.
 - g. Zoeller Company.
2. Description: Factory-assembled and -tested sump-pump unit.
3. Pump Type: Submersible, end-suction, single-stage, close-coupled, overhung-impeller, centrifugal sump pump as defined in HI 1.1-1.2 and HI 1.3.
4. Pump Casing: Cast iron, with strainer inlet, legs that elevate pump to permit flow into impeller, and vertical discharge for piping connection.
5. Impeller: Statically and dynamically balanced, ASTM A 48/A 48M, Class No. 25 A cast iron, semiopen design for clear wastewater handling, and keyed and secured to shaft.
6. Pump and Motor Shaft: Stainless steel, with factory-sealed, grease-lubricated ball bearings.
7. Seal: Mechanical.
8. Motor: Hermetically sealed, capacitor-start type; with built-in overload protection; lifting eye or lug; and three-conductor, waterproof power cable of length required and with grounding plug and cable-sealing assembly for connection at pump.
 - a. Motor Housing Fluid: Oil.
9. Controls:
 - a. 8224 Diaphragm level control switch.
 - b. Switch Type: Mechanical-float type.
 - c. Provide additional power cord length as required.

2.2 SUMP PUMP CAPACITIES AND CHARACTERISTICS

- #### A. Unit Capacity: See schedule on drawings for additional information.

2.3 MOTORS

- #### A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 220513 "Common Motor Requirements for Plumbing Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
- B. Motors for submersible pumps shall be hermetically sealed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for plumbing piping to verify actual locations of storm drainage piping connections before sump pump installation.

3.2 INSTALLATION

- A. Pump Installation Standards: Comply with HI 1.4 for installation of sump pumps.

3.3 CONNECTIONS

- A. Comply with requirements for piping specified in Section 221413 "Storm Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Tests and Inspections:
1. Perform each visual and mechanical inspection.
 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Pumps and controls will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.5 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.

3.6 ADJUSTING

- A. Adjust pumps to function smoothly, and lubricate as recommended by manufacturer.
- B. Adjust control set points.

3.7 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain controls and pumps.

END OF SECTION 221429