



Department of Management Services  
Purchasing Division  
241 West South Street  
Kalamazoo, MI 49007-4796  
Phone: 269.337.8020  
Fax: 269.337.8500  
[www.kalamazoo.org](http://www.kalamazoo.org)  
[purchasing@kalamazoo.org](mailto:purchasing@kalamazoo.org)

**INVITATION FOR BIDS (IFB)**

The City of Kalamazoo, Michigan is soliciting sealed bids for:

**Project Name: Well Station 11 Filter Improvements      Bid Reference #: 91392-003.0**

**IFB ISSUE DATE: Wednesday, January 19, 2022**

**BID DUE/OPENING DATE: Wednesday, February 9, 2022 @ 3:00 p.m. Local Time**  
*Facsimile Bids Will Not Be Accepted.*

**MAILING ADDRESS & INSTRUCTIONS**

**Mail to:**  
Purchasing Division  
241 W. South Street  
Kalamazoo, MI 49007

**Questions about this IFB should be directed to:**  
Department Contact: **Anna Crandall, Senior Civil Engineer** at [crandalla@kalamazoo.org](mailto:crandalla@kalamazoo.org)

*Include on the Envelope the Project Name and Bid Reference Number. All Envelopes Must Be Sealed.*

You are invited to submit a bid for this project. Specifications, terms, conditions and instructions for submitting bids are contained herein. This Invitation for Bids with all pages, documents and attachments contained herein, or subsequently added to and made a part hereof, submitted as a fully and properly executed bid shall constitute the contract between the City and the successful bidder when approved and accepted on behalf of the City by an authorized official or agent of the City. Please review the bid document as soon as possible and note the **DEADLINE FOR QUESTIONS** in the Instructions to Bidders.

All bidders shall complete and return the Bid and Award page(s) and submit all information requested herein in order for a bid to be responsive. The bid document shall be returned in its entirety, in a properly identified and sealed envelope to the Purchasing Division at the above address. **BIDS MUST BE RECEIVED BEFORE THE DUE DATE - LATE BIDS WILL NOT BE CONSIDERED.** The City reserves the right to postpone the bid opening for its own convenience.

**TABLE OF CONTENTS**

<u>SECTION</u>	<u>PAGE #</u>	<u>APPENDICES</u>
I	Statement of No Bid	
I	Instructions to Bidders	Appendix A
II	Bid & Award Pages	Appendix B
III	Insurance Requirements	Prevailing Wages
IV	Special Requirements	Specifications
V	General Provisions	Plans
VI	Terms & Conditions	

**STATEMENT OF NO BID**

**NOTE: If you DO NOT intend to bid on this commodity or service, please complete and return this form immediately.** Your response will assist us in evaluating all responses for this important project and to improve our bid solicitation process.

The Purchasing Division of the City of Kalamazoo wishes to keep its bidders list file up-to-date. If, for any reason you cannot supply the commodity/service noted in this bid solicitation, this form must be completed and returned to remain on the particular bid list for future projects of this type.

**If you do not respond to this inquiry within the time set for the bid opening date and time noted, we will assume that you can no longer supply this commodity/service, and your name will be removed from this bid list.**

- \_\_\_\_\_ Specifications too "tight", i.e. geared toward one brand or manufacturer only (explain below).
- \_\_\_\_\_ Specifications are unclear (explain below).
- \_\_\_\_\_ We are unable to meet specifications.
- \_\_\_\_\_ Insufficient time to respond to the Invitation for Bid.
- \_\_\_\_\_ Our schedule would not permit us to perform.
- \_\_\_\_\_ We are unable to meet bond requirements.
- \_\_\_\_\_ We are unable to meet insurance requirements.
- \_\_\_\_\_ We do not offer this product or service.
- \_\_\_\_\_ Remove us from your bidders list for this commodity or service.
- \_\_\_\_\_ Other (specify below).

REMARKS: \_\_\_\_\_

\_\_\_\_\_

SIGNED: \_\_\_\_\_ NAME: \_\_\_\_\_  
(Type or Print)

TITLE: \_\_\_\_\_ DATE: \_\_\_\_\_

FIRM NAME: \_\_\_\_\_  
(if any)

ADDRESS: \_\_\_\_\_  
(Street address) (City) (State) (Zip)

PHONE: \_\_\_\_\_ FAX: \_\_\_\_\_

EMAIL: \_\_\_\_\_

**SECTION I  
INSTRUCTIONS TO BIDDERS**

1. **EXAMINATION OF BID DOCUMENT**-Before submitting a bid, bidders shall carefully examine the specifications and shall fully inform themselves as to all existing conditions and limitations. The bidder shall indicate in the bid the sum to cover the cost of all items included on the bid form.
2. **PREPARATION OF BID**-The bid shall be legibly prepared in ink or typed. If a unit price or extension already entered by the bidder on the Bid and Award form is to be altered, it shall be crossed out and the new unit price or extension entered above or below and initialed by the bidder with ink. The bid shall be legally signed and the complete address of the bidder given thereon.

All bids shall be tightly sealed in an envelope plainly marked SEALED BID and identified by project name, bid opening date and time. Bids opened by mistake, due to improper identification, will be so documented and resealed. The Purchasing Division will maintain and guarantee confidentiality of the contents until the specified opening date and time. Bids submitted by Fax machine will not be accepted.

3. **EXPLANATION TO BIDDERS**-Any binding explanation desired by a bidder regarding the meaning or interpretation of the Invitation for Bids (IFB) and attachments must be requested in writing, **at least 5 business days before the bid opening** so a reply may reach all prospective bidders before the submission of bids. Any information given to a prospective bidder concerning the IFB will be furnished to all prospective bidders as an amendment or addendum to the IFB if such information would be prejudicial to uninformed bidders. Receipt of amendments or addenda by a bidder must be acknowledged in the bid by attachment, or by letter or fax received before the time set for opening of bids. Oral explanation or instructions given prior to the opening will not be binding.
4. **CASH DISCOUNTS**-Discount offered for payment of less than thirty (30) days will not be considered in evaluating bids for award. Offered discounts of less than thirty (30) days will be taken if payment is made within the discount period, even though not considered in evaluation of the bid.
5. **WITHDRAWAL OF BIDS**-Bids may be withdrawn in person by a bidder or authorized representative, provided their identity is made known and a receipt is signed for the bid, but only if the withdrawal is made prior to the exact time set for receipt of bid. No bid may be withdrawn for at least ninety (90) days after bid opening.
6. **ALTERNATE BIDS**-bidders are cautioned that any alternate bid, unless specifically requested or any changes, insertions or omissions to the terms and conditions, specifications or any other requirement of this IFB may be considered non-responsive, and at the option of the City, result in rejection of the alternate bid.
7. **LATE BIDS**-Any bid received at the office designated herein after the exact time specified for receipt will not be considered. (Note: The City reserves the right to consider bids that have been determined by the City to be received late due to mishandling by the City after receipt of the bid and no award has been made.)
8. **UNIT PRICES**-If there is a discrepancy between unit prices and their extension, unit prices shall prevail.

**SECTION II  
 BID AND AWARD**

The undersigned having become thoroughly familiar with all of the bid/contract documents incorporated herein, the project site and the location conditions affecting the work, hereby proposes to perform everything required to be performed in strict conformity with the requirements of these documents, and to provide and furnish all the equipment, labor and materials necessary to complete in a professional manner the furnishing and installing of all of the following, meeting or exceeding the specifications as set forth herein for the prices as stated below.

**BID – WITH PREVAILING WAGES**  
 This project will be awarded **WITH** Prevailing Wages.

PAY ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL
Well Station 11 Improvements	LS	1		
<b>TOTAL BID</b>				
Alternate 1: Process Piping Painting	LS	1		
<b>TOTAL BID + ALTERNATE</b>				

**ALTERNATE BID – WITHOUT PREVAILING WAGES**  
 To gather information on the cost of completing projects **WITHOUT** Prevailing Wages. This project will be awarded **WITH** Prevailing Wages.

PAY ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL
Well Station 11 Improvements	LS	1		
<b>TOTAL BID</b>				
Alternate 1: Process Piping Painting	LS	1		
<b>TOTAL BID + ALTERNATE</b>				

Bidder shall provide all of the information as requested herein with their bid. **Failure to do so and/or failure to provide post-bid requested information may be cause for rejecting the bid as non-responsive.**

Work shall start within **10** working days after receipt of notification by Contractor of Notice to Proceed, and final completion shall be **May 1, 2023**.

The City encourages the use of local labor in fulfilling the requirements of this contract.

This contract shall be governed by the laws of the State of Michigan.

Bidder/Contractor has examined and carefully studied the bidding documents and attachments, and acknowledges receipt of the following addenda:

Addendum No: \_\_\_\_\_

Dated: \_\_\_\_\_

By my signature below, I certify that the firm bidding on this contract, when making hiring decisions, does not use a past criminal conviction as a bar to or preclude a person with a criminal conviction from being considered for employment with the bidding firm unless otherwise precluded by federal or state law. I further certify that I have read and agree to be bound by the provisions of the City’s Non-Discrimination Clause found in Appendix A as updated by City Ordinance 1856.

Signed: \_\_\_\_\_ Name: \_\_\_\_\_

Title: \_\_\_\_\_

CITY OF KALAMAZOO EX-OFFENDER POLICY CHECKLIST

As part of the City’s commitment to reducing unacceptable poverty, encouraging rehabilitation, reducing recidivism and strengthening families in Kalamazoo, the City has updated its Purchasing Policy to ensure that firms with whom the City does business share in this commitment by utilizing hiring practices that do not unfairly deny people with arrest and conviction records gainful employment. *(Important: This requirement also extends to any subcontractors the bidder intends to use to fulfill the contract for goods or services being sought from the City.)*

**Part I: Proof that the bidder does not inquire about an individual’s past arrest or criminal history on the bidders employment application form**

- Attach a copy of the current application for employment being used by the bidder

**Part II: Certification that the bidder does not use an individual’s past arrest or criminal history to unlawfully discriminate against them by checking *one or more* of the following:**

- That pursuant to federal or state law bidder is precluded from hiring persons with certain criminal records from holding particular positions or engaging in certain occupations by providing a cite to the applicable statute or regulation; if checking this box, provide a citation to the applicable statute or rule upon which the bidder is relying: \_\_\_\_\_
- That bidder conducts criminal history background checks only as necessary, and only after making a conditional offer of employment; that any withdrawal of an offer of employment to an individual because of a past criminal history is job-related and consistent with business necessity after the individual has been provided an individualized assessment opportunity to review and challenge or supplement the history of past criminal conduct being relied upon by the bidder;
- That the use by bidder of criminal history background checks complies with the U.S. Equal Employment Opportunity Commission’s Enforcement Guidance on the Consideration of Arrest and Conviction Records in Employment Decisions and that the bidder has not had a determination rendered against it in past 7 years that it discriminated against a person through the use of an individual’s arrest or criminal history

I CERTIFY THAT THE ABOVE STATEMENTS ARE TRUE.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Position

**CITY OF KALAMAZOO  
LOCAL PREFERENCE POLICY AND CERTIFICATION**

The lowest responsive Kalamazoo County bidder whose bid is not low but falls within 2% of the lowest responsive bid is afforded the opportunity to become the successful bidder if it agrees to reduce its bid to match the lowest responsive bid. The City of Kalamazoo is the sole determiner whether a bidder is responsible, qualifies as a Kalamazoo County bidder, and if its bid is responsive to the City’s specifications, terms and conditions.

If the lowest Kalamazoo County bidder chooses not to match the lowest bid, the next lowest responsive Kalamazoo County bidder whose bid falls within 2% of the lowest bid, is given the opportunity to match the lowest responsive bid.

To qualify as a Kalamazoo County bidder, the bidder must meet both the following criteria:

1. Have a physical presence in Kalamazoo County by maintaining a permanent office, factory or other facility in Kalamazoo County with employees working in Kalamazoo County.
2. Have paid real or personal property taxes related to said business to the City of Kalamazoo, County of Kalamazoo or other municipal corporation within Kalamazoo County in the previous tax year, except that a non-profit entity need not meet this requirement.

This local preference policy applies only to purchases for materials, supplies, capital outlay, and services for maintenance, repair or operation of City facilities that are over \$25,000. If more than 50% of the contract is sub-contracted to firms located outside of Kalamazoo County that bid does not qualify for the local preference policy outlined above. The local preference policy will not apply if prohibited by law. The Purchasing Agent has the authority to finally determine if the bidder qualifies as a Kalamazoo County bidder as set forth herein. The Purchasing Agent may take into account the permanency of the business in Kalamazoo, and whether the business appears to be claiming to be a Kalamazoo County business solely or primarily to qualify as a Kalamazoo County business under this Resolution, and any other material factors.

**CERTIFICATION**

If you qualify as a Kalamazoo County bidder and wish to be considered for the local preference provisions as provided above please certify that fact by providing the information requested below and attesting to its accuracy.

Firm Name: \_\_\_\_\_

Street Address of Business: \_\_\_\_\_

City, State, and Zip Code: \_\_\_\_\_

Number of employees working in Kalamazoo County: \_\_\_\_\_

Name the city or township to which business real and/or personal property taxes are paid or provide non-profit status:

\_\_\_\_\_

The above information is accurate:

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Title: \_\_\_\_\_



**REFERENCE QUESTIONNAIRE**

Please answer the following questions completely.

1. Firm name: \_\_\_\_\_
2. Established: Year \_\_\_\_\_ Number of Employees: \_\_\_\_\_
3. Type of organization:
  - a. Individual: \_\_\_\_\_
  - b. Partnership: \_\_\_\_\_
  - c. Corporation: \_\_\_\_\_
  - d. Other: \_\_\_\_\_
4. Former firm name(s) if any, and year(s) in business:  
\_\_\_\_\_  
\_\_\_\_\_
5. Include at least 3 references of contracts for similar work performed over the last five (5) years. Include: owner, contact person and phone number and description of work performed.
  - 5.1 Company Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Contact: \_\_\_\_\_  
Type of work or contract: \_\_\_\_\_
  - 5.2 Company Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Contact: \_\_\_\_\_  
Type of work or contract: \_\_\_\_\_
  - 5.3 Company Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Contact: \_\_\_\_\_  
Type of work or contract: \_\_\_\_\_

I hereby certify that all of the information provided is true and answered to the best of my ability.

Signed: \_\_\_\_\_ Name: \_\_\_\_\_  
(type or print)

Title: \_\_\_\_\_ Date: \_\_\_\_\_

*NOTE: This blanket addendum is for informational purposes only and does not need to be acknowledged by bidders in their submission.*

**COVID-19 ADDENDUM #2**  
January 1, 2022

**TO: ALL Prospective Bidders**  
**PROJECT: ALL Upcoming Projects**

The purpose of this addendum is to clarify and/or modify the sealed bid delivery and bid opening process for all upcoming projects. All work affected is subject to all applicable terms and conditions of the Bidding and Contract Documents.

**1. UPDATE TO SEALED BID DELIVERY AND BID OPENING POLICY:**

**Effective immediately and continuing until further notice, the City of Kalamazoo will return to IN-PERSON bid openings following City Hall guidelines, including Mask Mandate.**

**BIDS MUST BE RECEIVED BEFORE THE DUE DATE AND TIME – LATE BIDS WILL NOT BE CONSIDERED.**

**Bidders can submit sealed bids in one of the following ways:**

- **Mail your bid**, to be received before the bid due date and time indicated in the bid document, to the City of Kalamazoo at the following address:  

City of Kalamazoo  
Purchasing Division  
241 West South Street  
Kalamazoo, MI 49007
- **Deliver your bid to the Treasurer’s Office Payment Drop Box** located in the northwest corner of City Hall before the bid due date and time indicated in the bid document.
- **Deliver your bid to City Hall In Person** before the bid due date and time indicated in the bid document.

All bids shall be tightly sealed in an envelope plainly marked SEALED BID and identified by project name, bid opening date and time. Bids opened by mistake, due to improper identification, will be so documented and resealed. The Purchasing Division will maintain and guarantee confidentiality of the contents until the specified opening date and time. Bids submitted by fax machine or email will not be accepted.

The Purchasing Division will post bid tabulations to the City of Kalamazoo website within 24 hours after the bid opening date and time at: <https://www.kalamazoocity.org/bidopportunities>.

Questions regarding this sealed bid delivery and bid opening policy change related to the COVID-19 virus should be directed to the City of Kalamazoo at (269) 337-8020.

Sincerely,  
  
Michelle Emig  
Purchasing Division Manager

I hereby state that all of the information I have provided is true, accurate and complete. I hereby state that I have the authority to submit this bid which will become a binding contract if accepted by the City of Kalamazoo. I hereby state that I have not communicated with nor otherwise colluded with any other bidder, nor have I made any agreement with nor offered/accepted anything of value to/from an official or employee of the City of Kalamazoo that would tend to destroy or hinder free competition.

The firm’s identification information provided will be used by the City for purchase orders, payment and other contractual purposes. If the contractual relationship is with, or the payment made to, another firm please provide a complete explanation on your letterhead and attach to your bid. Please provide for accounts payable purposes:

Tax Identification Number (Federal ID): \_\_\_\_\_

Remittance Address: \_\_\_\_\_

Financial Contact Name: \_\_\_\_\_ Financial Contact Phone Number: \_\_\_\_\_

Financial Contact Email Address: \_\_\_\_\_

I hereby state that I have read, understand and agree to be bound by all terms and conditions of this bid document.

SIGNED: \_\_\_\_\_ NAME: \_\_\_\_\_  
(Type or Print)

TITLE: \_\_\_\_\_ DATE: \_\_\_\_\_

FIRM NAME: \_\_\_\_\_  
(if any)

ADDRESS: \_\_\_\_\_  
(Street address) (City) (State) (Zip)

PHONE: \_\_\_\_\_ FAX: \_\_\_\_\_

EMAIL ADDRESS: \_\_\_\_\_

**FOR CITY USE ONLY - DO NOT WRITE BELOW**

**SECTION III  
CITY OF KALAMAZOO  
INDEMNITY AND INSURANCE**

Contractor, or any of their subcontractors, shall not commence work under this contract until they have obtained the insurance required under this paragraph, and shall keep such insurance in force during the entire life of this contract. All coverage shall be with insurance companies licensed and admitted to do business in the State of Michigan and acceptable to the City of Kalamazoo within ten (10) days of the Notice of Award. The requirements below should not be interpreted to limit the liability of the Contractor. All deductibles and SIR's are the responsibility of the Contractor.

The Contractor shall procure and maintain the following insurance coverage:

Workers' Compensation Insurance including Employers' Liability Coverage, in accordance with all applicable statutes of the State of Michigan.

Commercial General Liability Insurance on an "Occurrence Basis" with limits of liability not less than \$1,000,000 per occurrence and aggregate. Coverage shall include the following extensions: (A) Contractual Liability; (B) Products and Completed Operations; (C) Independent Contractors Coverage; (D) Broad Form General Liability Extensions or equivalent, if not already included and (E) XCU coverage if the nature of the contract requires XC or U work.

Automobile Liability in accordance with all applicable statutes of the State of Michigan, with limits of liability not less than \$1,000,000 per occurrence, combined single limit for Bodily Injury, and Property Damage. Coverage shall include all owned vehicles, all non-owned vehicles, and all hired vehicles.

Additional Insured: Commercial General Liability and Automobile Liability, as described above, shall include an endorsement stating that the following shall be *Additional Insureds*: The City of Kalamazoo, all elected and appointed officials, all employees and volunteers, all boards, commissions, and/or authorities and board members, including employees and volunteers thereof. It is understood and agreed that by naming the City of Kalamazoo as additional insured, coverage afforded is considered to be primary and any other insurance the City of Kalamazoo may have in effect shall be considered secondary and/or excess.

To the fullest extent permitted by law the Contractor agrees to pay on behalf of, indemnify, and hold harmless the City of Kalamazoo, its elected and appointed officials, and employees against any claims, demands, suits, or loss, including all costs connected therewith, and for any damages which may be asserted, claimed, or recovered against or from the City of Kalamazoo, by reason of personal injury, including bodily injury or death and/or property damage, including loss of use thereof, caused in whole or part by any negligent act or omission by the Contractor, its employees, agents, or officers which arises out of, or is in any way connected or associated with, this contract.

Cancellation Notice: All policies, as described above, shall include an endorsement stating that it is understood and agreed that thirty (30) days, or ten (10) days for non-payment of premium, Advance Written Notice of Cancellation, Non-Renewal, Reduction, and/or Material Change shall be sent to: City of Kalamazoo, Purchasing Division, 241 W. South Street, Kalamazoo, MI 49007.

Proof of Insurance Coverage: The Contractor shall provide the City of Kalamazoo at the time that the contracts are returned by him/her for execution, or within 10 days of Notice of Award, whichever is earlier, a Certificate of Insurance as well as the required endorsements. In lieu of required endorsements, if applicable, a copy of the policy sections where coverage is provided for additional insured and cancellation notice would be acceptable. Copies or certified copies of all policies mentioned above shall be furnished, if so requested.

**INDEMNITY AND INSURANCE**  
*Continued*

If any of the above coverages expire during the term of this contract, the Contractor shall deliver renewal certificates and/or policies to City of Kalamazoo at least ten (10) days prior to the expiration date.

Scope of Coverage: The above requirements and conditions shall not be interpreted to limit the liability of the Contractor under this Contract, but shall be interpreted to provide the greatest benefit to the City and its officers and employees. The above listed coverages shall protect the Contractor, its employees, agents, representatives and subcontractors against claims arising out of the work performed. It shall be the Contractor's responsibility to provide similar insurance for each subcontractor or to provide evidence that each subcontractor carries such insurance in like amount prior to the time such subcontractor proceeds to perform under the contract.

**SECTION IV  
SPECIAL REQUIREMENTS**

**1. BID BOND/GUARANTEE**

The bid must be accompanied by a bid bond which shall not be less than five (5%) percent of the total amount of the bid. No bid will be considered unless it is accompanied by the required guarantee. The bid guarantee shall ensure the execution of the bid and award, and the furnishing of a performance bond and a labor and material bond (A and B below) by the successful bidder. (Contractors Note: A cashier's or certified check in lieu of a bid bond is **NOT** acceptable.)

**A. PERFORMANCE BOND**

A performance bond shall be furnished in the full amount of the contract ensuring the City of faithful performance of all the provisions of the contract, and the satisfactory performance of any equipment required hereunder. The bond shall also ensure the City against defective workmanship and/or materials.

**B. LABOR AND MATERIAL (PAYMENT) BOND**

A labor and material (payment) bond shall be furnished for the period covered by the contract, in the full amount of the contract for the protection of labor and material suppliers and sub-contractors.

Bonds shall be secured by a guaranty or a surety company listed in the latest issue of the U.S. Treasury, circular 570, and licensed to do business in the State of Michigan, and written in favor of the City of Kalamazoo. The amount of such bonds shall be within the maximum amount specified for such company in said circular 570. The bonds shall be accompanied by a power of attorney showing authority of the bonding agent to sign such bonds on behalf of the guaranty or surety company. The cost of the bonds shall be borne by the Contractor.

Failure of the Contractor to supply the required bonds within ten (10) days after Notice of Award, or within such extended period as the Purchasing Agent may agree to, shall constitute a default and the City of Kalamazoo may either award this contract to the next lowest bidder or re-advertise for bids and may charge against the Contractor for the difference between the amount of the bid and the amount for which a contract for the work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the bid bond. If a more favorable bid is received by re-advertising, the defaulting bidder shall have no claim against the City of Kalamazoo for a refund.

**2. WAIVERS OF LIEN**

Upon completion of all work and request for final payment, the Contractor shall furnish a 100% waiver of lien from each supplier and sub-contractor covering all items of the work. Failure to supply waivers of lien for the entire job upon completion and final payment request will be considered grounds for withholding final payment.

**3. SUBCONTRACTORS**

- A. Contractors shall state on the Bid and Award page any and all subcontractors to be associated with their bid, including the type work to be performed. Any and all subcontractors shall be bound by all of the terms, conditions and requirements of the contract; however, the prime contractor shall be responsible for the performance of the total work requirements.
- B. The Contractor shall cooperate with the City of Kalamazoo in meeting its commitments and goals with regard to maximum utilization of minority and women business enterprise, and shall use its best efforts to ensure that minority and women business enterprises have maximum practicable opportunity to compete for subcontract work under this agreement.

**4. PREVAILING WAGES**

The successful bidder will be required to comply with Section 2-125 of the Code of Ordinances of the City of Kalamazoo regarding prevailing wages and Appendix B attached, incorporated herein by reference. Special note: **This provision applies only to projects in excess of \$100,000 for City (\$2,000 federal) funded projects.**

The City's requirements as it relates to prevailing wages includes a meeting with the City's Purchasing Division **prior** to work and payroll and work monitoring during the duration of the contract. Please contact Purchasing at (269) 337-8020 if you have any questions regarding Davis-Bacon provisions.

**SECTION V  
GENERAL PROVISIONS**

**1. INTENT**

It is the intent of these plans and specifications to provide for a Contractor who shall provide all labor, materials, tools and equipment necessary to perform in a professional manner for the **Well Station 11 Filter Improvements** project as described in the Specifications (*Attachment A*) and bid document.

**2. SCOPE OF WORK**

This contract includes, but is not limited to:

- 2.1. Removal and replacement of pressure filter media.
- 2.2. Pressure filter tank improvements including interior and exterior coating, new manways, new piping manifolds, and complete interior and exterior coating.
- 2.3. New pipe, valves, and fittings associated with the backwash discharge system replacement. Includes new concrete sump extension.
- 2.4. New air release valves and associated piping, valves, and fittings.
- 2.5. New filter loss of head differential pressure transmitter and associated piping. Includes wiring and SCADA programming via the Owner's existing Wonderware software.
- 2.6. Miscellaneous valve replacement including the filter effluent isolation valves and drain valves. Replacement of a section of the 3-inch drain piping.

**3. QUANTITIES**

The quantities shown or indicated on the Plans (*Attachment B*) are only estimated. Payment will be made based upon unit pricing of quantities **installed**.

**4. UNIT PRICING**

The unit price, including its pro-rata share of overhead, multiplied by the quantity shown shall represent the total bid and shall be held firm for the life of this contract. Any bid not conforming to this requirement may be rejected as non-responsive.

**5. INSPECTION OF WORK**

The City may maintain inspectors on the job who shall at all times have access to work.

**6. INSPECTION OF SITE**

Each bidder shall visit the site of the proposed work and fully acquaint himself/herself with the existing conditions relating to construction and labor, and shall fully inform himself/herself as to the facilities involved and the difficulties and restrictions attending the performance of this contract. The bidder shall thoroughly examine and become familiar with the drawings, specifications and all other bid/contract documents. The Contractor, by the execution of this contract, shall in no way be relieved of any obligation under it due to his/her failure to receive or examine any form or legal instrument, or to visit the site and acquaint himself/herself with the conditions there existing. No allowance shall be made subsequently in this connection in behalf of the Contractor for any negligence of his/her part. For inspection call the Public Services Department, Water Resources Division.

**7. INSPECTION AND TESTING**

The Contractor shall give the Project Manager timely notice of readiness of the work for all required inspections, tests or approvals, and shall cooperate with inspections and testing personnel to facilitate required inspections or tests. The City will provide for materials and construction testing including but not limited to compaction of subbase and backfill material, concrete testing and asphalt testing. The cost of said testing shall be borne by the City. Verification that testing required by the contract has been completed on one phase of the project prior to proceeding to the next phase is the responsibility of the Contractor. In the event that the project has proceeded without required testing, the Contractor shall insure that the required testing is obtained retroactively and shall provide access for testing as necessary at his/her sole expense.

**8. MATERIALS INSPECTION AND RESPONSIBILITY**

- 8.1 The Project Manager shall have the right to inspect any materials to be used in carrying out the terms of the contract.
- 8.2 The City does not assume any responsibility for the contracted quality and standard of all materials, equipment, components or completed work furnished under this contract.
- 8.3 Any materials, equipment, components or completed work which does not comply with contract specifications, MDOT, or State codes may be rejected by the City, and shall be replaced by the Contractor at no cost to the City.
- 8.4 Any materials, equipment or components rejected shall be removed within a reasonable period of time from the premises of the City at the entire expense of the Contractor after notice has been given by the City to the Contractor that such materials, equipment or components have been rejected.

**9. LAYING OUT WORK**

Before submitting a bid the Contractor shall verify all measurements and shall be responsible for the correctness of same. No extra charge or compensation will be allowed on account of differences between actual dimensions and the measurements indicated on the drawings. Any difference that may be found shall be submitted to the City Engineer for consideration before proceeding. The Contractor shall provide for construction staking; cost shall be included in the major items of work.

**10. SUPERVISION**

The Contractor shall employ an experienced superintendent or foreperson on the job at all times.

**11. TEMPORARY UTILITIES**

- 11.1 Temporary or construction water will NOT be available on the sites. The Contractor must provide for drinking water.
- 11.2 Temporary toilets: To be supplied by the Contractor as may be necessary.

12. **SITE SECURITY**

The Contractor shall be responsible for job site security of all materials and tools provided by him/her and no claim for loss or damage will be considered by the City.

13. **TARDINESS**

Construction delays resulting from tardiness on the part of the Contractor will be reviewed by the City in the event of any request for contract extension by the Contractor.

14. **PROGRESS SCHEDULE**

14.1 After receipt of Notice to Proceed, work shall start within 10 days unless otherwise agreed to by the Project Manager.

14.2 **Project shall have a final completion date of May 1, 2023.**

14.3 Work of a similar nature may be added to this contract if agreed to by the City and the Contractor. In the event that work is added, the progress schedule for the work will remain unchanged. Any contract time added for additional work will be applied to that additional work only, and cannot be added to items in the original contract. Any work done on the items in the original contract past the number of working days stated herein will be subject to liquidated damages regardless of any work that may be added at a later date.

14.4 The Contractor will be required to meet with the Public Services representatives to work out detailed progress schedule. The schedule for this meeting will be within two weeks after contract award has been made.

14.5 The named sub-contractor(s) for all items shall also be present at the scheduled meeting and they will be required to sign the Progress Schedule to indicate their approval of the scheduled dates of work set forth in the Progress Schedule.

14.6 The Progress Schedule shall include, as a minimum, the starting and completion dates for major items, and where specified in the bid document the date the project is to be opened to traffic as well as the final project completion date specified in the bid documents. The Progress Schedule shall be coordinated with all aspects of the work occurring at the site.

14.7 Failure on the part of the Contractor to carry out the provisions of the Progress Schedule as established may be considered sufficient cause to prevent bidding future projects until a satisfactory rate of progress is again established.

14.8 The starting date and the contract time to the completion date for this project may be adjusted by Public Services without imposing liquidated damages upon the receipt of satisfactory documented evidence that unforeseen delayed delivery of critical materials will prevent the orderly prosecution of the work.

14.9 Section 501.03.I.2, Seasonal Limitations, is amended as follows: Seasonal limits for placing HMA mixtures in the City of Kalamazoo will be April 15 through November 15. No HMA paving will be allowed outside of these dates unless approved by the Engineer.

**15. CONSTRUCTION SCHEDULE AND COORDINATION**

- 15.1 The Contractor shall supply the City with an agreeable construction schedule before commencing work on this contract. This schedule shall detail beginning and completion dates for each major component of the project.
- 15.2 The Contractor shall coordinate and cooperate with all other contractors who may be working on the site in order to allow for the orderly progress of work being done.
- 15.3 The Contractor is required to keep the Project Manager fully informed of any proposed work which will tend to interfere with the existing operations at the site.
- 15.4 The Contractor shall schedule all work to accommodate the City's schedule. In the event Contractor's schedule falls on weekends, nights or overtime work is required, no additional compensation will be allowed. All work shall be part of this contract without regard to when it is done.

**16. CONTRACTOR COORDINATION**

- 16.1 The Contractor shall make every effort to coordinate every aspect of his work with that of other contractors on the site to assure an efficiently managed and proper installation.
- 16.2 Consideration shall be given to timing of construction, maintaining adequate construction access, and construction staging. Any costs associated with this coordination shall be included in the contract.

**17. COORDINATING CLAUSE**

The Contractor's attention is called to Article 104.08 of the 2020 MDOT Standard Specifications for Construction entitled "Cooperation by Contractor."

**18. ADDITIONS**

- 18.1 Any modification to the contract shall be subject to prior approval by the Purchasing Agent. City Commission approval may also be required.
- 18.2 Prices for additional work required are not requested in the itemized listing contained herein for the base project. Should additional work be authorized, compensation shall be made on the basis of price or prices to be mutually agreed upon. Such additional work shall not begin until a Change Order has been approved.

19. **MAINTAINING TRAFFIC**

- 19.1 This work shall be in accordance with the requirements of Section 812 of the MDOT Standard Specifications for Construction and as specified herein. The Contractor is advised that the current Michigan Manual of Uniform Traffic Control Devices is hereby established as governing all work in connection with traffic control devices, barricade lighting, etc. required on this project.
- 19.2 The Contractor shall furnish, erect, maintain and, upon completion of the work, remove all traffic control devices and barricade lights within the project and around the perimeter of the project for the safety and protection of through and local traffic. This includes, but is not limited to: Advance, regulatory and warning signs; barricades and channeling devices at intersecting streets on which traffic is to be maintained; barricades at the ends of the project and at right-of-way lines for intersecting streets which are to be closed with the first usable street on each side of the project. Traffic regulators, where required by the Engineer, are included.
- 19.3 Where the existing pavement or partial widths of new pavement are to be utilized for the maintenance of through and local traffic, drum type barricades will be required at 50' intervals or as directed by the Engineer for channeling and directing traffic through the construction area.
- 19.4 Through traffic shall be maintained utilizing sidewalk closures with detours and traffic shifts per MDOT traffic and safety details.
- 19.5 Protection of all pedestrian traffic shall be maintained at all times.
- 19.6 Payment for the traffic control devices shall be based on the quantity used and the contract unit prices.
- 19.7 Under Article 812.04.D "Operated Pay Items" the term 'Relocating' shall include the relocating of the item from any street covered by the contract to any other street covered by the contract.

**Special Restrictions:** Access to frontage properties shall be maintained as much as practical. Emergency access shall be maintained at all times. The Contractor shall maintain two-way traffic with flag control as needed when the road is restricted to only one traffic lane.

20. **LIQUIDATED DAMAGES**

- 20.1 Liquidated damages, if applicable, shall be \$500.00 a day regardless of contract size.

21. **REMOVAL OF RUBBISH**

The Contractor shall daily remove all rubbish and accumulated materials due to his/her construction.

22. **SITE ACCESS**

The City will provide fair and reasonable access to the job site within the working schedules of both parties.

**23. GUARANTEE**

The Contractor shall guarantee all of his/her work for a period of two (2) years following the date of final acceptance of the completed work and shall repair, replace or make good any materials or work which fail to function or perform or be found defective, without cost to the City.

**24. SAFETY**

The Contractor shall comply with all applicable OSHA and MIOSHA regulations.

**25. PAY ESTIMATES**

The Contractor shall be responsible for the generation of invoices for payment. Payment will be generated by the City based upon an approved invoice. Recommended frequency of payment is monthly, however, frequency of payment will not exceed bi-weekly.

**26. PRODUCT/SYSTEM SUBSTITUTIONS**

Submit a written request, to be received not later than 10 days prior to scheduled bid opening, for Substitution of any Product not named. If no substitutions are submitted, it will be reasonably concluded by the Owner that the specified product will be incorporated into the Work and the Bidder will be committed to supplying the specified product.

- 26.1 Describe in detail any variance to the Product specified. All proposed substitution for specified items shall be substantially the same size (height, length, width, diameter, etc.), type, color, construction quality and shall meet the design intent to be considered for substitution for the Product specified.
- 26.2 Document each request with complete data substantiating compliance of proposed Substitution with Product specified including written certification that Product conforms to or exceeds all requirements of the Product specified.
- 26.3 Document all coordination information, including a list of changes or modifications needed to the Contract Documents or other parts of the Work and to construction performed by the Owner and Separate Contractors that will become necessary to accommodate the proposed substitution.
- 26.4 Provide name, address and telephone number of manufacturer's authorized representative.
- 26.5 Submit three copies of all documents for each request for Substitution for consideration.
- 26.6 Approval of the Substitution request, if given, will be in the form of an addendum issued prior to scheduled opening date and hour at local time.

**27. SAMPLES AND DEMONSTRATIONS**

Evidence in the form of samples may be requested. Such samples are to be furnished after the date of bid opening only upon request of the City unless otherwise stated in the bid proposal. If samples should be requested, such samples must be received by the City no later than seven (7) days after formal request is made. When required, the City may request full demonstrations of any unit(s) bid prior to the award of any contract. Samples, when requested, must be furnished free of expense to the City and if not used in testing or destroyed, will upon request within thirty (30) days of bid award be returned at the bidder's request.

**28. ACCEPTANCE OF MATERIAL**

The material delivered under this proposal shall remain the property of the seller until a physical inspection and actual usage of the material and/or services is made and thereafter accepted to the satisfaction of the City and must comply with the terms herein, and be full in accord with specifications and of the highest quality. In the event the material and/or service supplied to the City is found to be defective or does not conform to specifications, the City reserves the right to cancel the order upon written notice to the seller and return the product to seller at the seller's expense.

**29. VARIATIONS TO SPECIFICATIONS**

For purposes of evaluation, the bidder **MUST** indicate any variances from our specifications, terms and/or conditions, no matter how slight. If variations are not stated in the proposal, it will be assumed that the product or service fully complies with our specifications, terms and conditions.

**30. SAFETY STANDARDS**

The bidder warrants that the products supplied to the City conform in all respects to the standards set forth in the Occupational Safety and Health Act of 1970 and its amendments and the failure to comply with this condition will be considered a breach of contract.

**31. MANUFACTURER'S CERTIFICATION**

The City reserves the right to request from bidders separate manufacturer certification of all statements made in the bid.

**32. PROTECTION OF WORK**

The Contractor shall maintain adequate protection of all his/her work from damage and shall protect all public and private abutting property from injury or loss arising in connection with this contract.

**33. PROTECTION OF PROPERTY**

33.1 The Contractor shall confine his/her equipment and operations to those areas of the work site necessary for the completion of the work, or as authorized by the Project Manager. The Contractor shall protect and preserve from damage any facilities, utilities or features including trees, shrubs and turf which are not required to be disturbed by the requirements of the work.

33.2 The Contractor shall be responsible to determine the location of and to protect from damage any utilities or other improvements.

**34. QUESTIONS**

Bidders shall address questions regarding the specifications to Anna Crandall, Senior Civil Engineer at [crandalla@kalamazoo-city.org](mailto:crandalla@kalamazoo-city.org). (This does not relieve the requirements of Page 3, Item 3.) Questions regarding terms, conditions and other related bid requirements may be addressed to Craig Hull, Buyer at (269) 337-8444.

**SECTION VI**  
**TERMS AND CONDITIONS**

**1. AWARD OF CONTRACT**

- A. This contract will be awarded to that responsible bidder whose bid, conforming to this solicitation, will be most advantageous to the City, price and other factors considered. The City reserves the right to accept or reject any or all bids and waive informalities and minor irregularities in bids received. Other factors include, as an example but not limited to, delivery time, conformance to specifications, incidental costs such as demurrage and deposits, etc.

Notification of award will be in writing by the Purchasing Agent. Upon notification, the Contractor shall submit to the Purchasing Division all required insurance certificates (if required) and such other documentation as may be requested or required hereunder. Upon their receipt and subsequent approval by the City, the Purchasing Agent will forward to the Contractor a written **NOTICE TO PROCEED**. Work shall **NOT** be started until such **NOTICE TO PROCEED** is received by the Contractor.

- B. Unilateral changes in bid prices by the bidder shall not be allowed. However, the City, at its sole option, reserves the right to negotiate with bidders in the event of, but not limited to:

- 1) No bids received;
- 2) A single bid being received; or
- 3) Prices quoted are over budget and/or unreasonable.

**2. COMPLETE CONTRACT**

This bid document together with its addenda, amendments, attachments and modifications, when executed, becomes the complete contract between the parties hereto, and no verbal or oral promises or representations made in conjunction with the negotiation of this contract shall be binding on either party.

**3. SUBCONTRACTORS – NON-ASSIGNMENT**

Bidders shall state in writing any and all sub-contractors to be associated with this bid, including the type of work to be performed. The Contractor shall cooperate with the City of Kalamazoo in meeting its commitments and goals with regard to maximum utilization of minority and women-owned business enterprises.

The Contractor hereby agrees and understands that the contract resulting from this solicitation shall not be transferred, assigned or sublet without prior written consent of the City of Kalamazoo.

**4. TAXES**

The City of Kalamazoo is exempt from all federal excise tax and state sales and use taxes.

5. **INVOICING**

All original invoice(s) will be sent to the Financial Services Division, 241 W. South Street, Kalamazoo, MI 49007 or via email at [apinvoice@kalamazoo-city.org](mailto:apinvoice@kalamazoo-city.org). The Finance Division processes payments after receipt of an original invoice from the Contractor and approval by the department. The City of Kalamazoo's policy is to pay invoice(s) within 30 days from the receipt of the original invoice, if the services or supplies are satisfactory and the proper paperwork and procedures have been followed. **In order to guarantee payment to the vendor on a timely basis, the vendor needs to receive a purchase order number before supplying the City of Kalamazoo with goods or services.** All original, and copies of original invoice(s), will clearly state which purchase order they are being billed against.

**The City of Kalamazoo is a government municipality and therefore is tax exempt from all sales tax.**

**The vendor is responsible for supplying the Finance Division with a copy of their W9 if they are providing a service to the City of Kalamazoo.**

6. **PAYMENTS**

Upon issuance of certificates of Payment by the Architect/Engineer for labor and material incorporated in the work and the materials suitably stored at the site payment shall be made up to ninety (90%) percent of the value thereof.

When the cumulative total of payment is equal to fifty (50%) percent of the contract sum, subsequent payments will be made in the full amount for labor and material certified by the Architect/Engineer.

The amount retained shall be held until final acceptance of the work, receipt of all payrolls, releases, and waiver of liens.

7. **CHANGES AND/OR CONTRACT MODIFICATIONS**

The City reserves the right to increase or decrease quantities, service or requirements, or make any changes necessary at any time during the term of this contract, or any negotiated extension thereof. Price adjustments due to any of the foregoing changes shall be negotiated and mutually agreed upon by the Contractor and the City.

Changes of any nature after contract award which reflect an increase or decrease in requirements or costs shall not be permitted without prior approval by the Purchasing Agent. City Commission approval may also be required.

**ANY CHANGES PERFORMED IN ADVANCE OF PURCHASING AGENT APPROVAL, MAY BE SUBJECT TO DENIAL AND NON-PAYMENT.**

**8. LAWS, ORDINANCES AND REGULATIONS**

The Contractor shall keep himself/herself fully informed of all local, state and federal laws, ordinances and regulations in any manner affecting those engaged or employed in the work and the equipment used. Contractor and/or employees shall, at all times, serve and comply with such laws, ordinances and regulations.

Any permits, licenses, certificates or fees required for the performance of the work shall be obtained and paid for by the Contractor.

This contract shall be governed by the laws of the State of Michigan.

**9. RIGHT TO AUDIT**

The City or its designee shall be entitled to audit all of the Contractor's records, and shall be allowed to interview any of the Contractor's employees, throughout the term of this contract and for a period of three years after final payment or longer if required by law to the extent necessary to adequately permit evaluation and verification of:

- A. Contractor compliance with contract requirements,
- B. Compliance with provisions for pricing change orders, invoices or claims submitted by the Contractor or any of his payees.

**10. HOLD HARMLESS**

If the negligent acts or omissions of the Contractor/Vendor or its employees, agents or officers, cause injury to person or property, the Contractor/Vendor shall indemnify and save harmless the City of Kalamazoo, its agents, officials, and employees against all claims, judgments, losses, damages, demands, and payments of any kind to persons or property to the extent occasioned from any claim or demand arising therefrom.

**11. DEFAULT**

The City may at any time, by written notice to the Contractor, terminate this contract and the Contractor's right to proceed with the work, for just cause, which shall include, but is not limited to the following:

- A. Failure to provide insurance and bonds (when called for), in the exact amounts and within the time specified or any extension thereof.
- B. Failure to make delivery of the supplies, or to perform the services within the time specified herein, or any extension thereof.
- C. The unauthorized substitution of articles for those bid and specified.
- D. Failure to make progress if such failure endangers performance of the contract in accordance with its terms.
- E. Failure to perform in compliance with any provision of the contract.

- F. **Standard of Performance** - Contractor guarantees the performance of the commodities, goods or services rendered herein in accordance with the accepted standards of the industry or industries concerned herein, except that if this specification calls for higher standards, then such higher standards shall be provided.

Upon notice by the City of Contractor's failure to comply with such standards or to otherwise be in default of this contract in any manner following the Notice to Proceed, Contractor shall immediately remedy said defective performance in a manner acceptable to the City. Should Contractor fail to immediately correct said defective performance, said failure shall be considered a breach of this contract and grounds for termination of the same by the City.

In the event of any breach of this contract by Contractor, Contractor shall pay any cost to the City caused by said breach including but not limited to the replacement cost of such goods or services with another Contractor.

