**Jones & Henry Engineers, Ltd.**

# Village of Ada, Ohio
# Water Treatment Plant Improvements
# Contract No. 21

## ADDENDUM 2

August 22, 2025

Planholders of the Village of Ada, Water Treatment Plant Improvement, Contract No. 21 project are hereby notified of the following amendments to the Contract Documents. This Addendum is hereby made a part of the Contract Documents.

**DRAWINGS**

Replace sheet C-0.1 with attached C-0.1

Replace sheet PE-1.1 with attached PE-1.1

Replace sheet PE-4.0 with attached PE-4.0

Replace sheet R-0.1 with attached R-0.1

**SPECIFICATIONS**

**Section C-410, 5.01C Bid Form, replace with attached**

**Section 01021, Section 4.02A Definition of Allowance, replace with attached**

**Section 01043, Section 4.03B Sequence of Construction, replace with attached**

**Section 02555, Section 2.01 Pressure Pipe Specification, replace with attached**

**Section 02555, Section 4.01B Piping Schedule, replace with attached**

**Section 11821, Section 1.01 Scope, replace with attached**

**Section 11821, Section 2.01A General, replace with attached**

**Section 11821, Section 2.03G Side Feed Clarifier (Clarifier 1), replace with attached**

**Section 11821, Section 2.04 Bottom Feed Clarifier (Clarifier 2), replace with attached**

**Section 16902, Section 2.12A Analytical, replace with attached**

Attachments: Drawing Sheet C-0.1
Drawing Sheet PE-1.1
Drawing Sheet PE-4.0
Drawing Sheet R-0.1
Specification C-410
Specification 01021

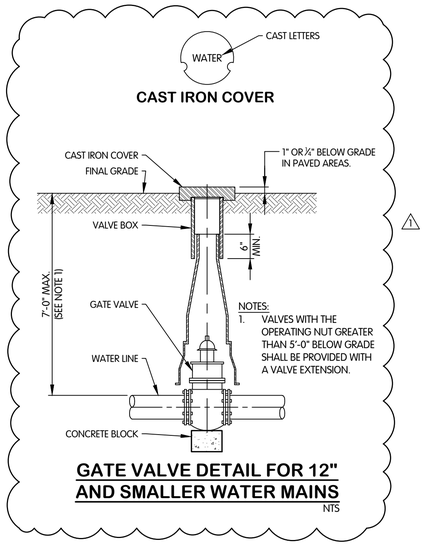
Specification 01043

Specification 02555

Specification 11821

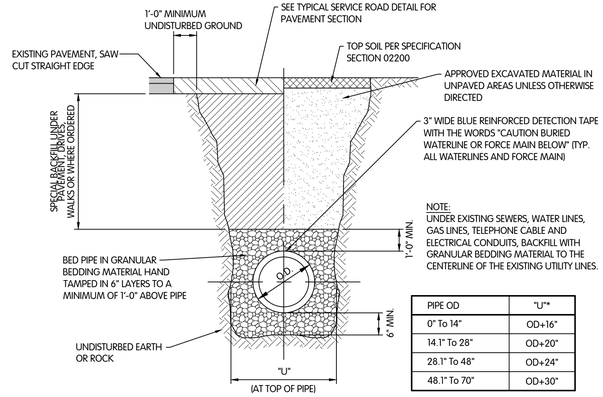
Specification 16902

**RECEIPT OF THIS ADDENDUM MUST BE ACKNOWLEDGED ON PAGE C-410 - 1 OF THE BID.**




## GATE VALVE DETAIL FOR 12" AND SMALLER WATER MAINS

NTS




| PIPE OD | "U"* |
|---|---|
| 0" To 14" | OD+16" |
| 14.1" To 28" | OD+20" |
| 28.1" To 48" | OD+24" |
| 48.1" To 70" | OD+30" |

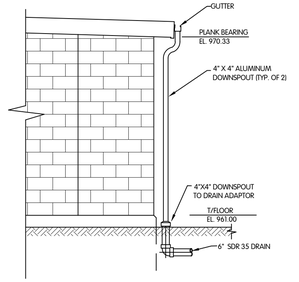
## TRENCH SCHEDULE

* NOTE:
"U" IS THE MINIMUM WIDTH FOR FLEXIBLE PIPES IN ACCORDANCE WITH ASTM D-2321 AND D-2774.