The City reserves the right to withhold any or all payments until any defects in performance have been satisfactorily corrected.

In the event the Contractor is in breach of this contract in any manner, and such breach has not been satisfactorily corrected, the City may bar the Contractor from being awarded any future City contracts.

- G. All remedies available to the City herein are cumulative and the election of one remedy by the City shall not be a waiver of any other remedy available to the City.

**12. TERMINATION OF CONTRACT**

The City may, at any time and without cause, suspend the work of this contract for a period of not more than ninety days after providing notice in writing to the Contractor. The Contractor shall be allowed an adjustment in the contract price or an extension of the contract times, or both, directly attributable to the suspension if Contractor makes an approved claim.

The City may, without prejudice to any other right or remedy of the City, and with or without cause, terminate the contract by giving seven days written notice to the Contractor. In such case the Contractor shall be paid, without duplication, for the following items:

- A. Completed and acceptable work executed in accordance with the contract documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such work;
- B. Expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials or equipment as required by the contract documents in connection with uncompleted work, plus fair and reasonable sums for overhead and profit on such expenses;
- C. All documented claims, costs, losses and damages incurred in settlement of terminated contracts with Subcontractors, Suppliers and others; and
- D. Reasonable expenses directly attributable to termination.

The Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

**13. INDEPENDENT CONTRACTOR**

At all times, the Contractor, any of his/her employees, or his/her sub-contractors and their subsequent employees shall be considered independent contractors and not as City employees. The Contractor shall exercise all supervisory control and general control over all workers' duties, payment of wages to Contractor's employees and the right to hire, fire and discipline their employees and workers. As an independent contractor, payment under this contract shall not be subject to any withholding for tax, social security or other purposes, nor shall the Contractor or his/her employees be entitled to sick leave, pension benefit, vacation, medical benefits, life insurance or workers' unemployment compensation or the like.

**14. PROJECT SUPERVISOR**

The Contractor shall employ an individual to act as Project Supervisor. The Project Supervisor shall be available to the Contractor's workers and the Project Manager at all times by use of a beeper or other reliable means. The Project Supervisor shall prepare daily work plans for the employees, monitor employee performance, attendance and punctuality; and work closely with the City's Project Manager in assuring contract compliance.

**15. MEETINGS**

The Contractor and/or Project Supervisor shall be available to meet with the Department Head or Project Manager at a mutually agreeable time to discuss problems, issues or concerns relative to the contract. Either party may call a meeting at any time. When such a request for a meeting is made, the meeting date shall, in no case exceed five (5) working days after the request; and, if in the sole opinion of the Department Head, the severity of the circumstance warrants, no more than one (1) working day.

**16. INSPECTION OF WORK SITE**

Before submitting bids or quotes for work, the Contractor shall be responsible for examining the work site and satisfying himself/herself as to the existing conditions under which he/she will be obligated to operate, or that in any way affects the work under this contract. No allowance shall be made subsequently, in behalf of the Contractor, for any negligence on his/her part.

**17. CONTRACT PERIOD, EXTENSIONS, CANCELLATION**

- A. The contract shall be in effect for the term stated in the specifications.
- B. The City may opt to extend this contract upon mutual agreement of both parties. The number of extensions shall be limited to that stated in the specifications.
- C. The City may, from time to time, find it necessary to continue this contract on a month-to-month basis only, not to exceed a six (6) month period. Such month-to-month extended periods shall be by mutual agreement of both parties, with all provisions of the original contract or any extension thereof remaining in full force and effect.
- D. All contracts, extensions and cost increases are subject to availability of funds and the approval of the City Commission (if required).
- E. The City reserves the right to cancel the contract due to non-appropriation of funds by the City with thirty (30) days written notice.

- F. Either party may terminate the contract (or any extension thereof) without cause at the end of any twelve (12) month term by giving written notice of such intent at least 60 days prior to the end of said twelve (12) month term.
- G. All notices are in effect commencing with the date of mailing. Written notices may be delivered in person or sent by First Class mail; faxed or emailed to the last known address.
- H. If cancellation is for default of contract due to non-performance, the contract may be canceled at any time (see Item 11, DEFAULT)

**APPENDIX A**  
**NON-DISCRIMINATION CLAUSE FOR ALL CITY OF KALAMAZOO CONTRACTS**

The Contractor agrees to comply with the Federal Civil Rights Act of 1964 as amended; the Federal Civil Rights Act of 1991 as amended; the Americans With Disabilities Act of 1990 as amended; the Elliott-Larson Civil Rights Act, Act. No. 453, Public Act of 1976 as amended; the Michigan Handicappers Civil Rights Act, Act No. 220, Public Act of 1976 as amended, City Ordinance 1856 and all other applicable Federal and State laws. The Contractor agrees as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, national origin, sex, age, height, weight, marital status, physical or mental disability, family status, sexual orientation or gender identity that is unrelated to the individual's ability to perform the duties of the particular job or position. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer, recruitment advertising, layoff or termination; rates of pay or other forms of compensations; and selection for training, including apprenticeship.
2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, national origin, sex, age, height, weight, marital status, physical or mental disability family status, sexual orientation or gender identity that is unrelated to the individual's ability to perform the duties of the particular job or position.
3. If requested by the City, the Contractor shall furnish information regarding practices, policies and programs and employment statistics for the Contractor and subcontractors. The Contractor and subcontractors shall permit access to all books, records and accounts regarding employment practices by agents and representatives of the City duly charged with investigative duties to assure compliance with this clause.
4. Breach of the covenants herein may be regarded as a material breach of the contract or purchasing agreement as provided in the Elliott-Larsen Civil Rights Act and City Ordinance 1856.
5. The Contractor will include or incorporate by reference the provisions of the foregoing paragraphs 1 through 4 in every subcontract or purchase order unless exempted by the rules, regulations or orders of the Michigan Civil Rights Commission\* and will provide in every subcontract or purchase order that said provision will be binding upon each subcontractor or seller.
6. The Contractor will not preclude a person with a criminal conviction from being considered for employment unless otherwise precluded by federal or state law. (for contracts over \$25,000)

The Elliott-Larson Civil Rights Act, Sec. 202 of Act. No. 453 of 1976 reads in part as follows:

Sec. 202. (1) An employer shall not:

- (a) Fail or refuse to hire, or recruit, or discharge or otherwise discriminate against an individual with respect to employment, compensation, or a term condition or privilege of employment because of religion, race, color, national origin, age, sex, height, weight or marital status.
- (b) Limit, segregate or classify an employee or applicant for employment in a way which deprives or tends to deprive the employee or applicant of an employment opportunity or otherwise adversely affects the status of an employee or applicant because of religion, race, color, national origin, age, sex, height, weight or marital status.
- (c) Segregate, classify or otherwise discriminate against a person on the basis of sex with respect to a term, condition or privilege of employment, including a benefit plan or system.

\* Except for contracts entered into with parties employing less than three employees.

## APPENDIX B - PREVAILING WAGES

Prevailing wages are applicable to this contract, therefore, rates will apply as follows:

- (XX) Project is funded by City of Kalamazoo monies and is estimated to be in excess of \$100,000.00. The applicable prevailing wage rates are attached.

Specifications for projects in which the City of Kalamazoo is a party for construction, alterations and/or repair including painting and decorating of public buildings or public works in, or for, the City of Kalamazoo and which requires or involves the employment of mechanics and/or laborers shall contain the following provisions stating the minimum wages to be paid the various classes of laborers and mechanics for the project. Prevailing wage rates determined by the U.S. Department of Labor under Davis Bacon and related acts will be used for City of Kalamazoo construction projects.

By the incorporation of prevailing wage rates within this specification, the City of Kalamazoo stipulates that:

- ✓ Contractor or his/her subcontractor shall pay all mechanics and laborers employed directly upon the site of the work, unconditionally and not less than once a week and without subsequent deduction or rebate on any account the full amount, accrued at the time of payment, computed at wage rates as incorporated herein regardless of any contractual relationship which may be alleged to exist between the contractor or subcontractor and such laborers and mechanics;
- ✓ The scale of wages to be paid shall be posted by the contractor in a prominent and easily accessible place at the site of the work;
- ✓ The Prime Contractor and all subcontractors shall submit weekly certified payrolls documenting the hours worked and wages paid by work classification. **NOTE: Contractor shall not include Social Security numbers of employees on certified payrolls.**
- ✓ There may be withheld from the contractor's accrued payments the amount considered necessary by the City's Contracting Official to pay to laborers and mechanics employed by the contractor or any subcontractor on the work for the difference between the rates of wages required by the contract and the rates of wages received by such laborers and mechanics except those amounts properly deducted or refunded pursuant to the terms of the Davis-Bacon Act (USC, Title 40, Sec. 276a) and interpretations thereof.

**Special Note:** The City's requirements as it relates to prevailing wages **includes a meeting with the City's Purchasing Agent prior to starting work and the submission of weekly certified payrolls by prime contractors and all subcontractors.** The City will monitor certified payrolls, work progress, and may conduct interviews with the mechanics and labors employed directly upon the site during the duration of the contract Please contact the Purchasing Department at (269) 337-8020 if you have any questions regarding the prevailing wage provision.

The overtime pay to which a laborer or mechanic is entitled under this contract shall be that overtime pay to which he/she is entitled by any agreement made with the contractor or subcontractor or by any applicable provision of law; but in no event shall such amount be less than the prevailing wage in the Kalamazoo community for such overtime.

Revised 4-08



***PREVAILING WAGES***

**Well Station 11 Filter Improvements**

**Bid Reference #: 91392-003.0**

**January 2022**

"General Decision Number: MI20220061 01/07/2022

Superseded General Decision Number: MI20210061

State: Michigan

Construction Type: Heavy

County: Kalamazoo County in Michigan.

Heavy, Includes Water, Sewer Lines and Excavation (Excludes Hazardous Waste Removal; Coal, Oil, Gas, Duct and other similar Pipeline Construction)

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022, Executive Order 14026 generally applies to the contract. The contractor must pay all covered workers at least \$15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022, Executive Order 13658 generally applies to the contract. The contractor must pay all covered workers at least \$11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number	Publication Date
0	01/07/2022

\* CARP0525-006 06/01/2021

	Rates	Fringes
CARPENTER, Includes Form Work....	\$ 25.94	20.59
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ELEC0131-006 06/01/2021		

	Rates	Fringes
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ELECTRICIAN.....\$ 36.61           7.95+27%

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ENGI0325-009 09/01/2021

POWER EQUIPMENT OPERATORS: Underground Construction (Including Sewer)

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1.....	\$ 35.92	24.85
GROUP 2.....	\$ 31.03	24.85
GROUP 3.....	\$ 30.53	24.85
GROUP 4.....	\$ 30.25	24.85

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Backhoe/ Excavator, Boring Machine, Bulldozer, Crane, Grader/ Blade, Loader, Roller, Scraper, Trencher (over 8 ft. digging capacity)

GROUP 2: Trencher (8-ft digging capacity and smaller)

GROUP 3: Boom Truck (non-swinging, non- powered type boom)

GROUP 4: Broom/ Sweeper, Fork Truck, Tractor, Bobcat/ Skid Steer /Skid Loader

-----  
ENGI0326-025 06/01/2021

EXCLUDES UNDERGROUND CONSTRUCTION

	Rates	Fringes
OPERATOR: Power Equipment		
GROUP 1.....	\$ 42.38	24.85
GROUP 2.....	\$ 39.08	24.85
GROUP 3.....	\$ 36.43	24.85
GROUP 4.....	\$ 34.72	24.85
GROUP 5.....	\$ 34.72	24.85
GROUP 6.....	\$ 28.86	24.85
GROUP 7.....	\$ 26.38	24.85

PAID HOLIDAYS: New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Crane operator with main boom and jib 400', 300', or 220' or longer.

GROUP 2: Crane operator with main boom and jib 140' or longer, tower crane, gantry crane, whirley derrick

GROUP 3: Backhoe/Excavator; Boring Machine; Bulldozer; Crane; Grader/Blade; Loader; Roller; Scraper; Tractor; Trencher

GROUP 4: Bobcat/Skid Loader; Broom/Sweeper; Fork Truck (over 20' lift)

GROUP 5: Boom truck (non-swinging)

GROUP 6: Fork Truck (20' lift and under for masonry work)

GROUP 7: Oiler

FOOTNOTES:

Crane operator with main boom and jib 300' or longer: \$1.50 per hour above the group 1 rate.

Crane operator with main boom and jib 400' or longer: \$3.00 per hour above the group 1 rate.

-----  
IRON0340-004 06/19/2017

	Rates	Fringes
IRONWORKER, STRUCTURAL AND REINFORCING.....	\$ 24.43	24.67

-----  
LAB00334-011 09/01/2018

SCOPE OF WORK:

OPEN CUT CONSTRUCTION: Excavation of earth and sewer, utilities, and improvements, including underground piping/conduit (including inspection, cleaning, restoration, and relining)

	Rates	Fringes
LABORER		
(1) Common or General.....	\$ 20.97	12.85
(2) Mason Tender-Cement/Concrete.....	\$ 21.10	12.85
(4) Grade Checker.....	\$ 21.28	12.85
(5) Pipelayer.....	\$ 21.40	12.85

-----  
LAB00355-010 06/01/2021

EXCLUDES OPEN CUT CONSTRUCTION

	Rates	Fringes
LABORER		
Common or General; Grade Checker; Mason Tender - Cement/Concrete.....	\$ 24.90	12.95
Pipelayer.....	\$ 20.34	12.85

-----  
PAIN0312-014 06/12/2014

	Rates	Fringes
PAINTER		
Brush & Roller.....	\$ 21.75	11.94
Spray.....	\$ 22.75	11.94

-----  
PLAS0016-020 04/01/2014

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER....	\$ 22.31	12.83

-----  
PLUM0333-026 06/01/2020

Fort Custer

	Rates	Fringes
PLUMBER.....	\$ 38.79	23.08
-----		
PLUM0357-012 07/01/2020		

Excluding Fort Custer

	Rates	Fringes
PLUMBER.....	\$ 35.20	22.35
-----		
TEAM0007-011 06/01/2020		

	Rates	Fringes
TRUCK DRIVER		
Lowboy/Semi-Trailer Truck...	\$ 28.05	.50 + a+b
Tractor Haul Truck.....	\$ 27.80	.50 + a+b

FOOTNOTE:

- a. \$470.70 per week.
- b. \$68.70 daily.

-----

SUMI2010-059 11/09/2010

	Rates	Fringes
LABORER: Landscape.....	\$ 12.25	0.00
TRUCK DRIVER: Dump Truck.....	\$ 18.00	6.43
TRUCK DRIVER: Off the Road Truck.....	\$ 20.82	3.69
-----		

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

=====

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses

(29CFR 5.5 (a) (1) (ii)).

-----

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union, which prevailed in the survey for this classification, which in this example would be Plumbers 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date

for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

-----  
WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Division National Office Branch of Wage Surveys. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.  
=====

END OF GENERAL DECISION"



**ATTACHMENT A**  
***SPECIFICATIONS***

**Well Station 11 Filter Improvements**

**Bid Reference #: 91392-003.0**

**City of Kalamazoo**

# **Well Station 11 Filter Improvements**

**Project Manual  
Project No. 210091**

**BIDS AND CONSTRUCTION**

PROJECT MANUAL  
FOR  
CITY OF KALAMAZOO

WELL STATION 11 FILTER IMPROVEMENTS

September 1, 2021  
Project Number 210091

ENGINEER

FISHBECK

1515 Arboretum Drive, SE  
Grand Rapids, Michigan 49546  
616.575.3824

4775 Campus Drive  
Kalamazoo, Michigan 49008  
269.375.3824

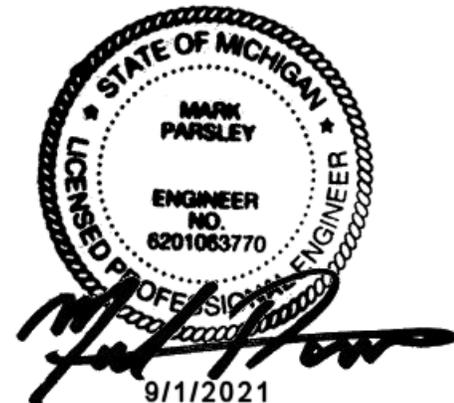
APPROVED BY:  
THE CITY OF KALAMAZOO

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DATE: 09/14/2021

DEPARTMENT OF PUBLIC SERVICES  
SENIOR CIVIL ENGINEER



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SECTION 00 01 10 – TABLE OF CONTENTS

DIVISION 01 GENERAL REQUIREMENTS

01 11 00	Summary of Work
01 18 13	Protection, Restoration and Notification
01 21 13	Cash Allowances
01 23 00	Alternates
01 25 13	Product Substitution Procedures
01 26 00	Contract Modification Procedures
01 26 13	Requests for Information
01 29 16	Payment Procedures
01 29 73	Schedule of Values
01 31 13	Project Coordination
01 31 19	Project Meetings
01 32 16	Construction Progress Schedule
01 33 00	Submittal Procedures
01 41 00	Regulatory Requirements
01 42 00	References
01 45 34	Special Inspections and Tests
01 50 00	Temporary Facilities and Controls
01 66 00	Product Storage and Handling Requirements
01 73 29	Cutting and Patching
01 74 00	Cleaning and Waste Management
01 74 26	Disinfection of Drinking Water Facilities
01 75 00	Starting and Adjusting
01 77 00	Closeout Procedures
01 78 39	Project Record Documents

DIVISION 02 EXISTING CONDITIONS

02 41 19	Selective Demolition
----------	----------------------

DIVISION 03 CONCRETE

03 11 00	Concrete Forming
03 15 00	Concrete Accessories
03 15 16	Post-Installed Anchors
03 21 00	Reinforcing Steel
03 60 00	Grouting

DIVISION 07 THERMAL AND MOISTURE PROTECTION

07 92 00	Joint Sealants
----------	----------------

DIVISION 09 FINISHES

09 91 00	Painting
----------	----------

DIVISION 40 PROCESS INTEGRATION

40 05 13	Process Piping Systems
40 05 23	Process Valves
40 90 00	Instrumentation and Control for Process Systems

DIVISION 43 PROCESS GAS AND LIQUID HANDLING, PURIFICATION, AND STORAGE EQUIPMENT

46 61 21	Pressure Filters
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END OF TABLE OF CONTENTS

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## SECTION 01 11 00 – SUMMARY OF WORK

### 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 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work covered by the Contract Documents comprises construction of Well Station 11 Filter Improvements located at 432 Kendall Avenue, Kalamazoo, MI 49006 for City of Kalamazoo, Owner.
- B. The Work includes the following major items:
  - 1. Removal and replacement of pressure filter media.
  - 2. Pressure filter tank improvements including complete interior and exterior coating, new manways and new piping manifolds.
  - 3. New pipe, valves, and fittings associated with the backwash discharge system replacement.
  - 4. New air release valves and associated piping, valves, and fittings.
  - 5. New filter loss of head differential pressure transmitter and associated piping. Includes wiring and SCADA programming via the Owner's existing Wonderware software.
  - 6. Miscellaneous valve replacement including the filter effluent isolation valves and drain valves.

#### 1.3 TYPE OF CONTRACT

- A. Construct the Work of this Contract under a single lump sum unit price Contract.

#### 1.4 GENERAL

- A. Imperative Language: These Specifications (Divisions 01 through 46) are written in the imperative and abbreviated form. This imperative language of the technical specifications is directed at Contractor unless specifically noted otherwise. Incomplete sentences shall be completed by inserting "shall", "shall be" and similar mandatory phrases by inference in the same manner as they are applied to notes on Drawings. The words "shall", "shall be" and similar mandatory phrases shall be supplied by inference where a colon (:) is used within sentences or phrases. Except as worded to the contrary, fulfill (perform) all indicated requirements whether stated in the imperative or otherwise.
- B. Related Sections: Some Sections of these Specifications (Divisions 01 through 46) may include a paragraph titled "Related Sections". This paragraph is an aid to the Project Manual user and is not intended to include all Sections which may be related. It is Contractor's obligation to coordinate all Sections whether indicated under "Related Sections" or not.
- C. Reference to the General Conditions: In Divisions 01 through 46, a reference to the General Conditions includes by inference all amendments or supplements in the Supplementary Conditions.

#### 1.5 CONTRACTOR USE OF PREMISES

- A. Limit use of premises to allow for Owner occupancy.
- B. Limit construction traffic access to Site from the main access drive off of Kendall Avenue.
- C. Coordinate use of premises under direction of the Owner.
  - 1. Contractor shall use only the entrance or entrances to the Site designated by Owner.
  - 2. All Contractor's vehicles and Subcontractor's vehicles shall be parked in areas designated by Owner.
  - 3. All Contractor's employees and Subcontractor's and their employees shall conform to the Owner's site security procedures.
  - 4. Contractor shall coordinate confined space area work with Owner and shall follow all applicable Owner's confined space entry requirements.

- D. Where the Contract Documents identify certain site elements within the construction limits, such as sidewalks, drives, and streets, that must be kept open for public or the Owner's use during construction, the Contractor shall be responsible for protection and maintenance of such elements as well.
- E. Except in connection with the safety or protection of persons or the Work or property at the Site or adjacent thereto, all Work at the site shall be restricted to the following hours:
  - 1. All Work in Confined Space Areas:
    - a. Monday Through Friday: 7 a.m. to 3:30 p.m.
  - 2. All Work Not in Confined Space Areas:
    - a. Monday Through Friday (Except Legal Holidays): 7 a.m. to 5 p.m. Work before 7 a.m. or after 5 p.m. only with written approval from the Owner.
  - 3. Saturday, Sundays or legal holidays with written approval of the Owner, with a request in writing at least 5 working days in advance.
- F. Work Within Highway Rights-of-Way: In accordance with Division 01 Section "Regulatory Requirements."

#### 1.6 OCCUPANCY REQUIREMENTS

- A. Owner Occupancy During Construction:
  - 1. The Owner will occupy or utilize premises during entire period of construction, for conduct of the Owner's normal operations. Cooperate with the Owner to minimize conflict and to facilitate the Owner's operations.
  - 2. Access to Abutting Properties: Provide at all times.
  - 3. Access for Emergency Vehicles:
    - a. Provide at all times.
    - b. Provide at least one clear lane during nonwork periods.
  - 4. Fire Hydrants: Provide access to at all times.
  - 5. Do not block fire access routes.
  - 6. Construct Work so as to not interfere with Well Station operations in accordance with this Section.
  - 7. Limit parking for construction vehicles to an area designated by the Owner.

#### 1.7 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Owner and Engineer.
- B. Sequence Submittal:
  - 1. The sequence indicated below is offered as a suggestion to the Contractor.
  - 2. Submit a proposed sequence with appropriate times of starting and completion of tasks to Engineer for review.
  - 3. Notify Owner at least 14 days prior to requiring any equipment to be taken out of service.
  - 4. Contractor to be solely responsible for all construction sequencing and scheduling.
- C. The following sequencing, scheduling, and site use constraints apply:
  - 1. One pressure filter must remain in service at all times during the period from October 1, 2021 to May 31, 2022.
  - 2. The backwash system improvements shall be completed in 5 days. All equipment must be procured and onsite prior to starting construction.
- D. Suggested Construction Sequence:
  - 1. Take Filter No. 1 offline. Complete all improvements associated with Filter No. 1.
  - 2. During rehabilitation of Filter No. 1, complete backwash system improvements prior to completion of Filter No. 1.
  - 3. At the conclusion of the Filter No. 1 rehabilitation, put back online and perform 2 week performance test.
  - 4. After successful performance test of Filter No. 1, take Filter No. 2 offline and complete all improvements associated with Filter No. 2.
  - 5. Complete pipe painting and other miscellaneous improvements in the station.

PART 2 - PRODUCTS

2.1 OTHER MATERIALS

- A. General: All other materials which are not specified herein and are not indicated on the Drawings, but are required for proper and complete performance of the Work.
  
- B. Procedure:
  - 1. Select new, first quality material.
  - 2. Obtain Engineer's review.
  - 3. Provide and install.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 11 00

## SECTION 01 18 13 – PROTECTION, RESTORATION AND NOTIFICATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes responsibilities for the protection, restoration and notification requirements for surface and subsurface structures, Underground Facilities and surface improvements.

#### 1.3 PROTECTION AND RELOCATION

- A. Be Responsible For:
  - 1. Protection of structures and utilities at or contiguous to the Site in accordance with the General Conditions.
  - 2. Cost of cleaning, repair, relocation, raising, lowering, or replacement of structures and utilities which are damaged as a result of Contractor's operations.
  - 3. Cost of cleaning, repair, relocation, raising, lowering, or replacement of structures and utilities which are identified on the Drawings for relocation.
  - 4. Temporary sheeting, bracing, poles, cables, sand fill or other means used to support a structure or utility exposed or endangered by Contractor's operations.
  - 5. Relocating, raising or lowering of a structure or utility for Contractor's convenience.

#### 1.4 RESTORATION

- A. Acceptable Standards for Restoration:
  - 1. Restore to the better of:
    - a. Original condition.
    - b. Requirements of the Contract Documents.
    - c. Current MDOT Standard Specifications for Construction.
    - d. MDOT Standard Plans.
- B. Property Corners, Government Survey Corners, and Plat Monuments:
  - 1. Protect from damage or disturbance.
  - 2. Protect discovered points until Engineer or Owner has witnessed or otherwise referenced their locations.
  - 3. Replace if disturbed or removed as a result of construction:
    - a. Arrange for replacement by a Licensed Land Surveyor.
    - b. Pay all costs.
- C. Driving Surfaces and Similar Improvements:
  - 1. Repair or replace damaged or removed surfaces as indicated on the Drawings and as specified herein.
  - 2. Adjust to temporary or final grade all new and existing castings (water valve boxes, manholes, catch basins and similar structures) for all gravel, bituminous or concrete surfacing or resurfacing.
- D. Landscaping and Miscellaneous Improvements:
  - 1. Includes, but is not limited to, topsoil, seeded areas, sodded areas, shrubs, trees, decorative plantings, fences, mailboxes, signs, guard posts and other similar items.
  - 2. Protect from damage by construction operations. In event of damage, replace damaged item with one of equivalent type and size.
- E. Wellhead Protection Area:
  - 1. Protect from damage by construction operations. Includes protection from exterior painting activities.
  - 2. Contractor is solely responsible for any costs associated with damage or contamination to Wellhead Protection Area.

## PART 2 - PRODUCTS

Not used.

## PART 3 - EXECUTION

### 3.1 SURFACE RESTORATION

- A. Unless Otherwise specified or indicated on the Drawings, perform the following surface restorations:
1. System Descriptions:
    - a. Bituminous Base Course - Bituminous Paved Roadway:
      - 1) Subbase: 6 inches.
      - 2) Bituminous Base Course:
        - a) Collector Roadway: 6 inches.
        - b) Local Roadway: 3 inches.
      - 3) Bituminous Leveling Course:
        - a) Collector Roadway: 1-1/2 inches.
        - b) Local Roadway: 1-1/2 inches.
      - 4) Bituminous Top Course: 1-1/2 inches.
    - b. Aggregate Base Course - Bituminous Paved Roadway:
      - 1) Subbase: 8 inches.
      - 2) Aggregate Base Course:
        - a) Collector Roadway: 12 inches.
        - b) Local Roadway: 6 inches.
      - 3) Bituminous Leveling Course:
        - a) Collector Roadway: 2 inches.
        - b) Local Roadway: 1-1/2 inches.
      - 4) Bituminous Top Course: 1-1/2 inches.
    - c. Bituminous Base Course - Bituminous Shoulders, Approaches, Driveways, Alleys, Parking Areas:
      - 1) Subbase: 4 inches.
      - 2) Bituminous Base Course: 3 inches.
      - 3) Bituminous Top Course: 1-1/2 inches.
    - d. Aggregate Base Course - Bituminous Shoulders, Approaches, Driveways, Alleys, Parking Areas:
      - 1) Subbase: 4 inches.
      - 2) Aggregate Base Course: 6 inches.
      - 3) Bituminous Leveling Course: 1-1/2 inches.
      - 4) Bituminous Top Course: 1-1/2 inches.
    - e. Aggregate Surface Roadways, Shoulders, Approaches, Driveways, Alleys, Parking Areas:
      - 1) Subbase: 4 inches.
      - 2) Aggregate Base Course: 6 inches.
      - 3) Aggregate Surface Course: 2 inches.
    - f. Bituminous Walkways and Bicycle Paths:
      - 1) Subbase: 4 inches.
      - 2) Aggregate Base Course: 4 inches.
      - 3) Bituminous Top Course: 2 inches.
    - g. Concrete Roadway Pavements:
      - 1) Subbase: 6 inches.
      - 2) Concrete Pavement: 8 inches.
      - 3) Reinforcement: 4 x 4 - W6.5 x W6.5.
    - h. Concrete Shoulders and Driveways:
      - 1) Subbase: 6 inches.
      - 2) Concrete Pavement: 6 inches.
      - 3) Reinforcement: 6 x 6 - W6.5 x W6.5.
    - i. Concrete Curb and Gutter:
      - 1) Same subbase and aggregate base as adjacent roadway.
      - 2) Match existing curb and gutter profile.
    - j. Concrete Sidewalks:
      - 1) Subbase: 4 inches.
      - 2) Concrete: 4 inches.
      - 3) Reinforcing: 6 x 6 - W1.4 x W1.4.

- k. Turf Establishment - Sodding and Seeding:
  - 1) Topsoil Thickness: 4 inches.
  - 2) Perform final grading, watering, backfilling of washouts, and related work.
  - 3) Sodded and seeded areas shall be weed free and established prior to acceptance.
- l. Landscaping:
  - 1) New, transplanted, relocated, and removed and replanted items shall be healthy and growing prior to acceptance.
  - 2) Watering is Contractor's responsibility and an incidental expense.
- 2. Material requirements for surface restoration unless specified otherwise:
  - a. Subbase: MDOT Granular Material Class II.
  - b. Aggregate Base Course: MDOT Dense Graded Aggregate 22A.
  - c. Aggregate Surface Course: MDOT Dense Graded Aggregate 22A.
  - d. Bituminous Base Course: MDOT 700-20C.
  - e. Bituminous Leveling Course: MDOT 1300L-20AA.
  - f. Bituminous Top Course: MDOT 1300T-20AA.
  - g. Concrete Roadway Pavement: MDOT 35P.
  - h. Concrete Driveways and Approaches: MDOT 35P.
  - i. Concrete Curb and Gutter: MDOT 35S.
  - j. Concrete Sidewalk: MDOT 35P.
  - k. Turf Materials: MDOT 6.53.
  - l. Landscaping Materials: MDOT 6.50.
  - m. All Other Materials: Incidental and as required by MDOT.
- 3. Construction Standards for Surface Restoration: Comply with MDOT construction requirements unless otherwise specified or indicated on the Drawings.

END OF SECTION 01 18 13

## SECTION 01 21 13 – CASH ALLOWANCES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section provides for cash allowances which are included in the Contract Price.
- B. Related Sections include Sections in Divisions 01 through 46, as identified below, provide additional information on what is covered by the respective allowances.

#### 1.3 SCHEDULE OF ALLOWANCES

- A. Include in the Contract Price the following amounts:
  - 1. The amount of \$25,000 for steel repair and nozzle replacement that is determined to be necessary after inspection of the pressure filters. Steel repair and replacement nozzles are specified in the Division 46 Section "Pressure Filters."

#### 1.4 CASH ALLOWANCES

- A. Costs Associated With Allowances:
  - 1. All costs, associated with allowances, which are not specifically defined in the Schedule of Allowances, paragraph 1.3 of this Section shall be included in the Base Bid.
  - 2. Associated costs not specifically defined in the Schedule of Allowances may include, but are not necessarily limited to:
    - a. Unloading.
    - b. Handling on the Site.
    - c. Labor.
    - d. Installation.
    - e. Overhead.
    - f. Profit.

#### 1.5 ADJUSTMENT OF COSTS

- A. Change Order: To adjust Contract Price if final cost is different from allowance.
- B. Documentation:
  - 1. Submit:
    - a. Within 60 days after completion of the work under the allowance.
    - b. Documentation of actual costs.
  - 2. Failure to submit claims within the designated time will constitute a waiver of claims for additional costs.
  - 3. At Contract closeout, reflect all approved changes in Contract amounts in the final statement of accounting.

### PART 2 - PRODUCTS

Not used.

### PART 3 - EXECUTION

Not used.

END OF SECTION 01 21 13

SECTION 01 23 00 – ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section identifies each alternate and describes the basic changes to be incorporated into the Work, only when that alternate is made a part of the Work by specific provisions of the Contract Documents.

1.3 SCHEDULE OF ALTERNATES

- A. Alternate 1: Process Piping Painting:
  - 1. Painting of all existing process piping located in the Pump Station.
    - a. Includes all process piping, fittings, and valves which are 3 inches in diameter and larger as indicated on the Drawings.
    - b. Coating system to be in accordance with Division 09 Section "Painting" for Ductile Iron Pipe and Fittings – Exterior.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 23 00

## SECTION 01 25 13 – PRODUCT SUBSTITUTION PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the administration of substitutions and Product options.

#### 1.3 SUBMITTALS

- A. List of all products proposed for installation:
  - 1. Submit 5 copies within 10 days prior to scheduled Bid opening unless otherwise indicated elsewhere in the Contract Documents.
  - 2. Tabulate the list by each Specification Section.

#### 1.4 CONTRACTOR'S OPTIONS

- A. Products specified only by reference standards or by description:
  - 1. Select any Product meeting the standards or description by any Supplier unless otherwise required elsewhere in the Contract Documents.
  - 2. Submit for Engineer's review:
    - a. Name and address of Supplier.
    - b. Trade name.
    - c. Model or catalog designation.
    - d. Manufacturer's data including:
      - 1) Performance and test data
      - 2) Compliance with reference standards.
- B. Products specified by naming one or more suppliers without an "or equal" clause:
  - 1. Use specified Product of one of the Suppliers named.
  - 2. No substitutions.
- C. Products specified by naming one or more suppliers with an "or equal" clause:
  - 1. Indicates the option of selecting equivalent Products by stating "or equal" after the specified Suppliers.
  - 2. Engineer may waive some or all of the requirements specified for substitutions if, at Engineer's sole discretion, the proposed equivalent Product is considered an "or equal".
  - 3. If, at Engineer's sole discretion, the proposed equivalent Product does not qualify as an "or equal", it will be considered as a proposed substitute and a substitution request submittal will be required.

#### 1.5 SUBSTITUTIONS

- A. Substitutions after the effective date of agreement:
  - 1. If no substitutions are submitted within 10 days prior to the schedule bid opening, it will be reasonably concluded by the Owner that the specified product(s) will be incorporated into the Work and the Contractor will be committed to supplying the specified product.
- B. Substitution Request Submittals: Submit 5 copies of the request for substitution including the following:
  - 1. Complete data substantiating compliance of the proposed substitution with the Contract Documents.
  - 2. For Products:
    - a. Names and addresses of Manufacturer and Supplier.
    - b. Product identification.
    - c. Manufacturer's literature, including:
      - 1) Product description.

- 2) Performance and test data
      - 3) Reference standards.
    - d. Samples.
    - e. Name and address of similar projects on which the Product was used and date of installation.
  3. For Construction Methods:
    - a. Detailed description of the proposed method.
    - b. Drawings illustrating methods.
  4. Itemized comparison of proposed substitution with Product or method specified.
  5. Data relating to changes in the construction schedule.
  6. Accurate cost data on the substitution and comparison with the Product or method specified.
  7. Changes to the Work which would be caused by the substitution.
- C. Contractor's Responsibilities: In making a request for a substitution, Contractor represents:
  1. Contractor has personally investigated the proposed Product or method and determined that it is equal or superior in all respects to that which is specified.
  2. Contractor will provide the same guarantee for the substitution as for the Product or method specified.
  3. Contractor will coordinate installation of the accepted substitution into the Work making such changes as may be required for the Work to be completed in all respects.
  4. Contractor waives all claims for additional cost related to the substitution which consequently become apparent.
  5. Cost data is complete and includes all related costs under Contractor's contract, but excludes costs under separate contracts and Engineer's redesign costs.
- D. Substitutions Not Considered: Substitutions will not be considered if:
  1. They are indicated or implied on Shop Drawings or Product data submittals without formal request submitted in accordance with this Section.
  2. Acceptance will require substantial revision of the Contract Documents.

## PART 2 - PRODUCTS

Not used.

## PART 3 - EXECUTION

Not used.

END OF SECTION 01 25 13

## SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes procedures for modifying the Contract Documents.

#### 1.3 BULLETIN

- A. Procedures: As indicated on form following this Section.
- B. Changes in Cost:
  - 1. Indicate add or deduct lump sum for each item.
  - 2. Include:
    - a. Labor.
    - b. Material.
    - c. Overhead and profit.
    - d. All related work.
    - e. All trades and Subcontractors.
    - f. Provide a complete cost breakdown with supporting documentation.
- C. Notification to Engineer: Notify Engineer in writing if any of the listed items will cause a change in the Work for with a cost item is not provided in this Bulletin.
- D. Submit: One copy to Engineer on or before due date noted.
- E. If Bulletin is accepted, Owner may issue one or more Change Orders for some or all items listed.

#### 1.4 FIELD ORDER

- A. Changes in Contract Price or Contract Times not permitted by use of Field Orders.
- B. Format:
  - 1. May take form of any written communication mutually acceptable to Engineer and Contractor, including, but not necessarily limited to:
    - a. Letter or memo.
    - b. Email correspondence.
    - c. Hand drawn or computer generated sketch.
- C. Procedures: Refer to the General Conditions.

#### 1.5 WORK CHANGE DIRECTIVE

- A. Procedures: Refer to the General Conditions and form following this Section.

#### 1.6 CHANGE ORDER

- A. Procedures: Refer to the General Conditions and form following this Section.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 SCHEDULES

- A. Attached are the following forms:
1. Bulletin.
  2. Work Change Directive.
  3. Change Order.

BULLETIN  
PAGE 1 OF 2

BULLETIN NO.:  
DATE:  
DUE DATE:

CONTRACT FOR:

OWNER:

CONTRACTOR:

ENGINEER:

DRAWING REVISION NO.:

ISSUED HEREWITH:

SPECIFICATION SECTIONS:

SKETCHES:

SHEETS:

The items below are being considered as possible changes to the Contract Documents for this Project. Contractor is requested to submit changes in cost, if any, for each item and indicate whether it is an addition to or deduction from the Contract Price. Costs are requested as lump sums unless otherwise noted as a unit cost. Include all labor, materials, overhead and profit, trades, subcontractors, and related costs. After reviewing the effects of those changes in the Work, Owner may issue a Change Order specifying which changes are to be incorporated in the Work, if any.

This Bulletin is not a Change Order and is not to be deemed authorization to proceed with the changes listed.

Additional work or materials, where proposed, shall meet the requirements of the Contract Documents, except where noted.

Contractor will be responsible for notifying Engineer, in writing, concerning any revision or clarification which causes a change in the Contract Documents, but not specifically mentioned as a cost item in this Bulletin.

Contractor shall return one (1) completed and signed copy of the Bulletin to Engineer on or before the due date noted above.

Each proposed change has been described briefly with additional information provided concerning detailed changes required for the major trades concerned. Only one total cost figure has been requested for each item on the Bulletin; however, a complete breakdown is required for each item as supporting documentation. This will allow Owner to more easily evaluate the proposed cost changes. Each Bulletin item is an all-inclusive item and may concern work from several trades or Subcontractors. It is Contractor's responsibility to ensure that all work for each item has been included in the total cost figure provided to Owner.

BULLETIN  
PAGE 2 OF 2

ITEM NO. 1:

Section:

A.

ADD/DEDUCT: \$ \_\_\_\_\_

ITEM NO. 2:

Section:

A.

ADD/DEDUCT: \$ \_\_\_\_\_

ITEM NO. 3:

Sheet:

A.

ADD/DEDUCT: \$ \_\_\_\_\_

ITEM NO. 4:

Sheet:

A.

ADD/DEDUCT: \$ \_\_\_\_\_

Contractor:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name and Title of Signatory

\_\_\_\_\_  
Date

END OF BULLETIN

WORK CHANGE DIRECTIVE  
PAGE 1 OF 1

WORK CHANGE DIRECTIVE NO.  
DATE OF ISSUANCE:  
EFFECTIVE DATE:

CONTRACT FOR:
OWNER:
CONTRACTOR:
ENGINEER:
ATTACHMENTS:
CONTRACTOR IS DIRECTED TO PROCEED PROMPTLY WITH THE FOLLOWING CHANGE(S) IN THE CONTRACT DOCUMENTS:

Authorization for Work described herein to proceed on the basis of Cost of the Work due to:

- Nonagreement on pricing of proposed change.
- Necessity to expedite Work described herein prior to changes on Contract Price and Contract Time.

Estimated change in Contract Price and Contract Times:

Contract Price \_\_\_\_\_ (increase/decrease)      Contract Time (Days) \_\_\_\_\_ (increase/decrease)

Recommended for  
Approval by Engineer: \_\_\_\_\_ Date: \_\_\_\_\_

Authorized for Owner by: \_\_\_\_\_ Date: \_\_\_\_\_

Received for Contractor by: \_\_\_\_\_ Date: \_\_\_\_\_

Received by  
Funding Agency (if applicable): \_\_\_\_\_ Date: \_\_\_\_\_

END OF WORK CHANGE DIRECTIVE

WORK CHANGE DIRECTIVE INSTRUCTIONS

A. GENERAL INFORMATION:

This document was developed for use in situations involving changes in the Work which, if not processed expeditiously, might delay the Project. These changes are often initiated in the field and may affect the Contract Price or the Contract Times. This is not a Change Order, but only a directive to proceed with Work that may be included in a subsequent Change Order.

For supplemental instructions and minor changes not involving a change in the Contract Price or the Contract Times, a Field Order may be used.

B. COMPLETING THE WORK CHANGE DIRECTIVE FORM:

Engineer initiates the form, including a description of the items involved and attachments.

Once Engineer has completed and signed the form, all copies should be sent to Owner for authorization because Engineer alone does not have authority to authorize changes in Price or Times. Once authorized by Owner, a copy should be sent by Engineer to Contractor.

Once the Work covered by this directive is completed or final cost and times are determined, Contractor should submit documentation for inclusion in a Change Order. Price and Times may only be changed by Change Order signed by Owner and Contractor with Engineer's recommendation.

This is a directive to proceed with a change that may affect the Contract Price or the Contract Times. A Change Order, if any, should be considered promptly.

CHANGE ORDER  
 PAGE 1 OF 1

CHANGE ORDER NO.:  
 DATE:

CONTRACT FOR:	
OWNER:	
CONTRACTOR:	
ENGINEER:	
ATTACHMENTS:	
Contractor shall indicate approval of Change Order through signing of this document and returning to Engineer. Engineer will forward to Owner, who shall indicate approval of Change Order through signing of this document and returning to Engineer. Upon receipt of fully executed (all signatures) Change Order, Engineer will distribute to all parties.	
YOU ARE DIRECTED TO MAKE THE FOLLOWING CHANGES IN THE CONTRACT DOCUMENTS:	
CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price:	Original Contract time:
\$	Substantial Completion:
	Ready for final payment:
Previous Change Order No.:	Net change from previous Change Orders:
\$	<u>Days</u>
Contract Price prior to this Change Order:	Contract Time prior to this Change Order:
\$	Substantial Completion:
	Ready for final payment:
Net of this Change Order:	Net of this Change Order:
\$	<u>Days</u>
Contract Price with all approved Change Orders:	Contract Time with all approved Change Orders:
\$	Substantial Completion:
	Ready for final payment:

RECOMMENDED By: _____ <div style="text-align: center;">Engineer</div> _____ <div style="text-align: center;">Name and Title of Signatory</div> Date: _____	APPROVED By: _____ <div style="text-align: center;">Contractor</div> _____ <div style="text-align: center;">Name and Title of Signatory</div> Date: _____	APPROVED By: _____ <div style="text-align: center;">Owner</div> _____ <div style="text-align: center;">Name and Title of Signatory</div> Date: _____
---	--	---

END OF CHANGE ORDER

CHANGE ORDER INSTRUCTIONS

A. GENERAL INFORMATION:

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Contract Price or Contract Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Order items to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order may be used.

B. COMPLETING THE CHANGE ORDER FORM:

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Contractor for acceptance. After acceptance by Contractor, all copies should be sent to Owner for acceptance. Engineer should make distribution of executed copies after approval by Owner.

If a change only applies to Contract Price or to Contract Times, indicate "N/A" (Not Applicable) in the part of the tabulation that does not apply.

Net "Increase" or "Decrease" in Price and Days should be included as applicable term.

END OF SECTION 01 26 00

## SECTION 01 26 13 – REQUESTS FOR INFORMATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes procedures for Contractor to give notice of conflicts, errors, ambiguities, or discrepancies in the Contract Documents.

#### 1.3 DEFINITIONS

- A. Abbreviation: Request for Information (RFI).

#### 1.4 REQUESTS FOR INFORMATION

- A. Format:
  - 1. Use the enclosed RFI form or, at Contractor's option, generate form.
  - 2. Minimum required content of Contractor's RFI form:
    - a. Project name.
    - b. Name and address of Contractor.
    - c. RFI number.
    - d. RFI date.
    - e. Name of initiator.
    - f. Complete written request, with sketches as required.
    - g. Signature of initiator.
    - h. Space for written response by Engineer, with signature and date of Engineer's representative.
- B. Procedures:
  - 1. Maintain a log of RFIs, including the RFI date and the date of the response.
  - 2. Allow at least 15 full working days for Engineer's response following Engineer's receipt of RFI.
  - 3. Submit written justification for shorter response time.
  - 4. Do not submit RFIs for information already included in the Contract Documents.
  - 5. Illegitimate RFIs may be cause for deductions in the Contract amount. See the Supplementary Conditions.
  - 6. RFIs submitted directly by subcontractors or vendors will be rejected.
  - 7. Changes in Contract Price or Contract Times not permitted within an RFI form.

### PART 2 - PRODUCTS

Not Used.

### PART 3 - EXECUTION

#### 3.1 SCHEDULES

- A. Attached is the following form:
  - 1. Request for Information.

REQUEST FOR INFORMATION  
PAGE 1 OF 1

CONTRACT FOR:	PROJECT NO.:
OWNER:	
CONTRACTOR:	
ENGINEER:	
THE CONTRACTOR SHALL COMPLY WITH THE PROCEDURES IN DIVISION 01 SECTION "REQUESTS FOR INFORMATION."	

RFI No.: \_\_\_\_\_

Fishbeck Project Manager: \_\_\_\_\_

REQUEST		
RFI From:	Signature:	Date:

RESPONSE		
Response From:	Signature:	Date:

END OF SECTION 01 26 13

## SECTION 01 29 16 –PAYMENT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes submittal to the Owner's designee of Applications for Payment and supporting documentation as specified herein.

#### 1.3 SUBMITTALS

- A. Application for Payment: Submit 3 copies on attached form.
- B. An incomplete or incorrect Application for Payment will constitute reason for refusing to recommend payment as indicated in Article 14 of the General Conditions.

#### 1.4 FORMS

- A. Copies of the forms to be used for the above requirements are attached and include the following:
  - 1. Application for Payment.

### PART 2 - PRODUCTS

Not used.

### PART 3 - EXECUTION

Not used.

END OF SECTION 01 29 16





## SECTION 01 29 73 – SCHEDULE OF VALUES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes preparation and submittal of a schedule of values.

#### 1.3 GENERAL

- A. Timing of Submittal: Submit to Engineer a schedule of values allocated to the various portions of the Work, within 10 days after the Effective Date of the Agreement.
- B. Supporting Data: Upon request of Engineer, support the values with data which will substantiate their correctness.
- C. Use of Schedule: The schedule of values, unless objected to by Engineer, shall be used only as the basis for the Contractor's Applications for Payment.

#### 1.4 FORM AND CONTENT OF SCHEDULE OF VALUES

- A. Form and Identification:
  - 1. Type schedule on 8-1/2-inch x 11-inch white paper.
  - 2. Contractor's standard forms and automated printout may be used.
  - 3. Identify Schedule with:
    - a. Title of Project and location.
    - b. Engineer.
    - c. Project number.
    - d. Name and address of Contractor.
    - e. Contract designation.
    - f. Date of submission.
- B. Detail: Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.
- C. Format:
  - 1. Follow the Table of Contents of this Project Manual as the format for listing component items.
  - 2. Identify each line item with the number and title of the respective major Section of the Specifications unless otherwise approved in advance by Engineer.
- D. Subvalues: For each major line item list subvalues of major Products or operations under the item.
- E. Allowances:
  - 1. Include in each line item the amount of the respective allowances specified in Division 01 Section "Cash Allowances."
- F. Change Orders: For each Application for Payment, revise schedule to list Change Orders.
- G. For the various portions of the Work:
  - 1. Each item shall include a directly proportional amount of Contractor's overhead and profit.
  - 2. For items on which progress payments will be requested for stored materials, break down the value into:
    - a. The cost of the materials, delivered and unloaded, with taxes paid.
    - b. The total installed value.

H. The sum of all values listed in the schedule shall equal the total Contract Price.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 29 73

## SECTION 01 31 13 – PROJECT COORDINATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes provisions for coordination of the Work.

#### 1.3 GENERAL COORDINATION

- A. Coordinate scheduling, submittals and work of the various Sections of the Specifications to:
  - 1. Ensure efficient and orderly sequence of installation of interdependent construction elements.
  - 2. Provide for items to be installed later.
- B. Interrelated Operating Equipment:
  - 1. Verify that characteristics of elements are compatible.
  - 2. Coordinate work of various sections having interdependent responsibilities for:
    - a. Installation.
    - b. Connection.
    - c. Placing in service.
- C. Space Coordination Between the Trades:
  - 1. General:
    - a. Coordinate the layout and space requirements of all trades including but not limited to:
      - 1) Mechanical.
      - 2) Plumbing.
      - 3) Communication network.
      - 4) Process piping.
      - 5) Structural systems.
  - 2. Drawings:
    - a. The Drawings of the following system are diagrammatic and not to scale. Each trade shall use required offsets, bends, and special connections, which are not necessarily indicated on the Drawings, but which are required for proper installation:
      - 1) Mechanical.
      - 2) Plumbing.
      - 3) Communication network.
      - 4) Process piping.
    - b. Follow the routing diagrammatically indicated in the Drawings as closely as practical.
  - 3. Space Utilization and Accessibility:
    - a. Utilize space efficiently to maximize accessibility for:
      - 1) Other systems.
      - 2) Maintenance.
      - 3) Repairs.
  - 4. Layout: Layout systems parallel with lines of the building.
  - 5. Shop Drawings: Carefully review and revise the Shop Drawings from the various trades to ensure that space requirements for all systems are coordinated.
  - 6. Additional Payments: No additional payments will be made by Owner due to location adjustments of systems or installations of offsets, bends, and special connectors necessary for proper installation.

#### 1.4 ACCEPTANCE OF CONDITIONS

- A. Inspection:
  - 1. Prior to performing any work under a section:
    - a. Carefully inspect the installed work.
    - b. Verify that all such work is complete to the point where the work under that Section may properly commence.
    - c. Starting of work indicates acceptance of the condition of components to which the work will be applied.
  - 2. Verify that all materials, equipment and Products to be installed under a Section may be installed in strict accordance with the original design and reviewed Shop Drawings.
  
- B. Discrepancies:
  - 1. Resolve all discrepancies and conflicts between the trades.
  - 2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

#### 1.5 SLEEVES AND INSERTS

- A. Function: For pipes, conduits and similar items in forms, walls, partitions and floors.
  
- B. Trades: Furnish required sleeves and inserts.
  
- C. Place sleeve and inserts in ample time so as to not delay work.
  
- D. Except as approved by Engineer, do not place sleeves vertically through:
  - 1. Beams.
  - 2. Girders.
  - 3. Similar construction.
  
- E. Maintain in proper position during subsequent work.

#### PART 2 - PRODUCTS

Not used.

#### PART 3 - EXECUTION

Not used.

END OF SECTION 01 31 13

## SECTION 01 31 19 – PROJECT MEETINGS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes scheduling and administering of preconstruction and progress meetings.
- B. Scheduling and Administration of Meetings:
  - 1. Responsibility:
    - a. Preconstruction Meeting: Engineer.
    - b. Progress Meetings: Contractor.
  - 2. Procedures:
    - a. Prepare agenda.
    - b. Distribute written notice and agendas of meetings 4 days in advance of the meeting date.
    - c. Make physical arrangements for the meetings.
    - d. Preside at meetings.
    - e. Record minutes and include significant proceedings and decisions.
    - f. Distribute copies of the minutes within 4 days after meetings to:
      - 1) Participants.
      - 2) Others affected by proceedings.

#### 1.3 PRECONSTRUCTION MEETING

- A. Schedule: Preconstruction meeting will be scheduled by Engineer:
  - 1. Within 20 days after the Effective Date of Agreement.
  - 2. Before starting the Work at the Site.
- B. Attendance: Representatives of the following parties are to be in attendance at the meeting:
  - 1. Owner.
  - 2. Engineer.
  - 3. Contractor.
  - 4. Major Subcontractors.
  - 5. Governmental or regulatory agencies when appropriate.

#### 1.4 PROGRESS MEETINGS

- A. Types of Progress Meetings:
  - 1. Regular.
  - 2. Called.
- B. Schedule meetings as follows unless otherwise approved by Engineer:
  - 1. Regular: Monthly.
  - 2. Called: As the progress of the Work dictates.
- C. Location: Hold meetings at Site or as indicated in the notice.
- D. Attendance: Representatives of the following parties are to be in attendance at the meeting:
  - 1. Engineer.
  - 2. Contractor.
  - 3. Major Subcontractors as pertinent to the agenda.
  - 4. Owner's representative as appropriate.
  - 5. Governmental or other regulatory agencies as appropriate.

- E. Minimum Agenda: The minimum agenda for progress meetings shall consist of the following:
1. Review and approve minutes of previous meetings.
  2. Review progress of the Work since the previous meeting.
  3. Note field observations, problems and decisions.
  4. Identify problems which impede planned progress.
  5. Review offsite fabrication problems.
  6. Develop corrective measures and procedures to regain plan schedule.
  7. Revise construction schedule as indicated.
  8. Review submittal schedules; expedite as required to maintain schedule.
  9. Maintenance of quality and work standards.
  10. Review changes proposed by Owner for their effect on the construction schedule and completion date.
  11. Identify all claims and potential claims.
  12. Pending changes and substitutions.
  13. Complete other current business.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 31 19

## SECTION 01 32 16 – CONSTRUCTION PROGRESS SCHEDULE

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the preparation, furnishing, distribution and periodic revision of construction progress schedules.

### PART 2 - PRODUCTS

#### 2.1 FORM OF SCHEDULE

- A. Preparation:
  - 1. Prepare in the form of a horizontal bar chart, CPM network, or other form as previously approved by Engineer.
  - 2. Provide a separate horizontal bar column or path for each trade or operation.
  - 3. Prepare the schedule in the chronological order of the beginning of each item of work.
  - 4. Identify each column or path by:
    - a. Major Specification Section number.
    - b. Distinct graphic delineation.
  - 5. Use a horizontal time scale and identify the first work day of each week.
  - 6. Allow space for updating.
- B. Size: The schedule sheets shall be 11 inches x 17 inches unless otherwise approved by Engineer.

#### 2.2 CONTENT OF SCHEDULES

- A. Construction Sequence:
  - 1. Provide a complete sequence of construction by activity identifying work of separate stages.
  - 2. For Shop Drawings, project data and Samples indicate the following:
    - a. Submittal dates.
    - b. Dates review copies will be required.
  - 3. Show decision dates for selection of finishes.
  - 4. Show Product procurement and delivery dates.
  - 5. Show dates for beginning and completion of each element of construction.
- B. Percentage Completion: Show the projected percentage of completion for each item of work as of the first day of each month.
- C. Subschedules:
  - 1. Provide separate subschedules showing submittals, review times, procurement schedules and delivery days.
  - 2. Provide subschedules to define critical portions of the entire schedule.

### PART 3 - EXECUTION

#### 3.1 SUBMITTALS

- A. Preliminary Schedule:
  - 1. Submit the preliminary schedule within 10 days after the Effective Date of Agreement.
  - 2. Engineer will review schedules and will return the reviewed copy within 15 days after receipt.
  - 3. If required, resubmit within 7 days after receipt of a returned review copy.
  - 4. Meet with Engineer at least 10 days prior to the submission of the first Application for Payment to review the schedule.
- B. Periodic Adjustment: Monthly, submit a revised schedule accurately depicting adjustments and progress to the first day of each month.
- C. Number of Copies: Submit the number of copies required by Contractor, plus 4 copies to be retained by Engineer.

#### 3.2 DISTRIBUTION

- A. Reviewed Schedules: Distribute copies of the reviewed schedules to the following:
  - 1. Job Site file.
  - 2. Subcontractors.
  - 3. Other concerned parties.
- B. Instructions to Recipients: Instruct recipients to report all inability to comply with the schedule, and provide detailed explanations with suggested remedies.

#### 3.3 ADJUSTMENT OF PROGRESS SCHEDULE

- A. Changes: Show all changes occurring since previous submission of the schedule.
- B. Progress: Indicate progress of each activity and show completion dates.
- C. Other Items:
  - 1. Include major changes in scope.
  - 2. Include activities modified since previous updating.
  - 3. Include revised projections due to changes.
  - 4. Include other identifiable changes.
- D. Narrative Report: Provide a narrative report including:
  - 1. A discussion of problem areas including current and anticipated delay factors and their impact.
  - 2. Direct action taken, or proposed, and its effect.
  - 3. A description of revisions including:
    - a. Their effect on the schedule due to change of scope.
    - b. Revisions in duration of activities.
    - c. Other changes that may affect the schedule.

END OF SECTION 01 32 16

## SECTION 01 33 00 – SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes procedures for the submittal of Shop Drawings, Product Data, Samples, Operation and Maintenance Manuals, and other information.
- B. Related Sections include pertinent Sections of these Specifications for the individual Submittals required.

#### 1.3 DEFINITIONS

- A. Submittal: Information sent by Contractor to convey information about systems, equipment, materials, products, and administrative matters for the Work.
- B. Resubmittal: Submittal sent for review a second or further time.
- C. Product Data: Illustrations, standard schedules, diagrams, performance charts, instructions, brochures, or manufacturer's literature that describe the physical size, appearance, and other characteristics of materials or equipment for a portion of the Work.
- D. Shop Drawings: Drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
- E. Samples: Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
- F. Action Submittals: Submittals that require Engineer's response.
- G. Informational Submittals: Submittals that do not require Engineer's response.
- H. Delegated-Design: In certain individual Specification Sections, design services or certifications by a design professional that are specifically delegated to the Contractor. Performance and design criteria are defined in the individual Specification Sections or on the Drawings. Contractor is solely responsible for design of those items or systems, coordination of the design with the balance of the Project, and achieving specified performance.
- I. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format. All PDF files shall be searchable.

#### 1.4 SUBMITTAL PROCEDURES

- A. Submittal Schedule:
  - 1. Prepare and submit a Submittal schedule that identifies the following for each Submittal:
    - a. Submittal number
    - b. Submittal description
    - c. Projected date Submittal will be submitted.
  - 2. An electronic copy (MS Excel file) of a blank Submittal schedule, in the preferred format, will be furnished by Engineer at the preconstruction meeting.

3. Submittal Numbers:
  - a. Use the applicable Specification Section number followed by a decimal point and then a sequential number (e.g., 06 10 00.1). Where a Submittal is required via a Drawing (instead of a Specification Section), use the applicable Drawing Number followed by a decimal point and then a sequential number (e.g., M501.1.1).
  - b. Resubmittals shall include a letter suffix after another decimal point (e.g., 06 10 00.1.A).
  - c. Submittals that are not numbered correctly may be rejected.
  
- B. Delivery Method:
  1. Submittals may be delivered as paper copies or electronic files at Contractor's option.
  2. Advise Engineer of delivery method to be used at the preconstruction meeting.
  3. Where Submittals include information that is intended to be printed on sheets larger than 11 inches x 17 inches, or where scale or drawing size are critical for proper review, submit 2 paper copies for review.
  4. Paper Copies:
    - a. Unless indicated otherwise, submit 2 copies of each Submittal.
    - b. One copy of each Action Submittal will be returned to Contractor.
    - c. Extra copies submitted by Contractor will be discarded.
  5. Electronic Files:
    - a. Unless indicated otherwise, submit 1 copy of each Submittal in PDF format.
    - b. Scanned Submittals shall be produced in such a way as to not compromise the graphic quality or accuracy of scale, where applicable; and text shall be searchable.
    - c. One copy of each Action Submittal will be returned to Contractor.
    - d. Submittals may be transmitted via electronic mail (e-mail) or on a CD or DVD. Submittals that are transmitted electronically may be returned electronically at the Engineer's discretion.
  6. Transmit Submittals to party and address identified by Engineer at preconstruction meeting.
  
- C. Coordination and Timing: Coordinate preparation and processing of Submittals with performance of construction activities. Contractor is responsible for cost of delays caused by lack of coordination or tardiness of Submittals. Incomplete Submittals will be rejected.
  1. Coordinate each Submittal with fabrication, purchasing, testing, delivery, other Submittals, and related activities that require sequential activity.
  2. Coordinate transmittal of different types of Submittals for related parts of the Work so processing will not be delayed because of need to review Submittals concurrently for coordination.
    - a. Engineer reserves the right to withhold action on a Submittal requiring coordination with other Submittals until related Submittals are received.
  
- D. Processing Time: Allow 15 full working days for Engineer to review each Submittal, including Resubmittals. Time for review shall commence on Engineer's receipt of Submittal. No extension of the Contract Time will be authorized because of failure to transmit Submittals enough in advance of the Work to permit processing, including Resubmittals. Engineer will advise Contractor when a Submittal being processed must be delayed for coordination.
  
- E. Identification: Place a permanent label on each Submittal or generate a separate cover sheet.
  1. Indicate name of firm or entity that prepared Submittal.
  2. Provide space to record Contractor's review and approval markings and action taken by Engineer.
  3. Include the following information:
    - a. Project name.
    - b. Date.
    - c. Name and address of Engineer.
    - d. Name and address of Contractor.
    - e. Name and address of Subcontractor(s).
    - f. Name and address of Supplier(s).
    - g. Name of Manufacturer.
    - h. Submittal number, including revision identifier.
    - i. Drawing number and detail references, as applicable.
    - j. Location(s) where product is to be installed, as applicable.
    - k. Other necessary identification.

- F. Deviations: Encircle or otherwise specifically identify deviations from the Contract Documents on Submittals. Submittals that include deviations that are not identified may be rejected. Engineer may or may not consider deviations. Deviations are not substitutions. Refer to Division 01 Section "Product Substitution Procedures" for procedures regarding requests for substitutions.
- G. Transmittal: Package each Submittal individually and appropriately for transmittal and handling. Transmit each Submittal using a transmittal form. Engineer will reject Submittal(s) received from sources other than Contractor.
- H. Resubmittals: Make Resubmittals in same form and number of copies as initial Submittal.
  - 1. Note date and content of previous Submittal.
  - 2. Clearly identify additions and revisions.
  - 3. Resubmit Submittals until they are marked, "Reviewed, No Exceptions Noted" or "Reviewed With Corrections Noted."
- I. Distribution: Furnish copies of Submittals with mark indicating, "Reviewed, No Exceptions Noted" or "Reviewed With Corrections Noted," to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities.
- J. Use for Construction: Unless otherwise indicated by Engineer, use only Submittals with mark indicating, "Reviewed, No Exceptions Noted" or "Reviewed With Corrections Noted."

#### 1.5 CONTRACTOR'S USE OF ENGINEER'S ELECTRONIC DRAWING FILES

- A. At Contractor's written request, copies of Engineer's electronic Drawing files may be provided to Contractor for Contractor's use in connection with Project, including Submittal preparation. Electronic files may be furnished by Engineer for the convenience of the Contractor. Conclusions or information obtained or derived from such electronic files will be at the Contractor's sole risk. Materials furnished by Engineer that may be relied upon are limited to printed Contract Documents.
- B. When Contractor uses Engineer's electronic Drawing files to facilitate Submittal preparation, prepare Submittals to be project specific. Submittals that are not project specific, including Engineer's Drawing files submitted on a new title block, will be rejected.

### PART 2 - PRODUCTS

#### 2.1 ACTION SUBMITTALS

- A. General: Prepare and submit project specific Action Submittals required by individual Specification Sections. Do not use highlighting that would not be reproducible. Include a table of contents or index with each Submittal. As part of electronic submittals, the table of contents or index shall include electronic bookmarks to the first page of the respective Section(s) identified.
- B. Product Data: Collect information into a single Submittal for each element of construction and type of product or equipment.
  - 1. If information must be specially prepared for Submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each Submittal to indicate which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's written recommendations.
    - b. Manufacturer's product specifications.
    - c. Manufacturer's installation instructions.
    - d. Color charts as required by individual Specification Sections.
    - e. Manufacturer's catalog cuts.
    - f. Wiring diagrams showing factory-installed wiring.
    - g. Printed performance curves.
    - h. Operational range diagrams.
    - i. Mill reports.
    - j. Standard product operation and maintenance manuals.
    - k. Compliance with specified referenced standards.



7. Disposition: Maintain sets of approved Samples at Site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used by Engineer to determine final acceptance of construction associated with each set.
  - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples shall be in an undamaged condition at time of Substantial Completion.
  - b. Samples not incorporated into the Work, or otherwise designated to become Owner's property, are the property of Contractor.
  
- E. Operation and Maintenance Manuals:
  1. General:
    - a. Where manuals are required to be submitted covering items included in the Work, prepare such manuals in durable plastic binders approximately 8-1/2 inches x 11 inches in size and with at least the following:
      - 1) Identification on, or readable through, the front cover stating general nature of the manual.
      - 2) Include a table of contents or index with each Submittal, near the front of the manual. As part of electronic submittals, the table of contents or index shall include electronic bookmarks to the first page of the respective Section(s) identified.
      - 3) Complete instructions regarding operation and maintenance of equipment involved, including:
        - a) Equipment function, normal operating characteristics, and limiting conditions.
        - b) Assembly, installation, alignment, adjustment, and checking instructions.
        - c) Operating instructions for start-up, routine and normal operating, regulation and control, shutdown, and emergency conditions.
        - d) Maintenance instructions, including lubrication requirements where applicable.
        - e) Guide to "troubleshooting".
        - f) Parts lists and predicted life of parts subject to wear.
        - g) Project specific outline and cross sections, assembly drawings, engineering data, and wiring diagrams. Wiring diagrams shall reflect final, as-installed conditions and include wire numbers.
        - h) Test data and performance curves.
      - 4) Complete nomenclature of all replaceable parts, their part numbers, current costs, and name and address of nearest vendor of parts.
      - 5) Copies of guarantees and warranties issued.
      - 6) Copies of the reviewed Submittals.
      - 7) Copies of data concerning changes made during construction.
    2. Extraneous Data: Where contents of the manuals include Manufacturer's catalog pages, clearly indicate the precise items included in this installation and delete all Manufacturers' data with which this installation is not concerned. Do not use highlighting that would not be reproducible.
    3. Number of Copies Required: Unless otherwise specifically directed by Engineer, or stipulated in the pertinent Section of these Specifications:
      - a. For review, submit 1 paper and 1 electronic copy.
      - b. For record, deliver 4 paper and 1 electronic copies to Owner.
    4. Schedule delivery of record copies of operation and maintenance manuals at least 30 days prior to startup of respective equipment, unless otherwise specified.

## 2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by individual Specification Sections. Do not use highlighting that would not be reproducible. Include a table of contents or index with each Submittal. As part of electronic submittals, the table of contents or index shall include electronic bookmarks to the first page of the respective Section(s) identified.
- B. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects/engineers and owners, and other information specified.

- D. **Welding Certificates:** Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- E. **Installer Certificates:** Prepare written statements on Manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by Manufacturer for this Project.
- F. **Manufacturer Certificates:** Prepare written statements on Manufacturer's letterhead certifying that Manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- G. **Product Certificates:** Prepare written statements on Manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- H. **Material Certificates:** Prepare written statements on Manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- I. **Material Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- J. **Product Test Reports:** Prepare written reports indicating current product produced by Manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by Manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- K. **Research/Evaluation Reports:** Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  - 1. Name of evaluation organization.
  - 2. Date of evaluation.
  - 3. Time period when report is in effect.
  - 4. Product and manufacturers' names.
  - 5. Description of product.
  - 6. Test procedures and results.
  - 7. Limitations of use.
- L. **Preconstruction Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- M. **Compatibility Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- N. **Field Test Reports:** Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- O. **Manufacturer's Instructions:** Prepare written or published information that documents Manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of Manufacturer. Include the following, as applicable:
  - 1. Preparation of substrates.
  - 2. Required substrate tolerances.
  - 3. Sequence of installation or erection.
  - 4. Required installation tolerances.
  - 5. Required adjustments.
  - 6. Recommendations for cleaning and protection.

- P. Manufacturer's Field Reports: Prepare written information documenting tests and inspections of factory-authorized service representative. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report.
  2. Statement of substrate condition and acceptability of substrate for installation or application of product.
  3. Statement that products at Site comply with requirements.
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement whether conditions, products, and installation will affect warranty.
  7. Document settings in writing.
  8. Other required items indicated in individual Specification Sections.
- Q. Safety Data Sheets (SDSs): Submit information directly to Owner; do not submit to Engineer.
1. Engineer will not review Submittals that include SDSs and will return the entire Submittal for Resubmittal.

### PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S REVIEW

- A. Review each Submittal and check for coordination with other work of the Contract and for compliance with the Contract Documents. Verify field dimensions and conditions; note corrections as necessary. Mark with approval stamp before submitting to Engineer.
1. Approval Stamp: Stamp each Submittal with an approval stamp. Use the same stamp format for each Submittal. Include Project name and location, Submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that Submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
- B. Submittals that are not approved and stamped by Contractor will be rejected.

#### 3.2 ENGINEER'S REVIEW

- A. Action Submittals: Engineer will review Action Submittals, make marks to indicate corrections or modifications required, and return Submittal. Engineer will stamp each Submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
1. Reviewed, No Exceptions Noted: Submittal appears to conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
  2. Reviewed With Corrections Noted: Upon incorporation of review comments, it appears that Submittal will conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
  3. Revise and Resubmit: Submittal has one or more specific segments that are incomplete, do not appear to conform to the information given in the Contract Documents, or are incompatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Contractor shall resubmit information for review to demonstrate understanding of comments and portions of Work to be provided. Except as noted, Contractor shall not proceed with work related to Submittal.
  4. Rejected, Resubmit: Submittal as a whole is incomplete, does not appear to conform to the information given in the Contract Documents, or is incompatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Contractor shall resubmit information for review to demonstrate understanding of comments and portions of Work to be provided. Contractor shall not proceed with work related to Submittal.
- B. Informational Submittals: Other Submittals required by the Contract Documents are for information only. Engineer will acknowledge receipt of Informational Submittals. Such Submittals include, but are not limited to:
1. Qualifications Data.
  2. Certificates.
  3. Test Reports.
  4. Manufacturer's Instructions.
  5. Maintenance Data.
  6. Field Reports.

- C. Submittals not required by the Contract Documents will be returned without being reviewed.
- D. Partial Submittals are not acceptable, will be considered non-responsive, and will be rejected.

### 3.3 RE-REVIEW COSTS

- A. Compensation:
  - 1. Should Engineer be required to review a Submittal more than twice because of failure of the Submittal to meet the requirements of the Contract Documents, Engineer will record Engineer's expenses for performing additional reviews.
  - 2. Owner will compensate Engineer for these additional services and deduct the amount paid from payments to Contractor.

END OF SECTION 01 33 00

## SECTION 01 41 00 – REGULATORY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes provisions for requirements and fees of regulatory agencies.
- B. Related Sections include permits and licenses indicated in other Sections.
- C. The General Conditions requires that Contractor obtain and pay for all construction permits. This Section includes provisions for specific permits but does not include all permits.

#### 1.3 PERMITS

- A. Owner has applied for and will obtain the following permits:
  - 1. Water System Construction (Act 399, P.A. 1976):
    - a. Agency: Michigan Department of Environment, Great Lakes, and Energy (EGLE).
- B. Permit Compliances:
  - 1. Ensure that permit has been issued prior to beginning the Work.
  - 2. Comply with requirements of permits.

### PART 2 - PRODUCTS

Not used.

### PART 3 - EXECUTION

Not used.

END OF SECTION 01 41 00

## SECTION 01 42 00 – REFERENCES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes provisions for references throughout the Contract Documents.

#### 1.3 DEFINITIONS

##### A. Abbreviations:

1. AASHTO - American Association of State Highway and Transportation Officials, 444 North Capitol Street, N.W., Suite 249, Washington, DC 20001.
2. ACI - American Concrete Institute, 38800 Country Club Dr., Farmington Hills, MI 48331.
3. AISC - American Institute of Steel Construction, Inc., One East Wacker Dr., Suite 700, Chicago, IL 60601-1802.
4. AITC - American Institute of Timber Construction, 7012 S. Revere Pkwy., Suite 140, Centennial, CO 80112.
5. ANSI - American National Standards Institute, 25 West 43rd St., 4th Floor, New York, NY 10036.
6. APA - American Plywood Association, 7011 S. 19th Street, Tacoma, WA 98466-5333.
7. ASTM - American Society for Testing and Materials, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.
8. AWS - American Welding Society, Inc., 550 N.W. LeJeune Road, Miami, FL 33126.
9. AWWA - American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235.
10. CPA – Composite Panel Association, 19465 Deerfield Avenue, Suite 306, Leesburg, VA 20176.
11. CRSI - Concrete Reinforcing Steel Institute, 933 Plum Grove Road, Schaumburg, IL 60173-4758.
12. EGLE - Michigan Department of Environment, Great Lakes and Energy, 525 West Allegan Street, P.O. Box 30473, Lansing, MI 48909-7973.
13. MDNR - Michigan Department of Natural Resources, 530 West Allegan Street, P.O. Box 30028, Lansing, MI 48909.
14. MDOT - Michigan Department of Transportation, 425 West Ottawa Street, P.O. Box 30050, Lansing, MI 48909.
15. MDCH - Michigan Department of Community Health, 201 Townsend Street, Lansing, MI 48913.
16. MIOSHA - Michigan Department of Licensing and Regulatory Affairs, Michigan Occupational and Health Administration, State Secondary Complex, 7150 Harris Drive, P.O. Box 30643, Lansing, MI 48909-8143.
17. NCMA - National Concrete Masonry Association, 13750 Sunrise Valley Drive, Herndon, VA 20171-4662.
18. NEC - National Electrical Code (see NFPA 70).
19. NEMA - National Electrical Manufacturers' Association, 1300 N. 17th Street N.W., Suite 1752, Rosslyn, VA 22209.
20. NFPA - National Fire Protection Association, One Batterymarch Park, Quincy, MA 02169-7471.
21. PCI - Precast Concrete Institute, 200 West Adams, Suite 2100, Chicago, IL 60606.
22. SDI - Steel Deck Institute, P.O. Box 25, Fox River Grove, IL 60021.
23. SJI - Steel Joist Institute, 234 West Cheves Street, Florence, SC 29501.
24. UL - Underwriters' Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

#### 1.4 REFERENCES

- A. The provisions of the Contract Documents shall govern over any conflicting provisions of the referenced documents.
- B. The provisions of laws and regulations shall govern over any conflicting provisions of the referenced documents.

- C. Comply with the referenced document that is in effect as of the Bid date, except when a specific date is specified.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 42 00

## SECTION 01 45 34 – SPECIAL INSPECTIONS AND TESTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes provisions for special inspections as follows and includes the Statement of Special Inspections.
  - 1. Special inspections of structures.
  - 2. Special inspections within structures.
- B. Special inspection services for which Owner will contract and pay directly and will be performed by a special inspector or inspectors selected by Owner:
- C. Testing, special inspections and certifications which are not included in the above, but shall be included in the Contractor's Base Bid:
  - 1. Inspections and tests required by codes or ordinances or by an authority having jurisdiction and made by a legally constituted authority.
  - 2. Inspections, testing services and certifications including, but not limited to, the following:
    - a. Pipe leakage tests.
    - b. Tank leakage tests.
    - c. Welder certifications.
    - d. Structural steel yield strength mill tests.
    - e. Pipe material yield strength tests.
    - f. Manufacturer's certificate of compliance for high-strength bolts.
    - g. Manufacturer's certificate of compliance for weld filler metal.
    - h. Manufacturers' certification tests for cement.
    - i. Testing in connection with the Engineer's review of materials and equipment proposed by Contractor to be incorporated into the Work.
    - j. Testing performed for the Contractor's convenience.
- D. Owner Paid Items: Owner may elect to inspect or to employ either Engineer or a special inspector to inspect materials or systems on the Project other than those specified herein. The cost of this inspection will be paid for by Owner.
- E. Special inspection services are required to verify compliance with the Contract Documents and with the requirements of the Building Code. These services do not relieve Contractor of responsibility for verification of compliance with Contract Document requirements.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. ACI - American Concrete Institute:
    - a. 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
    - b. 301 - Specification for Structural Concrete.
    - c. 318 - Building Code Requirements for Reinforced Concrete.
  - 2. ASTM Standards:
    - a. C31 - Practice for Making and Curing Concrete Test Specimens in the Field.
    - b. C33 - Specification for Concrete Aggregates Including Appendix XI.
    - c. C39 - Test Method for Compressive Strength of Cylindrical Concrete Specimens.
    - d. C138 - Test Method for Density (Unit Weight), Yield and Air Content (Gravimetric) of Concrete.
    - e. C143 - Test Method for Slump of Hydraulic-Cement Concrete.
    - f. C157 - Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.

- g. C172 - Practice for Sampling Freshly Mixed Concrete.
- h. C173 - Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- i. C231 - Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- j. C295 - Guide for Petrographic Examination of Aggregates for Concrete.
- k. C1019 - Test Method for Sampling and Testing Grout.
- 3. AWS:
  - a. D1.1 - Structural Welding Code - Steel.
  - b. D1.3 - Structural Welding Code - Sheet Steel.
- 4. AWWA C652 - Disinfection of Water Storage Facilities.
- 5. Michigan Building Code.

#### 1.4 DEFINITIONS

- A. Terms:
  - 1. Building Code: The building code plus amendments, if any, legally adopted for the location in which the Project is located.
  - 2. Special Inspection: Inspection and testing as herein required of materials, installation, fabrication, erection or placement of components and connections requiring special expertise of one or more approved special inspectors in order to ensure compliance with the Building Code and the Contract Documents.
  - 3. Testing Agency; Independent Testing Agency: Special inspector.

#### 1.5 PERFORMANCE REQUIREMENTS

- A. Special Inspector Qualifications:
  - 1. Qualified in accordance with the Building Code and by local building official.
  - 2. Objective, competent and independent from the contractor performing the work to be inspected.
  - 3. Familiar with Building Code requirements for special inspections.
  - 4. Having adequate equipment, periodically calibrated as required, to perform the special inspections.
  - 5. Employing experienced personnel educated in conducting, supervising and evaluating special inspections similar in complexity to that required for the Project.
  - 6. Weld Inspectors: Certified in accordance with AWS D1.1, D1.3, D1.4 and D1.8, as applicable.
  - 7. Submission of Qualifications:
    - a. Special inspector shall provide to the building official written documentation as required to demonstrate competence, objectivity and experience or training.
    - b. Disclose possible conflicts of interest.
- B. Perform special inspections in accordance with:
  - 1. Laws and Regulations.
  - 2. Reference procedures and requirements.
  - 3. Building Code.
  - 4. Contract Documents.
  - 5. Manufacturer's requirements, as applicable.
  - 6. Reviewed submittals for the Project, as applicable.

#### 1.6 REINSPECTION COSTS

- A. Reinspection:
  - 1. When initial special inspections of items except soil compaction indicate noncompliance with the Contract Documents, subsequent special inspections occasioned by the noncompliance shall be performed by the same special inspection agency, and the costs thereof will be deducted by the Owner from the Contract Sum.
  - 2. Soil Compaction:
    - a. The first retesting of soil compaction shall be paid for in accordance with the provisions of the Contract Documents.
    - b. The second and subsequent retesting for soil compaction due to noncompliance with the Contract Documents shall be performed by the same special inspection agency, and the costs thereof will be deducted by the Owner from the Contract Sum.
- B. Uncovering Costs: Paid for as described in the General Conditions.

## 1.7 REPORTS AND SUBMISSIONS

- A. Special Inspection Reports:
1. Special inspector shall keep records of special inspections in accordance with the Building Code.
  2. Records shall indicate that work inspected was or was not completed in conformance with the Contract Documents.
  3. Report and reinspect non-conformances until they are in conformance with the Contract Documents.
  4. Final Report:
    - a. Prepare and submit a final report at the completion of the special inspections.
    - b. Document the completion of specified special inspections and correction of discrepancies.
    - c. Submit as specified for inspection reports.
  5. Provide typed electronic copies of reports to:
    - a. Owner.
    - b. Engineer.
    - c. Contractor.
  6. Discrepancies: Bring to immediate attention of Contractor, and, if not corrected, to attention of Engineer and building official.

## 1.8 SCHEDULES FOR SPECIAL INSPECTIONS

- A. Establishing Schedule: By advance discussion between special inspector and Contractor, determine the time required to perform special inspection and to issue findings.
- B. Revising Schedule: When changes of construction schedule are necessary during construction, coordinate such changes of schedule with the special inspector.
- C. Adherence to Schedule: When the special inspector is ready according to the determined schedule, but is prevented from performing special inspection due to incompleteness of the Work, extra costs attributable to the delay may be charged to Contractor and shall not be borne by Owner.

## 1.9 CONTRACTOR'S DUTIES

- A. Cooperate with Special Inspector:
1. Schedule the Work so that special inspector is allowed a reasonable schedule and amount of time to access and view the components requiring special inspection before being obscured by subsequent construction.
  2. Notify [ Engineer and ] special inspector 24 hours minimum prior to expected time when special inspection services will be required.
  3. Provide the following as necessary for special inspector to properly perform its functions:
    - a. Access to the Work.
    - b. Facilities for access to the Work.
    - c. Tools.
    - d. Storage.
    - e. Assistance as requested.
- B. Submission of Written Statements:
1. To be submitted by each contractor responsible for construction of a main wind or seismic force resisting system, designated seismic system or a wind or seismic resisting component listed in the Statement of Special Inspections.
    - a. Submit to building official, Owner, and Engineer, prior to commencement of construction on the respective system or component.
    - b. Acknowledging awareness of the special inspections specified herein.
  2. Each fabricator, at the completion of their respective fabrication, shall submit a certificate of compliance to the building official and Engineer stating that the fabrication was performed in accordance with the Contract Documents.

## PART 2 - PRODUCTS

Not used.

## PART 3 - EXECUTION

### 3.1 STATEMENT OF SPECIAL INSPECTIONS

- A. Frequency of Special Inspections:
1. The minimum frequency of the special inspections (periodic vs. continuous) shall be as indicated in the Building Code.
  2. Quality assurance inspections performed in accordance with standards referenced herein shall conform to the frequency requirements indicated in those standards.
- B. Concrete Construction:
1. Special Inspections:
    - a. Except for material testing, perform special inspections in accordance with Table 1705.3 of the Building Code and this Specification for all concrete.
    - b. Inspect and verify:
      - 1) Reinforcing steel and placement.
      - 2) Anchor rods prior to and during placing of concrete.
      - 3) Anchors post-installed in hardened concrete.
      - 4) Proper use of required design mix.
      - 5) Proper placement of concrete.
      - 6) Maintenance of specified curing techniques and temperatures.
      - 7) Concrete formwork for proper shape, location and dimension.
  2. Concrete Material Testing:
    - a. Perform material testing in accordance with Table 1705.3 of the Building Code and this Specification for all concrete.
    - b. Point of sampling and the method of securing the Samples:
      - 1) Determined by special inspector.
      - 2) In accordance with ASTM C172.
    - c. Slump Tests:
      - 1) Perform slump tests in accordance with ASTM C143.
      - 2) Perform one slump test on the Site for each 10 cubic yards of concrete.
      - 3) At Engineer's request, also perform slump tests at batch plant before adding water reducer.
      - 4) Perform more slump tests if deemed necessary by Engineer.
    - d. Perform 1 air-entraining test in accordance with ASTM C231 or C173 for each truckload or every 10 yards of concrete placed, whichever is more frequent.
    - e. Test the concrete unit weight in accordance with ASTM C138 or C567, as applicable.
    - f. Test the air content and fresh concrete temperature of each set of concrete cylinders.
    - g. Concrete Cylinder Testing:
      - 1) In accordance with ASTM C31 and C39.
      - 2) Take concrete cylinder Samples as follows:
        - a) Once each day a given class of concrete is placed, nor less than
        - b) Once for each 150 cubic yards (or fraction thereof) of each class of concrete placed each day, nor less than
        - c) Once for each 5,000 square feet of slab or wall surface area placed each day.
      - 3) Concrete cylinder Sample shall consist of a minimum of 4 cylinders.
        - a) Make standard 6x12 cylinders, except that for concrete mixes with 1-inch or smaller coarse aggregate, 4x8 cylinders may be used.
        - b) Contractor shall be responsible for having additional pairs of cylinders taken and tested, if required to demonstrate adequate concrete strengths at ages earlier than 28 days if Contractor's schedule requires form removal from load-bearing concrete prior to 28 days.
      - 4) Handle cylinders carefully.
      - 5) On Site Storage:
        - a) 12 hours, minimum, 48 hours maximum.
        - b) At a temperature range of 60 to 80 degrees F and in a moist environment.
        - c) Shielded from direct sunlight and radiant heat.
        - d) The Contractor shall construct heated or water bath enclosures, as applicable, if conditions require.

- e) Cylinders Samples taken to establish adequate strength for form removal earlier than 28 days shall be cured in locations that represent the conditions under which the structural concrete will be cured.
  - 6) Laboratory Curing:
    - a) For duration of curing after on Site storage.
    - b) Does not include cylinders taken to establish adequate strength for form removal earlier than 28-days.
  - 7) Test 1 of the cylinders at 7 days and 2 cylinders at 28 days. Save 1 cylinder as a spare.
  - 8) Acceptance and evaluation of the concrete shall be based on ACI 301.
- C. Pressure Filter Tank Inspection:
- 1. Inspect the interior and exterior of the tank.
  - 2. Inspector: Dixon Engineering.
  - 3. Furnish a written report of the results of the inspection and recommendations.
  - 4. Contractor shall drain the tank and remove existing filter media prior to inspection.
  - 5. Perform the following tank inspection services:
    - a. Clean the interior surfaces of the tank with high pressure water. Cleaning is necessary to allow the inspector to be able to see deterioration of the steel, pitting, and similar defects.
    - b. Inspect the tank's exterior coating for remaining intactness, anticipated life, and potential Hazardous Waste problems. Review interior girders and appurtenances for possible structural damage from icing or corrosion.
    - c. Review interior surfaces for corrosion or damage and qualify damage for repairs. Repairs may be quantified by extrapolation of a measured area.
    - d. Review exterior appurtenances for damage due to corrosion.
    - e. Review the exterior of the exposed foundations.
    - f. Coordinate with Engineer on condition of existing underdrain nozzles. Engineer will work with pressure filter manufacturer on recommendations for replacement.
    - g. Prepare a report documenting items found and recommendations for repair, including budgetary items. The report shall include conclusions and recommendations, base report, photographs with descriptions, and a field inspection report.

END OF SECTION 01 45 34

## SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of construction facilities as follows:
  - 1. Temporary Utilities: Water, electricity, and telephone.
  - 2. Contractor's field offices.
  - 3. Sanitary facilities.
  - 4. Temporary heat.
  - 5. Project signs.
  - 6. Enclosures such as tarpaulins, barricades and canopies.
  - 7. Storage areas.

#### 1.3 STORAGE AREAS

- A. Locations:
  - 1. The following general areas are available for storage:
    - a. Grassy area south of the pressure filter tanks.
    - b. Other areas on Site as approved by Owner.
  - 2. Specific storage locations within the general areas:
    - a. Carefully coordinate with Owner.
    - b. Subject to approval of Owner.
- B. Protection and Restoration:
  - 1. Protect trees and shrubs in the storage areas.
  - 2. Replace grass and other vegetation disturbed or damaged in the storage areas.
  - 3. Take reasonable means to prevent spillage of fuel, oil, chemicals, paint, and similar materials.
  - 4. Clean up spills and, if necessary, remove soil and replace with uncontaminated soil so as to allow vegetation to be quickly reestablished.
  - 5. Provide secondary containment for storage of hazardous materials, as required by governing authorities or agencies.
- C. Cleaning: Keep storage areas clean in accordance with Division 01 Section "Cleaning and Waste Management."
- D. Storage: Maintain in accordance with Division 01 Section "Product Storage and Handling Requirements."

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. General:
  - 1. New or used.
  - 2. Adequate in capacity for the required usage.
  - 3. Provide safe conditions.
  - 4. Comply with requirements of applicable codes and standards.

## 2.2 UTILITIES

### A. Temporary Utilities:

1. Equipment Testing:
  - a. Owner will pay utility charges for all power, water and other utilities.
  - b. Furnish, install, remove and pay for associated temporary equipment, piping, pumps, fuel, power distribution, and connections.
2. Water:
  - a. Owner will pay for water usage charges.
  - b. Furnish, install, remove and pay for all temporary piping, water meters, equipment and connections.
  - c. Obtain water by connection to Owner's existing water system with appropriate backflow prevention device. Coordinate with Owner on backflow preventing device requirements.
3. Electricity:
  - a. Owner will pay for electrical usage charges.
  - b. Furnish, install, remove and pay for all temporary wiring, equipment switches, panels, connections and transformers.
  - c. Furnish, install, remove, and pay for area distribution boxes so located that power and artificial lighting are located at all points where required by the Work.
  - d. Obtain electrical power by connecting to Owner's existing system.