## TRENCH DETAIL FOR FLEXIBLE PIPE

NTS

| JOINT RESTRAINT TABLE | | |
|---|---|---|
| Length Of Pipe To Be Restrained In Each Direction From ℄ Of Bend | | |
| Degree Of Bend | 12" DIP BASED ON 100 PSI TEST PRESSURE | 16" DIP BASED ON 50 PSI TEST PRESSURE |
| Tees & Plugs | 31' | 15' |
| 90° | 13' | 8' |
| 45° | 6' | 4' |
| 22½° | 3' | 2' |




## GUTTER AND DOWNSPOUTS

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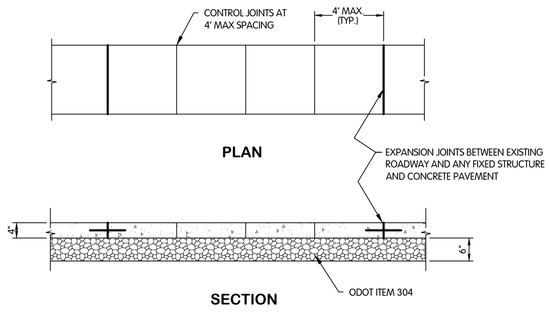
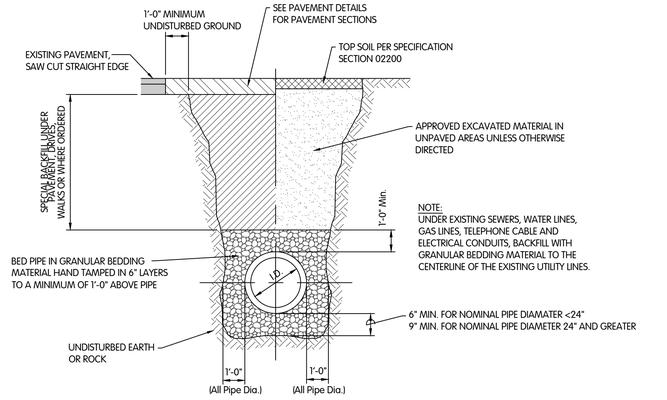


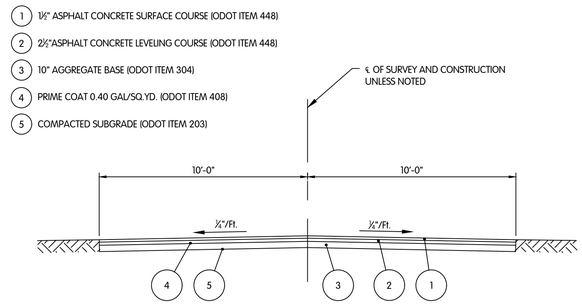

## TYPICAL CONCRETE SIDEWALK DETAIL

NTS




## TRENCH DETAIL FOR RIGID PIPE (DIP)

NTS




## TYPICAL ASPHALT PAVEMENT SECTION

NTS

CIVIL DETAILS

VILLAGE OF ADA, OHIO - WATER TREATMENT PLANT IMPROVEMENTS
CONTRACT 21

| NO. | DATE | REVISIONS AFTER ISSUED FOR BID | BY |
|---|---|---|---|
| 5 | | | |
| 4 | | | |
| 3 | | | |
| 2 | 08/21/25 | ADDENDUM 2 | JDM |
| 1 | | | |

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JOB NO. 014-8046.002

SCALE 1"=10'

THIS LINE SCALES 1" WHEN PLOTTED TO NOTED SCALE

| DESIGNED | DRAWN | CHECKED |
|---|---|---|
| JDM | NAT | JDM |

STATUS: ISSUED FOR BID

DATE: JULY 2025

SHEET NO.