## 2.3 FIELD OFFICES

### A. Contractor's Field Office:

1. Contractor's field office shall have at least 1 outside door.
2. Pay for all heat, electricity and telephone charges.

## 2.4 SANITARY FACILITIES

- ### A. Furnish and install required sanitary facilities, including temporary toilet buildings with sanitary toilets and hand washing facilities or hand sanitizing stations, for use of workers; comply with minimum requirements of the Health Department or other public agency having jurisdiction; maintain in a sanitary condition at all times.

## 2.5 CONSTRUCTION HEATING

### A. General:

1. All heating required during the progress of the Work, prior to the installation of the permanent heating system, shall be classified "temporary heat".
2. Prior to the installation of permanent heating equipment, furnish approved heaters and fuel as required.
3. Keep equipment and surroundings in clean, safe condition.
4. Pay all fuel bills for heat.

## 2.6 OTHER TEMPORARY CONSTRUCTION FACILITIES

- ### A. Furnish, install and maintain all other temporary construction facilities necessary for proper completion of the Work.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Comply with applicable requirements specified in Local Building Code.
- B. Maintain and operate systems to ensure continuous service.
- C. Modify and extend systems as Work progress requires.

3.2 REMOVAL

- A. Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work. Remove all such temporary facilities and controls as rapidly as progress of the Work will permit.

END OF SECTION 01 50 00

## SECTION 01 66 00 – PRODUCT STORAGE AND HANDLING REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes provisions for the storage and protection of Products.

#### 1.3 STORAGE AND PROTECTION

- A. Storage:
  - 1. Maintain ample way for foot traffic at all times, except as otherwise approved by Engineer.
  - 2. Repair or replace property damaged by reason of storing of material at no additional cost to Owner.
  - 3. Packaged Materials:
    - a. Delivered in original, unopened containers.
    - b. Stored until ready for use.
  - 4. Materials shall meet the requirements of these Specifications at the time that they are used in the Work.
  - 5. Store Products in accordance with Manufacturer's instructions.
- B. Protection:
  - 1. Use all means necessary to protect the:
    - a. Products of every Section before, during and after installation.
    - b. Installed work and materials of all trades.
  - 2. All materials shall be delivered, stored and handled to prevent:
    - a. The inclusion of foreign materials.
    - b. Damage by water, breakage or other causes.
  - 3. Provide weathertight storage sheds with raised floors as may be required to adequately protect those materials and Products stored on the Site which may require protection from damage by the elements.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of Engineer and at no additional cost to Owner.

### PART 2 - PRODUCTS

Not used.

### PART 3 - EXECUTION

Not used.

END OF SECTION 01 66 00

## SECTION 01 73 29 – CUTTING AND PATCHING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes provisions for cutting and patching work.
- B. Requirements:
  - 1. Cutting and patching may be described in various Sections of these Specifications
  - 2. Execute cutting, including excavating and filling, or patching of work required to:
    - a. Make several parts fit properly.
    - b. Uncover work to provide for installation of ill-timed work.
    - c. Remove and replace defective work.
    - d. Remove and replace work not conforming to the requirements of the Contract Documents.
    - e. Remove Samples of the installed work as specified for testing.
    - f. Install specified work in existing construction.
- C. Requirements Upon Engineer's Instructions:
  - 1. In addition to Contract requirements, upon written instruction of Engineer:
    - a. Uncover work to provide for Engineer's observation of covered work.
    - b. Remove Samples of installed materials for testing.
    - c. Remove work to provide for alteration of existing work.
- D. Protection of Work:
  - 1. Do not endanger any work by cutting or altering the work or any part of it.
  - 2. Do not cut or alter the work of another trade without written consent of Engineer.

#### 1.3 SUBMITTALS

- A. Written Notice:
  - 1. Prior to cutting which may affect the structural integrity of the Project or the work of another trade, submit written notice to Engineer requesting consent to proceed with cutting.
  - 2. Required Information:
    - a. Identification of Project.
    - b. Description of all related defective work.
    - c. Necessity for cutting.
    - d. Effect on other work or on the structural integrity of the Project.
    - e. Description of the proposed work including:
      - 1) Scope of cutting and patching.
      - 2) Subcontractor and trades to execute work.
      - 3) Products proposed to be used.
      - 4) Extent of refinishing.
    - f. Alternatives to cutting and patching.
    - g. Designation of party responsible for the cost of cutting and patching.
- B. Changes of Materials or Methods:
  - 1. Should conditions of the Work, or the schedule, indicate change of materials or methods, submit a written recommendation to Engineer including:
    - a. Conditions indicating the change.
    - b. Recommendations for alternative materials or methods.
    - c. Submittals as required for substitutions.

- C. Uncovered Work: Submit written notice to Engineer designating the time work will be uncovered to provide for observation.

#### 1.4 DIVISION OF WORK

##### A. Work:

1. In accordance with the General Conditions, Contractor is responsible for dividing the Work among the Subcontractors and Suppliers and for delineating the work to be performed by specific trades.
2. The following are suggestions as to how the Work may be divided. This is not a complete list of all the Work:
  - a. Each trade shall be financially responsible for all cutting and patching for sleeves, penetrations and installation of isolated components as necessary for its work unless herein specifically stated to the contrary.
  - b. On renovation projects, Contractor shall cut and patch walls, floors, ceilings to allow for continuous runs of recessed utilities and ductwork.
  - c. All patching shall be done by the trade whose work is damaged.
  - d. Any cost caused by defective or ill-timed work shall be borne by the party responsible.
  - e. Each trade shall do all fitting of its own work as required to make its several components fit together or to receive the work of other contractors.
  - f. Holes cut in exterior walls or roofs for installation of mechanical or electrical equipment shall be waterproofed. If existing roofing is to remain, obtain and submit to Owner original roofing manufacturer's approval and warranty on new roof penetrations and where removing existing roof penetrations and curbs.

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

- A. All materials and workmanship shall conform to the requirements of other Sections of the Specifications. Where no materials are specified in these specifications, use materials of an equivalent type, quality, and size to match those existing in other areas of the facility. If none exist, use materials and workmanship recognized as of the highest quality in the industry. Obtain Engineer's review of all such material and workmanship.

#### PART 3 - EXECUTION

##### 3.1 INSPECTION

- A. Existing Conditions: Inspect existing conditions of the Work, including elements subject to movement or damage during cutting and patching or excavating and backfilling.
- B. Uncovered Work: After uncovering work, inspect conditions affecting the installation of new Products.

##### 3.2 PREPARATION

- A. Shoring and Bracing: Provide shoring, bracing and support as required to maintain structural integrity of the Project.
- B. Protection: Provide protection for other portions of the Project and provide protection from the elements.

##### 3.3 PERFORMANCE

- A. Adjustments to Products: Execute fitting and adjustments of Products to provide finished installation.
- B. Refinishing:
  1. Prepare existing surfaces for finishes by scraping, sanding, filling, acid etching, and sand blasting to ensure bonding and a smooth finish.
  2. Refinish entire surfaces as necessary to provide an even finish.
  3. Refinish continuous surfaces to the nearest intersection.
  4. Refinish entire assemblies.

3.4 CLEANING

- A. Clean materials installed under this Section in accordance with Division 01 Section "Cleaning and Waste Management."

END OF SECTION 01 73 29

## SECTION 01 74 00 – CLEANING AND WASTE MANAGEMENT

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes provisions for maintaining structures and the Site in a standard of cleanliness.
- B. Related Sections: In addition to standards described in this Section, comply with requirements for cleaning as described in various other Sections of these Specifications.

#### 1.3 QUALITY ASSURANCE

- A. Inspection:
  - 1. Daily and more often if necessary.
  - 2. Conduct inspections to verify that requirements of cleanliness are being met.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Hazards Control:
  - 1. Volatile Wastes:
    - a. Store in covered metal containers.
    - b. Remove from premises daily.
    - c. Provide secondary containment for storage of hazardous materials, as required by governing authorities or agencies.
  - 2. Prevent accumulation of wastes which create hazardous conditions.
  - 3. Provide adequate ventilation during use of volatile or noxious substances.

#### 1.5 PROJECT CONDITIONS

- A. Cleaning and Disposal:
  - 1. Conduct operations to comply with local ordinances and anti-pollution laws.
  - 2. Not Allowed:
    - a. Burning or burying of rubbish or waste materials on Site.
    - b. Disposal of volatile wastes in storm or sanitary sewers: Volatile wastes include, but are not limited to, mineral spirits, oil or paint thinner.
    - c. Disposal of wastes into streams or waterways.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS AND EQUIPMENT

- A. Compatibility:
  - 1. Compatible with the surface being cleaned.
  - 2. Recommended by the Manufacturer of the material being cleaned.
  - 3. As reviewed by Engineer.

## PART 3 - EXECUTION

### 3.1 PROGRESS CLEANING

#### A. General:

1. Store Materials:
  - a. In an orderly arrangement allowing maximum access.
  - b. To allow unimpeded drainage and traffic.
  - c. Provide for the required protection of materials.
2. Do not allow accumulation of scrap, debris, waste material and other items not required for construction of the Work.
  - a. Remove from Site at least each week and more often if necessary.
  - b. Provide adequate storage for materials awaiting removal.
3. Observe requirements for fire protection and protection of the environment.

#### B. Site:

1. Daily, and more often if necessary:
  - a. Inspect the Site.
  - b. Pick up scrap, debris and waste material; remove such items to the place designated for their storage.
2. Weekly, and more often if necessary:
  - a. Inspect arrangements of materials stored on Site.
  - b. Restack or otherwise service arrangements to meet the requirements of paragraph 3.1.A.1 above.
3. At all times maintain the Site in a neat and orderly condition which meets the approval of Engineer.
4. Paved Surfaces: Keep clean.
5. Dust Control:
  - a. Control dust on or near the Work by the application of water or other approved means.
  - b. If Contractor fails to correct unsatisfactory conditions with 24 hours after due notification:
    - 1) Owner may arrange for such work to be performed by other means.
    - 2) Pay costs.

#### C. Buildings, Tanks, and Other Structures:

1. Weekly, and more often if necessary:
  - a. Inspect.
  - b. Pick up scrap, debris and waste material; remove such items to the place designated for their storage.
  - c. Sweep interior spaces clean. Clean shall be defined to be free from dust and other material capable of being removed by reasonable diligence using a hand-held broom.
2. Preparation for installation of succeeding material:
  - a. Clean the building, tank or other structure or pertinent portion thereof:
    - 1) To the degree of cleanliness recommended by the Manufacturer of the succeeding material.
    - 2) Using equipment and materials required to achieve the required cleanliness.
3. After installation of finish floor material:
  - a. Clean the finish floor daily at all times while work is being performed in the space in which finish materials have been installed.
    - 1) Clean as used above shall be defined to be free from all foreign material which, in the opinion of Engineer, may be injurious to the finish floor material.
4. Schedule cleaning operations so that dust and other contaminants resulting from cleaning operations will not fall on wet, recently painted surfaces.

### 3.2 FINAL CLEANING

A. Definitions for Clean: The level of cleanliness generally provided by commercial building maintenance subcontractors using commercial quality building maintenance equipment and materials.

#### B. Prior to Completion of the Work:

1. Remove from the Site all tools, surplus materials, equipment, scrap, debris and waste.
2. Conduct final progress cleaning as described in Article 3.1 above.

- C. Site:
  - 1. Unless otherwise specifically directed by Engineer:
    - a. Hose down paved areas on Site and public sidewalks directly adjacent to the Site.
    - b. Rake clean other surfaces of the grounds.
  - 2. Remove resultant debris.
  
- D. Buildings, Tanks and Other Structures:
  - 1. Exterior:
    - a. Visually inspect exterior surfaces.
    - b. Remove traces of soil, waste material, smudges and other foreign matter.
    - c. Remove traces of splashed materials from adjacent surfaces.
    - d. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior surface.
    - e. In the event of stubborn stains not removable with water, Engineer may require light sandblasting or other cleaning at no additional cost to Owner.
  - 2. Interior:
    - a. Visually inspect interior surfaces.
    - b. Remove traces of soil, waste material, smudges and other foreign matter.
    - c. Remove traces of splashed materials from adjacent surfaces.
    - d. Remove paint droppings, spots, stains and dirt from finished surfaces using only the specified cleaning materials and equipment.
  - 3. Glass: Clean glass inside and outside.
  - 4. Polished Surfaces: To surfaces requiring the routine application of buffed polish, apply the specified polish as recommended by the Manufacturer of the material being polished.
  
- E. Timing: Schedule final cleaning as approved by Engineer to enable Owner to accept a completely clean Project.

END OF SECTION 01 74 00

## SECTION 01 74 26 – DISINFECTION OF DRINKING WATER FACILITIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes disinfection of drinking water facilities.
- B. Disinfection of Other Components:
  - 1. Procedures for the disinfection of individual piping systems or of certain project components may be specified elsewhere in these specifications.
  - 2. Coordinate the work of this Section with the disinfection requirements specified elsewhere.

#### 1.3 DELIVERY

- A. Pipes:
  - 1. Clean inside when delivered to Site.
  - 2. Stored in a manner to maintain the interior of pipe in clean condition.

### PART 2 - PRODUCTS

Not used.

### PART 3 - EXECUTION

#### 3.1 BUILDING PIPES

- A. Disinfection: In accordance with Division 40 Section "Process Piping Systems."

#### 3.2 STORAGE TANKS

- A. Cleaning:
  - 1. Remove all debris from tank interior which will be in contact with potable drinking water.
  - 2. Thoroughly clean interior walls which will contact potable drinking water of all dirt, grease, and other contaminants.
- B. Disinfection:
  - 1. Prepare chlorine solution of at least 200 mg/l to be applied directly to the walls of the tank with suitable brushes or spray equipment.
  - 2. The strong chlorine solution shall stay in contact with the surfaces to be disinfected for at least 30 minutes; then fill the tank with potable water to its overflow level and collect samples for bacteriological quality analysis.
  - 3. If samples are satisfactory in quality, the water in the tank may be pumped to the distribution system for use as long as the aesthetic quality is acceptable as determined by Engineer.
  - 4. Results to be reviewed by Engineer if analyses are unacceptable.
  - 5. If sample results are not satisfactory, re-disinfect as directed by Engineer.
  - 6. Place in service only after 2 consecutive acceptable bacteriological analyses.
  - 7. Owner to provide bacteriological sampling and analysis.

END OF SECTION 01 74 26

## SECTION 01 75 00 – STARTING AND ADJUSTING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes provisions for facility startup and demonstration of the following systems:
  - 1. Equipment.
  - 2. Mechanical Systems.

#### 1.3 SUBMITTALS

- A. Preliminary Schedules:
  - 1. Submit 2 weeks prior to earliest proposed date.
  - 2. List time and date for the following for each system:
    - a. Startup.
    - b. Demonstration.
- B. Completion Reports:
  - 1. Submit within 1 week after each system demonstration.
  - 2. List time, date and persons present for the following for each system:
    - a. Start-up.
    - b. Demonstration.
  - 3. Include Manufacturer's representative's report indicating:
    - a. Approval of installation.
    - b. Satisfactory start-up.
    - c. Functioning correctly.
  - 4. Indicate that demonstration and instructions were satisfactorily completed.

#### 1.4 QUALITY CONTROL

- A. Manufacturer's Field Services:
  - 1. Provide when required by individual Section.
  - 2. Provide the following services except where indicated otherwise in individual Sections.
    - a. Inspect, check and approve system installation.
    - b. Supervise system start-up.
    - c. Provide written report indicating that system:
      - 1) Has been properly installed and lubricated.
      - 2) Is in accurate alignment.
      - 3) Is free from undue stress imposed by connecting lines or anchor bolts.
      - 4) Has been satisfactorily operated under full load conditions.
    - d. Demonstrate operation of system to Owner's personnel.
    - e. Instruct Owner's personnel on operation and maintenance of system.

#### 1.5 PROJECT CONDITIONS

- A. Verify that:
  - 1. Excess packing and shipping bolts have been removed.
  - 2. Interdependent systems have been checked and are operational.

#### 1.6 CORRECTION PERIOD

- A. Provide periodic continuing warranty services as necessary to ensure proper functioning of mechanical systems after occupancy of the Project, and for a period of 1 year after date of Substantial Completion.

## PART 2 - PRODUCTS

Not used.

## PART 3 - EXECUTION

### 3.1 STARTING OF SYSTEMS

- A. Inspection:
  - 1. Verify that Project conditions comply with requirements.
  - 2. Verify that status of Work meets requirements for starting of systems.
  
- B. Preparation:
  - 1. Coordinate sequence for start-up of various systems.
  - 2. Notify Engineer 7 days prior to start-up of each system.
  - 3. Have at hand during entire start-up process:
    - a. Contract Documents.
    - b. Shop Drawings.
    - c. Product data.
    - d. Operation and maintenance data.
  - 4. Verify that each piece of equipment has been checked for:
    - a. Control sequence.
    - b. Other conditions which may cause damage.
  - 5. Verify control systems are fully operational in automatic mode.
  - 6. Control Valves:
    - a. Inspect both hand and automatic control valves; clean bonnets and stems.
    - b. Tighten packing glands to ensure no leakage, but permit valve stems to operate without galling.
    - c. Replace packing in valves to retain maximum adjustment after system is judged complete.
    - d. Replace packing on any valve which continues to leak.
    - e. Remove and repair bonnets which leak.
    - f. Coat packing gland threads and valve stems with a surface preparation of "Moly-Cote" or "Fel-Pro" after cleaning.
    - g. Verify that control valve seats are free from foreign material and are properly positioned for intended service.
  - 7. Flanges:
    - a. Tighten flanges after system has been placed in operation.
    - b. Replace flange gaskets which show any sign of leakage after tightening.
  - 8. Screwed Joints:
    - a. Inspect screwed joints for leakage.
    - b. Promptly remake each joint which appears to be faulty; do not wait for rust to form.
    - c. Clean threads on both parts, apply compound and remake joints.
  - 9. Cleaning:
    - a. After system has been placed in operation, clean strainers, dirt pockets, orifices, valve seats and headers in fluid systems, to ensure being free of foreign materials.
    - b. Open air vents; remove operating elements. Clean thoroughly, replace internal parts, and put back into operation.
    - c. Remove rust, scale and foreign materials from equipment and renew defaced surfaces.
  - 10. Control Circuits:
    - a. Check each electrical control circuit to ensure that operation complies with Specifications and requirements to provide desired performance.
  - 11. Pressure Gages:
    - a. Inspect each pressure gage and thermometer for calibration.
    - b. Replace items which are defaced, broken or which read incorrectly.
  - 12. Repair damaged insulation.
  - 13. Venting and Drainage:
    - a. Vent gases trapped in any part of systems.
    - b. Verify that liquids are drained from all parts of gas or air systems.
  - 14. Leaks: Check piping for leaks at every joint and at every screwed, flanged or welded connection using "Leak-Tek" or other approved compound.

- C. Start-up:
  - 1. Execute start-up under supervision of responsible persons in accordance with Manufacturer's instructions.
  - 2. Place equipment in operation in proper sequence.

### 3.2 SYSTEMS DEMONSTRATION

- A. Preparation:
  - 1. Verify that system:
    - a. Has been inspected and put in service.
    - b. Is fully operational.
  - 2. Operation and Maintenance Manuals:
    - a. Completed.
    - b. Sufficient copies available for use in demonstrations and instructions.
- B. Demonstrations and Instructions:
  - 1. Demonstration of and instruction on operation and maintenance of system:
    - a. To Owner's personnel.
    - b. Two weeks prior to Substantial Completion.
  - 2. Instruction:
    - a. Operation and maintenance manual as basis.
    - b. Review contents of manual in detail.
    - c. Explain all aspects of operation and maintenance.
  - 3. Demonstrate:
    - a. Start-up.
    - b. Operation.
    - c. Control.
    - d. Adjustment.
    - e. Troubleshooting.
    - f. Servicing.
    - g. Maintenance.
    - h. Shutdown.

### 3.3 PERFORMANCE TEST

- A. Performance Test:
  - 1. Test the entire Work, including all of its individual systems for 2 weeks before final payment will be made.
  - 2. Make final tests in the presence of Owner and Engineer.
  - 3. If any part of the Work or equipment does not meet Specifications:
    - a. Correct the situation.
    - b. Obtain approval of Engineer before final payment is made.
  - 4. Provide the personnel and bear all costs for correcting all malfunctions.
  - 5. Owner will provide operating personnel and utilities.

END OF SECTION 01 75 00

## SECTION 01 77 00 – CLOSEOUT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the instructions for and the responsibilities of each party in contract closeout.
- B. Related Section includes Certificate of Substantial Completion.

#### 1.3 SUBSTANTIAL COMPLETION

- A. Contractor: When Contractor considers that the Work or any portion of the Work is ready for its intended use, Contractor shall submit:
  - 1. Written certification to Engineer and Owner that the Work, or designated portion of the Work, is substantially complete.
  - 2. A list of major items to be completed or corrected.
  - 3. Request that Engineer issue a certificate of Substantial Completion.
- B. Engineer's Inspection: Engineer will make an inspection:
  - 1. Within 10 days after receipt of certification.
  - 2. Together with Owner and Contractor.
- C. Engineer's Determination of Substantial Completion:
  - 1. Should Engineer consider the Work or designated portion of the Work substantially complete, the following steps shall be taken:
    - a. Contractor shall prepare and submit to Engineer, a list of items to be completed or corrected as determined by the inspection.
    - b. Engineer will prepare and deliver to Owner:
      - 1) A tentative certificate of Substantial Completion.
      - 2) A tentative list of items to be completed or corrected before final payment.
    - c. Owner shall have 7 days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list.
    - d. Engineer will, within 14 days after delivery of tentative certificate to Owner, decide:
      - 1) Not Substantially Complete: Engineer will issue written notice to Contractor stating reasons.
      - 2) Substantially Complete: Engineer will issue definitive certificate of Substantial Completion and a revised list of items to be corrected or completed.
  - 2. Should Engineer consider that the Work or designated portion of the Work is not substantially complete, the following steps shall be taken:
    - a. Engineer shall notify Contractor in writing stating Engineer's reasons.
    - b. Contractor shall complete the Work and send a second written notice to Engineer certifying that the Project, or designated portion of the Project, is substantially complete.
    - c. Engineer and Owner will reinspect the Work.
- D. Division of Responsibilities:
  - 1. Engineer:
    - a. At the time of delivery of tentative certificate of Substantial Completion.
    - b. Deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment with respect to:
      - 1) Security.
      - 2) Operation.
      - 3) Safety.
      - 4) Protection of the Work.
      - 5) Maintenance.

- 6) Heat.
  - 7) Utilities.
  - 8) Insurance.
  - 9) Warranties.
2. Engineer's written recommendation on division of responsibilities shall be binding on Owner and Contractor until final payment unless Owner and Contractor agree otherwise in writing and so notify Engineer prior to Engineer's issuance of a definitive certificate of Substantial Completion.

#### 1.4 FINAL INSPECTION

- A. Contractor Certification: Prior to final inspection, Contractor shall submit written certification that:
  1. The Contract Documents have been reviewed.
  2. The Project has been inspected in compliance with the Contract Documents.
  3. Work has been completed in accordance with the Contract Documents.
  4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
  5. The Project is complete and ready for final inspection.
- B. Engineer's Inspection: The Engineer will make final inspection:
  1. Within 10 days after receipt of certification.
  2. Together with Owner and Contractor.
- C. Engineer's Determination of Final Completion:
  1. Should Engineer consider the Work complete and ready for final payment in accordance with the requirements of the Contract Documents, Engineer shall request Contractor to make Project closeout submittals.
  2. Should Engineer consider the Work not complete and ready for final payment:
    - a. Engineer shall notify Contractor in writing stating the reasons.
    - b. Contractor:
      - 1) Take immediate steps to remedy the stated deficiencies.
      - 2) Send a second written notice to Engineer certifying that the Work is complete.
    - c. Engineer and Owner will reinspect the Work.

#### 1.5 REINSPECTION COSTS

- A. Should Engineer be required to perform second inspections because of failure of the Work to comply with the original certifications of Contractor, Owner will compensate Engineer for additional services and deduct the amount paid from payment or payments to Contractor.

#### 1.6 ADDITIONAL INSPECTION COSTS

- A. Substantial Completion: Owner will compensate Engineer for inspection services rendered between the scheduled date of Substantial Completion and the actual date of Substantial Completion and deduct the amounts paid from payment or payments to Contractor.
- B. Final Completion: Owner will compensate Engineer for inspection services rendered between the scheduled date of final completion and the actual date of final completion and deduct the amounts paid from payment or payments to Contractor.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Contractor:
  1. Provide closeout submittals as required in the Contract Documents.
  2. These submittals shall include, but not necessarily be limited to:
    - a. Project record documents.
    - b. Operation and maintenance manuals.
    - c. Guarantees.
    - d. Spare parts and maintenance materials.
    - e. Instruction in operation of all systems.

1.8 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

- A. Affidavits:
  - 1. Submit with final Application for Payment an affidavit of payment of debts and release of claims.
  - 2. Affidavit shall include:
    - a. Contractor's release or waiver of lien.
    - b. Consent of surety of final payment.
- B. Execution: All submittals shall be duly executed before delivery to Engineer.

1.9 FINAL ADJUSTMENT OF ACCOUNTS

- A. Final Statement: Submit a final statement of accounting, which reflects all adjustments, to Engineer. This statement shall contain the following:
  - 1. Original Contract Price.
  - 2. Additions and deductions.
  - 3. Total Contract Price as adjusted.
  - 4. Previous payments.
  - 5. Sum remaining due.
- B. Final Change Order: Engineer will prepare a final Change Order reflecting approved adjustments to the Contract Price not previously made by Change Orders.

1.10 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit a final Application for Payment in accordance with the requirements of the Contract Documents.
- B. Disposition of Final Application for Payment:
  - 1. If the final Application for Payment and the Work are acceptable in accordance with the Contract Documents:
    - a. Engineer will, within 10 days after receipt of the Application for Payment:
      - 1) Submit to Owner a written recommendation for payment.
      - 2) Submit to Owner and Contractor a written notice that the Work is acceptable subject to the provisions of the General Conditions.
    - b. Owner will, within 30 days after receipt of the Application for Payment and Engineer's recommendation in accordance with the Contract Documents, pay to Contractor the amount recommended.
  - 2. If the Application for Payment, the Work or both are unacceptable:
    - a. Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment.
    - b. Contractor shall make the necessary corrections and resubmit the Application for Payment.
  - 3. Final Completion Delayed:
    - a. Upon receipt of Contractor's final Application for Payment and recommendation by Engineer, Owner shall make payment of the balance due for that portion of the Work fully completed and accepted if Engineer confirms that final completion of the Work is significantly delayed through no fault of Contractor.
    - b. Payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.
    - c. [ Contractor shall submit with the Application for Payment written consent of surety if the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement. ]

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 77 00

## SECTION 01 78 39 – PROJECT RECORD DOCUMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes procedures for the maintenance, recording and submittal of Project record documents.

#### 1.3 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Storage:
  - 1. Store documents and Samples in Contractor's field office apart from documents used for construction.
  - 2. Provide files and racks for storage of documents.
  - 3. Provide locked cabinet or secure storage space for storage of Samples.
- B. Filing: File record documents in accordance with CSI Masterformat.
- C. Maintenance:
  - 1. Maintain documents in a clean, dry, legible condition and in good order.
  - 2. Do not use record documents for construction purposes.
- D. Availability: Make documents and Samples available at all times for inspection by Engineer.

#### 1.4 RECORDING

- A. Labeling: Label each document "PROJECT RECORD" in neat large printed letters.
- B. Recording:
  - 1. Record actual revisions to the Work.
  - 2. Record information concurrently with construction progress.
  - 3. Do not conceal any work until required information is recorded.
- C. Drawings:
  - 1. Legibly mark, with notes or graphic representations, to record actual construction.
    - a. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
    - b. Field changes of dimension and detail.
    - c. Changes made by Field Order, Work Change Directive or Change Order.
    - d. Details not on original Contract Drawings.
  - 2. After Engineer's review of the record drawings, transfer all marks to a set of hard copy and electronic documents provided by Engineer.
- D. Specifications and Addenda:
  - 1. Legibly mark each Section to record:
    - a. Manufacturer, trade name, catalog number, and Supplier of each Product and item of equipment actually installed.
    - b. Changes made by Field Order, Work Change Directive or Change Order.

1.5 SUBMITTAL

- A. Delivery:
  - 1. At Contract closeout, deliver record documents to Engineer for Owner.
  - 2. Submit only Contract Documents marked up. Three dimensional models, shop drawings, or other representations of the Project created by the Contractor from the Contract Documents will not be accepted.
  
- B. Transmittal Letter:
  - 1. Accompany submittal with transmittal letter in duplicate, containing:
    - a. Date.
    - b. Project title and number.
    - c. Contractor's name and address.
    - d. Title and number of each Record Document.
    - e. Signature of Contractor or their authorized representative.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 78 39

## SECTION 02 41 19 – SELECTIVE DEMOLITION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the modification, alteration, conversion, and renovation of existing structures:
  - 1. Be aware of the many incidental items which exist which must be demolished, relocated, or replaced in order to accomplish the remodeling work of trades.
  - 2. Include the price of such demolition, relocating, and replacement in the base Bid.
  - 3. These incidental items may or may not be indicated in the Contract Documents.
  - 4. Contractor and Subcontractors performing remodeling work are expected to be familiar with the unknown nature of existing utilities serving an area to be remodeled and shall calculate the base Bid to include the demolition, removal, relocation, and replacement of these utilities.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the pertinent provisions of the following:
  - 1. American National Standards Institute: ANSI A10.6 - Safety Requirements for Demolition Operations.
  - 2. ASTM: D1557 - Laboratory Compaction Characteristics of Soil Using Modified Effort.
  - 3. EPA: Rule 406(b) of the Toxic Substances Control Act of 1992.
  - 4. NFPA: NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

#### 1.4 DEFINITIONS

- A. Terms:
  - 1. Abandon:
    - a. Remove an item to the extent that it is not visible and does not interfere with new construction.
    - b. Portions of the abandoned item may be left in place.
    - c. No abandoned items shall be left below new footings.
  - 2. Demolish:
    - a. Remove existing items from their present location in the Project area and haul to an area outside of the Project area.
    - b. Remove utilities serving these items.
  - 3. Relocate:
    - a. Move existing items from their present location to another location in the Project area.
    - b. Extend utilities serving the present location to the new location.
  - 4. Remove:
    - a. Except for items indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property.
    - b. Remove existing items from their present location in the Project area and haul to an area outside of the Project area.
    - c. Remove utilities serving these items.
  - 5. Replace:
    - a. Remove existing items from their present location in the Project area, haul them to an area outside of the Project area, and furnish and install new items in the same or another location.
    - b. Extend utilities serving the present location to the new location.
  - 6. Reuse: Move existing items from their present location to another location in the Project area. Extend utilities serving the present location to the new location.

7. Historic Items:
  - a. Historic items, relics, and similar object including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property.
  - b. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

#### 1.5 DIVISION OF WORK

- A. Work: In accordance with the General Conditions, Contractor is responsible for dividing the Work among the Subcontractors and Suppliers and for delineating the work to be performed by specific trades. The following are suggestions as to how the Work may be divided. This is not a complete list of the work:
  1. Contractor:
    - a. Cut and patch walls, floors, and ceilings to allow for recessed utilities and ductwork.
    - b. Replace damaged units.
    - c. Place sleeves in new concrete structures.
    - d. Patch roof at new penetration and curbs and where existing penetrations and curbs are removed.
  2. Mechanical and Electrical Subcontractors:
    - a. Furnish sleeves for use in new concrete construction.
    - b. Install fire stop and smoke stop systems at utility penetrations in accordance with local building codes.
    - c. Furnish and install sleeves in gypsum board and masonry construction.
    - d. Core drill existing concrete for new utilities and sleeves after obtaining Engineer's review of locations.
    - e. Furnish new heads, piping, and connections as required for completion of the Work.
  3. Miscellaneous:
    - a. Each trade shall be financially responsible for cutting and patching for sleeves, penetrations, and installation of isolated components as necessary for its work unless herein specifically stated to the contrary.
    - b. On renovation projects, cut and patch walls, floors, and ceilings to allow for continuous runs of recessed utilities and ductwork.
    - c. Patching shall be done by the trade whose work is damaged.
    - d. Costs caused by defective or ill-timed work shall be borne by the party responsible.
    - e. Each trade shall do fitting of its own work as required to make its several components fit together or to receive the work of other trades.

#### 1.6 SUBMITTALS

- A. Predemolition Audio-Video:
  1. Submit showing existing conditions of construction to remain that could be misconstrued as damage caused by construction activities.
  2. Including building and Site, as well as interior and exterior finishes.
  3. Submit prior to commencing Work.

#### 1.7 QUALITY ASSURANCE

- A. Qualifications: Engage an experienced firm that has specialized in demolition work similar to material and extent indicated for this Project.
- B. Regulatory Requirements:
  1. Comply with governing EPA notification regulations before beginning selective demolition.
  2. Comply with hauling and disposal regulations of authorities having jurisdiction.
  3. Comply with ANSI A10.6 and NFPA 241.
  4. Comply with 29 CFR 1926.62-(OSHA Paint Standard).

- C. Pre-Demolition Conference:
  - 1. Conduct pre-demolition conference at Site in accordance with in Division 01 Section "Project Meetings."
  - 2. Review methods and procedures related to selective demolition including, but not limited to, the following:
    - a. Inspect and discuss condition of construction to be selectively demolished.
    - b. Review structural load limitations of existing structure.
    - c. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and to avoid delays.
    - d. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

## 1.8 PROJECT CONDITIONS

- A. Owner Occupancy:
  - 1. Owner will occupy portions of building immediately adjacent to selective demolition area.
  - 2. Conduct selective demolition so Owner's operations will not be disrupted.
  - 3. Provide not less than 72 hours notice to Owner of activities that will affect Owner's operations.
- B. Access:
  - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
  - 2. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.
- C. Conditions:
  - 1. Owner and Engineer assume no responsibility for condition of areas to be selectively demolished.
  - 2. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as far as practicable.
- D. Storage or sale of removed items or materials on Site will not be permitted.
- E. Maintenance of Utilities: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- F. Unknown Hazardous Materials:
  - 1. It is not expected that hazardous materials will be encountered in the Work.
  - 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner in accordance with the General Conditions.
  - 3. Hazardous materials will be removed by Owner under a separate contract.
- G. Lead Paint: Remove and remediate existing lead paint as required to comply with all codes and requirements while performing the requirements of the Work. Either remove lead paint completely or partially as required to achieve this.

## 1.9 WARRANTIES

- A. Existing Warranties:
  - 1. Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.
  - 2. If possible, retain original installer or fabricator to patch exposed work that is damaged during selective demolition.
  - 3. If it is not possible to engage original installer or fabricator, engage another recognized, experienced, and specialized firm.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General:
  - 1. Materials and workmanship shall conform to the requirements of other Sections of the Specifications.
  - 2. Where no materials are specified in these specifications, use materials of an equivalent type, quality, and size to match those existing in other areas of the facility.
  - 3. If none exist, use materials and workmanship recognized as of the highest quality in the industry.
  - 4. Obtain Engineer's review of such material and workmanship.
- B. Piping: Existing piping which is removed from its present location shall not be reused where new piping is required unless specifically noted on the Drawings.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled, and of items to be removed and salvaged.
- D. Conflicts:
  - 1. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict.
  - 2. Promptly submit written report to Engineer.
- E. Survey, or engage a competent person to survey condition of the building, in accordance with requirements of OSHA, to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition operations.
- F. Perform additional surveys as the work progresses to detect hazards resulting from operations to date.

### 3.2 UTILITY SERVICES

- A. Maintain existing services indicated to remain and protect them against damage during selective demolition operations.
- B. Interruptions:
  - 1. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and other authorities having jurisdiction.
  - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.
  - 3. Provide at least 72 hours notice to Owner if shutdown of service is required during changeover.

### 3.3 PREPARATION

- A. Site Access and Temporary Controls:
  - 1. Conduct selective demolition and debris removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 2. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and other authorities having jurisdiction.
  - 3. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
  - 4. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.

5. Protect existing Site improvements, appurtenances, and landscape features to remain.
6. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line or groups of trees to remain.

B. Temporary Facilities:

1. Protection:
  - a. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - b. Provide protection to ensure safe passage of people around selective demolition area, and to and from occupied portion of building.
  - c. Weather Protection:
    - 1) Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
    - 2) Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures.
    - 3) Coordinate enclosures with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
  - d. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - e. Cover and protect furniture, furnishings, and equipment that have not been removed.
2. Shoring and Bracing:
  - a. Provide and maintain shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
  - b. Strengthen or add new supports when required during progress of selected demolition.

3.4 POLLUTION CONTROLS

A. Dust Control:

1. Use water mist, temporary closures, and other suitable methods to limit spread of dust and dirt.
2. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
3. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure.
4. Vacuum carpeted areas.
5. Comply with governing environmental protection regulations.

B. Disposal:

1. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
2. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

3.5 GENERAL

A. Demolish and remove existing construction only to the extent required by new construction and as indicated.

B. Methods:

1. Use methods required to complete the work within limitations of governing regulations.
2. Level by Level:
  - a. Proceed with selective demolition systematically, from higher to lower level.
  - b. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
3. Cutting Openings:
  - a. Neatly cut openings and holes plumb, square, and true to dimensions required.
  - b. Use cutting methods least likely to damage construction to remain or to adjoining construction.
  - c. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces.
  - d. Temporarily cover openings to remain.
4. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

5. Flame Cutting:
    - a. Do not use cutting torches until work area is cleared of flammable materials.
    - b. At concealed spaces, such as duct and pipe chases, verify condition and contents of hidden space before starting flame-cutting operations.
    - c. Maintain portable fire suppression devices during flame-cutting operations.
    - d. Maintain adequate ventilation when using cutting torches.
  6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials, and promptly and legally dispose of off Site.
  7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  9. Dispose of demolished items and materials promptly.
  10. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
- C. Existing Facilities: Comply with Owner's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries, and other building facilities during the selective demolition operations.
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
  2. Paint equipment to match new equipment.
  3. Pack or crate items after cleaning and repairing, and identify contents of containers.
  4. Protect items from damage during transport and storage.
  5. Reinstall items in locations indicated.
  6. Comply with requirements for new materials and equipment.
  7. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

### 3.6 DEMOLITION

- A. Structures:
1. Cut, repair, reuse, excavate, demolish or otherwise remove parts of the existing structures or appurtenances, as indicated on the Drawings, herein specified and necessary to permit completion of the Work.
  2. Dispose of demolished materials in an approved manner.
  3. Include necessary cutting, bending, and welding of reinforcing steel, structural steel, or miscellaneous metal work found embedded in the existing structures.
  4. When removing materials or portions of existing structures, shore up, underpin, and protect adjacent structures.
  5. Concrete:
    - a. Demolish in small sections.
    - b. Cut concrete to a depth of at least 3/4-inch at junctures with construction to remain, using a power driven saw.
    - c. Dislodge concrete from reinforcement to remain at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated.
    - d. Neatly trim openings to dimensions indicated.
  6. Engineer's review of cutting: No existing structure, equipment or appurtenance shall be shifted, cut, removed or otherwise altered without obtaining review of Engineer.
- B. Equipment:
1. Dismantle, remove, and relocate existing equipment, piping, and other appurtenances required for the completion of the Work.
  2. Cut existing pipelines for the purpose of making connections thereto.
  3. Cut off anchor bolts for equipment and structural steel indicated to be removed 1-inch below the concrete surface.
  4. Patch remaining concrete surface to smooth even finish.

- C. Piping, Fire Protection, and Electrical Components:
    - 1. When a new connection is made to an existing pipeline, install additional new piping, extending to and including the most convenient new valve.
    - 2. Piping, conduit, and wiring indicated or required to be demolished shall be done so to the nearest reasonable connection outside of the Project area or as directed by Engineer.
    - 3. Where necessary or required for the purpose of making connections, cut existing pipelines in a manner to provide an approved joint.
    - 4. Weld beads, flanges, and provide Dresser couplings on existing and new piping.
    - 5. Furnish new heads, piping, and connections as required for completion of the Work.
  - D. Conceal Utilities: Recess new piping, conduit, and other utilities into floors, wires, and ceilings in finished areas.
  - E. Ownership of Salvaged Materials:
    - 1. Materials and equipment removed shall remain the property of Owner at Owner's option.
    - 2. Items not salvageable, as determined by Engineer and Owner, and items Owner elects not to keep shall become the property of Contractor to be properly disposed of off the Site.
    - 3. Salvaged equipment shall be thoroughly cleaned, lubricated, and greased for protection during prolonged storage.
  - F. Nonshrink Grout: Use nonshrink grout for setting wall castings, sleeves, leveling pump bases, doweling anchors into existing concrete and elsewhere as indicated.
  - G. Protect Facility from Water Damage: Provide flumes, hoses, piping, suitable plugs, bulkheads, or other means to divert or hold back the flow of wastewater, water, or other liquids, as required for proper performance of the Work.
  - H. Blasting: Not permitted.
  - I. Sleeves:
    - 1. Subcontractors for mechanical, electrical, and other trades shall furnish sleeves and inserts for pipes, conduits, and similar items in forms, walls, partitions, and floors.
    - 2. Perform work in cooperation with Contractor.
    - 3. Place items in ample time so as not to delay operations.
    - 4. Do not place sleeves so they pass through beams, girders, and similar construction.
- 3.7 PATCHING AND REFINISHING
- A. Promptly repair damage to adjacent construction caused by selective demolition operations.
  - B. Patching:
    - 1. Patch and repair existing surfaces from which items have been removed leaving holes, fasteners, and surface blemishes exposed to view.
    - 2. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
    - 3. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to Manufacturer's written recommendations.
    - 4. Comply with Division 01 Section "Cutting and Patching."
  - C. Refinishing:
    - 1. Prepare existing surfaces for finishes by scraping, sanding, filling, acid etching, and sand blasting to ensure bonding and a smooth finish.
    - 2. Refinish entire surfaces as necessary to provide an even finish.
    - 3. Refinish continuous surfaces to the nearest intersection and entirely finish assemblies.
    - 4. Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.
    - 5. Refinish entire surfaces if necessary to remediate existing lead painted surfaces.

D. Floors and Walls:

1. Where floors or partitions that are demolished extend one finished area into another, patch and repair floor and wall surfaces in the new space.
2. Provide an even surface of uniform finish, color, texture, and appearance.
3. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
4. Patch with durable seams that are as invisible as possible.
5. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
6. Where patching occurs in a painted surface, apply primer and intermediate coats over the patch and apply final coat over entire unbroken surface containing patch.
7. Provide additional coats until patch blends with adjacent surfaces.
8. Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

3.8 CLEANING

- A. Clean materials installed under this Section in accordance with Division 01 Section "Cleaning and Waste Management."
- B. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations.
- C. Return adjacent areas to conditions existing before selective demolition operations began.

END OF SECTION 02 41 19

## SECTION 03 11 00 – CONCRETE FORMING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the design, installation and removal of forms for cast-in-place concrete.
- B. Division of Work:
  - 1. In accordance with the General Conditions, Contractor is responsible for dividing the Work among the Subcontractors and Suppliers and for delineating the work to be performed by specific trades. The following are suggestions as to how the Work may be divided. This is not a complete list of all the work:
    - a. Mechanical, Electrical and Plumbing Trades: Supply, locate and install premanufactured items including inserts, sleeves, and other embedded items required by those respective trades.
    - b. Formwork Subcontractor:
      - 1) Supply and install Site fabricated box-outs for chases, sleeves and other openings for mechanical, electrical and plumbing trades.
      - 2) Install other inserts, embedded parts, box-outs for openings, chases, reveals and recesses, except those specifically mentioned above that are by mechanical, electrical or plumbing trades. Special inserts, embedded parts or other special requirements needed by a specific trade shall be supplied by that trade to the formwork Subcontractor for installation.
    - c. Contractor: Coordinate location of mechanical, electrical and plumbing inserts, embedded parts, openings and recesses with respective trades.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. ACI - American Concrete Institute:
    - a. 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
    - b. 301 - Standard Specifications for Structural Concrete for Buildings.
    - c. 347R - Guide to Formwork for Concrete.

#### 1.4 DESIGN AND PERFORMANCE REQUIREMENTS

- A. Form Construction:
  - 1. Provide required forms, shores, bracing, breast timbers, form ties, and accessories in sufficient quantities so as not to delay the Work, and of strength to support vertical and horizontal loads to which they are subjected.
  - 2. Deflection: Maximum deflection of forms shall be 1/240 of span or 1/4-inch, whichever is less.

#### 1.5 QUALITY ASSURANCE

- A. Design: The design and engineering of formwork, as well as its construction, shall be the responsibility of Contractor.
- B. Notifications: Notify special inspector at least 24 hours in advance of placing concrete.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Formwork Facing Materials:
1. Smooth Form Finish Areas:
    - a. Locations: All locations unless otherwise noted.
    - b. The form facing material shall produce a smooth, hard, uniform surface on the concrete.
    - c. Form facing materials may be plywood, tempered concrete-form-grade hardboard, metal, plastic, paper; or other approved material capable of producing the desired finish.
    - d. Facing materials shall be supported by studs or other backing capable of preventing deflections in excess of those specified herein.
    - e. Material with damaged surfaces, worn edges, patches, dents or other defects which will impair the texture of the concrete surface shall not be used.
  2. For walls in contact with treated water in water plants, form facing materials shall be in like new condition.
- B. Chamfer Strips:
1. Wood, metal, rubber, or PVC.
  2. Sizes as indicated, 3/4-inch x 3/4-inch minimum.
- C. Form Ties at Smooth Form Finish Areas:
1. Factory fabricated metal ties.
  2. Removable or snap type, with tapered cones as required to leave no tie portion within 1-inch of concrete surface plane.
  3. Designed to leave no larger than a 7/8-inch diameter hole at concrete surface.
  4. Chosen by Contractor to suit application and to resist pressure of fresh concrete.
  5. For concrete tank walls, in addition to the above requirements, provide waterstop type feature on the tie.
- D. Form Release Agent:
1. Products:
    - a. General Use: Magic Kote by Symons, Crete-lease 727 by Cresset Company; or equal.
    - b. Walls in contact with treated water in water plants: Crete-Lease 727 by Cresset Company; no substitutions.
  2. Chemically neutral agent in hydrocarbon solvent that will effectively prevent absorption of moisture and prevent bond with the concrete.
  3. Non-staining and compatible with finish coats specified in Division 09 Section "Painting."

## PART 3 - EXECUTION

### 3.1 FORMWORK CONSTRUCTION

- A. General:
1. Install wall form ties in a regular repetitive pattern.
  2. Align and secure joints to avoid offsets.
  3. Provide chamfered strips in exposed corners of concrete stair stringers, piers, columns, beams, spandrels, internal corners and for similar conditions throughout the Work.
  4. Construct forms to allow for installation of waterstops, bentonite waterproof bead, and waterproofing termination.
  5. Tie waterstops up to prevent folding when concrete is placed.
  6. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only.
  7. The arrangement of facing material shall be orderly and symmetrical with the number of seams kept to the practical minimum.
  8. Retighten forms after concrete placement if required to eliminate mortar leaks.
  9. Inspection Ports and Cleanouts:
    - a. Provide temporary openings where interior area of formwork is inaccessible for cleanout and inspection.
    - b. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar.
    - c. Locate temporary openings on forms at inconspicuous locations.

- B. Openings and Embedded Items:
  - 1. Set and build into the work anchorage devices and other embedded items required for work that is attached to, or supported by, cast-in-place concrete.
  - 2. Coordinate work of other Sections and cooperate with trade involved in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchor and other inserts.
  - 3. Use setting drawings, diagrams, instructions and directions provided by Suppliers of the respective items.
  - 4. Do not perform work unless specifically indicated on Drawings or reviewed prior to installation.
- C. Cleaning:
  - 1. Clean forms as erection proceeds, to remove foreign matter.
  - 2. Remove cuttings, shavings and debris from within forms.
  - 3. Flush with water or use compressed air to remove remaining foreign matter.
  - 4. Ensure that water and debris drain to exterior through clean-out ports.
  - 5. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints.
  - 6. Thoroughly clean embedded waterstops and concrete surfaces prior to constructing forms for the next pour.
- D. Applying Form Release Agent:
  - 1. Temperature of release agent and surfaces to which it is applied shall be a minimum of 70 degrees F.
  - 2. Apply by spray only.
  - 3. Uniformly coat surfaces with a thin film.
  - 4. Wipe off excess with clean towels.
  - 5. Apply in accordance with Manufacturer's recommendations.
  - 6. Do not allow to stand in puddles in the forms and prevent bonding of concrete at construction joints.
- E. Provisions for Form Removal:
  - 1. Fabricate forms for easy removal without hammering or prying against the concrete surfaces.
  - 2. Kerf wood inserts for forming keyways, reglets, recesses and the like to prevent swelling and for easy removal.

### 3.2 FORM AND SUPPORT REMOVAL

- A. Forms and supports shall remain in place for not less than the following periods of time:
  - 1. Building Walls, Support Bases: 12 to 24 hours.
- B. In any event, do not remove forms and supports until concrete in walls has reached 30% of design strength, and in structural members and slabs has reached 75% of design strength.
- C. Special precautions shall be taken when concrete is placed in average temperatures of 50 degrees F or below to ensure that forms are not removed before design strengths specified above are met.
- D. If Contractor elects to use high-early-strength cement, the specified periods of time may be reduced as allowed by Engineer. This does not relieve Contractor of Contractor's liability.
- E. Remove forms in such a manner and at such times as required to ensure safety of persons involved and so as to protect and maintain structural integrity of members.
- F. Particular care shall be taken in removing forms to minimize damage to concrete surfaces; use crush or wrecking plates as necessary.
- G. Whenever the formwork is removed, cure the exposed concrete as specified under Division 03.

### 3.3 FIELD QUALITY CONTROL

- A. Inspect and check completed formwork, shoring and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties and parts are secure.

- B. Form Surface Repairs:
  - 1. Repair surfaces of forms to be reused in the work.
  - 2. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable.
  - 3. Apply new form release agent to new concrete contact form surfaces.
  - 4. Do not use patched forms for exposed concrete surfaces.
  
- C. Special Inspections:
  - 1. Inform special inspector when formwork is complete and has been cleaned, to allow for inspection.
  - 2. Allow inspection of each section of plywood type of formwork prior to reuse.
  - 3. Obtain inspections prior to placing concrete.

END OF SECTION 03 11 00

## SECTION 03 15 00 – CONCRETE ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of concrete accessories.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. ASTM Standard Specifications:
    - a. D1751 - Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
    - b. E96 - Water Vapor Transmission of Materials.
    - c. E1643 – Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
    - d. E1745 - Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
  - 2. AASHTO 153-98.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Waterproof Bead:
  - 1. Waterstop RX by CETCO; or equal.
  - 2. 3/4-inch x 3/8-inch.
  - 3. Provide at all joints marked WSJ on Drawings and at all other joints below high water level in tanks and walls.
- B. Other Materials: All other materials not specifically described but required for a complete and proper installation of concrete accessories shall be as selected by Contractor subject to the approval of Engineer.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install Concrete Accessories:
  - 1. As indicated on the Drawings.
  - 2. As specified in various other Sections.
  - 3. As necessary for the proper and complete performance of the Work.
- B. Waterproof Bead:
  - 1. Install in joints at last convenient time of accessibility.
  - 2. Apply in strict accordance with Manufacturer's instructions.
- C. Piping, Mechanical and Electrical Equipment Support: Refer to Division 03 Section "Concrete Forming."

END OF SECTION 03 15 00

## SECTION 03 15 16 – POST-INSTALLED ANCHORS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of post-installed anchors.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following pertinent provisions:
  - 1. ASTM:
    - a. A36 - Carbon Structural Steel.
    - b. A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.
    - c. A198 - Steel Bolting Materials for High-Temperature Service.
    - d. A240 - Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
    - e. A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
    - f. A510 - General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel.
    - g. A563 - Carbon and Alloy Steel Nuts.
    - h. B633 - Electrodeposited Coatings of Zinc on Iron and Steel.
    - i. E488 - Strength of Anchors in Concrete and Masonry Elements.
    - j. E1512 - Testing Bond Performance of Bonded Anchors.
    - k. F436 - Hardened Steel Washers.
    - l. F593 - Stainless Steel Bolts, Hex Cap Screws, and Studs.
    - m. F594 - Stainless Steel Nuts.
    - n. F844 - Washers, Steel, Plain (Flat), Unhardened for General Use.
  - 2. ACI:
    - a. 318, Appendix D - Anchoring to Concrete.
    - b. 355.2 - Qualification of Post-Installed Mechanical Anchors in Concrete.
    - c. 355.4 - Qualification of Post-Installed Adhesive Anchors in Concrete.
  - 3. International Code Congress Evaluation Service - ICC-ES:
    - a. AC-193 - Mechanical Anchors in Concrete Elements.
    - b. AC-308 - Acceptance Criteria for Post-installed Adhesive Anchors in Concrete Elements.
  - 4. Michigan Building Code.

#### 1.4 SUBMITTALS

- A. Product Data: For each anchor type to be furnished for each base material to which it will be fastened, including:
  - 1. Anchor specific type, physical properties and installation procedures.
    - a. General catalog sheets of anchors without specific reference are not acceptable.
  - 2. Strength developed by anchor in each base material to which each is being fastened.
  - 3. Anchor embedment depth in base material.
  - 4. Anchor material.
  - 5. ICC-ESR Report for each specific anchor indicating compliance to applicable building code.

#### 1.5 QUALITY ASSURANCE

- A. Provide special inspections of post-installed anchors in accordance with Division 01 Section "Special Inspections and Tests."

- B. Compliance:
  - 1. Mechanical anchors shall comply with AC-193 and ACI 355.2.
  - 2. Adhesive anchors shall comply with AC-308 and ACI 355.4.
  
- C. Installation Personnel Qualifications:
  - 1. Knowledgeable of the specific Manufacturer's requirements for proper installation of post-installed anchors.
  - 2. Anchor installers shall be properly trained by the anchor Manufacturer on Site.
    - a. Anchor Manufacturer's representative shall not be a distributor or third party.
    - b. The installers to be trained shall be the actual person or persons installing the anchors, not the foreman, superintendent or similar supervisory personnel.
    - c. The on Site training shall include training for installation of each anchor in each substrate on the Project for each trade.
    - d. Each person installing the anchor shall be trained.
    - e. Anchor installation training shall take place prior to the installation of the anchors. The installer shall have training verification available for review at any time.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis of Design: Hilti.
  
- B. Products of the following manufacturers are among those which may be considered equal based on Submittals reviewed by Engineer; approval or rejection of the proposed or equal will be at Engineer's sole discretion:
  - 1. Powers/Rawl.
  - 2. Redhead.
  - 3. Simpson.
  
- C. If Contractor intends to substitute other than Basis of Design products, Contractor shall be responsible to submit substitution product data that proves equivalence including, but not limited to:
  - 1. Capacities for specific anchor sizes, embedment lengths, and base materials into which the anchor will be fastened.
  - 2. Capacity reduction factors for spacing and edge distance.
  - 3. Material of each anchor type.
  - 4. ICC ESR report applicable to each anchor type.

### 2.2 MATERIALS

- A. General:
  - 1. Submerged or Subject to Becoming Wet: Stainless steel in accordance with ASTM F593.

### 2.3 POST-INSTALLED ANCHORS

- A. Anchors that Resist Loads Through an Injectable Chemical Adhesive:
  - 1. In Concrete: Hilti HIT HY 200 Safe Set.
  - 2. In Solid Grouted Masonry: Hilti HIT-HY 70.
  - 3. In Hollow Brick or Hollow Masonry: Hilti HIT-HY 70 with screen tubes.
  - 4. Anchored Material: Carbon steel or stainless steel threaded rods or deformed reinforcing bars as indicated on the Drawings.
  - 5. Bonding Strength: Tested in accordance with ASTM E1512.
  - 6. If installation temperatures of base materials fall below 41 degrees F, review cold weather applications with Manufacturer.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install post-installed anchors:
  - 1. In strict accordance with the installation instructions supplied by the Manufacturer.
  - 2. In rotary hammer drilled holes, unless otherwise approved by Engineer.
  - 3. In drilled out holes of the proper depth and diameter cleaned of dust and debris according to the Manufacturer's specific installation instructions.
  
- B. Provide sizes, spacings, edge distances and embedment as indicated on the Drawings.
  
- C. Anchors that Resist Loads Through an Injectable Chemical Adhesive:
  - 1. Install in concrete with minimum age of 21 days, and in masonry with a minimum age of 7 days.
  - 2. Do not apply load until adhesive has properly cured and developed specified strength where cure time shall be as called out in the Manufacturer's literature based on prevailing environmental conditions at the time of installation.

END OF SECTION 03 15 16

## SECTION 03 21 00 – REINFORCING STEEL

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and placement of concrete reinforcement.

#### 1.3 REFERENCES:

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. ACI:
    - a. 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
    - b. 315 - Details and Detailing of Concrete Reinforcement.
    - c. 315R - Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.
    - d. 318 - Building Code Requirements for Reinforced Concrete.
  - 2. ASTM Specifications:
    - a. A185 - Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.
    - b. A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
  - 3. CRSI:
    - a. Manual of Standard Practice.
    - b. Reinforcing Bar Detailing.
    - c. Placing Reinforcing Bars.

#### 1.4 SUBMITTALS

- A. Prepare Shop Drawings in accordance with ACI 315 and 315R and the CRSI Manual of Standard Practice and Reinforcing Bar Detailing. Include the following:
  - 1. Number, size, length, mark, and location of concrete reinforcement.
  - 2. Bending diagrams.
- B. Certified Mill Test Reports:
  - 1. Submit upon request by Engineer.
  - 2. Showing physical and chemical analysis for each heat of reinforcement used on Project.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver reinforcement free of loose rust, scale, paint, oil and structural defects, and store on the site so as to maintain that condition.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. General:
  - 1. All concrete reinforcement and accessories shall be new, free from rust, scale, paint, oil and structural defects.
  - 2. Reinforcement shall be the sizes indicated on the Drawings.
- B. Reinforcing Bars:
  - 1. ASTM A615.
  - 2. Yield Stress:  $F_y = 60,000$  psi.
  - 3. Deformed unless otherwise noted; smooth where specifically indicated on the Drawings.

- C. Welded Wire Fabric:
  - 1. ASTM A185.
  - 2. Yield Stress:  $F_y = 65,000$  psi.
  - 3. Plain, cold drawn, electrically welded fabric.
- D. Accessories:
  - 1. Chairs, bolsters, anchors, spacers, stirrups, ties and other devices as required for spacing and fastening reinforcement in place shall conform to CRSI Manual of Standard Practice.
  - 2. At exposed underside of concrete, use plastic-tipped chairs and bolsters.

## 2.2 FABRICATION

- A. General:
  - 1. Fabricate reinforcement to the dimensions indicated on the Drawings and the reviewed Shop Drawings in accordance with the CRSI Manual of Standard Practice.
  - 2. Tolerances: As indicated in ACI 117.
  - 3. Bundle and tag reinforcement with suitable identification to permit checking, sorting and placing.
  - 4. Welding:
    - a. Not permitted.
    - b. No tack welding permitted.
- B. Hooks:
  - 1. Bend hooks in accordance with ACI 318.
  - 2. Extension on 90 degree hook shall satisfy the requirements of a standard hook unless indicated longer on the Drawings.
  - 3. Cold bend bars in such a way that will not damage the reinforcement.
- C. Reinforcement with any of the following defects will not be permitted in the Work:
  - 1. Bar lengths, depths and bends exceeding specified fabrication tolerances.
  - 2. Bends or kinks not indicated on Drawings or reviewed Shop Drawings.
  - 3. Bars with reduced cross-section due to excessive rusting or other cause.

## PART 3 - EXECUTION

### 3.1 PLACEMENT

- A. Place concrete reinforcement in accordance with:
  - 1. Shop Drawings reviewed by Engineer.
  - 2. CRSI Placing Reinforcing Bars and Manual of Standard Practice.
  - 3. Tolerances indicated in ACI 117.
- B. Clearance:
  - 1. Preserve clear space between bars of not less than 1 times the normal diameter of round bars.
  - 2. In no case let the clear distance be less than 1-inch or less than 1-1/3 times the maximum size of aggregate.
  - 3. In the absence of specific cover requirements on the Drawings, provide the following minimum concrete cover for reinforcement:
    - a. No. 6 Through No. 18 Bars: 2 inches.
    - b. No. 5 Bars, 5/8-Inch Wire and Smaller: 1-1/2 inches.
- C. Splices:
  - 1. Comply with ACI 318 and this Section.
  - 2. In the absence of specific lap requirements on the Drawings, lap in accordance with ACI 318, Class B.
  - 3. Laps of Circular Ring Tension Steel: Not less than 40 bar diameters.
- D. Corner Bars:
  - 1. Provide corner bars for all horizontal wall steel.
  - 2. In the absence of specific lap requirements on the Drawings, lap in accordance with ACI 318, Class B.

- E. Field Cutting and Bending: Field cutting or bending of bars will be permitted only under special conditions approved by Engineer.
- F. Field Welding:
  - 1. Not permitted.
  - 2. No tack welding permitted.
- G. Welded Wire Fabric:
  - 1. Block up, lap and tie all welded wire fabric reinforcement.
  - 2. Lap welded steel fabric 6 inches at sides and ends.
  - 3. Install welded wire fabric 2-inches from top of slabs.

### 3.2 FIELD QUALITY CONTROL

- A. Notification:
  - 1. Notify special inspector when reinforcing is in place so special inspector may review the reinforcement placement.
  - 2. Provide a minimum of 24 hours' notice prior to placement of concrete.

END OF SECTION 03 21 00

## SECTION 03 60 00 – GROUTING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and placement of the following:
  - 1. Cementitious grouts for column base plates, bearing plates, drilled-in anchor bolts, drilled-in reinforcing dowels, railing posts, etc.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on Drawings, the work of this Section shall comply with the following:
  - 1. ASTM Standard Specifications and Test Methods:
    - a. C939 - Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
    - b. C1107 - Packaged Dry Hydraulic-Cement Grout (Nonshrink).
    - c. C1181 - Compressive Creep of Chemical-Resistant Polymer Machinery Grouts.
    - d. C1339 - Flowability and Bearing Area of Chemical-Resistant Polymer Machinery Grouts.
  - 2. Corps of Engineers Specifications: CRD C621 – Non Shrink Grout Packaged Dry, Hydraulic Cement Grout.

#### 1.4 SUBMITTALS

- A. Product Data: Submit Manufacturer's descriptive literature, including surface preparation and installation instructions.
- B. Shop Drawings: Submit shop including drawings setting locations, templates, and directions for installing anchor bolts and other anchorages.

#### 1.5 QUALITY ASSURANCE

- A. Use only experienced tradesmen for the work of this Section.
- B. Test for flow consistency of 25 to 30 seconds in accordance with ASTM C939 at 30 minutes extended working time at temperature extremes between 45 and 90 degrees F.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Non-Metallic, Non-Shrink Grout: Premixed, cementitious, non-metallic, non-corrosive, non-staining product complying with CRD C621 and ASTM C1107, with minimum compressive strength of 6,000 psi at 28 days:
  - 1. Subject to compliance with requirements, provide one of the following:
    - a. "Masterflow 555", BASF The Chemical Company.
    - b. "1107 Advantage Grout" or "Edoco Multi-Purpose Grout", Dayton Superior.
    - c. "NS Grout", The Euclid Chemical Company.
    - d. "Crystex", L&M Construction Chemicals, Inc.

### PART 3 - EXECUTION

#### 3.1 MIXING

- A. Cementitious Grouts:
  - 1. Add only potable water and use mechanical mixer for minimum of 3 minutes.
  - 2. Maintain proper curing temperature between 45 degrees F and 90 degrees F.
  - 3. Comply with manufacturer's instructions.

#### 3.2 INSTALLATION

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials including, but not limited to rust, grease, debris, dust and oil and roughen to improve bond. Use suitable mechanical preparation that will give a surface profile that complies with Manufacturer's recommendations.
- B. Rinse thoroughly with liberal quantities of water, leaving concrete saturated but free of standing water.
- C. Clean bottom surface of base plates and bearing plates of rust, grease, debris, dust and oil. Set loose and attached base plates on steel wedges or other steel adjusting devices.
- D. Tighten anchor bolts after supported members have been positioned and plumbed.
- E. Do not remove wedges or shims, but cut off flush with edges of base plates if protruding.
- F. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain.
- G. Finish exposed grout surfaces, protect from weather, and cure.
- H. Comply with Manufacturer's instructions.

END OF SECTION 03 60 00

## SECTION 07 92 00 - JOINT SEALANTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes:
  - 1. Nonsag gunnable joint sealants.
  - 2. Joint backings and accessories.

#### 1.3 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.
- B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2018.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- E. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2014.
- F. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2018.
- G. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2013.

#### 1.4 SUBMITTALS

- A. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
  - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
  - 2. List of backing materials approved for use with the specific product.
  - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
  - 4. Substrates the product should not be used on.
  - 5. Substrates for which use of primer is required.
  - 6. Substrates for which laboratory adhesion and/or compatibility testing is required.
  - 7. Certification by manufacturer indicating that product complies with specification requirements.
  - 8. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.
- B. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- C. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

## 1.6 WARRANTY

- A. Correct defective work within a 5 year period after Date of Substantial Completion.
- B. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
  - 1. Dow Chemical Company; [consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
  - 2. Master Builders Solutions by BASF; [www.master-builders-solutions.basf.us/en-us/#sle](http://www.master-builders-solutions.basf.us/en-us/#sle).
  - 3. Pecora Corporation; [www.pecora.com/#sle](http://www.pecora.com/#sle).
  - 4. Sika Corporation; [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
  - 5. Tremco Commercial Sealants & Waterproofing; [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).

### 2.2 JOINT SEALANT APPLICATIONS

- A. Scope:
  - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
    - a. Joints between filter tank and the existing masonry wall construction.

### 2.3 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.
- B. Colors: As selected by Architect from the manufacturer's full color range.

### 2.4 NONSAG JOINT SEALANTS

- A. Non-sag Polyurethane Sealant for Continuous Water Immersion: Polyurethane; ASTM C920, Grade NS, Uses M and A; single or multicomponent; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
  - 1. Movement Capability: Plus and minus 25 percent, minimum.
  - 2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Selected by Engineer and Owner.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
  - 5. Products:
    - a. Sika Corporation; Sikaflex-1a for joints a maximum of 1-inch deep.
    - b. Sika Corporation; Sikaflex-2c for joints greater than 1-inch deep.
  - 6. Color: To be selected by Architect from manufacturer's standard range.

### 2.5 ACCESSORIES

- A. Backer Rod: ITP standard closed cell polyethylene foam.
  - 1. 25% to 33% larger in diameter than joint width.
  - 2. Products: Industrial Thermo Polymers, Ltd.
- B. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

#### 3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

#### 3.3 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Install bond breaker backing tape where backer rod cannot be used.
- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- E. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- F. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

#### 3.4 FIELD QUALITY CONTROL

- A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION 07 92 00

## SECTION 09 91 00 – PAINTING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and application of coating products, such as paints, stains and sealers, and labeling products.
1. Surfaces to be painted or finished include, but are not necessarily limited to, the following interior and exterior surfaces for items furnished or installed under this Work, except as otherwise indicated on the Drawings or herein specified:
    - a. Machinery and equipment.
    - b. Ferrous metals, hangers, structural steel and joist framing.
    - c. Galvanized steel.
    - d. Exposed pipe and fittings including wall and floor sleeves (if pipe is insulated, insulation shall be painted).
    - e. Exposed pipe, fittings, and pipe supports including surfaces between pipes and supports.
    - f. Existing pressure filter steel tanks, interior and exterior.
    - g. Existing process piping, as indicated on the Drawings.
    - h. All other surfaces not specifically excluded in the following paragraph. A completely finished project is required, regardless of whether every individual item is specified herein or indicated on the Drawings to be painted.
  2. Surfaces not to be painted or finished include the following unless otherwise indicated on the Drawings:
    - a. Interior, below grade walls and ceilings.
    - b. Manufacturer's name and identification plates.
    - c. Fiberglass grating.
    - d. Aluminum (unless specifically indicated to be painted).
    - e. Stainless steel (unless specifically indicated to be painted).
    - f. Items indicated on the Drawings as not to be painted.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on Drawings, the work of this Section shall comply with the pertinent provisions of the following:
1. ASME/ANSI: A13.1 - Scheme for the Identification of Piping Systems.
  2. ASTM:
    - a. A780 - Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
    - b. D16 - Terminology for Paint, Related Coatings, Materials, and Applications.
    - c. D520 - Zinc Dust Pigment.
    - d. D523 - Test Method for Specular Gloss.
    - e. D7234 - Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
  3. Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers:
    - a. Ten States Standards 2.14 - Recommended Standards for Water Works.
  4. Michigan Administrative Code: R 325.51992 Part 603 - Lead Exposure in Construction.
  5. National Association of Pipe Fabricators (NAPF):
    - a. NAPF 500-03-01 - Solvent Cleaning for Ductile Iron.
    - b. NAPF 500-03-02 - Hand Tool Cleaning for Ductile Iron.
    - c. NAPF 500-03-03 - Power Tool Cleaning for Ductile Iron.
    - d. NAPF 500-03-04 - Abrasive Blast Cleaning for Ductile Iron Pipe.
    - e. NAPF 500-03-05 - Abrasive Blast Cleaning for Cast Ductile Iron Fittings.
  6. National Sanitation Foundation (NSF): - Standard No. 61 - Drinking Water System Components - Health Effects.

7. Steel Structures Painting Council (SSPC):
  - a. AB-1 - Mineral and Slag Abrasives.
  - b. PA-1 - Shop, Field, and Maintenance Painting of Steel.
  - c. PA-3 - A Guide to Safety in Paint Application.
  - d. SP-1 - Solvent Cleaning.
  - e. SP-2 - Hand Tool Cleaning (SSI-St2).
  - f. SP-3 - Power Tool Cleaning (SSI-St3).
  - g. SP-5 - White Metal Blasting (SSI-Sa3) (NACE #1).
  - h. SP-6 - Commercial Blast Cleaning (SSI-Sa2) (NACE #3).
  - i. SP-7 - Brush-off Blast (SSI-Sa1) (NACE #4).
  - j. SP-8 - Pickling.
  - k. SP-10 - Near-White Blast Cleaning (SSI-Sa2-1/2) (NACE #2).
  - l. SP-11 - Power Tool Cleaning to Bare Metal.
  - m. VIS-1 - Visual Standard for Abrasive Blast Cleaned Steel.
8. United States Department of Labor, Occupational Safety and Health Administration (OSHA): 29 CFR 1926.62.

#### 1.4 DEFINITIONS

##### A. Terms:

1. Coating: Paint, stain, sealer or other product specified.
2. Environment:
  - a. Severe: Highly corrosive industrial atmospheres with sustained exposure to high humidity and condensation, frequent cleaning using strong chemicals, heavy concentrations of strong chemical fumes, and frequent splashing and spilling of harsh chemical products.
  - b. Moderate: Corrosive industrial atmospheres with intermittent exposure to high humidity and condensation, occasional mold and mildew development, regular cleaning with strong chemicals, and occasional splashing and spilling of chemical products.
  - c. Mild: Industrial atmospheres with normal exposure to moderate humidity and condensation, occasional mold and mildew development, infrequent cleaning with strong chemicals, low levels of mild chemical fumes, occasional splashing and spilling of chemical products, and normal outdoor weathering.
3. Exposure:
  - a. Environmental conditions to which different surfaces may be exposed as follows:
    - 1) Concealed: Surfaces within the confines of a building or other enclosure not constantly exposed to weather, trapped moisture, high heat or other deteriorating conditions, and normally concealed from view.
    - 2) Immersed:
      - a) Surfaces below a liquid surface or exposed to spray.
      - b) Surfaces exposed to spray include areas to 8 inches above maximum liquid surface in quiescent structures and to 18 inches above maximum liquid surface in mixed or agitated structures.
      - c) Immersed surfaces also include the interior surfaces of the floors, walls, and tops of fully or partially enclosed liquid containing structures, regardless of the liquid level.
    - 3) Interior: Surfaces within the confines of a building or other enclosure not immersed or constantly exposed to weather, trapped moisture, high heat or other deteriorating conditions, and exposed to view.
    - 4) Exterior:
      - a) Above Grade: Surfaces above finished grade and not included in 1), 2), or 3) above.
      - b) Below Grade: Surfaces below finished grade and not included in 1), 2), or 3) above.
4. Gloss Range (as determined by ASTM D523):
  - a. High Gloss: A high sheen finish of more than 70 when measured at a 60 degree meter.
  - b. Semi Gloss: A medium sheen finish of 35 - 70 when measured at a 60 degree meter.
  - c. Satin: A low-to-medium sheen finish of 15 - 35 when measured at a 60 degree meter.
  - d. Eggshell: A low sheen finish of 20 - 35 when measured at a 60 degree meter.
  - e. Flat: A lusterless or matte finish of less than 5 when measured at an 60 degree meter.

## 1.5 SUBMITTALS

- A. Manufacturer's Literature: Specification data sheets and color charts for materials proposed for use on the Work. Provide Safety Data Sheets (SDS) as requested by Engineer.
- B. Schedules:
  - 1. Submit a finish schedule indicating rooms and other structures and systems to be coated, items or areas to be coated, the proposed coating system, including surface preparation, primer, intermediate/finish coats, application methods and color charts.
  - 2. Schedule shall be submitted as a complete package.
  - 3. No coatings may be applied until Engineer has made a complete review of the entire submittal.
- C. Manufacturer's Certificates: Submit signed affidavit from coatings Manufacturer that submitted coatings are of same or better quality than those specified, and Manufacturer's approval of applicator.
- D. Applicator's Experience: Submit written verification of experience required herein.
- E. Product and Maintenance Schedules:
  - 1. At or before the completion of the Work, submit complete lists, in a finish schedule, of the actual products used. Include item covered, coating Manufacturer's name, type of coating and color.
  - 2. Provide pipe coding schedules listing pipe name, coating Manufacturer's name, type of coating and color.
  - 3. Provide maintenance manuals detailing the proper procedures and materials to be used for maintenance and repainting of the various coatings.

## 1.6 QUALITY ASSURANCE

- A. General:
  - 1. Acceptability of materials and performance shall be determined by Engineer.
  - 2. Testing or certifications may be required to aid Engineer's determination.
    - a. Expense of testing and certifications when required and, unless noted otherwise in the Contract Documents, shall be borne by Contractor.
    - b. If destructive testing is required, Contractor shall repair damaged area. Expense of repair shall be borne by Contractor.
    - c. If initial testing results are unsatisfactory or yield failing results, additional testing will be required. Cost of additional testing shall be borne by Contractor.
  - 3. Coating Reviews:
    - a. Request, in writing, a review of each coat by Engineer of first finished surface of each type for color, texture and workmanship.
    - b. First accepted surface of each type and color shall be visibly labeled by Engineer with removable label as Project standard for that type and color of item.
    - c. Labels shall remain in place until painting is finished and accepted.
    - d. For spray application, paint a surface of 100 square feet as a Project standard.
  - 4. Work may be inspected as to proper surface preparation, pretreatment, priming, dry film thickness, curing, color, and workmanship.
  - 5. Applicable standards, test methods, and inspection equipment includes, but is not necessarily limited to the following:
    - a. SSPC-VIS-1 photographic blast cleaning standards (latest revision).
    - b. Inspector's wet film and dry film thickness gages.
    - c. Zorelco 369/PHD pin hole detector.
    - d. Mark II Tooke Gage.
- B. Coating Subcontractors:
  - 1. Applicators shall have experience with the coating systems specified.
  - 2. Experience shall be substantiated by previous project experience, certifications, seminar attendance, Manufacturer validation, or similar means.

- C. Pre-Application Meeting:
1. Convene a pre-application meeting before the start of work and prior to ordering materials.
  2. Require attendance of parties directly affecting work of this Section, including Engineer, applicator and coating Manufacturer's technical representative.
  3. Review the following as a minimum:
    - a. Access and safety requirements.
    - b. Heating, ventilation and humidity control measures to be utilized.
    - c. How application information will be monitored and recorded, including responsible personnel, monitoring equipment, forms, and timely reporting of information recorded.
    - d. Protection of surfaces not scheduled to be coated.
    - e. Schedule of work.
    - f. Surface preparation.
    - g. Coating application.
    - h. Daily log to be used.
    - i. Repairs anticipated.
    - j. Applicator's field quality control.
    - k. Cleaning procedures.
    - l. Testing procedures.
    - m. Protection of coating systems.
    - n. Coordination with Owner's activities.
- D. Manufacturer's Services:
1. Arrange for Manufacturer's technical representative to provide the services indicated below.
  2. Site Visits by the Manufacturer's Technical Representative:
    - a. The pre-application meeting.
    - b. A visit to observe surface preparation and review application techniques of components of the system.
    - c. A visit to review the completed installation.
  3. Generally provide assurance and guidance for the entire coating system installation.
  4. Written documentation required from the coating system Manufacturer:
    - a. A letter of acknowledgement that the coating system materials are specified to be used in a location and for a purpose that meets with the approval of the coating system Manufacturer and the intent of the Contract Documents. The signed letter shall certify that the Manufacturer's technical representative:
      - 1) Is familiar with the Project, has attended meetings and is aware of the Project conditions and aware of associated products (i.e. filler resurfacers, primers, coatings and other products proposed for the Project).
      - 2) Agrees with the intended application of their products as specified.
      - 3) Agrees with the surface preparation specified, as completed.
      - 4) Agrees with the specifications. If necessary, submit revisions to specifications.
      - 5) Agrees that their products are compatible with associated products (i.e. concrete repair materials, existing coating systems, and other products proposed for the Project).
      - 6) Agrees with the type and quantity of testing to be performed, to ensure their product is adequately installed.
      - 7) Approval of DFT tests.
- E. Installation Subcontractor's Supervising Site Representative:
1. On Site during work being performed.
  2. Knowledgeable of all aspects of the work.
  3. Review each day's agenda with crew, and with Contractor's and Engineer's Site representatives.
  4. If a portion of the work becomes unclear as to the most appropriate direction, work shall stop until a consensus is reached by all parties, including the Engineer's representative and the Manufacturer's technical representative, as required.
- F. Applicator's Project Record:
1. Applicator shall maintain a record for each day work is performed, and shall include a record of application process information. At a minimum, applicator's record shall include:
    - a. Material Manufacturer's batch numbers.
    - b. Surfaces to which material is applied.
    - c. Time of application.
    - d. Ambient temperature.

- e. Substrate temperature.
  - f. Substrate moisture.
  - g. Relative humidity.
  - h. Dew point temperature.
  - i. Use of heating, dehumidification and ventilation equipment.
  - j. Unusual or important conditions, features, or events that occur before, during or after work is performed that day. Such information shall be referred to on previous or subsequent daily reports, when appropriate.
2. Submit for Project record.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original sealed containers of the Manufacturer with labels legible and intact. Include the following on labels on each container:
  1. Manufacturer's name.
  2. Type of coating.
  3. Manufacturer's stock number.
  4. Manufacturer's batch identification.
  5. Color name and number.
  6. Instructions for mixing and reducing, where applicable.
  7. Percent total solids by volume.
  8. Identification of toxic substances and special instructions.
  9. VOC content.
- B. Storage:
  1. Store materials in tightly covered containers at a minimum ambient temperature of 45 degrees F.
  2. Store materials in a well ventilated area and in such a manner as to comply with safety requirements including applicable federal, state, and local rules and requirements.
  3. Storage shall also be in accordance with instructions of the paint Manufacturer and requirements of insurance underwriters.
  4. Maintain storage containers in a clean condition, free from foreign materials and residue:
    - a. Protect from freezing.
    - b. Keep storage area neat and orderly.
    - c. Remove oily rags and waste daily and dispose of legally.
- C. Handle volatile products carefully and use caution so as not to puncture containers. Keep open flame away from areas while handling containers and be aware of material flash points.

#### 1.8 PROJECT CONDITIONS

- A. Environmental Requirements:
  1. Waterborne Paints:
    - a. Apply only when temperature of surface to be painted and surrounding air are between 50 and 90 degrees F.
    - b. Maintain temperature range throughout the minimum cure time recommended by the Manufacturer.
  2. Solvent-Thinned Paints:
    - a. Apply only when temperature of surface to be painted and surrounding air are between 45 and 95 degrees F.
    - b. Maintain temperature range throughout the minimum cure time recommended by the Manufacturer.
  3. Inclement Weather:
    - a. Do not apply paint:
      - 1) In snow, rain, fog, or mist.
      - 2) When relative humidity exceeds 85%.
      - 3) When steel temperature is less than 5 degrees F above the dew point.
      - 4) To damp or wet surfaces.
    - b. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the Manufacturer during application and drying periods. Refer to Article 1.7 for further restrictions.

- B. Existing Painted Surfaces:
  - 1. When painting is specified over existing painted surfaces and existing coating types are not known, analyze samples of existing coatings using a laboratory approved by Engineer to determine generic type of coating present and the presence of lead.
  - 2. Submit written report from the lab to Engineer before coating is applied.
  - 3. Required modifications to painting schedule caused by existing paint shall not be justification for extra payment.
  - 4. Existing Coat Bonding Failure:
    - a. Remove existing coating by abrasive blasting or other means, obtaining surface cleanliness and profile required for coating specified without damaging the substrate to the point of affecting its appearance.
    - b. Paint as new surface.
    - c. Unforeseen failure conditions may be justification for extra payment.
- C. Epoxy Coatings:
  - 1. Do not expose epoxies during application and cure to sunlight and heaters that emit carbon dioxide and carbon monoxide.
  - 2. Use caution when applying and curing epoxy coatings to ensure that surrounding areas are not occupied and that adequate ventilation and fresh air are present.
- D. Contractor shall demonstrate acceptability of environmental conditions as required by Engineer.

#### 1.9 EXTRA MATERIALS

- A. Leave with Owner at least 1 gallon of each type and color of paint used for finish coats and 1 gallon of each type of thinner required.
- B. Containers shall be tightly sealed and clearly labeled.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
  - 1. Coatings: Tnemec Company, Inc.; no exceptions.

#### 2.2 MATERIALS

- A. Material Types:
  - 1. NSF Certification:
    - a. Generally, coating systems in contact with treated potable water require NSF certification.
    - b. NSF certified coating systems have been included in the painting schedule, where the intended use requires NSF certification.
    - c. Proposed substitutions shall also carry NSF certification for specific applications.
    - d. Verify that coating systems utilized carry NSF certification, where such certification is required.
  - 2. Paint, primer and related materials are included in the painting schedule in this Section.
  - 3. Paint used for repair of galvanizing shall have minimum 95% zinc dust in accordance with ASTM D520.
- B. Colors: Colors of finish coats shall be as selected by Engineer. For pressure filters exterior coating, match existing color.
- C. Blast Abrasives:
  - 1. Level of ionic contaminants shall be in accordance with SSPC-AB 1.
  - 2. Products and Manufacturers:
    - a. Magnum Blast by Dust Net, Wedron, Illinois.
    - b. Black Magnum by Dust Net, Wedron, Illinois.
    - c. Black Beauty by Reed Minerals, Highland, Indiana.

- D. VOC Compliance:
  - 1. Individual coatings and coating systems shall have VOC levels at or below the EPA recommendations identified in 40 CFR Part 59.
  - 2. VOC content shall be tested in accordance with EPA Method 24.

### 2.3 MIXES

- A. Mixing:
  - 1. Deliver paints to the Site ready-mixed, when possible.
  - 2. Mix two-component paints at the Site and observe pot life as recommended by Manufacturer.
  - 3. Proceed with mixing until paint becomes smooth, homogeneous, and free of surface swirls or pigment lumps.
  - 4. When mixing multi-component paints, remix each component individually, then blend the components, as recommended by the Manufacturer, until the mixture is completely uniform in color.
- B. Thinning:
  - 1. No thinning will be permitted unless absolutely necessary.
  - 2. Paint shall be spray-applied in as-received condition to demonstrate necessity for thinning.
  - 3. Use only thinners as recommended by paint Manufacturer for specific use.
  - 4. Amount of thinner used shall be reported to Engineer.
  - 5. Measure viscosity to ensure proper thinning ratios have been used.
- C. Tinting:
  - 1. Onsite tinting will be permitted only when accepted in writing by Engineer.
  - 2. Use only tinting colors recommended by the Manufacturer for the specific type of coating.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Inspection:
  - 1. Prior to the commencement of surface preparation or other coating activities, thoroughly inspect the surfaces to determine if the Work is ready to be prepared and painted.
  - 2. Report in writing to Engineer conditions that may potentially affect proper application.
  - 3. Do not commence surface preparation or other coating activities until such defects have been corrected.
- B. Correction of Defects:
  - 1. Correct defects and deficiencies in surfaces which may adversely affect work of this Section.
  - 2. Apply filler resurfacers, patching materials and the like that are required to provide the surface recommended by the coating Manufacturer.
  - 3. Start of painting will be construed as the applicator's acceptance of surfaces and conditions within a particular area.

### 3.2 TEMPORARY HEATING, VENTILATION AND HUMIDITY CONTROL REQUIREMENTS

- A. General:
  - 1. Ventilation is mandatory.
  - 2. Provide ventilation that exhausts fumes and odors to the exterior at a location where existing HVAC systems will not pick up these fumes and odors.
  - 3. Provide negative air pressure to those spaces receiving coatings without reducing air temperatures in those spaces which may impede the curing process of those coating systems.
  - 4. Ventilation is required during surface preparation, application of coating systems, and the curing period for those systems.
  - 5. Provide additional equipment and fuel as required to condition the space for surface preparation, application of products, and curing of those products, in accordance with Manufacturer's requirements. This equipment may include, but is not limited to, heaters, dehumidifiers and fans for intake and exhaust air.

- B. Enclosures:
1. Provide temporary enclosures as required to isolate dust, fumes and odors from areas in use, to control temperature and humidity, and to protect surface to be coated from the weather.
  2. The enclosure shall be of such quality as to maintain optimal conditions for the work of this Section.
  3. The enclosure shall remain until the work is sufficiently cured.

### 3.3 PREPARATION

- A. General:
1. Prepare surfaces in accordance with this Article, the paint Manufacturer's recommendations and as specified in the painting schedule of this Section.
  2. Cleanliness of Abrasive Blast-Cleaned Steel:
    - a. Determined by Engineer using Steel Structures Painting Council Manual SSPC-VIS-1.
    - b. Small steel panels which have been abrasive blast-cleaned and approved for a specific cleanliness may be used for comparative purposes to facilitate inspection and approval.
    - c. Securely wrap these panels in clear plastic, seal to protect them from deterioration and mark with appropriate SSPC-SP6 cleaning specification.
  3. Cleanliness of Compressed Air:
    - a. Do not use contaminated air for blast cleaning.
    - b. Periodically check compressed air used for blasting to verify that it is clean, dry and oil-free by directing its flow toward a sheet of clean white paper.
  4. Place oil and water separators in the air line as close as possible to blast-cleaning equipment. Make measurements of surface profile of abrasive blast-cleaned steel with a Keane-Tator Surface Profile Comparator or Testex Press-O-Film and Micrometer.
  5. Abrasive Media:
    - a. Select abrasive media to provide the type of profile required by the Manufacturer of the coating product.
    - b. Abrasive media shall contain less than 5% free silica sand.
  6. Protective Covers:
    - a. Protect motors, bearings, chain drives, and other moving parts by wrapping with plastic and sealing with tape.
    - b. Maintain protective covers in dust tight condition.
  7. Correct steel and fabrication defects revealed by surface preparation, such as weld imperfections, delamination, scabs, and slivers, by appropriate trade before proceeding further with surface preparation.
  8. Clean Up of Blast Cleaned Areas:
    - a. Remove dust and blast products from the abrasive blast-cleaned surfaces by high pressure air or vacuum cleaning.
    - b. Completely clean up residue from blasting operations within the entire space to be painted prior to applying coatings.
  9. Inspect surfaces after surface preparation is complete and prior to application of coatings.
  10. Remove hardware, accessories, plates, machined surfaces, lighting fixtures, and similar items in place that are not to be painted, or provide surface applied protection prior to surface preparation and painting, and then replace items after paint has dried.
  11. When acid etching is the approved means of preparing surfaces for coating systems, protect the surrounding areas. Neutralize dispensed solutions and dispose of properly.
- B. Ferrous Metals:
1. Non-Immersed Ferrous Metals:
    - a. Surface Preparation - Shop:
      - 1) Remove dirt, oil, grease and other foreign matter in accordance with SSPC-SP1.
      - 2) Abrasive blast clean surfaces to specification required for coating to be applied.
      - 3) Perform abrasive blast cleaning only when the relative humidity is no higher than 75% and the surface temperature of the steel is at least 5 degrees F above the dew point.
      - 4) Coat cleaned surfaces before visible rust forms on the surface. Do not leave cleaned surfaces uncoated for more than 24 hours.
      - 5) Apply coating as specified under this Section.
    - b. Surface Preparation - Field:
      - 1) Remove dirt, oil, grease and other foreign matter in accordance with SSPC-SP1.
      - 2) Prepare field welds by grinding to remove sharp edges, undercuts, recesses and pin holes.
      - 3) Completely remove weld slag and spatter.