C-0.1

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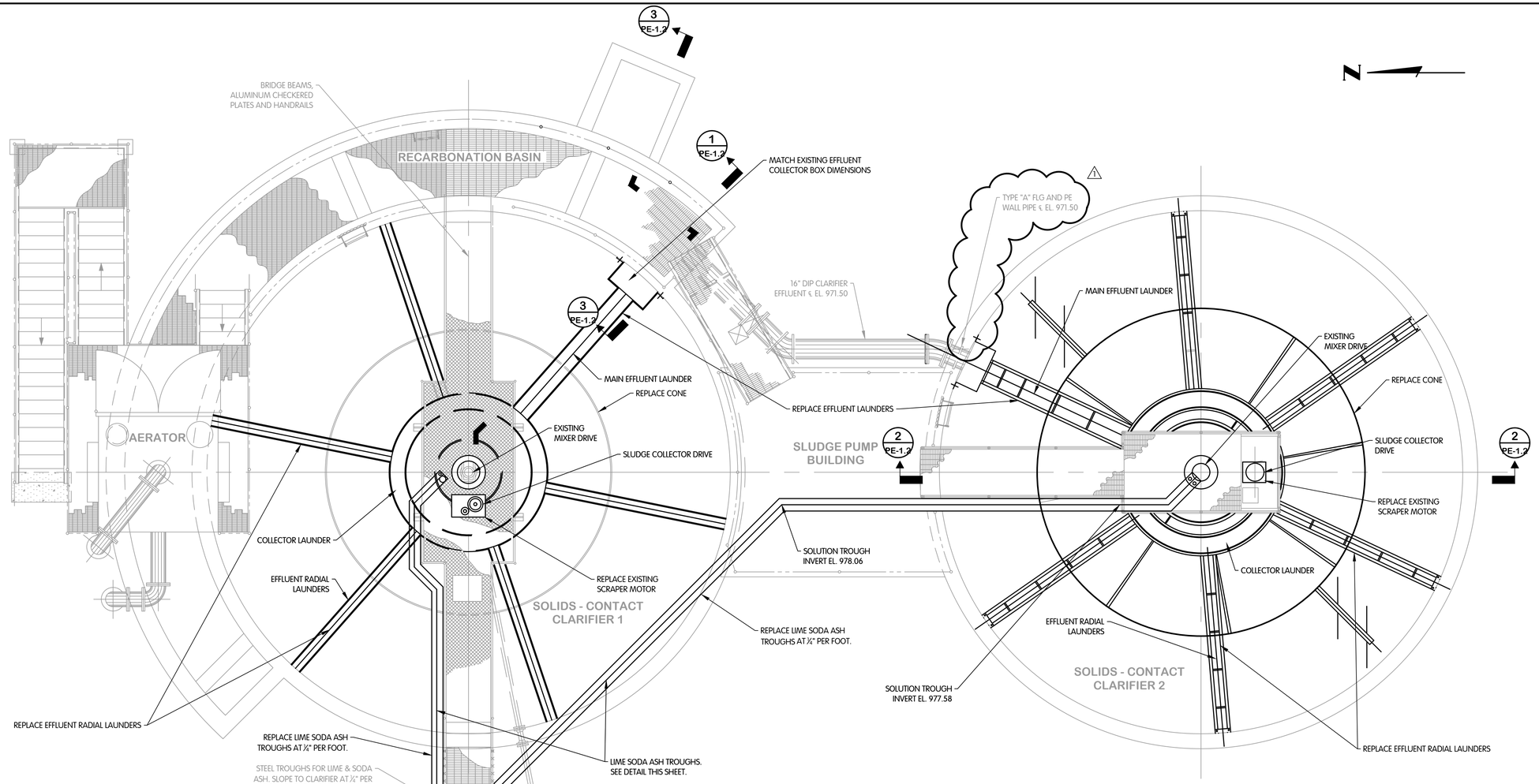
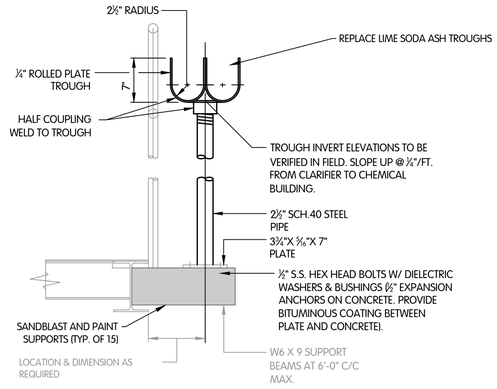
C:\N-8046\00\COI\C-0.1 CIVIL DETAILS
8/21/2025 7:45 AM - LBROWN
8/21/2025 7:46 AM




LIME & SODA ASH TROUGH DETAIL

1"= 1'-0"

NOTES:
1. CLARIFIER MANUFACTURER SHALL MEASURE THE EXISTING DIMENSIONS AND FIELD VERIFY LOCATIONS OF EXISTING EQUIPMENT AND MATCH EXISTING EQUIPMENT WHEN POSSIBLE.

# EXISTING CLARIFIERS 1 AND 2 PIPING AND EQUIPMENT PLAN AT EL. 978.00

VILLAGE OF ADA, OHIO - WATER TREATMENT PLANT IMPROVEMENTS
CONTRACT 21

| NO. | DATE | REVISIONS AFTER ISSUED FOR BID | BY |
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| 1 | 8/21/25 | ADDENDUM 2 | JDM |