- 4) Thoroughly clean damages, scratches and abraded areas of shop primers. Thoroughly clean field welds and areas within 4 inches of field welds before painting using surface preparation methods at least as effective as those specified for the structure itself.
  - 5) Feather out edges to make touch-up patches inconspicuous.
  - 6) Clean surfaces with solvent.
  - 7) Contractor may, at Contractor's option, clean and apply one overall coat of primer for each specified shop coat in place of touch-up or spot priming.
  - 8) Contractor shall meet applicable surface preparation and application specifications.
2. Immersed Ferrous Metals:
- a. Surface Preparation - Field:
    - 1) Remove dirt, oil, grease and other foreign matter in accordance with SSPC-SP1.
    - 2) Prepare field welds by grinding to remove sharp edges, undercuts, recesses, and pin holes.
    - 3) Completely remove weld slag and spatter.
    - 4) Abrasive blast clean surfaces to specification required for coating to be applied.
    - 5) Perform abrasive blast cleaning only when the relative humidity is no higher than 75% and the surface temperature of the steel is at least 5 degrees F above the dew point.
    - 6) Coat cleaned surfaces before any visible rust forms on the surface.
    - 7) Do not leave cleaned surfaces uncoated for more than 24 hours.
    - 8) Apply coating as specified under this Section.
- C. Ductile Iron Pipe and Fittings:
1. Do not follow preparation procedures typically used for other ferrous metals as these may result in damage to the ductile pipe surface and subsequent reduced coating effectiveness and life expectancy.
  2. Perform surface preparation in accordance with NAPF 500-03-01 through 05 and the painting schedule.
- D. Nonferrous Metals and Galvanized Steel:
1. Remove dirt, oil, grease, and other foreign matter in accordance with SSPC-SP1. For Solvent Cleaning, test surface with copper sulfate solution. If galvanizing turns black, then surface is clean and ready for paint application. Otherwise abrade surface or brush blast in accordance with SSPC-SP7.
  2. Remove white rust by hand or power brushing being careful not to damage or remove the galvanizing.
  3. Remove rust in accordance with SSPC-SP2 or SSPC-SP3.
  4. On surfaces potentially exposed to the touch, such as railings, grind runs and drips of galvanizing material smooth and repair using zinc-rich primer.
  5. On galvanized steel, touch-up exposed metal areas using zinc-rich primer.
  6. Repairs and touch up of galvanized coatings shall comply with ASTM A780. Zinc-rich primers shall be compatible with finish coats.
- E. Existing Pressure Vessels:
1. Open doors, hatches, and covers, and remove removable appurtenances and prepare surfaces separately in accordance with this Section.
  2. Interior: SSPC-SP10 – Near-White Metal Blast Cleaning.
  3. Exterior:
    - a. SSPC-SP WJ-4 using minimum 3,500 psi equipment fitted with zero.
    - b. Followed by SSPC-SP 2 Hand Tool Cleaning and SSPC-SP 3 Power Tool Cleaning.
- 3.4 APPLICATION
- A. General:
1. Take necessary safety precautions in accordance with this Article, SSPC-PA Guide 3, Manufacturer's recommendations, federal, state, and local rules and requirements, and insurance underwriter's guidelines.
  2. Apply coatings in accordance with this Article, SSPC-PA1, and the Manufacturer's recommendations.
  3. Moisture Content:
    - a. Do not apply initial coating until moisture content of surface is within limitations recommended by paint Manufacturer.
    - b. Determine moisture content by one of the following methods:
      - 1) As specified herein.
      - 2) By use of a moisture meter approved by Engineer.

4. Mil Thickness:
    - a. Apply coats in a uniform manner and of the minimum dry film thickness as indicated in the painting schedule.
    - b. Maximum mil thickness shall be as recommended by coating Manufacturer.
    - c. Where the mil thickness is not indicated in the painting schedule, it shall be as recommended by coating Manufacturer.
  5. Sand and dust between each coat to remove defects visible from a distance of 5 feet.
  6. Additional Coats:
    - a. Apply within recoat recommendation of the Manufacturer based on temperature and humidity variations.
    - b. Schedule inspections so as to not interfere with recoat time.
  7. Each coat shall be smooth, free of brush marks, streaks, laps or pile-up of paint, and skipped or missed areas.
  8. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping.
  9. Spray apply coatings on hollow metal units.
  10. Finish door tops, edges, and bottoms the same as exposed surfaces.
  11. Except for contact surfaces, surfaces of fabricated assemblies that are inaccessible after erection shall receive field coats of paint before erection.
  12. Ensure that concrete cracks and defects have been repaired prior to applying coating, then fill remaining depressions and crevices with paint if practical.
  13. Protect wet paint against damage from dust or other detrimental foreign matter as much as is practicable.
  14. Remove grills, covers, and access panels of mechanical and electrical systems and tanks from location and paint separately.
  15. Paint the interior surface of ducts flat black in the immediate area of supply and exhaust grilles.
  16. Omit application of masonry filler on acoustical masonry.
  17. Coat concrete and masonry walls prior to mounting equipment.
  18. Where equipment, piping, conduit or the like are removed from an existing painted surface, patch and paint the newly exposed surface as required so the newly exposed surface matches surrounding surfaces in coating and appearance.
  19. Where epoxy coatings are scheduled over existing paint:
    - a. Test existing paint and substrate for lifting or alligatoring.
    - b. If existing paint lifts or alligators, remove it down to bare substrate.
  20. Where a portion of a surface is to be coated, carry the coating to the nearest break point in the surface plane beyond the portion specified.
- B. Valves, Fittings, and Supports:
1. Paint valves and fittings the same base color as the pipe they adjoin.
  2. Paint floor stands the same base color as the pipe they adjoin.
  3. Do not paint handwheels, position indicators, or position scale marks on valve actuators. These are to be visible after painting. Contractor to provide external position marks if they are not visible after painting at no cost to the Owner.
  4. Wall Brackets and Pipe Hangers:
    - a. Paint the same base color as the wall or ceiling they adjoin.
    - b. Use gray color if wall or ceiling is not painted.
- 3.5 PIPE AND EQUIPMENT IDENTIFICATION
- A. General:
1. Identify non-buried piping installed as part of the Work in accordance with ASME/ANSI A13.1, this Section, as required in the pipe identification schedule, and as indicated on the Drawings.
  2. Painting or banding of concealed piping above suspended ceilings is not required, but labels as specified following are required.
  3. Identify pumps, tanks, and equipment.
- B. Labels and Arrows:
1. Label pipes at intervals not to exceed 20 feet and where pipe enters and leaves each wall, to identify the contents of the pipe as determined by Engineer.
  2. Place an arrow adjacent to every pipe label to indicate direction(s) of flow.
  3. Use preprinted labels and arrows manufactured by a company which normally manufactures pipe identification systems.

4. Supply pipe labels, arrows, and color bands by a single Manufacturer.
5. Labels and Arrow Heights:
  - a. Pipe or Covering Over 3-inch Diameter: 2-1/4 inches.
  - b. Pipe or Covering 1-inch to 3-inch Diameter: 1-1/8 inches.
  - c. Pipe or Covering Under 1-inch Diameter: 1/2-inch.
6. Materials shall be suitable for the use intended.
7. Label pumps, tanks, and equipment items, including description and tag number, with lettering size coordinated with Engineer depending on equipment size.

### 3.6 PHYSICAL HAZARDS IDENTIFICATION

- A. General:
1. Identify physical hazards of the facilities constructed and installed under this Work.
  2. Identify physical hazards in accordance with the requirements and standards of OSHA, and other governing state and local laws, ordinances, and codes.
  3. In the event of discrepancy between regulations and standards, the more strict requirements shall govern.

### 3.7 FIELD QUALITY CONTROL

- A. Inspection:
1. To facilitate painting and inspection, each coat of paint shall be of a different color or tint.
  2. Finished metal surfaces shall be free of skips, voids or pinholes in each coat when tested with a low voltage detector.
  3. Do not apply additional coats until previous coat has been inspected and acknowledged in writing by Engineer.
  4. Only coats of paint acknowledged in writing will be considered in determining number of coats applied.
- B. Final Touch-Up:
1. Surface damage shall be repaired with touch-up paint matching material used for original coating.
  2. Repaired areas shall be rubbed out and polished to match surrounding finish.
  3. Finish repair shall be of the quality typically found within the auto body industry.

### 3.8 CLEANING

- A. Remove spilled, splashed, or spattered paint from surfaces.
- B. Do not mar surface finish of item being cleaned.
- C. Prior to acceptance of the work of this Section, thoroughly clean painted surfaces and related areas in accordance with Division 01 Section "Cleaning and Waste Management."

### 3.9 PROTECTION

- A. General:
1. Adequately protect other surfaces from paint and damage.
  2. Repair damage as a result of inadequate or unsuitable protection.
- B. Protective Materials: Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.
- C. Fire Hazards: Place cotton waste, cloths, and materials which may constitute a fire hazard in closed metal containers and remove daily from Site.
- D. Electrical Plates and Hardware:
1. Remove electrical plates, surface hardware, fittings and fastenings prior to painting operations.
  2. These items are to be carefully stored, cleaned and replaced upon completion of work in each area.
  3. Do not use solvent to clean hardware that may remove permanent lacquer finish.

E. Equipment with Factory-Applied Final Finishes:

1. Certain equipment with factory-applied finishes may be accepted by Engineer at Engineer's discretion.
2. Protect finishes of equipment with approved factory-applied final finishes from scratches and abrasions by all practical means.
3. Repair surface damage with touch-up paint furnished by equipment Manufacturer by workmen skilled in this type of work.
4. Rub out and polish repaired areas to match surrounding finish.
5. Finish repair shall be of the quality typically found within the auto body industry.
6. If damage to item is severe in the judgment of Engineer, the equipment will be rejected or a new finish coat shall be applied after proper surface preparation at the discretion of Engineer, at no additional cost to Owner.

3.10 PAINTING SCHEDULE

A. The following schedule indicates systems by Tnemec Company, Inc. No expectations or alternative Manufacturers.

B. Minimum percent solids by volume is indicated in parentheses after each coating type:

1. Horizontal Pressure Filter Exterior – Non-Immersed: Gloss Zinc/Aliphatic Acrylic Polyurethane System:  
 (Note: Match color to existing paint color on vessel – Tnemec Twine 68BR)

System Manufacturer	Surface Preparation	First Coat	Second Coat	Third Coat
Tnemec	(Field): See paragraph 3.3.E.	(Field) and (Field Touch-up): 132 Protuff Mastic (81%) 2.0-3.0 Mils	(Field): Series 3600 ProBond (100%) 1.0-2.0 Mils	(Field): 1095 Endura-Shield II (66%) 2.0-3.0 Mils

2. Horizontal Pressure Filter Interior – Immersed: Modified Polyamine Epoxy System:  
 (Note: Contractor shall verify current NSF certification; provide product currently certified at no extra cost to Owner.)

System Manufacturer	Surface Preparation	First Coat	Second Coat
Tnemec	(Field): SSPC-SP10 near white metal blast cleaning	(Field) and (Field Touch-up, Prime): 94-H20 Hydro-Zinc (62%) 2.5-3.5 Mils	(Field): 22 Epoxoline (100%) 116.0-20.0 Mils

3. Interior Ferrous Metals – Non-Immersed: Gloss Zinc/Aliphatic Acrylic Polyurethane System:

System Manufacturer	Surface Preparation	First Coat	Second Coat	Third Coat
Tnemec	(Shop): SSPC-SP6 commercial blast cleaning	(Shop) and (Field Touch-up, Prime): 90-97 Tneme-Zinc (63%) 2.5-3.5 Mils	(Field): 69-Hi-Build Epoxoline (69%) 4.0-6.0 Mils	(Field): 1074 Endura-Shield II (69%) 3.0-5.0 Mils

4. Interior Non-Ferrous and Galvanized Metals – Non-Immersed: Gloss Zinc/Aliphatic Acrylic Polyurethane System:

System Manufacturer	Surface Preparation	First Coat	Second Coat
Tnemec	(Field): SSPC-SP1 solvent cleaning and SSPC-SP3 or SSPC-SP7 (abrade to create a 1.0 - 1.5 mil profile)	(Field) 69 Hi-Build Epoxoline II (69%) 4.0-6.0 Mils	(Field): 1074 Endura-Shield II (66%) 2.0-3.0 Mils

5. Existing Ductile Iron Pipe and Fittings – Non-Immersed: Modified Polyamidoamine Epoxy System:

System Manufacturer	Surface Preparation	Primer	First Coat	Second Coat	Third Coat
Tnemec	(Field): See Paragraph 3.3.C.	(Field): 135 Chembuild (84%) 4.0-6.0 Mils	(Field): 135 Chembuild (84%) 4.0-6.0 Mils	(Field) : Tnemec Series 971 Aerolon 40-50 Mils per coat 80-100 mils (Total)	(Field): 1094 Endura-Shield (66%) 2.0-3.0 Mils

3.11 PIPE IDENTIFICATION COLOR SCHEDULE

- A. Exposed pipes shall be identified with the following colors from the Tnemec Colorbook color card or equivalent colors of other Manufacturers indicated in Part of this Section. Confirm color selections with Owner and Engineer prior to applying coatings.
- B. In situations where 2 colors do not have sufficient contrast to easily differentiate between them, paint a 6-inch band of contrasting color at 30-inch intervals.
- C. The name of the liquid or gas should also be on the pipe and arrows indicating the direction of flow.

Water Plant Piping	Color Description	Tnemec Colorbook ID
Raw Water	Olive Green	Gale Force 97GN
Filtered Water	Light Blue	Fountainbleu 25BL
Potable/Finished	Dark Blue	Safety Blue 11SF
Backwash Waste	Light Brown	Twine 68BR
Drain Lines, Vent Lines	Gray	Slate Gray 31GR
Other Lines	Gray	Slate Gray 31GR

END OF SECTION 09 91 00

## SECTION 40 05 13 – PROCESS PIPING SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of process piping.
- B. Related Section includes Division 09 Section "Painting."

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. ANSI B 16.5 - Pipe Flanges and Flange Fittings.
  - 2. ASTM Standards:
    - a. A36 - Structural Steel.
    - b. A193 - Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
    - c. A194 - Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.
    - d. E23 - Notched Bar Impact Testing of Metallic Materials.
  - 3. AWWA Standards:
    - a. C 104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fitting for Water.
    - b. C 110 - Ductile-Iron and Gray-Iron Fittings, 3 In. through 48 In., for Water and Other Liquids.
    - c. C 115 - Flanged Ductile-Iron Pipe with Threaded Flanges.
    - d. C 151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
    - e. C 600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
    - f. C 606 - Grooved and Shouldered Joints.
    - g. C 651 - Disinfecting Water Mains.
    - h. Design Manual M-11 - Steel Pipe – A Guide for Design and Installation.
  - 4. NSF Standards: 61 - Drinking Water System Components.

#### 1.4 DESIGN AND PERFORMANCE REQUIREMENTS

- A. Pipe:
  - 1. Design, fabricate and install according to the references and standards specified herein.
  - 2. The Drawings indicate general pipe layout only. Details of joints, couplings, tie rods, supports and make-up pieces are not necessarily indicated. Submit proposed details for these components for Engineer's review.
  - 3. Provide makeup pipe spools, supports and suitable couplings so that piping may be easily separated for removing valves and inline flanged device.
- B. Supports and Hangers:
  - 1. The detailed design, layout and spacing of process pipe supports shall be the responsibility of the Contractor. However, required locations of some supports may be indicated on the Drawings.
  - 2. Design to prevent pipe sway and movement.
  - 3. Adequate to prevent sagging of plastic pipe.
  - 4. Utilize supporting members as indicated on the structural Drawings for the design, layout and spacing of the process piping supports systems.
  - 5. Design process piping support systems to allow process valves and meters to be removed from the piping system without adding temporary pipe supports to the pipe upstream or downstream of the valve or meter.

## 1.5 SUBMITTALS

- A. Itemized Listings:
  - 1. Equipment to be provided.
  - 2. Deviations from the requirements of this Section.
- B. Shop Drawings: For equipment assemblies in this Section to include:
  - 1. Details of construction and installation, including taps, weld-on outlets, water collars, specials, and similar features.
  - 2. Pipe diameter, wall thickness, length, centerline elevations, and locations and dimensions of valves fittings, taps, and in-line equipment and instruments, and similar features.
  - 3. Location and centerline elevation of wall sleeves and wall pipes.
  - 4. Type and location of pipe supports on 8-inch pipe and larger.
  - 5. Details for concrete pipe supports including dimensions, reinforcement, pipe straps and locations proposed for use.
  - 6. Type and location of pipe couplings.
  - 7. Schedule of wall sleeves and pipes indicating proposed sizes, lengths, and connection details.
  - 8. Plan indicating preliminary testing schedule showing pipe sections to be tested, bulkheads, drains, and chlorine injection locations.
  - 9. Schedule of coatings.
- C. Product/Catalogue Data: For all products in this Section to include:
  - 1. Manufacturer.
  - 2. Manufacturer's engineering and specification data.
  - 3. Dimensions, thicknesses, cross-sections, materials of construction.
  - 4. Coatings.
- D. Installation Instructions:
  - 1. Submit complete Manufacturer's installation instructions for all products.
  - 2. Submit pipe Manufacturer's recommended span lengths between hangers or supports for each pipe size and type.
- E. Certifications: Submit Manufacturer's certification that products and materials conform to these Specifications.

## 1.6 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
  - 1. Trained and experienced in the fabrication and installation of the materials and equipment.
  - 2. Knowledgeable of the design and the reviewed Shop Drawings.

## 1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original, unbroken, brand marked containers or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, and damage by weather or elements, and in accordance with Manufacturer's directions.
- C. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

## PART 2 - PRODUCTS

All products shall be provided per City of Kalamazoo Standard Specifications and "Buy America Requirements" unless otherwise specified in this Section.

## 2.1 PIPE AND FITTINGS

### A. General:

1. In-Plant Process Piping 3-Inch and Larger:
  - a. Ductile iron.
  - b. Unless otherwise specified below or indicated on the Drawings.
2. Provide taps at locations indicated on the Drawings.

### B. Ductile Iron Pipe Systems:

1. Use: Filter backwash piping, drain piping.
2. Ductile Iron Pipe: Conform to AWWA C 151, Class 53. Cement mortar lined with bituminous seal coating according to AWWA C 104.
3. Minimum Tests and Test Results of the Physical Characteristics of the Pipe:
  - a. Tensile Test:
    - 1) ASTM E8.
    - 2) Minimum Tensile Strength: 60,000 psi.
    - 3) Minimum Yield Strength: 42,000 psi.
    - 4) Minimum Elongation: 10%.
  - b. Notched Charpy Impact Test:
    - 1) ASTM E23 with 0.500-inch specimen.
    - 2) Minimum 7 ft-lbs at 70 degrees F  $\pm$  10.
  - c. Hydrostatic Pressure Test: Test pipe at 500 psi for at least a 10-second duration.
4. Pipe Joints: Pressure rated at least as great as the pipe or fittings of which it is a part.
5. Flanges:
  - a. Conform to AWWA C 115.
  - b. Flange bolts and Hardware: 316 stainless steel.
6. Flange Gaskets: Full face, rubber, NSF listed for potable water service.
7. Fittings: Conform to AWWA C 110 with cement mortar lining as specified above.
8. Grooved Pipe Joints and Couplings:
  - a. For Pump Connections and Flexible Joints: Victaulic Style 31.
  - b. Ductile iron body, galvanized or zinc-plated hardware.
  - c. Gasket NSF listed for potable water service.
  - d. Conform to AWWA C 606.
  - e. Rigid joint grooving.
9. Provide factory fabricated weld-on outlets meeting AWWA C111 and C115 where indicated on Drawings (working pressure 250 psi minimum). Coat and line piping after welding.
10. Paint outside of pipe, fittings, flanges and couplings in accordance with Division 09 Section "Painting."

### C. Copper Pipe Systems:

1. Use: Air valve discharge piping.
2. Material:
  - a. 1/2-inch and Larger:
    - 1) Seamless copper tubing.
    - 2) ASTM B88, Type L, hard drawn.
  - b. 3/8-inch O.D. and Smaller:
    - 1) Seamless copper tubing.
    - 2) ASTM B88, Type K, soft temper.
3. Factory coded and marked. Piping 2 feet and longer shall have a permanent marking in accordance with ASTM or ANSI specifications.
4. Soft temper tubing shall have long radius bends preventing kinks.
5. Solder: 95% tin and 5% silver.
6. Fittings:
  - a. Sweat type, wrought copper.
  - b. Elbows shall be long radius type.
  - c. Cast fittings will only be allowed by written approval from Engineer.
7. Provide threaded connections to valves and equipment.
8. Provide threaded unions between isolation valves and equipment for removal of equipment.

- D. Stainless Steel Tubing and Accessories:
1. Use: Instrument connections to differential pressure transmitter.
  2. 316L stainless steel.
  3. Finished tubes shall be reasonably straight and have smooth ends free of burrs. Tubing shall be suitable for bending.
  4. Minimum wall thickness: 0.035-inch.
  5. Rated 2,600 psig minimum at 100 degrees F.
  6. Size as required for flow for uses.
  7. Fittings: Swagelok tube fittings rated to working pressure of stainless steel tubing.
  8. Strainers: Swagelok TF Series; or equal.
    - a. Removable 60 micron filter.
    - b. 316 stainless steel filter and body.

## 2.2 SUPPORTS AND HANGERS

- A. General:
1. Design Layout and Spacing of the Pipe Supports: Responsibility of Contractor.
  2. Furnish factory fabricated hangers and supports complete with necessary inserts, clamps, bolts, nuts, washers, and accessories.
  3. On pipes 12-inch diameter and larger, generally use pipe stand type supports extending to the floor below. Coordinate proposed use of hangers from floors above the pipe with Engineer to ensure that the floors are capable of supporting pipe weight.
- B. Materials (Supports and Hardware):
1. General Process Service: Hot-dip galvanized or zinc-plated.
  2. Isolate dissimilar pipe and support materials with 1/8-inch thick EPDM rubber sheet stock.
- C. Manufacturers and Types:
1. Hangers and Supports: Grinnell, Unistrut, Crane; or equal.
  2. Ranges:
    - a. High Service Pump Discharges: 0 - 160 psig.
    - b. High Service Pump Suction: -30 inHg - 60 psig (compound).
  3. Manufacturer: Ashcroft, Model 1279; or equal.

## 2.3 GROOVED FLANGE ADAPTER

- A. Suitable for installation on ductile iron pipe, Class 53 or higher.
1. 250 psi maximum working pressure.
  2. Materials:
    - a. Housing: ASTM A536 ductile iron.
    - b. Bolts and nuts: 316 stainless steel.
    - c. Rubber gasket: NSF/ANSI-61 certified elastomer for potable water use.
    - d. Coating: NSF/ANSI-61 certified liquid epoxy protective coating in accordance with AWWA C 210.
  3. Manufacturers:
    - a. Victaulic Style 341 Vic-Flange.
    - b. Or Engineer approved equal.

## 2.4 PRESSURE GAGES

- A. General Service Process Water Gages: Provide two pressure gages for the filter loss of head indication.
1. Gage:
    - a. 2-inch diameter face.
    - b. All 316 stainless steel construction.
    - c. 2.0% of full scale accuracy.
    - d. Liquid-filled.
    - e. Lower process connection, 1/4-inch NPT.
  2. Ranges:
    - a. Filter Loss of Head: 0-160 psig.
  3. Manufacturer: Ashcroft, Model 1008S; or equal.

## 2.5 ORIFICE PLATE

- A. Suitable for installation on raised face flanges, ASME 16.5, Class 150.
- B. 150 psi maximum working pressure.
- C. Handle with orifice identification and information stamped on handle.
- D. Dimensions:
  - 1. Pipe Size: 8-inch.
  - 2. Bore Size: 3.50-inch. Concentric, no bevel.
  - 3. 0.25-inch plate thickness.
- E. Materials:
  - 1. Housing: 316 stainless steel.
  - 2. Seals: Nitrile Rubber.
- F. Manufacturers:
  - 1. Emerson Model 560.
  - 2. Or Engineer approved equal.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General:
  - 1. Install process piping and accessories in conformance with:
    - a. The Manufacturer's recommendations.
    - b. The Shop Drawings as reviewed by Engineer.
  - 2. Install items plumb, square, true to lines, grades, elevations, and locations as indicated on the Drawings and herein specified.
  - 3. Valves, regardless of size and contents, shall be readily accessible.
- B. Hangers and Supports:
  - 1. Install hangers and supports at less than maximum spacing as recommended by pipe Manufacturer.
  - 2. Adjust hangers and supports to bring pipe lines to proper elevations.
  - 3. Install inserts in concrete flush with the surface and capable of developing the full strength of the bolt.

### 3.2 PAINTING

- A. Paint pipe, fittings, supports, hangers, sleeves and accessories in accordance with Division 09 Section "Painting."

### 3.3 TESTING

- A. General:
  - 1. Hydrostatically test.
  - 2. Tests shall be witnessed by Engineer.
  - 3. Provide necessary equipment to perform tests including, but not necessarily limited to pumps, plugs, hoses and gages.
- B. Procedure:
  - 1. Pressure test procedure shall be in conformance with AWWA C 600, Section 4.
  - 2. Duration: 2 hours.
  - 3. Pressure: Maintain 150 pounds per square inch.
  - 4. No visible leaks.
- C. Repairs: In case of leakage under test, locate and repair leaks in an approved manner and test section again until a satisfactory test is secured.

3.4 DISINFECTION

- A. Disinfect new process piping in conformance with AWWA C 651.
- B. After disinfection, flush new process piping until the chlorine residual in the new section of piping is equal to that of the adjoining system, or less than 2 mg/l.
- C. Use adequate quantities of flushing water so that the chlorine residual of the combined flushing and disinfection water is similar to the water of the adjoining system and is suitable for disposal.

3.5 CLEANING

- A. Thoroughly clean installed materials and Products and related areas:
  - 1. Prior to acceptance of the work of this Section.
  - 2. In accordance with Division 01 Section "Cleaning and Waste Management."

3.6 PROCESS PIPING SCHEDULE

Description	Size	Material	Lining	Joint Style	Notes
Backwash Discharge Line, Drain	3", 8"	Ductile Iron	Cement Mortar with bituminous seal coating	Flanged	Class 53
Air Release Piping	1"	Copper	-	Threaded, Solder	-
Instrument Piping	1/4"	Stainless Steel		Swagelok	

END OF SECTION 40 05 13

## SECTION 40 05 23 – PROCESS VALVES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of non-buried valves and valve operators in the process piping system as indicated on the process Drawings.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the valves and operators of this Section shall comply with the following as applicable:
  - 1. ASTM Specification:
    - a. A48 - Gray Iron Castings.
    - b. A126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
    - c. A148 - Aluminum Bronze Castings.
    - d. A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware
    - e. A240 - Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
    - f. A351 - Steel Castings, Austenitic, for High Temperature.
    - g. A436 - Austenitic Gray Iron Castings.
    - h. A536 - Ductile Iron Castings.
    - i. B21 - Naval Brass Rod, Bar, and Shapes.
  - 2. AWWA Standards:
    - a. C 111 - Rubber-Gasket Joints for Ductile-Iron and Gray-Iron.
    - b. C 500 - Metal-Seated Gate Valves for Water Supply Service.
    - c. C 504 - Rubber-Seated Butterfly Valves.
    - d. C 512 - Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
    - e. C 509 - Resilient-Seated Gate Valves for Water Supply Service.
    - f. C 511 - Reduced Pressure Principle Backflow Prevention Assembly.
    - g. C 540 - Power Actuating Devices for Valves and Slide Gates.
    - h. C 550 - Protective Epoxy Interior Coatings for Valves and Hydrants.
    - i. C 507 - Ball Valves 6-inch through 48-inch.
  - 3. ANSI/NSF Standards: Standard 61 – Drinking Water System Components.

#### 1.4 SUBMITTALS

- A. Shop Drawings:
  - 1. For equipment assemblies in this Section to include:
    - a. Manufacturer.
    - b. Model.
    - c. Details of construction.
    - d. Dimensions, including actuator dimensions and clearances.
    - e. Materials of construction.
    - f. Listing of components.
    - g. Project specific wiring diagrams.
    - h. Coatings.
    - i. Weight of assemblies.
  - 2. For each type of equipment installed to include:
    - a. Itemized listings.
    - b. Deviations from the requirements of this Section.

- B. Product Data: For equipment in this Section to include:
  - 1. Manufacturer.
  - 2. Model.
  - 3. Materials of construction.
  - 4. Manufacturer's engineering and specification data.
  - 5. Electrical specifications and requirements.
  - 6. Torque specifications for actuators.
- C. Torque calculations for actuators.
- D. Installation instructions for equipment in this Section.
- E. Operation and Maintenance Manuals: For equipment in this Section to include:
  - 1. Copy of reviewed Shop drawings and product/catalog data.
  - 2. Equipment function, normal operating characteristics and limiting conditions.
  - 3. Assembly, installation, alignment, adjustment and checking instructions.
  - 4. Operating instructions for start-up, routine and normal operating, regulation and control, and shutdown and emergency conditions.
  - 5. Lubrication and maintenance instructions.
  - 6. Guide to "troubleshooting."
  - 7. Parts lists and predicted life of parts subject to wear.
  - 8. Outline, cross-sections, assembly drawings, engineering data, and wiring diagrams.
- F. Certifications/Affidavits:
  - 1. Submit Manufacturer's certification that products and materials conform to these specifications.
  - 2. Submit an affidavit from the valve manufacturer which certifies that actuators used were furnished and installed by the valve manufacturer.

#### 1.5 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
  - 1. Trained and experienced in the fabrication and installation of the materials and equipment.
  - 2. Knowledgeable of the design and the reviewed Submittals.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original, unbroken, brand marked containers or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration or damage, contamination with foreign matter, and damage by weather or elements and in accordance with Manufacturer's directions.
- C. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.
- D. Ship and handle valves in conformance with Section 18 of AWWA C 504.

### PART 2 - PRODUCTS

All products shall be provided per City of Kalamazoo Standard Specifications and "Buy America Requirements" unless otherwise specified in this Section.

#### 2.1 MANUFACTURERS AND TYPES

- A. Provide valves of the size and type as indicated on the Drawings and these Specifications.
- B. All valves of each type shall be the Product of one Manufacturer.

## 2.2 MATERIALS AND FABRICATION

- A. Resilient Seated (RS) Butterfly Valves:
1. Use: Tank Effluent/Backwash and Drain isolation valves (21, 22, 23, 24).
  2. Valves shall be 90 degree turn with resilient rubber facing bonded to all interior body surfaces, short lay length, no external gaskets required for mounting between flanges.
  3. Tapped lugged wafer ductile iron body, stainless steel disc/stem, EPDM food grade seat in the valve body.
  4. Suitable for use with ANSI Class 150 flanges.
  5. Valves shall be leak tested in the factory for their rated pressure.
  6. Valve pressure rating: 150 psig.
  7. Valve temperature rating: 200 degrees F.
  8. Valve Actuators:
    - a. Designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering.
    - b. In accordance with AWWA C 504.
    - c. Installed, adjusted, tested, and certified by the valve manufacturer prior to shipping.
    - d. Locking lever (for valves 3-inch and smaller).
    - e. Handwheel:
      - 1) Position indicators.
      - 2) Factory-installed actuator to valve.
      - 3) Traveling nut type, sized for at least 150% of maximum operating torque requirement.
      - 4) Self-locking.
      - 5) Minimum Handwheel Diameter: 12 inches.
      - 6) Turn wheel counterclockwise to open valve.
      - 7) Direction to open valve indicated on handwheel.
    - f. Provide enclosed valve stem extensions and adapters as required.
  9. Manufacturer:
    - a. Henry Pratt Company Series BF
    - b. Dezurik BOS Series.
    - c. Or Engineer approved equal.
- B. Globe Valves:
1. Use: Backwash discharge throttling valve (20).
  2. 1. I.B.B.M. outside screw and yoke, flanged for 150 pound pressure rating.
  3. Materials of Construction:
    - a. Body and Cover: Cast steel.
    - b. Stem: Stainless steel.
    - c. Disc and seat: Cast steel
    - d. Packing: Graphite.
    - e. Hardware: Stainless steel.
  4. Manufacturer and Model:
    - a. Crane 143XU.
    - b. Cincinnati Valve, Lunkenheimer Figure 1523.
    - c. Or Engineer approved equal.
- C. Brass Ball Valves (2-1/2-Inch and Smaller):
1. Use on air release system.
  2. Style: 2-piece construction - body and body end cap.
  3. Connections: Threaded.
  4. Materials of Construction:
    - a. Body: Brass with stainless steel trim.
    - b. Seats and Seals: TFE and TFE filled.
    - c. Locking lever stainless steel handle.
  5. Working Pressure: 600 psi minimum at 100 degrees F.
  6. Lead free, suitable for potable water.
  7. Port Size: Full Size.
  8. Manufacturer: Apollo, Flow-Tek, Neles-Jamesbury, Crane, Grinnell; or equal.

- D. Stainless Steel Ball Valves:
  - 1. Use on stainless steel instrumentation lines.
  - 2. Style: 1-piece construction.
  - 3. Connections: Swagelok.
  - 4. Materials of Construction:
    - a. Body: Stainless steel.
    - b. Packing: PTFE.
    - c. Handle: Nylon.
  - 5. Working Pressure: 600 psi minimum at 100 degrees F.
  - 6. Port Size: Full Size.
  - 7. Manufacturer: Swagelok; or equal.
  
- E. Combination Air/Vacuum Valve:
  - 1. Furnish combination air/vacuum valves as indicated on the Drawings (AV-1, AV-2).
  - 2. Compound lever type designed to release small quantities of air at line pressures upto 175 psi.
  - 3. Valve shall close water tight when liquid enters.
  - 4. Materials of Construction:
    - a. Body and Cover: Cast iron.
    - b. Float: Stainless steel.
    - c. Levers: Bronze or stainless steel.
    - d. Seat: Buna-N or Viton.
    - e. Inlet Connection: 1-inch NPT.
    - f. Outlet Connection: 1-inch NPT.
    - g. Pipe plug on top of valve.
  - 5. Manufacturers:
    - a. Val-Matic, Model 201C.2.
    - b. Apco.
    - c. Or Engineer approved equal.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install in conformance with:
  - 1. The Shop Drawings reviewed by Engineer.
  - 2. The Manufacturer's recommendations.
  
- B. Check and adjust valves, operators and accessories for smooth operation.
  
- C. Paint all valves and accessories in accordance with Division 09 Section "Painting" or provide factory coating to match existing valve as approved by Engineer.
  
- D. Labeling: Provide an engraved stainless steel tag securely fastened to the actuator with the size, pressure rating, and tag number clearly indicated.

#### 3.2 CLEANING

- A. Thoroughly clean all installed materials and products and related areas:
  - 1. Prior to acceptance of the work of this Section.
  - 2. In accordance with Division 01 Section "Cleaning and Waste Management."

3.3 PROCESS VALVE SCHEDULE

- A. The valve schedule is provided as an aid to the Contractor, but does not include all project valves, specifically manual valves smaller than 3-inch nominal size. Verify all valve requirements and provide valves for a completely operable system. Provide temporary valves as needed.

Valve Tag	Size	Type	Operator	Service	Notes
20	8"	Globe	Handwheel	Potable	
21	8"	Resilient Butterfly	Handwheel	Potable	
22	8"	Resilient Butterfly	Handwheel	Potable	
23	3"	Resilient Butterfly	Lever	Potable	
24	3"	Resilient Butterfly	Lever	Potable	
AV-1	1"	Air/Vacuum Valve	-	Air Release/Vacuum Protection	
AV-2	1"	Air/Vacuum Valve	-	Air Release/Vacuum Protection	

END OF SECTION 40 05 23

## SECTION 40 90 00 – INSTRUMENTATION AND CONTROL FOR PROCESS SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes, but is not necessarily limited to, the furnishing and installation of the horizontal pressure filter process control and instrumentation system comprised of the major items listed below, as indicated on the Drawings, as specified herein, and as necessary for the proper and complete performance of the Work:
  - 1. Programming and addition of new signals to existing controls panels.

#### 1.3 GENERAL REQUIREMENTS

- A. System Overview:
  - 1. Design is based on reusing the Owner's existing control panels and much of the field wiring and conduit connected to them. The Owner's existing control system shall be updated to incorporate new signals.
  - 2. Contractor shall conduct field investigations as required to determine existing conditions, existing programming, all wiring details, additional I/O requirements, signal ranges, units and calibration requirements.
  - 3. New programming is intended to follow existing programming standards and conventions and be consistent with existing programming in place.
- B. Provide all components and labor necessary, as indicated on Drawings, to achieve functional intent as described in this Section. Some components (i.e., power supplies, terminal strips, etc.) may not be specifically itemized.
- C. Provide components which are compatible with process equipment.
- D. Functionally similar components shall be products of a single Manufacturer.
- E. Installation of new systems and equipment shall be sequenced and coordinated to minimize disruptions to Owner's normal operations.
- F. Existing systems and equipment shall be kept in operation until new systems and equipment are functional and demonstrated to be reliable, to satisfaction of Engineer, for a minimum of 2 weeks.

#### 1.4 SUBMITTALS

- A. Itemized Listings:
  - 1. Description of deviations from the requirements of this Section.
  - 2. Re-submittals shall contain response(s) to each comment made by Engineer. Re-submittals that do not contain response(s) will be returned and will be subject to re-review compensation.
- B. Shop Drawings:
  - 1. General: Shop Drawing submittal material shall be project specific.
  - 2. For all systems with control panels, to include:
    - a. Control panel wiring diagrams:
      - 1) Shall clearly differentiate between internal and field wiring.
      - 2) Shall indicate loop wiring numbers for all devices.
      - 3) Analog loop diagrams shall indicate instrument range in engineering units.
    - b. Where modifications are required to existing control panels, existing control panel wiring shall be field verified and existing wiring shall be depicted in Shop Drawings to the extent required to fully indicate the extent of the modifications and to indicate the integration of the existing and new equipment.

3. For all systems with PLC equipment, to include:
    - 1) List of all analog input and output signals (new and existing) with verified ranges in engineering units.
    - 2) List of all new derived signals with ranges in engineering units.
    - 3) List of all new alarms with proposed initial setpoints.
    - 4) List of all new equipment being controlled based on an analog signal where an over-range or under-range may cause unintended operation and a description of logic which will cause the control system to safely shut down or control equipment in safest way possible.
  - b. The following shall be submitted before Field Performance Demonstration is scheduled to begin:
    - 1) Ladder logic diagrams with documentation for existing PLC.
- C. Operation and Maintenance Manuals:
1. General:
    - a. Table of contents.
    - b. Subdivided (tabbed) into separate sections that cover separate equipment or grouping of equipment.
    - c. Each site shall be uniquely tabbed. Manuals for each site shall be repeated as required so that remote site material can be separated and stand alone.
    - d. Provide 1 electronic copy (CD-ROM) per hard copy, of the overall O&M Manual that includes information for all sites. Owner shall be permitted to make copies of CD-ROM without restriction.
  2. For all SCADA systems, to include:
    - a. Overall system operation, interdependence, redundancy/fail-over capability.
    - b. Alarm List with descriptions as seen in SCADA system and with differentiation related to alarm indication method (e.g. SCADA, annunciator, dialer, etc). Coordinate with the City for standardized naming conventions.
    - c. List of IP or node addresses for all addressable equipment.
    - d. Written functional description and color print-outs of all newly developed operating screen.

## 1.5 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
  1. Trained and experienced in fabrication and installation of materials and equipment.
  2. Knowledgeable of the design and reviewed Shop Drawings.
- B. Manufacturer's Services:
  1. Submit Manufacturer's sworn statement that equipment furnished complies with this Specification and Manufacturer's engineer's written approval of installation.
  2. Provide Manufacturer's field service as specified herein.
- C. All materials, installation and testing shall be in accordance with ISA Standards and Recommended Practice.
- D. Contractor shall conduct field investigations as required to verify existing conditions, I/O, programming, wiring requirements, instrument ranges/calibration and signal types.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in original, unbroken, brand marked containers or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration or damage, contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer's directions.
- C. Store materials indoors in a controlled environment with low moisture content. Do not store outdoors.
- D. Reject damaged, deteriorated or contaminated materials and immediately remove from Site. Replace rejected materials with new materials at no additional cost to Owner.

## 1.7 FUNCTIONAL INTENT

### A. General:

1. All systems shall be controlled in accordance with the following description, as indicated on the Drawings and herein specified. New monitoring, controls, features, and functionality of the control system with new equipment is intended to match existing standards and conventions.
2. Contractor shall provide all devices, controls, panels, wiring and miscellaneous items required to achieve the specified functional intent whether specifically itemized on the Drawings or not.
3. Contractor shall inspect existing conditions to determine exact materials and work required to interface new control system components with existing equipment.
4. Coordinate with applicable related trades to incorporate equipment specific parameters in programming as necessary to meet specified performance.
5. Coordinate calibration and tuning of all equipment, control components, programming, and control loops to provide a complete system and achieve specified system performance.

### B. Basic Functionality:

1. The functional intent is provided as an aid to the Contractor to describe the minimum functionality and interoperability of components required for the system to operate properly. Contractor is to provide programming as described herein and as required, whether specifically itemized herein or not, to provide a fully functioning system. Where conflicts exist between this Specification and existing programming standards and conventions, existing standards and conventions shall govern. Contractor is responsible for field verifying and understanding existing standards and conventions.
2. Where equipment is being controlled based on an analog signal, an over-range or under-range condition shall generate an equipment failure alarm.
3. Entire system shall restart and resume programmed sequential operations without rebooting or resetting any subsystems upon resuming of power after power failure or after generator automatically starts.
4. New PLC program/project shall be compatible with Owner's existing version of PLC programming software unless new programming software is to be provided.
5. PLC programming shall be in Relay Ladder Logic and "latch" and "unlatch" instructions shall not be used in equipment control logic.
6. Where existing equipment or I/O is not to be removed/demolished and is to remain as "spare", provide label and prepare equipment for future use.

### C. Filter Operations:

1. Backwash Flow Rate:
  - a. The backwash flow rate shall be calculated taking the total raw water flow into the station (from the well pumps) and subtracting the change in level in the reaction tank. This shall be updated every 30 seconds and calculated with the following equation:

$$\text{Backwash Flow Rate} = Q_{rw} - ((L2 - L1) * 13,584)$$

Where:  $Q_{rw}$  = Raw Water Flow (gpm)  
 $L2$  = Reaction Tank Level (feet) at  $t = 30$  seconds  
 $L1$  = Reaction Tank Level (feet) at  $t = 0$  seconds

2. Filter Loss of Head:
  - a. A pressure differential transmitter (PDIT-10) shall be installed between the filter supply header and filter effluent header to measure head loss in the filter. A 4-20mA dc signal, proportional to differential pressure, shall be sent to SCADA for indication, logging, and adjustable high and low pressure alarms.

### D. Additional Programming:

1. Provide programming, in addition to that described above, as required to provide a fully functioning system.
2. Provide field modification of SCADA programming as required where system is found, through testing or Owner operation to require the following:
  - a. Additional functionality.
  - b. Modification of functionality.

- E. SCADA System Software:
  - 1. Graphic Screens: Owner's existing graphic screens (Wonderware) shall be updated to integrate the new filter loss of head pressure differential transmitter and display backwash rate calculation. Existing screens shall be similar with only the addition of the 2 signals. Contractor to coordinate with Owner and provide any additional information on screens required by Owner.
  - 2. PLC Program(s): Existing PLC program(s) shall be edited to integrate new instruments.

## 1.8 GUARANTEE AND WARRANTY

- A. Process control and instrumentation system Supplier shall guarantee the entire system for a period of 1 year. This guarantee shall cover all parts, labor, troubleshooting, telephone consulting, travel, and equipment recalibration.
- B. The 1-year guarantee period shall begin at Substantial Completion.

## PART 2 - PRODUCTS

All products shall be provided per City of Kalamazoo Standard Specifications and "Buy America Requirements" unless otherwise specified in this Section.

### 2.1 GENERAL

- A. Acceptable Manufacturers for major system components are specified herein.
- B. Not all components are specified. It is the system Supplier's responsibility to furnish and install components necessary to achieve the functional intent and to meet or exceed the governing local, state or national standards and/or codes.
- C. Pre-Approved Acceptable System Suppliers:
  - 1. Tetra Tech.
  - 2. West Michigan Instrumentation.
  - 3. No substitutions.

### 2.2 CONTROL PANELS AND COMMUNICATION PANELS

- A. General:
  - 1. Install all wiring in a workmanlike manner. Group, bundle, label, support, and route horizontally and vertically to provide a neat and organized appearance.
  - 2. All field 4-20mA dc signals shall be powered from panels, unless indicated otherwise on the Drawings.
  - 3. All wiring shall be sized, labeled and color coded. All panel wiring shall be type MTW unless indicated otherwise on the Drawings.
  - 4. Provide labeled terminal strips for all wiring entering and leaving panels.
  - 5. Label addressable devices with IP or node addresses.
  - 6. Coordinate and provide all necessary mounting hardware.
  - 7. Contractor shall provide all mounting hardware, shelves, support brackets, patch panels, etc., as required to install equipment.
- B. Modification to Existing Control Panels:
  - 1. Provide all field modification, wiring changes, and wiring additions as indicated on Drawings or as required to achieve function as described in this section.
  - 2. Control panels field modifications shall be performed by UL listed fabrication facility personnel to UL standards and meet the requirements of NEC and UL508/698.

C. I/O Cards:

1. Field verify existing cards and space available. Provide new cards as required to incorporate all new signals. I/O cards shall be as indicated below and as required to be compatible with the existing installation:
  - a. Analog Input Modules:
    - 1) Analog input modules shall be 16-bit resolution and shall operate on voltage provided through the backplane. Modules shall be capable to 8 differential voltage or current inputs. Modules shall be user configurable to either accept a voltage input of  $\pm 10$  Vdc (typically 1-5 Vdc) or 0-20 mAdc (typically 4-20 mAdc). Modules shall be capable of scaling to engineering units through the software.
    - 2) Manufacturer: Allen-Bradley 1769-IF8.
  - b. Analog Output Modules (Current):
    - 1) Analog output modules shall be 16-bit resolution and shall operate on voltage provided through the backplane. Modules shall have 4 differential outputs of 4-20 mAdc (typically 4-20 mAdc). Modules shall be capable of scaling to engineering units through the software.
    - 2) Manufacturer: Allen-Bradley 1769-OF4CI

2.3 FIELD INSTRUMENTS

A. General:

1. Schedules are provided as an aid to Contractor. It is Contractor's responsibility to verify information contained in the schedules for completeness and to provide equipment that is indicated elsewhere in Drawings and Specifications, but not listed in schedules.
2. Provide instruments rated for environment.
3. Existing instruments that are relocated or modified shall be recalibrated.
4. Tagging: Equip all instruments with a permanently attached, stamped or engraved identification tag. The tags shall include the device name, Engineer's tag identification, and manufacturer's tag identification if different from Engineer's.
5. Finish: Finish on the instruments and accessories shall provide protection against corrosion by the elements in the environment in which they are to be installed.
6. Temperature Rating: Instruments shall be suitable for the temperature in which they are to be exposed. Therefore, instruments located outdoors or in unheated spaces shall be suitable for -20 degrees F to 120 degrees F. Instruments exposed to direct sunlight (without sunshield) shall be suitable for temperatures up to 140 degrees F.
7. Provide configuration software and cables or hand held device(s) for any instrument which cannot be fully programmed via keypad/interface which is integral to device.

B. Instrument Pipe Stand:

1. General: Modular support system for mounting of instrumentation components.
2. Provide for each instrument that cannot be wall mounted.
3. Material of construction: Galvanized carbon steel, aluminum or stainless steel as required by environment to prevent corrosion.
4. Floor stands shall have gussets for strength and stability.
5. Size as required to mount instrument at 4'-6" above operating level, unless otherwise noted.
6. Manufacturers:
  - a. O'Brien, Saddlepak.
  - b. Techline Mfg.
  - c. Or equal.

C. Differential Pressure Transmitter:

1. Microprocessor based smart transmitter.
2. Display: Integral LCD.
3. Material:
  - a. Stainless steel wetted parts and diaphragm.
  - b. Teflon O-rings.
  - c. Silicone fill fluid.
  - d. Stainless steel mounting bracket and hardware.
  - e. Epoxy covered aluminum housing.
4. Accuracy: 0.04% of span with 5-year stability.
5. Rangeability: 150:1.
6. Process Connection: Stainless steel 3-valve manifold with drain/vent ports.

7. Output: 4-20 mAdc plus HART protocol.
8. Power: Loop powered.
9. Schedule:
  - a. PDIT-10 0-10 feet H2O
10. Manufacturers:
  - a. Rosemount 3051.
  - b. Or engineer approved equal.
11. Accessories:
  - a. Integrally attached new 5-valve manifold with:
    - 1) Two impulse line valved connections.
    - 2) Two drain/vent valves.
    - 3) One equalization valve.
    - 4) Verify connection sizes with existing tubing and fittings.
    - 5) Provide new tube fitting connections
  - b. Provide 316 stainless steel mounting hardware as required.
  - c. Transmitter to have 5-year warranty

### PART 3 - EXECUTION

#### 3.1 PRE-INSTALLATION

- A. Prior to performing any programming work and prior to program related Shop Drawing review, Contractor shall schedule a meeting between Owner, Engineer and System Supplier (including PLC and operator interface computer programmer(s)) to review system configuration and functional intent. Meeting will be held at the Water Plant.
- B. Once programming has begun, Contractor shall review programming progress, review programming for compliance with functional intent and Owner requirements, and to coordinate and communicate details of system operation at progress meetings once per month until Project has reached final completion.

#### 3.2 INSTALLATION COORDINATION

- A. Install process control equipment and instrumentation in conformance with:
  1. Shop Drawings reviewed by Engineer.
  2. Manufacturer's recommendation.
- B. Electrical:
  1. Install wiring in conformance with applicable sections of the National Electric Code (NEC) and as indicated on the Drawings.
  2. Run all 4-20 mAdc process control wiring in separate conduit from power and control wiring.
  3. Communication cabling shall be in separate conduits from power control and analog signal wiring.

#### 3.3 FIELD QUALITY CONTROL

- A. System Supplier's Field Service:
  1. Arrange and pay for process control and instrumentation system Supplier's engineer to:
    - a. Provide field services indicated below:
      - 1) Assist with start-up and conduct performance demonstration.
      - 2) Demonstrate operation and maintenance to the system operators.
      - 3) Review operations and maintenance manual with system operators.
    - b. The following is the suggested minimum onsite time, provide onsite time as required to complete all work and field services required as a part of the Contract Documents:
      - 1) 1 hour to oversee installation.
      - 2) 1 hour to inspect and certify installation.
      - 3) 1 hour to assist with start-up and conduct performance demonstration.
      - 4) 1 hour to demonstrate operation and maintenance.
      - 5) Additional time as necessary for installation, start-up and training.
  2. Schedule field services as soon as practical and at times approved by Engineer.
  3. Promptly make all changes and additions required by system Supplier's engineer and as necessary for proper operation of the system.
  4. System Supplier's engineer shall submit written approval of installation.

- B. Field Performance Demonstration:
  - 1. General.
    - a. Procedures shall be developed by system Supplier and submitted to Engineer for review prior to scheduling demonstration.
    - b. Schedule a minimum of 2 weeks in advance.
    - c. Demonstration shall include "simulation" of system operation.
    - d. Schedule and coordinate with Owner and Owner's operation staff to minimize disruptions to plant operation.
  - 2. Pre-Requisite:
    - a. Complete installation and test all functionality prior to calling for witnessed field demonstration by Engineer.
    - b. Complete integrator sign-off portion of test procedures and route to Engineer for verification.
  - 3. Instruments:
    - a. Demonstrate proper calibration and maximum accuracy.
    - b. Demonstrate that system performs monitoring functions as specified and indicated on the Drawings.
  - 4. System:
    - a. Demonstrate proper operation in failure modes.
    - b. Demonstrate backup and recovery modes.
  - 5. Demonstration shall be repeated as required by Engineer until satisfactory results are obtained.

END OF SECTION 40 90 00

## SECTION 46 61 21 – PRESSURE FILTERS

### 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. Work under this Section includes the furnishing and installation of filter media, manways, filter header pipe and laterals, steel and nozzle repair, start-up and testing of the system at the Well Station No. 11 pressure filters.

#### 1.3 ALLOWANCES

- A. Provide steel repair and underdrain baffle replacement work under a cash allowance specified in Division 01 Section "Cash Allowances."

#### 1.4 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  1. AISC – American Institute of Steel Construction.
  2. ASME – American Society of Mechanical Engineers: Boiler and Pressure Vessel Code.
  3. ASTM - American society for testing and Materials Standard Specifications: A 36 - Structural Steel.
  4. AWS – American Welding Society.
  5. AWWA – American Water Works Associations Standards:
    - a. B100 – Filtration.
    - b. C653 – Disinfection of Water Treatment Plants.
  6. Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers: Recommended Standards for Water Works (10 State Standards).
  7. Michigan Building Code.
  8. SSPC - Structural Systems Painting Council: SP10 – Near –White Blast Cleaning.

#### 1.5 DESIGN AND PERFORMANCE CRITERIA

- A. Filter media manufacturer shall provide a list of references for current and past projects which involved piloting and treating of similar water with the media.
- B. Existing Filter Design:
  1. The pressure filter equipment consists of:
    - a. Two horizontal pressure filters complete with underdrain system, filter media, media supporting beds, internal influent distribution piping, internal backwash water system and effluent collection piping and appurtenances.
  2. Pressure Filter: Two vessels, isolated cell, horizontal, each with 2 isolated cells, 10-foot diameter x 32-foot overall length.
  3. Filter Underdrain System: effectively retains filter media and provide uniform flow distribution.
  4. Each filter is provided with a dividing partition to completely subdivide into equal isolated filter cells.
  5. Backwashing: Accomplished with system pressure by using water externally from the reaction tank.
  6. Designed for a working pressure of 100 psig. Vessels shall be hydrostatically tested to 130 psig.
  7. The existing underdrain is curved baffle plate with stainless steel baffles placed uniformly throughout.

- C. Performance:
1. Filters have a design capacity of 900 GPM with all four filter cells in service when filtering at a rate of 3 GPM per square foot of filter area.
  2. Filter Area 150 square foot per cell, 300 square foot per vessel.
  3. There are two filters, size of each filter 10 ft diameter and 32 ft length.
  4. Backwash Rate: 1,800 gpm at 12 GPM per square foot of filter area.
  5. Filters shall be designed for backwashing with a maximum media loss of 1-inch per year.
  6. Raw Water Quality Data:
    - a. Alkalinity = 270 mg/L as CaCO<sub>3</sub> average.
    - b. Total Hardness = 400 mg/L as CaCO<sub>3</sub> average.
    - c. Magnesium = 33 mg/L average.
    - d. Manganese = 0.058 – 0.356 (average 0.13) mg/L.
    - e. Iron = 0.4 – 5.0 (average 1.10) mg/L.
    - f. Sulfate = 35 mg/L average.
    - g. pH = 6.3 – 7.6 S.U.
  7. The iron removal equipment shall meet the following filtered water quality requirements for:
    - a. Iron: Less than 0.3 mg/L at all times with a target of 0.02 mg/L.
    - b. Manganese: Less than 0.05 mg/L at all times with a target of 0.03 mg/L.
- D. Performance Guarantee
1. Guarantee that the filtration media will achieve the specified performance.
  2. Provide documentation of performance guarantee with bid, submit to Engineer for review and approval at least 14 days prior to bid opening.

## 1.6 SUBMITTALS

- A. Itemized Listings:
1. Equipment to be provided
  2. Deviations from the requirements of this Section.
  3. Deviations from the Drawings resulting from the equipment to be provided.
- B. Shop Drawings for all Equipment Assemblies of this Section to Include:
1. Manufacturer, model, details of construction, materials of construction, dimensions, listing of components, shipping weight, operating weight and coatings.
  2. Dimensioned face piping layout drawings, coordinated with mechanical Contractor's piping Shop Drawings and showing valves.
- C. Product/catalog data for all equipment and materials in this Section to include: Manufacturer, materials of construction, performance data, dimensions, chemistry, installation details, Manufacturer's engineering and specification data, shipping and operating weights.
- D. Installing instructions for equipment assemblies in this Section to include: new filter media and support gravel, start-up and testing instructions of the system.
- E. Operation and Maintenance Manuals for All Equipment in this Section to include:
1. Copy of reviewed Shop Drawings and Product/catalog data, equipment function, normal operating characteristics and limiting conditions.
  2. Assembly, installation, alignment, adjustment and checking instructions.
  3. Operating instructions for start-up, routine and normal operating, regular and control, and shutdown, and emergency conditions.
  4. Maintenance instructions, guide to "troubleshooting."
  5. Parts lists and predicted life of parts subject to wear.
  6. Outline, cross-sections, assembly drawings, engineering data, test data, performance data, and performance curves.
- F. Manufacturer's representative start-up report.

1.7 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Fabrication Personnel:
    - a. Trained and experienced in the fabrication and assembly of the materials and equipment.
    - b. Knowledgeable of the design and the reviewed Shop Drawings.
  - 2. Manufacturer:
    - a. Will have been in continuous business for a period of at least 10 years engaged in the manufacture of water treatment equipment. Manufacturer will have experience in providing filter media for similar horizontal pressure filters.
    - b. Will provide a list of a minimum of 10 filter media installations of similar size used in municipal applications. The Manufacturer will provide references and contact information for said equipment installations.
    - c. All equipment shall be suitable for potable water applications. Materials to be in contact with water shall be NSF compliant.

PART 2 - PRODUCTS

All products shall be provided per City of Kalamazoo Standard Specifications and "Buy America Requirements" unless otherwise specified in this Section.

2.1 MANUFACTURERS

- A. Approved Manufacturers:
  - 1. Horizontal Pressure Filter Media and Support Gravel:
    - a. Manganese Anthrasand by WesTech Engineering
    - b. MARIS Media, by Artesian of Pioneer
    - c. Manganese Greensand Plus by Inversand Company.
    - d. Or Engineer approved equal.
  - 2. Horizontal Pressure Filter Manways: WesTech Engineering.
  - 3. Horizontal Pressure Filter Backwash Header and Laterals: WesTech Engineering.
  - 4. Horizontal Pressure Filter Underdrain Nozzles: WesTech Engineering.

2.2 MATERIALS

- A. All components of the systems described herein shall be fabricated and manufactured from new, unused materials, free from defects, of the highest quality.
- B. Anchoring Hardware: 316 stainless steel.
- C. Materials in Contact with Water: Suitable for drinking water treatment and shall have NSF approvals as required by state and local regulations.

2.3 HORIZONTAL PRESSURE FILTERS

- A. Media Support Gravel:
  - 1. The filter media washed and graded material meeting the requirements of AWWA B100.
  - 2. Each filter cell shall be provided with a (10 inch) supporting bed consisting of the following graded layers of gravel:

Layer and Depth	Effective Size
Bottom 4"+Fill	3/4" x 1/2"
Next 3"	1/2" x 3/16"
Top 3"	3/16" x 3/32"

- 3. The gravel shall be free from clay, loam, dirt, calcareous, or other foreign material, and shall consist of round or angular particles being relatively free of flat or elongated particles. The gravel shall be shipped bagged and palletized.

4. The gravel must meet the requirements of the AWWA Specification number B-100-96 (or most current edition) and be NSF/ANSI 61 certified.
- B. Filtration Media:
1. Filter media shall have a total depth of 24 inches over the above detailed support gravel.
  2. For each layer, provide a minimum of 5% excess for skimming.
  3. Filter media shall be for use in the production of potable water and conform to ANSI/AWWA B100 and NSF Standard 61 requirements and the following specifications.
  4. Filter sand shall consist of hard, durable grains free from dirt, loam, clay, mica, and organic matter that will resist degradation during handling and use.
  5. Filter media shall be washed, screened, and hydraulically graded.
  6. Provide any preconditioning requirements for the filter media. The media manufacturer will supervise preconditioning of the media during start-up of the filters.
  7. The filter media characteristics:
    - a. Effective Size: 0.6-0.8 mm
    - b. Uniformity Coefficient: Less than or equal to 1.6
  8. Alternate proprietary media gradations can be submittal for consideration by the Engineer
- C. Manways:
1. Provide each filter with a ASME steel 24-inch diameter hinged full opening manway with a 6-inch collar.
  2. Manways shall be designed for a working pressure of 100 psig.
  3. Threaded hold downs.
    - a. Quantity: 8.
  4. Materials:
    - a. Body: Steel.
    - b. Hardware: 304 stainless steel.
    - c. Gasket: Hypalon rubber.
  5. The manways and installation to be provided by WesTech Engineering.
- D. Backwash Header and Laterals:
1. Provide schedule 80 PVC pipe with laterals and orifice collectors for each filter.
  2. Orifice locations and size on lateral to be exactly the same as existing laterals.
  3. Contractor to install new header and laterals per the Manufacturer's installation requirements.
  4. The header and laterals are to be provided by WesTech Engineering.
- E. Stainless Steel Underdrain Baffles:
1. Quantity provided determined after inspection of pressure vessels by Engineer and Owner and coordinated with Manufacturer, Westech Engineering.
  2. Stainless steel construction to fit into existing GFC curved underdrain.
  3. Contractor to install new stainless steel underdrain baffles per the Manufacturer's installation requirements.
  4. Underdrain baffles are to be provided by WesTech Engineering.
- 2.4 DELIVERY, STORAGE AND HANDLING
- A. Provide adequate level, drained site area for storage of all materials.
  - B. Notify Engineer 48 hours ahead of unloading schedule.
  - C. Store materials blocked up above ground on timbers and skids, or pallets as suitable for the product being stored. Protect filter media from sunlight and inclement weather. Use media only from unopened, undamaged containers.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install all equipment in strict accordance with the Manufacturer's recommendations and Shop Drawings.

- B. Existing Filter Media and Support Gravel Removal:
    - 1. Remove existing media and support gravel within each filter vessel using vacuum methods and dispose to a designated location.
    - 2. Clean the interior of the filter vessel for inspection including the underdrain area.
  - C. Filter Interior Inspection and Repair: After removal of existing material and prior to the installation of new media, inspection of the filter interior, underdrains and completion of the recommended repairs based on the inspection may be required.
  - D. Filter steel repair and underdrain baffle replacement:
    - 1. After inspection of the filter interiors, the Engineer and Special Inspector, Dixon Engineering, will make recommendations on the required steel repair areas and underdrain baffle replacement that will need to occur prior to coating.
    - 2. Payment for the steel repair and underdrain baffle replacement will be made from the cash allowance.
  - E. Filter Interior and Exterior Coating: After the recommended repairs are made and prior to installation of new media, the interior and exterior of the filter vessels need to be prepared and coated in accordance with Division 09 Section "Painting."
  - F. Filter Media and Support Gravel:
    - 1. Install media in accordance with pressure filter Manufacturer's instructions and AWWA B100.
    - 2. Provide services of a qualified manufacturer's technical representative to direct the placement of media and supporting gravel.
    - 3. Thoroughly clean the filtration box and underdrain before starting gravel and media placement.
    - 4. Keep materials clean during placement, remove and replace any particles that is dirty.
    - 5. Place the gravel layers per manufacturer's recommendation by hand to avoid movement of the underdrain system and to ensure free passage for water from the orifices.
    - 6. Complete each layer before the next layer above is started.
    - 7. For materials less than 1/2-inch in diameter, the workman shall not stand or walk directly upon the gravel but shall walk upon boards which will sustain the weight of the workman without displacing the gravel.
    - 8. Any gravel becoming mixed should be removed and replaced in layers as herein specified.
    - 9. Backwashing of the gravel to remove dirt, dust, or fine accumulations.
    - 10. The correct thickness of each layer shall be obtained as follows:
      - a. Before the gravel is placed, the top of each layer shall be marked on the side of the filter.
      - b. The top of each layer shall then be leveled against a water surface held at the appropriate mark.
    - 11. Place media in the manner similar to the gravel placement and processed to receive the gradation recommended by the Manufacturer.
    - 12. At least one backwash of each media layer shall be required to assure proper sizing prior to placement of successive layers.
  - G. Disinfection:
    - 1. Disinfect pressure filters in accordance with the procedure specified in AWWA C653.
    - 2. Backwash each filter as required to remove media fines.
    - 3. Apply chlorine at a rate of 25 mg/l and allow contact for 12 hours. Dechlorinate waste as required prior to discharge.
    - 4. Thoroughly flush filters by filtering to waste until background level of chlorine is reached in filter.
    - 5. Collect duplicate bacteriological samples from each filter effluent not less than 30 minutes apart. Owner will analyze samples.
    - 6. Repeat disinfection procedure as necessary until satisfactory results are obtained.
    - 7. Place filter in service when bacteriological analyses are satisfactory.
  - H. Promptly make all changes and additions required by Manufacturer's engineer.
  - I. Submit Manufacturer's engineer's written approval of installation.
- 3.2 PAINTING
- A. Blast and paint materials and equipment in accordance with Division 09 Section "Painting."

- B. Filter Equipment:
  - 1. Interior coating
  - 2. Exterior coating
- C. No shop coatings are required on aluminum, stainless steel, or nonferrous material covered under this Section unless specifically designated.

### 3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service:
  - 1. Arrange and pay for Manufacturer's engineer to:
    - a. Provide the services indicated below.
    - b. Minimum Onsite Time: 2 trips with a total onsite time of 2 days (8 hours each day).
  - 2. Schedule the Following:
    - a. During installation of the filter internal components.
    - b. As soon as practicable after installation.
    - c. At times approved by Engineer and Owner.
  - 3. Manufacturer's Engineer: Check work.
  - 4. Promptly make all changes and additions required by Manufacturer's engineer.
  - 5. Manufacturer's Engineer:
    - a. Coordinate with system integrator to provide a fully functional system meeting or exceeding performance criteria.
    - b. Instruct Contractor on proper installation techniques and observe installation to ensure conformance with Manufacturer's recommendations.
    - c. Assist in start-up.
    - d. Demonstrate operation and maintenance to Owner's personnel.
  - 6. Submit Manufacturer's engineer's written approval of installation.
- B. Field Performance Test: As soon as practicable after installation, notify Engineer of the readiness for the Manufacturer's representative to check out the work of this Section. Promptly make all changes and additions as required for Engineer's approval.

### 3.4 CLEANING

- A. General: Prior to acceptance of the work of this Section, thoroughly clean all installed materials, equipment, and related areas.

END OF SECTION 46 61 21



## **ATTACHMENT B**

### ***PLANS***

## **Well Station 11 Filter Improvements**

**Bid Reference #: 91392-003.0**

# City of Kalamazoo

## Well Station 11 Filter Improvements

### Kalamazoo County, Michigan



VICINITY MAP

BUILDING CODE INFORMATION

Issued for Bids and Construction - 9/1/2021  
Project Number 210091



www.fishbeck.com 1515 Arboretum Drive,  
800.456.3824 Grand Rapids, Michigan

SHEET INDEX

GENERAL

G101 TITLE SHEET

CIVIL

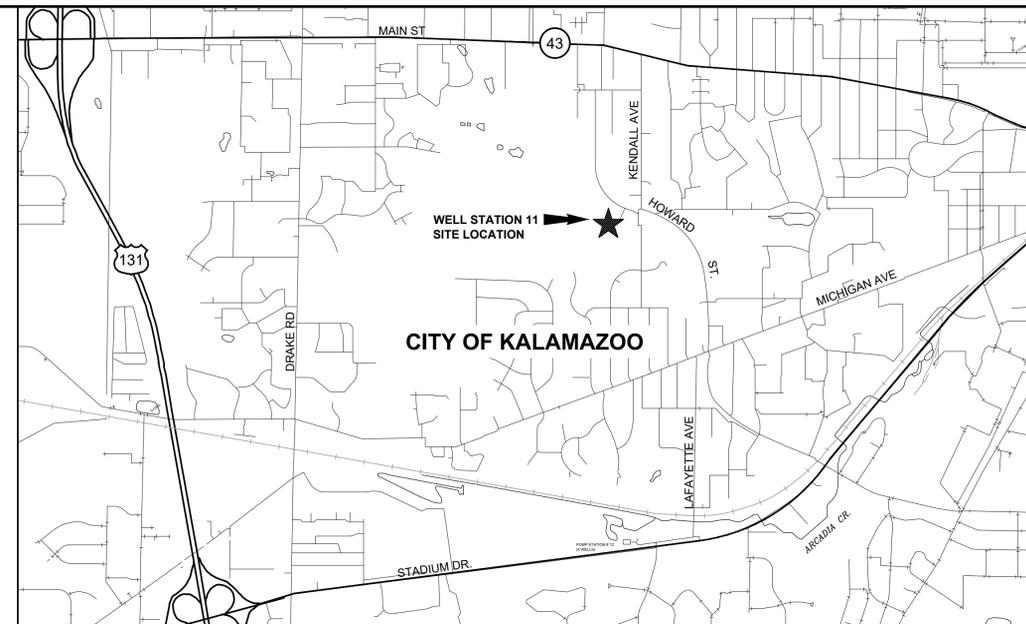
C101 SITE PLAN

DEMOLITION

D101 PLANS, SECTION AND PHOTOS  
D102 SECTIONS AND DETAIL

PROCESS

P101 GENERAL NOTES, ABBREVIATIONS, LEGEND AND DETAILS  
P102 PROCESS AND INSTRUMENTATION DIAGRAM  
P201 PIPING AND EQUIPMENT PLAN  
P202 PIPING AND EQUIPMENT SECTIONS  
P203 FILTER PLAN AND ELEVATIONS



LOCATION MAP  
SCALE: NOT TO SCALE

GENERAL ABBREVIATIONS

AFF ABOVE FINISH FLOOR	FD FLOOR DRAIN	MEZZ. MEZZANINE	RD ROOF DRAIN
AHU AIR HANDLING UNIT	FRT FIRE RETARDANT TREATED	MIN. MINIMUM	RO ROUGH OPENING
AL. ALUMINUM	FT. FOOT/FEET	MO. MOUNTED	SCH. SCHEDULE
ALT. ALTERNATE	GA. GAUGE/GAGE	MTD. MOUNTED	SF SQUARE FOOT
BF. BARRIER FREE	GALV. GALVANIZED	N/A NOT APPLICABLE	SIM. SIMILAR
BRG. BEARING	GC GENERAL CONTRACTOR	NC NOISE CRITERIA	SP. SPACE/SPACING
CJ CONTROL JOINT	HB HOSE BIBB	NIC NOT IN CONTRACT	SQ. SQUARE
CL. CENTERLINE	HP HIGH POINT	NO. NUMBER	SS STAINLESS STEEL
CLG. CEILING	HORIZ. HORIZONTAL	NRC NOISE REDUCTION COEFFICIENT	STD. STANDARD
CMU CONCRETE MASONRY UNIT	HVAC HEATING VENTILATING AIR CONDITIONING	NTS NOT TO SCALE	TAN. TANGENT
CO. CLEANOUT	ID INSIDE DIAMETER	OC ON CENTER	TYP. TYPICAL
CONC. CONCRETE	IE INVERT ELEVATION	OD OUTSIDE DIAMETER	UL. UNDERWRITER'S LABORATORY
CONST. CONSTRUCTION	IN. INCH/INCHES	OH. OVERHEAD	UNO UNLESS NOTED OTHERWISE
CONT. CONTINUOUS	INSUL. INSULATION	OPP. OPPOSITE	VERT. VERTICAL
DN. DIAMETER	LAV. LAVATORY	ORD OVERFLOW ROOF DRAIN	VERT. VERTICAL
DS. DOWNSPOUT	LED LIGHT EMITTING DIODE	PERP. PERPENDICULAR	VTR VENT THROUGH ROOF
EF EXHAUST FAN	LLH LONG LEG HORIZONTAL	PL. PLATE	W/ WITH
EL. ELEVATION	LLV LONG LEG VERTICAL	PSF POUNDS PER SQUARE FOOT	WC WATER CLOSET
EJ EXPANSION JOINT	LP LOW POINT	PSI POUNDS PER SQUARE INCH	WH WATER HEATER
EQ. EQUAL	MFR. MANUFACTURER	PVC POLYVINYL CHLORIDE	W/O WITHOUT
EWC ELECTRIC WATER COOLER	MAX. MAXIMUM	R RADIUS	WP. WEATHERPROOF
		REQD. REQUIRED	WT. WEIGHT

GRAPHIC SYMBOLS

SECTION CUT LINE 	ELEVATION, SECTION AND DETAIL DESIGNATION 	EXTERIOR ELEVATION TAG 	ENLARGED DETAIL FRAME 	BULLETIN IDENTIFICATION 
NORTH ARROW DESIGNATION 	PLAN DESIGNATION <b>FLOOR PLAN</b> SCALE: 1/8" = 1'-0"	INTERIOR ELEVATION TAG 	WALL TYPE TAG 	ADDENDUM IDENTIFICATION 
ROOM NAME AND NUMBER 	ELEVATION TARGET 	FINISH FLOOR EL. 100'-0"	SIGNAGE TAG 	SKETCH IDENTIFICATION 
DOOR NUMBER 	ELEVATION TAG 		FINISH TAG 	BARRIER FREE LOCATION 
				KEY NOTE TAG 
				DEMOLITION NOTE TAG 

APPROVED BY:  
THE CITY OF KALAMAZOO  
*John Randall* DATE: 09/14/2021  
DEPARTMENT OF PUBLIC SERVICES  
SENIOR CIVIL ENGINEER

SEAL



City of Kalamazoo  
Kalamazoo County, Michigan  
Well Station 11 Filter Improvements

REVISIONS

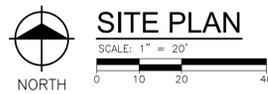
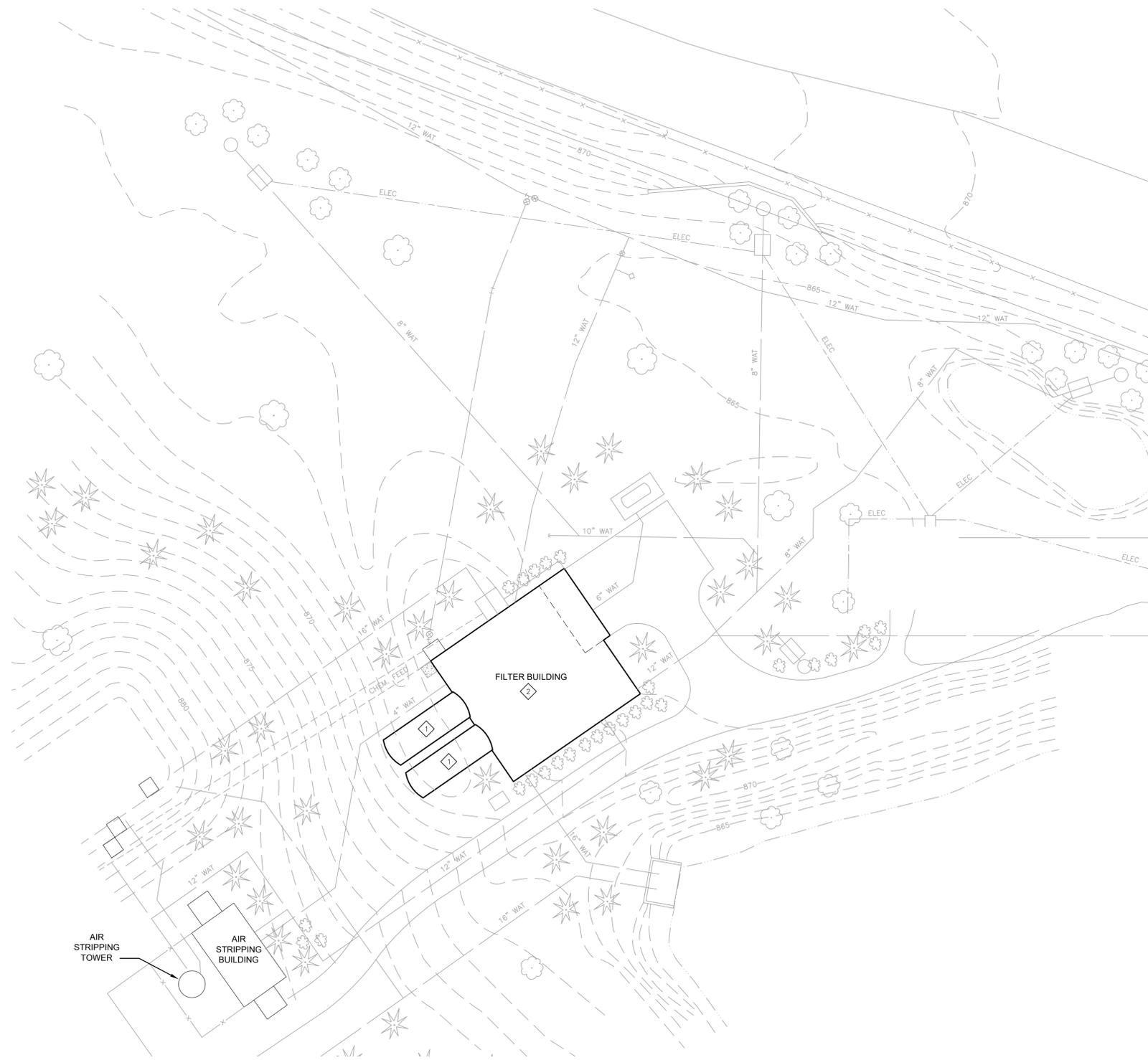
9/1/2021	BIDS AND CONSTRUCTION
Drawn By	SG
Designer	MBK
Reviewer	MTP
Manager	MTP

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PROJECT NO.  
210091  
SHEET NO.

**G101**

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**NOTES**

- RESTORE ALL DISTURBED AREAS NOT COVERED BY SURFACE TREATMENT WITH 4" TOP SOIL, SEED, FERTILIZER, MULCH OR MULCH BLANKET.

**KEY NOTES**

- LOCATION OF THE EXISTING HORIZONTAL PRESSURE FILTERS FOR ASSOCIATED FILTER IMPROVEMENTS.
- ALL OTHER ASSOCIATED PROCESS AND INSTRUMENTATION IMPROVEMENTS ARE TO OCCUR WITHIN THE FILTER BUILDING.

REVISIONS

9/1/2021 BIDS AND CONSTRUCTION

Drawn By SG  
 Designer MBK  
 Reviewer MTP  
 Manager MTP

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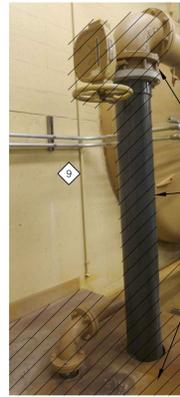
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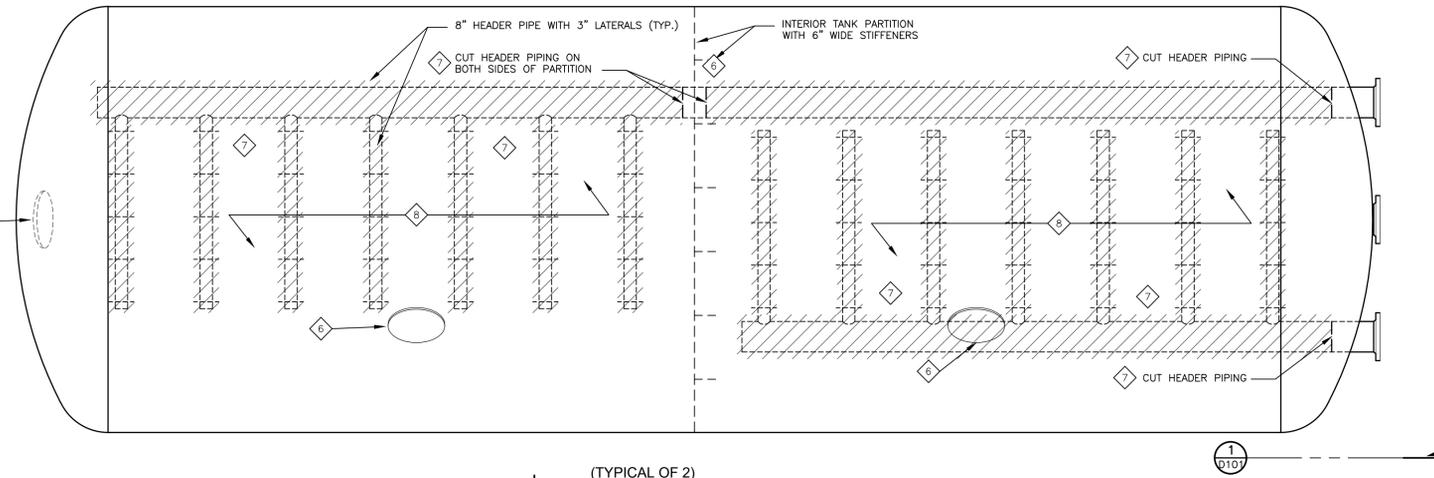
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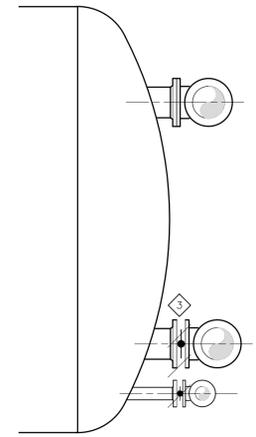
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3 PHOTO  
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(TYPICAL OF 2)  
**PRESSURE FILTER**  
SCALE: 1/2" = 1'-0"  
NORTH



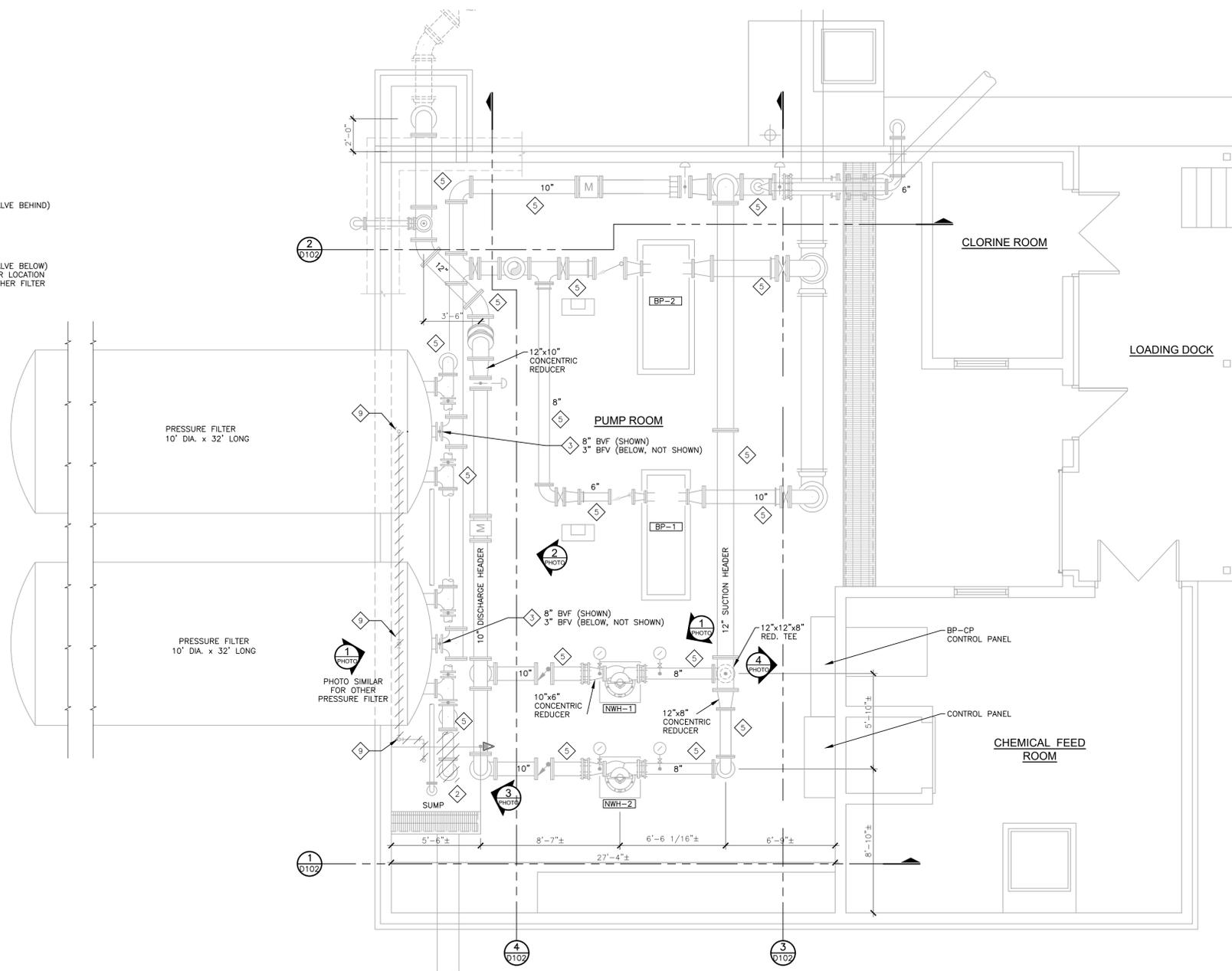
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1 PHOTO  
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**WELL STATION 11  
DEMOLITION PLAN**  
SCALE: 1/4" = 1'-0"  
NORTH

**PROCESS DEMOLITION NOTES**

- REMOVE ALL PORTIONS OF WORK IDENTIFIED BY CROSS HATCHING UNLESS NOTED OTHERWISE.
- DEMOLITION NOTES AND PLANS DO NOT FULLY REPRESENT ALL DEMOLITION WORK REQUIRED TO INSTALL NEW WORK IN ACCORDANCE WITH CONTRACT DOCUMENTS, BUT ARE INTENDED TO SERVE AS GENERAL DEMOLITION GUIDELINES.
- ALL PROCESS NOTES, SYMBOLS, LEGENDS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY NOT BE ALL INCLUSIVE AND ONLY APPLY PROCESS DRAWINGS (P).
- COORDINATE ALL WORK WITH PROCESS, MECHANICAL, AND ELECTRICAL DRAWINGS FOR BOTH DEMOLITION AND NEW CONSTRUCTION.
- COORDINATE PHASING AND SEQUENCING OF DEMOLITION IN ACCORDANCE WITH PLANS AND SPECIFICATIONS AND WITH OTHER CONTRACTORS IN ORDER TO MAINTAIN CONTINUING OPERATIONS FOR OWNER. MAINTAIN BUILDING SECURITY AND WEATHER TIGHTNESS.
- COORDINATE ITEMS, IF ANY TO BE TURNED OVER TO THE OWNER PRIOR TO BEGINNING DEMOLITION. CONTRACTOR TO REMOVE, PROTECT AND RELOCATE ITEMS TO BE TURNED OVER TO THE OWNER.
- SUPPORT PIPING TO REMAIN IN PLACE DURING AND AFTER DEMOLITION.
- REMOVE ALL UTILITIES INCLUDING MECHANICAL, PLUMBING, AND ELECTRICAL ASSOCIATED WITH EQUIPMENT TO BE REMOVED. REMOVE ALL PIPING, SUPPORTS, ANCHOR BOLTS, AND APPURTENANCES TO SOURCE AND PROVIDE SUITABLE CAP.
- REMOVE EMBEDDED EQUIPMENT AND HARDWARE A MINIMUM OF 1" BELOW THE SURFACE IT IS ATTACHED TO. PATCH OVER REMAINING PORTION OF ANCHOR BOLT IN ACCORDANCE WITH SPECIFICATIONS.
- WHERE ITEMS ARE REMOVED AND OPENINGS ARE CREATED BY DEMOLITION, IN ROOFS, WALLS, FLOORS AND ADJACENT SURFACES, PATCH TO MATCH ADJACENT SURFACES OR APPLY NEW FINISHES WHERE SCHEDULED.
- REMOVE SIGNAGE RELATED TO EXISTING SYSTEMS AFTER THE EXISTING SYSTEMS ARE DECOMMISSIONED AND ANY RELATED CHEMICALS HAVE BEEN REMOVED FROM THE SITE. REPAIR DAMAGED SURFACES RESULTING FROM REMOVAL OF SIGNAGE AND REPAINT DISTURBED AREAS TO MATCH ADJACENT SURFACES.
- EXISTING EQUIPMENT LIST (WHEN USED) IS NOT ALL INCLUSIVE OF EQUIPMENT IN AREAS SHOWN.

**KEY NOTES**

- REMOVE EXISTING DIFFERENTIAL PRESSURE GAUGES AND ASSOCIATED PLUMBING. SEE PHOTO 2 THIS SHEET.
- REMOVE 8" FLANGED 90° ELBOW, BUTTERFLY VALVE, VERTICAL PVC PIPING AND PVC SPLASH GUARD. REMOVE EXISTING 3" TANK DRAIN PIPE. SEE PHOTO 3 THIS SHEET.
- REMOVE 8" WAFER STYLE BUTTERFLY VALVE WITH HANDWHEEL OPERATOR. REMOVE 3" WAFER STYLE BUTTERFLY VALVE WITH LEVEL OPERATOR JUST BELOW 8" VALVE. (TYPICAL OF 2 LOCATIONS, EACH TANK) SEE PHOTO 2.
- REMOVE EXISTING JOINT SEALANT, BACKER ROD AND CLEAN AREA. PROVIDE NEW BACKER ROD AND JOINT SEALANT. SEE PHOTO 1 THIS SHEET AND DETAIL ON SHEET D102.
- REMOVE EXISTING PIPE COATING AND PROVIDE NEW COATING FOR PROCESS PIPING INCLUDING VALVES AND APPURTENANCES IN PLACE AS SPECIFIED WITHIN SECTION 099100. SEE PHOTO 2 AS A SAMPLE FOR EXISTING CONDITION OF PIPING.
- REMOVE EXISTING 12"x16" MANWAYS. THIS WORK IS TO BE PERFORMED BY THE EQUIPMENT MANUFACTURER.
- REMOVE EXISTING 8" HEADER AND 3" LATERALS. COORDINATE EXTENT OF REMOVAL WITH EQUIPMENT MANUFACTURER.
- REMOVE AND DISPOSE OF MEDIA FROM THE INTERIOR OF FILTERS.
- REMOVE AIR PIPING AND ASSOCIATED AIR RELEASE VALVES.

**REVISIONS**

9/1/2021 | BIDS AND CONSTRUCTION

Drawn By: SG  
Designer:  
Reviewer:  
Manager: MTP

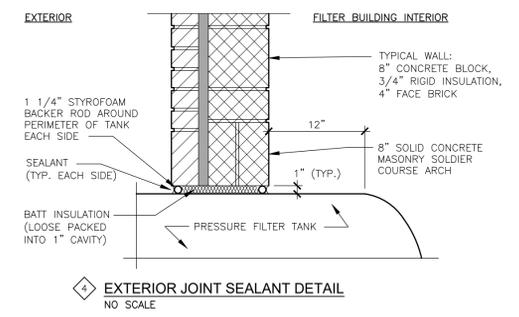
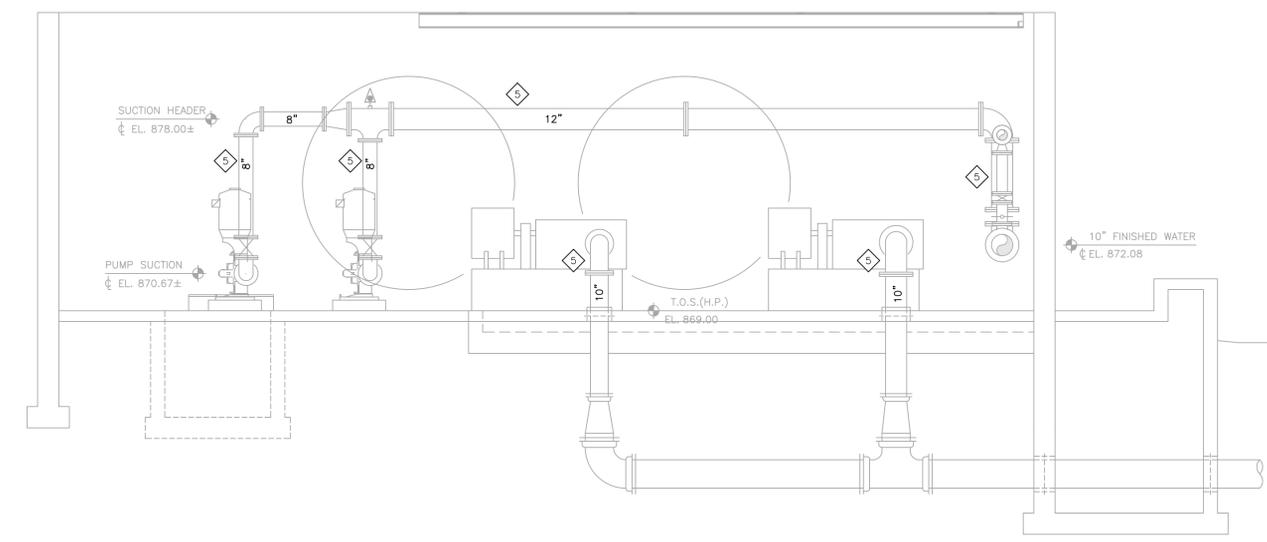
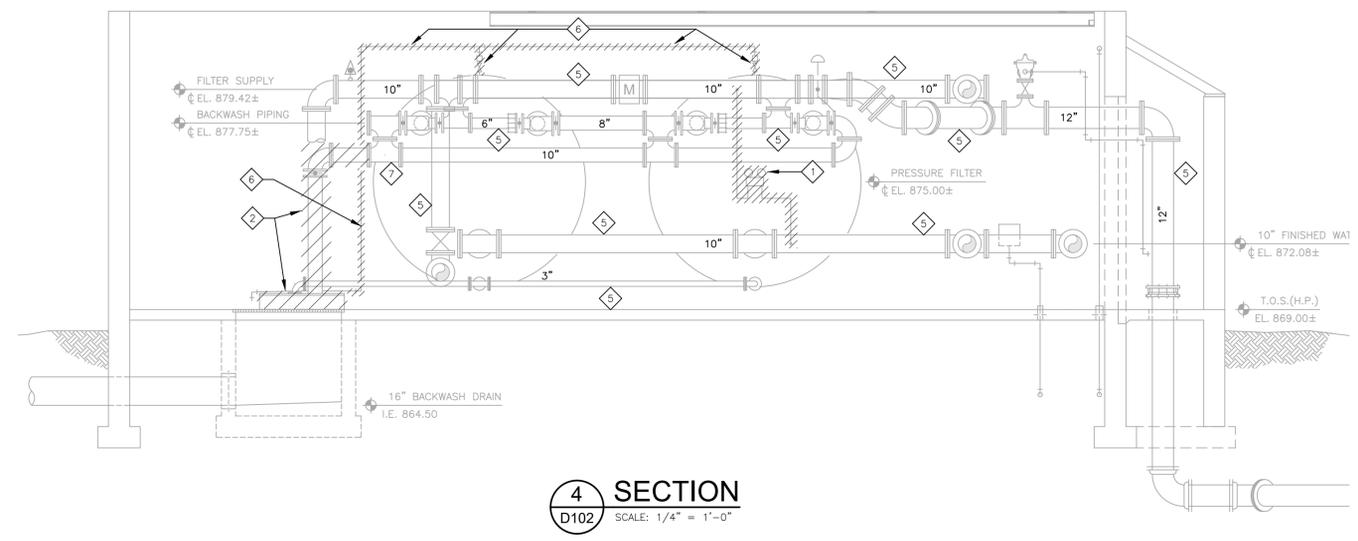
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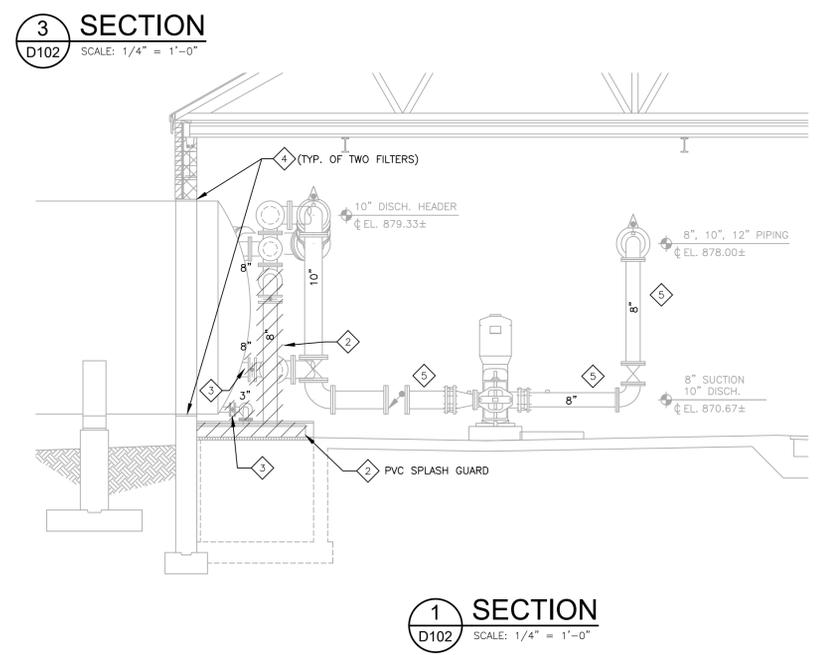
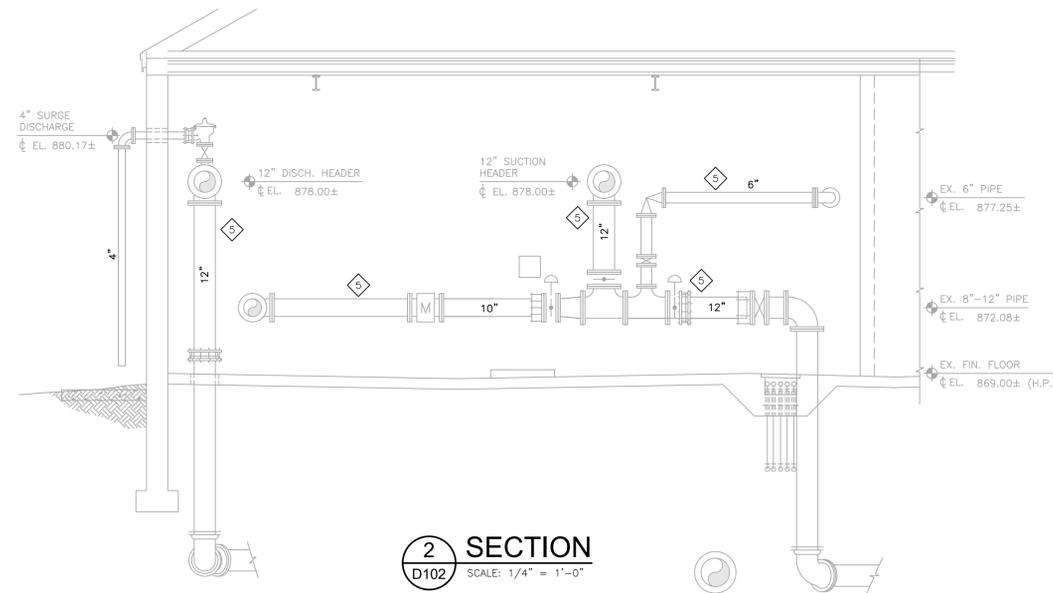
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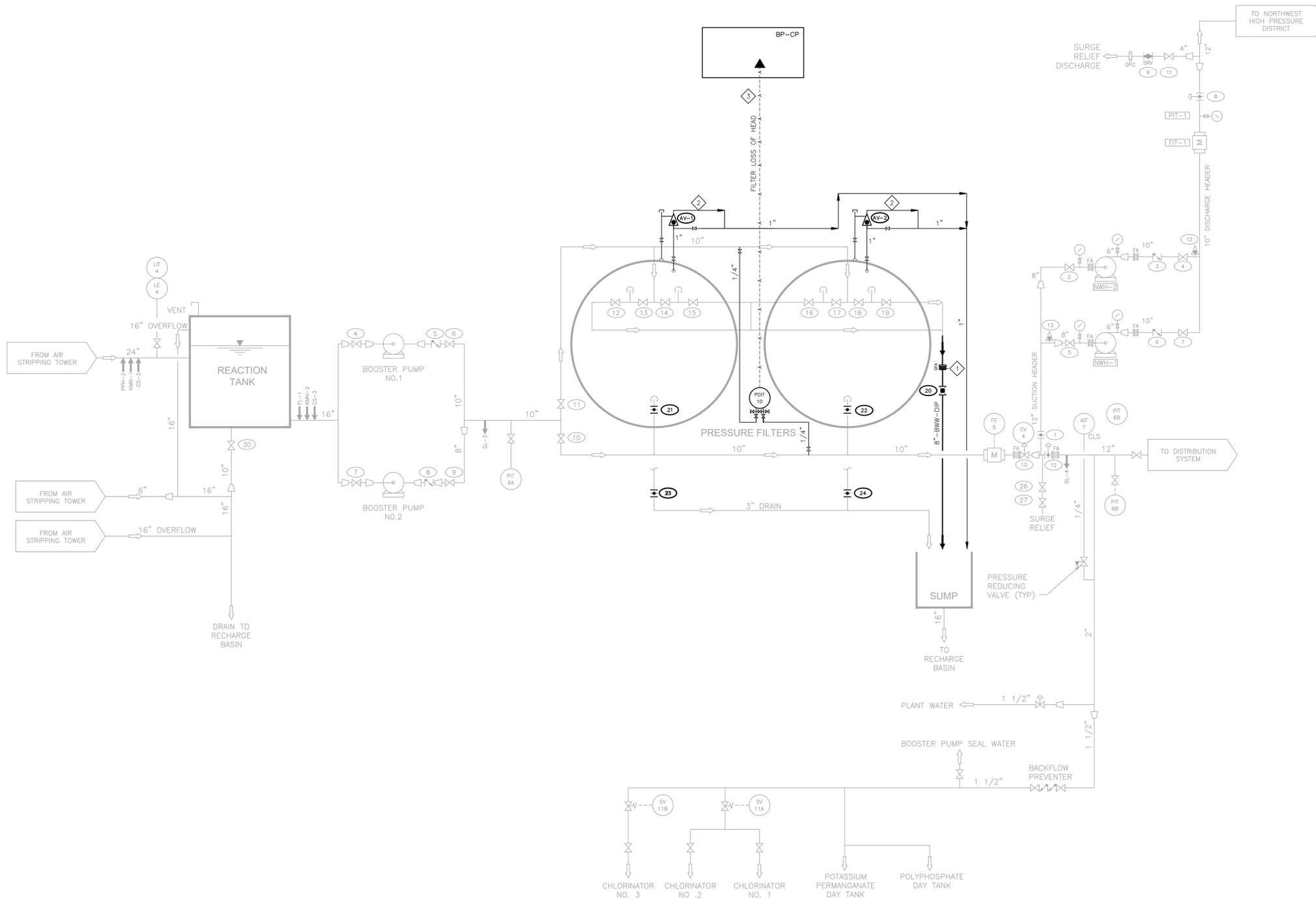


- KEY NOTES**
- REMOVE EXISTING DIFFERENTIAL PRESSURE GAUGES AND ASSOCIATED PLUMBING.
  - REMOVE 8" FLANGED 90° ELBOW, BUTTERFLY VALVE, VERTICAL PVC PIPING AND PVC SPLASH GUARD. SEE PHOTO 3 ON SHEET D101.
  - REMOVE 8" WAFER STYLE BUTTERFLY VALVE WITH HANDWHEEL OPERATOR. REMOVE 3" WAFER STYLE BUTTERFLY VALVE WITH LEVER OPERATOR JUST BELOW 8" VALVE. (TYPICAL OF 2 LOCATIONS, EACH TANK) SEE PHOTO 2 ON SHEET D101.
  - REMOVE EXISTING JOINT SEALANT, BACKER ROD AND CLEAN AREA. PROVIDE NEW BACKER ROD AND JOINT SEALANT. SEE DETAIL THIS SHEET.
  - REMOVE EXISTING PIPE COATING AND PROVIDE NEW COATING FOR PROCESS PIPING INCLUDING VALVES AND APPURTENANCES IN PLACE AS SPECIFIED WITHIN SECTION 09 91 00. SEE SHEET D101, PHOTO 2 AS A SAMPLE FOR EXISTING CONDITION OF PIPING.
  - REMOVE AIR PIPING AND ASSOCIATED AIR RELEASE VALVES.
  - REMOVE AND SALVAGE EXISTING 8" TEE. SEE P202 FOR NEW ORIENTATION OF EXISTING TEE.



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**NOTES**

1. REFER TO SPECIFICATION SECTION 409000 FOR FUNCTIONAL INTENT.

**KEY NOTES**

1. INSTALL 8" ORIFICE PLATE BETWEEN FLANGE AND GROOVED FLANGE ADAPTER.
2. 1" AIR DISCHARGE FROM COMBINATION AIR/VACUUM VALVE OUTLET.
3. PROVIDE (1) #16 TWISTED SHIELDED PAIR CABLE IN 3/4" RIGID STEEL CONDUIT BETWEEN CONTROL PANEL BP-CP AND INSTRUMENT PDIT-100. LIQUID-TIGHT FLEXIBLE METAL CONDUIT MAY BE USED FOR FINAL CONNECTION TO THE INSTRUMENT. UTILIZE SPARE TERMINAL BLOCKS AND SPARE ANALOG INPUT IN PANEL BP-CP FOR CONNECTION OF INSTRUMENT TO SCADA SYSTEM. PROVIDE ALL INTERNAL WIRING AND PROGRAMMING IN BP-CP PLC AS REQUIRED FOR INTEGRATION OF INSTRUMENT. SEE SPECIFICATION SECTION 40 90 00 FOR ADDITIONAL INFORMATION. PROVIDE PROGRAMMING FOR PANEL MOUNTED HMI SCREEN AND OWNER'S SCADA SYSTEM SCREENS AS REQUIRED.

**REVISIONS**

9/1/2021 BIDS AND CONSTRUCTION

Drawn By SG  
Designer MBK  
Reviewer MTP  
Manager MTP

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PROJECT NO.  
210091

SHEET NO.

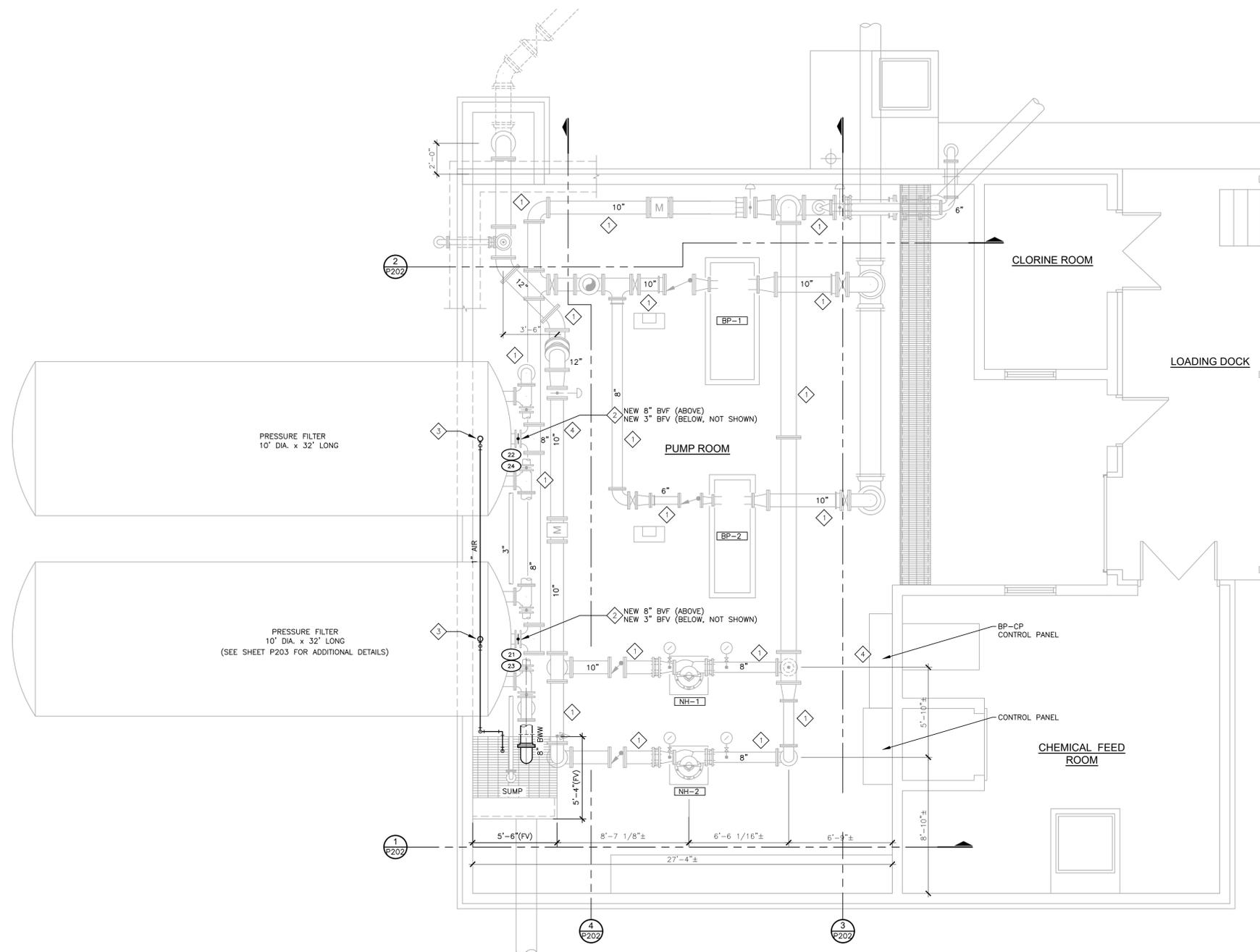
**P102**

**PROCESS & INSTRUMENTATION DIAGRAM**

NO SCALE

PROCESS VALVE SCHEDULE				
VALVE TAG	SIZE	TYPE	OPERATOR	SERVICE
20	8"	GLOBE	HANDWHEEL	POTABLE
21	8"	RESILIENT BUTTERFLY	HANDWHEEL	POTABLE
22	8"	RESILIENT BUTTERFLY	HANDWHEEL	POTABLE
23	3"	RESILIENT BUTTERFLY	LEVER	POTABLE
24	3"	RESILIENT BUTTERFLY	LEVER	POTABLE
AV-1	1"	AIR/VACUUM	-	AIR RELEASE/VACUUM PROTECTION
AV-2	1"	AIR/VACUUM	-	AIR RELEASE/VACUUM PROTECTION

PROCESS PIPING SCHEDULE					
DESCRIPTION	SIZE	MATERIAL	LINING	JOINT STYLE	NOTES
BACKWASH DISCHARGE LINE, DRAIN	3", 8"	DUCTILE IRON	CEMENT MORTAR	FLANGED	CLASS 53
AIR RELEASE PIPING	1"	COPPER	-	THREADED, SOLDER	-
INSTRUMENT PIPING	1/4"	STAINLESS STEEL	-	SWAGelok	-



**NOTES**

1. PROVIDE CLEANING AND COATING OF EXTERIOR OF FILTERS IN ACCORDANCE WITH SPECIFICATION SECTION 09 91 00.
2. PREPARE INTERIOR SURFACES OF FILTERS AND COAT INTERIOR SURFACES INCLUDING PARTITION WALL IN ACCORDANCE WITH SPECIFICATION SECTION 09 91 00.

**KEY NOTES**

1. PROVIDE NEW COATING ON THE PROCESS PIPING INCLUDING VALVES AND APPURTENANCES IN PLACE AS SPECIFIED WITHIN SECTION 09 91 00.
2. INSTALL NEW 8" WAFER TYPE BUTTERFLY VALVE WITH HANDWHEEL. INSTALL NEW 3" WAFER TYPE BUTTERFLY WITH HAND LEVER (TYP. 2 PLACES)
3. NEW 1" COMBINATION AIR/VACUUM VALVE AT EACH FILTER. RUN NEW 1" PIPING TO SUMP. SEE SECTION 4 ON P202 FOR MORE DETAIL.
4. PROVIDE (1) #16 TWISTED SHIELDED PAIR CABLE IN 3/4" RIGID STEEL CONDUIT BETWEEN CONTROL PANEL BP-CP AND INSTRUMENT PDI-100. LIQUID-TIGHT FLEXIBLE METAL CONDUIT MAY BE USED FOR FINAL CONNECTION TO THE INSTRUMENT. UTILIZE SPARE TERMINAL BLOCKS AND SPARE ANALOG INPUT IN PANEL BP-CP FOR CONNECTION OF INSTRUMENT TO SCADA SYSTEM. PROVIDE ALL INTERNAL WIRING AND PROGRAMMING IN BP-CP PLC AS REQUIRED FOR INTEGRATION OF INSTRUMENT. SEE SPECIFICATION SECTION 40 90 00 FOR ADDITIONAL INFORMATION. PROVIDE PROGRAMMING FOR PANEL MOUNTED HMI SCREEN AND OWNER'S SCADA SYSTEM SCREENS AS REQUIRED.

**City of Kalamazoo**  
Kalamazoo County, Michigan  
Well Station 11 Filter Improvements

**REVISIONS**

9/1/2021 BIDS AND CONSTRUCTION

Drawn By SG  
Designer  
Reviewer  
Manager MTP

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210091

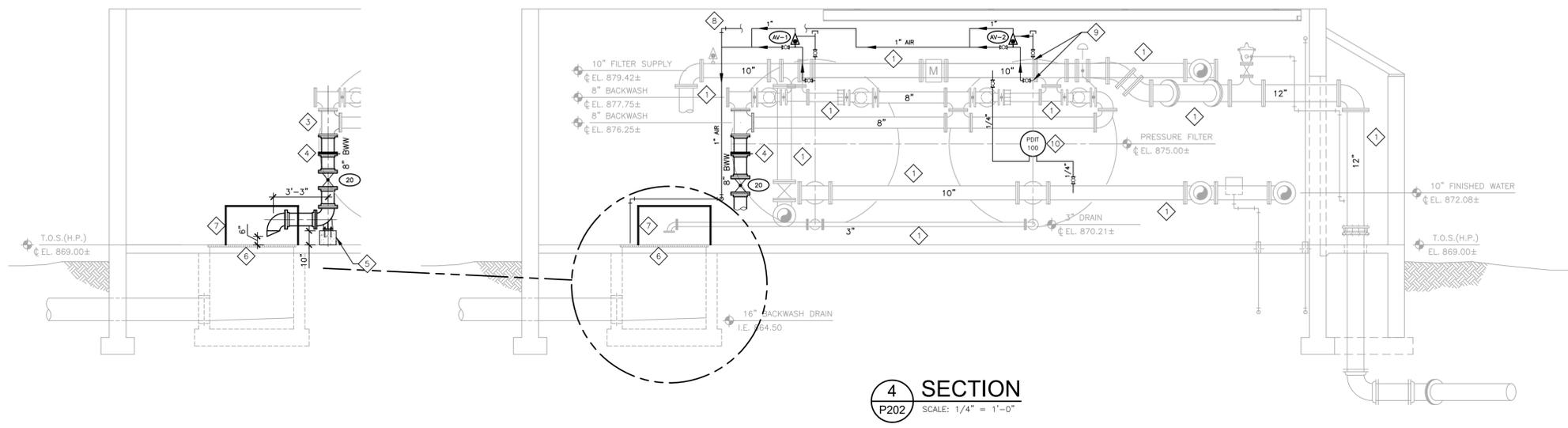
SHEET NO.

**P201**

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PLT: I:\P201\210091\CADD\DWG\210091.DWG LAYOUT: P201 DATE: 9/13/2021 TIME: 10:25:16 AM USER: SGODLEWSKI

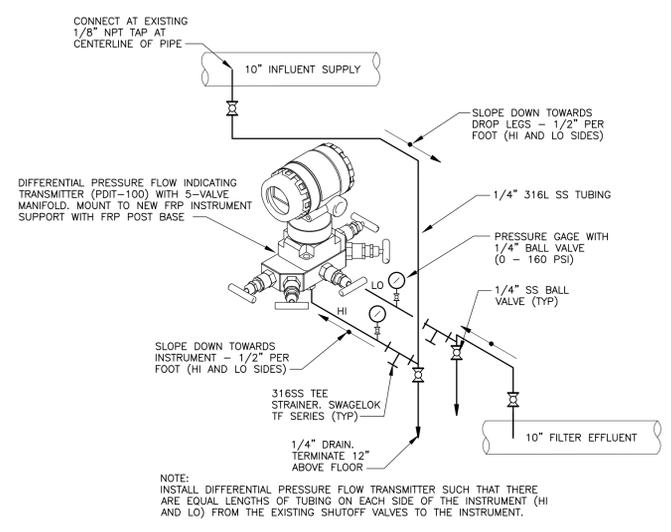




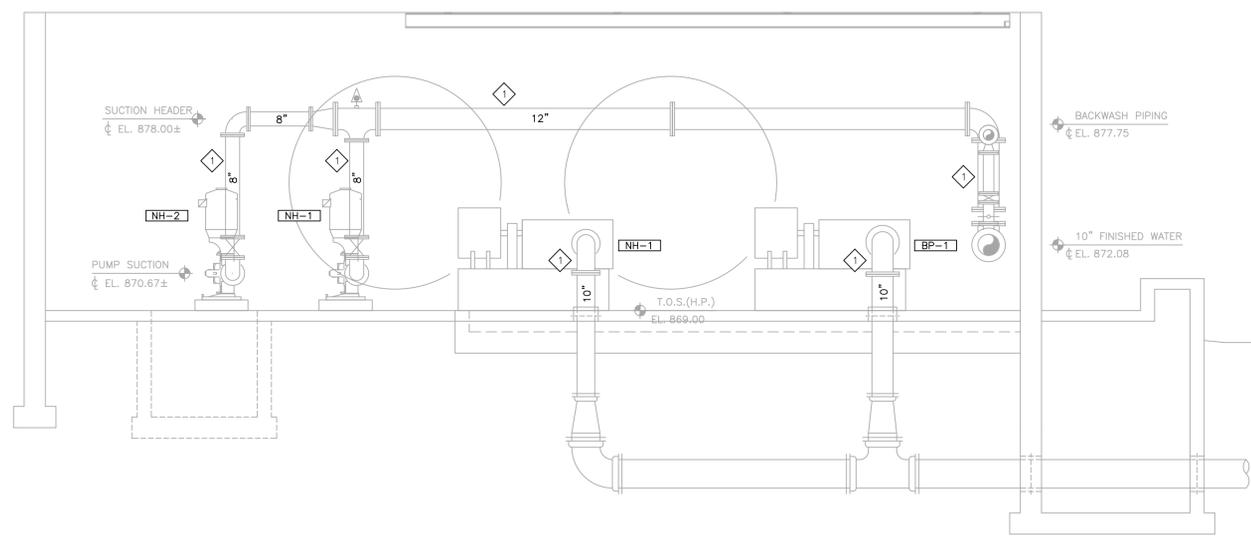
**4 SECTION**  
 P202 SCALE: 1/4" = 1'-0"

**NOTES**

1. PROVIDE CLEANING AND COATING OF EXTERIOR OF FILTERS IN ACCORDANCE WITH SPECIFICATION SECTION 09 91 00.
2. PREPARE INTERIOR SURFACES OF FILTERS AND COAT INTERIOR SURFACES INCLUDING PARTITION WALL IN ACCORDANCE WITH SPECIFICATION SECTION 09 91 00.



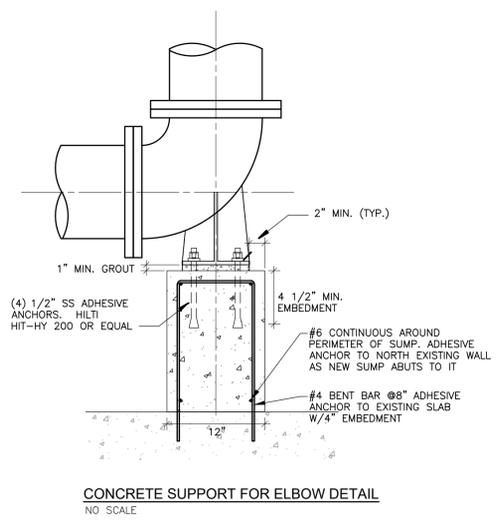
**DIFFERENTIAL PRESSURE FLOW INDICATING TRANSMITTER INSTALLATION DETAIL**  
 NO SCALE



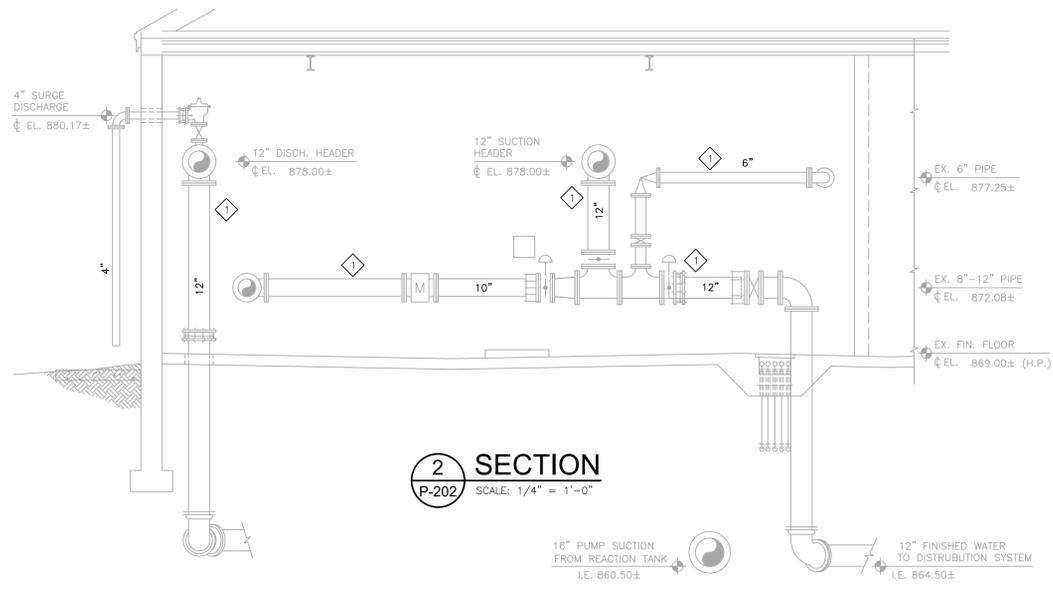
**3 SECTION**  
 P202 SCALE: 1/4" = 1'-0"

**KEY NOTES**

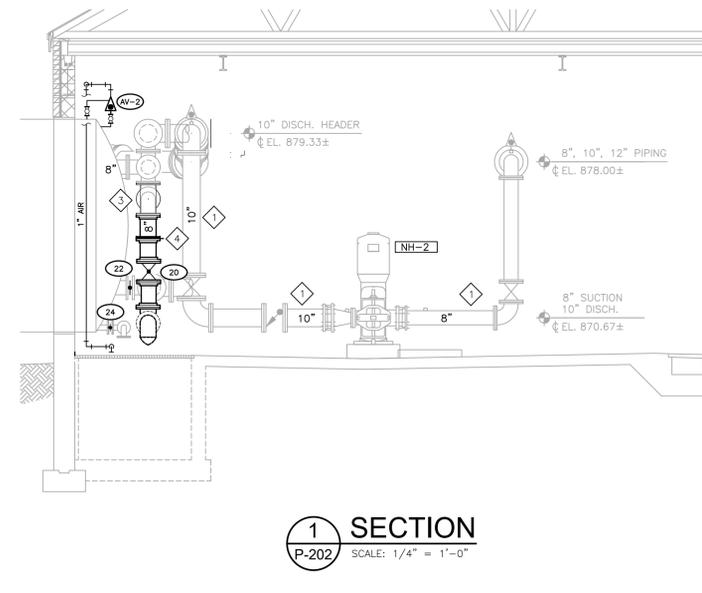
1. PROVIDE NEW COATING ON THE PROCESS PIPING INCLUDING VALVES AND APPURTENANCES IN PLACE AS SPECIFIED WITHIN SPECIFICATION SECTION 09 91 00.
2. INSTALL NEW 8" WAFER TYPE BUTTERFLY VALVE WITH HANDWHEEL ACTUATOR. INSTALL NEW 3" WAFER TYPE BUTTERFLY WITH HAND LEVER. (TYP. 2 PLACES)
3. REUSE AND ROTATE EXISTING 8" DI TEE.
4. 8" ORIFICE PLATE INSTALLED BETWEEN FLANGES. ORIFICE PLATE DIMENSIONS AS SPECIFIED IN 40 05 13. ON UPSTREAM SIDE OF ORIFICE PLATE, PROVIDE 8" GROOVED FLANGE ADAPTER.
5. PROVIDE 12" X 12" CONCRETE BASE FOR MOUNTING NEW 8" BASE ELBOW. SEE DETAIL ON THIS SHEET.
6. REUSE EXISTING SUMP GRATING.
7. PROVIDE PVC SPLASH GUARD AS SHOWN. FABRICATE SPLASH GUARD OUT OF 3/4" PVC SHEET STOCK AND ANCHOR TO WALL WITH 3/8" SS ANCHORS. INSTALLATION SIMILAR TO EXISTING. NOTCH OUT SPLASH GUARD AT PIPE PENETRATIONS. SPLASH GUARD NEEDS TO BE EASILY REMOVABLE.
8. 1" COPPER TUBING AND FITTINGS. PROVIDE BALL VALVES AS SHOWN. ROUTE TO SUMP AND TERMINATE WITH ELBOW 2" ABOVE GRATING.
9. CONNECT TO EXISTING 3/4" TAPS ON PRESSURE FILTERS. 2 LOCATIONS PER FILTER, TYPICAL OF 2 FILTERS. INSTALL COMBINATION AIR/VACUUM VALVE SUCH THAT CENTERLINE OF THE VALVE IS ABOVE THE TOP OF THE TANK.
10. PROVIDE (1) #16 TWISTED SHIELDED PAIR CABLE IN 3/4" RIGID STEEL CONDUIT BETWEEN CONTROL PANEL BP-CP AND INSTRUMENT. LIQUID-TIGHT FLEXIBLE METAL CONDUIT MAY BE USED FOR FINAL CONNECTION TO THE INSTRUMENT. UTILIZE SPARE TERMINAL BLOCKS AND SPARE ANALOG INPUT IN PANEL BP-CP FOR CONNECTION OF INSTRUMENT TO SCADA SYSTEM. PROVIDE ALL INTERNAL WIRING AND PROGRAMMING IN BP-CP PLC AS REQUIRED FOR INTEGRATION OF INSTRUMENT. SEE SPECIFICATION SECTION 40 90 00 FOR ADDITIONAL INFORMATION. PROVIDE PROGRAMMING FOR PANEL MOUNTED HMI SCREEN AND OWNER'S SCADA SYSTEM SCREENS AS REQUIRED. SEE DETAIL ON THIS SHEET FOR PIPING REQUIREMENTS.



**CONCRETE SUPPORT FOR ELBOW DETAIL**  
 NO SCALE

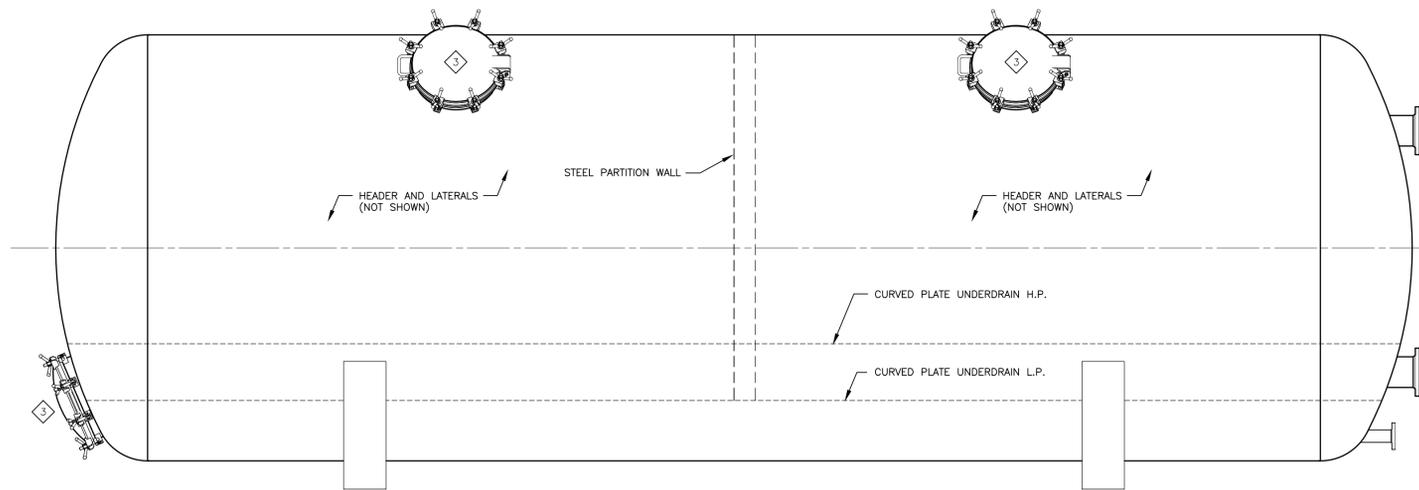


**2 SECTION**  
 P-202 SCALE: 1/4" = 1'-0"

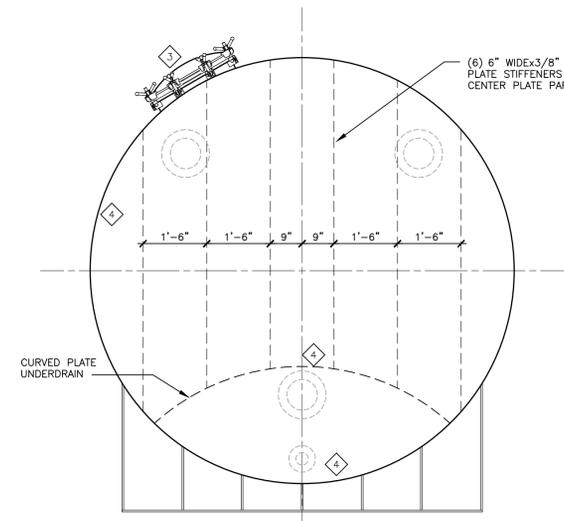


**1 SECTION**  
 P-202 SCALE: 1/4" = 1'-0"

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(TYPICAL OF 2)  
**SIDE VIEW**  
SCALE: 1/2" = 1'-0"



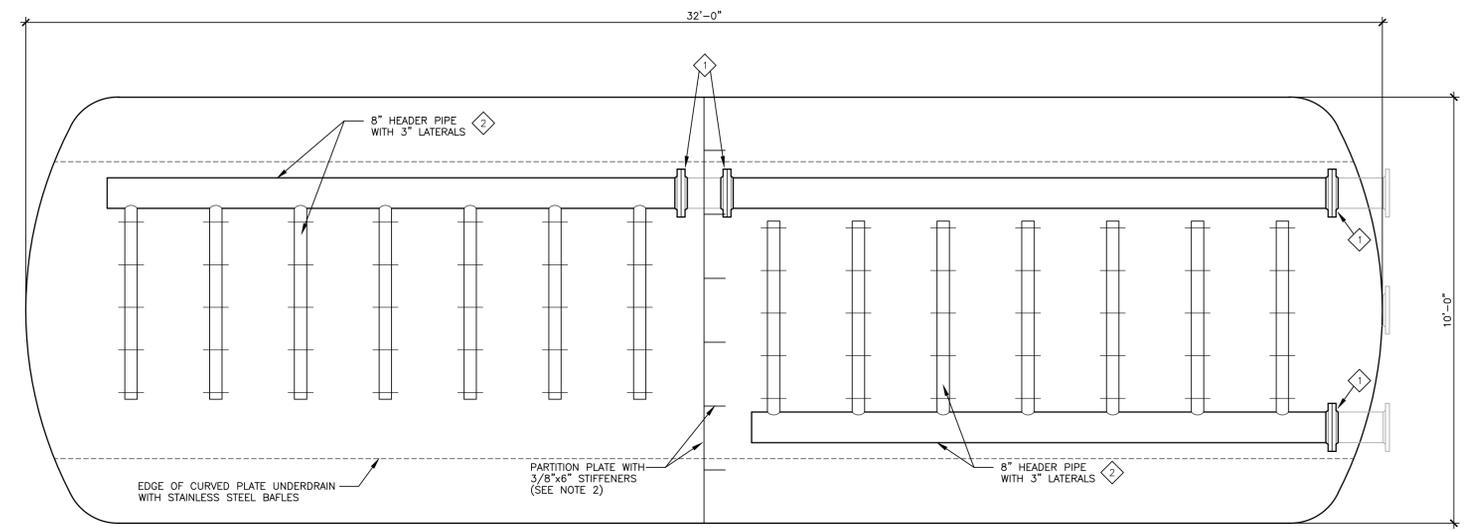
(TYPICAL OF 2)  
**FRONT VIEW**  
SCALE: 1/2" = 1'-0"

**NOTES**

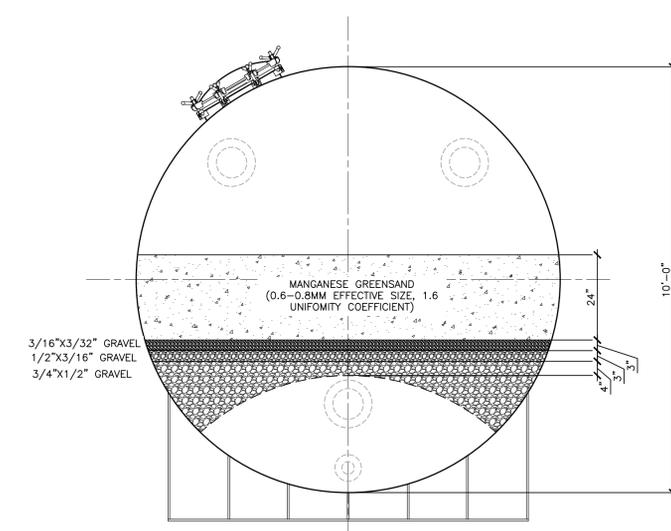
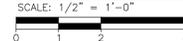
1. PROVIDE CLEANING AND COATING OF EXTERIOR OF FILTERS IN ACCORDANCE WITH SPECIFICATION SECTION 09 91 00.
2. PREPARE INTERIOR SURFACES OF FILTERS AND COAT INTERIOR SURFACES INCLUDING PARTITION WALL IN ACCORDANCE WITH SPECIFICATION SECTION 09 91 00.

**KEY NOTES**

1. FIELD WELD NEW 8" STEEL SLIP-ON FLANGES AT INDICATED LOCATIONS TO ALLOW FOR INSTALLATION OF NEW HEADER, INSTALLED BY CONTRACTOR.
2. NEW 8" HEADER PIPE WITH 3" LATERALS PROVIDED BY EQUIPMENT MANUFACTURER, INSTALLED BY CONTRACTOR.
3. PROVIDE NEW 24" HINGED MANWAYS, (3) PER FILTER. INSTALLATION TO BE PERFORMED BY EQUIPMENT MANUFACTURER.
4. AFTER FILTER IS DRAINED AND OFFLINE, A FULL INSPECTION COORDINATED WITH THE ENGINEER AND OWNER'S TANK INSPECTION REPRESENTATIVES WILL OCCUR. ANY STEEL REPAIR OR UNDERDRAIN NOZZLE REPLACEMENT WILL BE DETERMINED AT THAT TIME AND BE PAID OUT OF AN ALLOWANCE. THIS IS TYPICAL FOR BOTH TANKS.



(TYPICAL OF 2)  
**FILTER INTERIOR PLAN**  
SCALE: 1/2" = 1'-0"



(TYPICAL OF 2)  
**FRONT VIEW**  
SCALE: 1/2" = 1'-0"

**REVISIONS**

9/1/2021 BIDS AND CONSTRUCTION

Drawn By SG  
Designer MBK  
Reviewer MTP  
Manager MTP

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SHEET NO.

**P203**