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| NAT | LKB | JDM |

STATUS: ISSUED FOR BID
DATE: JULY 2025
SHEET NO.
PE-1.1
42 OF 78


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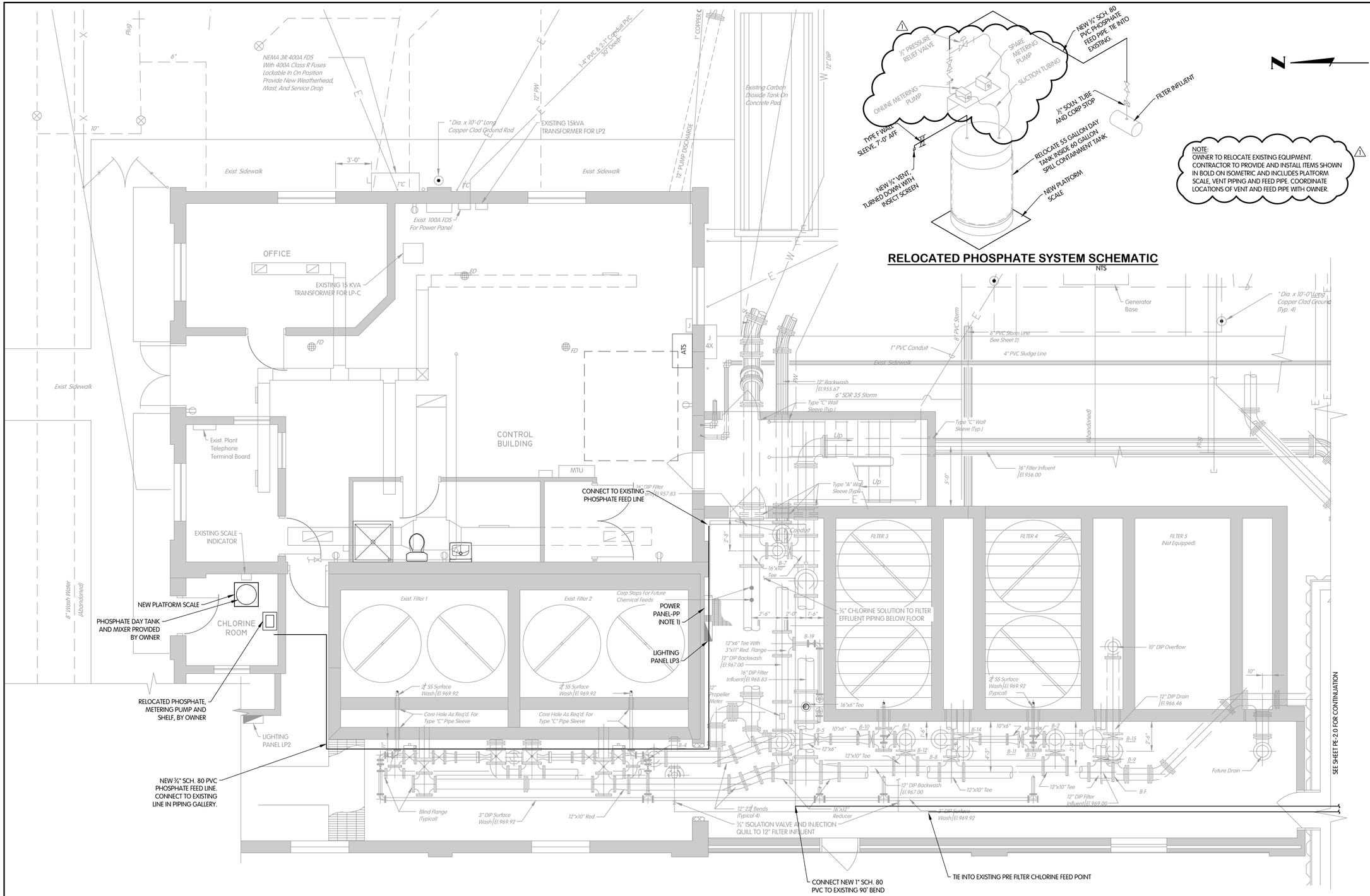


## PLAN

¼"=1'-0"




## RELOCATED PHOSPHATE SYSTEM SCHEMATIC

NTS

1 NOTE:
OWNER TO RELOCATE EXISTING EQUIPMENT. CONTRACTOR TO PROVIDE AND INSTALL ITEMS SHOWN IN BOLD ON ISOMETRIC AND INCLUDES PLATFORM SCALE, VENT PIPING AND FEED PIPE. COORDINATE LOCATIONS OF VENT AND FEED PIPE WITH OWNER.

# NEW CHEMICAL FEED PIPING PIPING AND EQUIPMENT PLAN

VILLAGE OF ADA, OHIO - WATER TREATMENT PLANT IMPROVEMENTS
CONTRACT 2I

| NO. | DATE | REVISIONS, AFTER ISSUED FOR BID | BY |
|---|---|---|---|
| 1 | 8/14/25 | ADDENDUM 2 | JDM |

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SCALE AS NOTED

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| DESIGNED | DRAWN | CHECKED |
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| NAT | LKB | JDM |

STATUS: ISSUED FOR BID

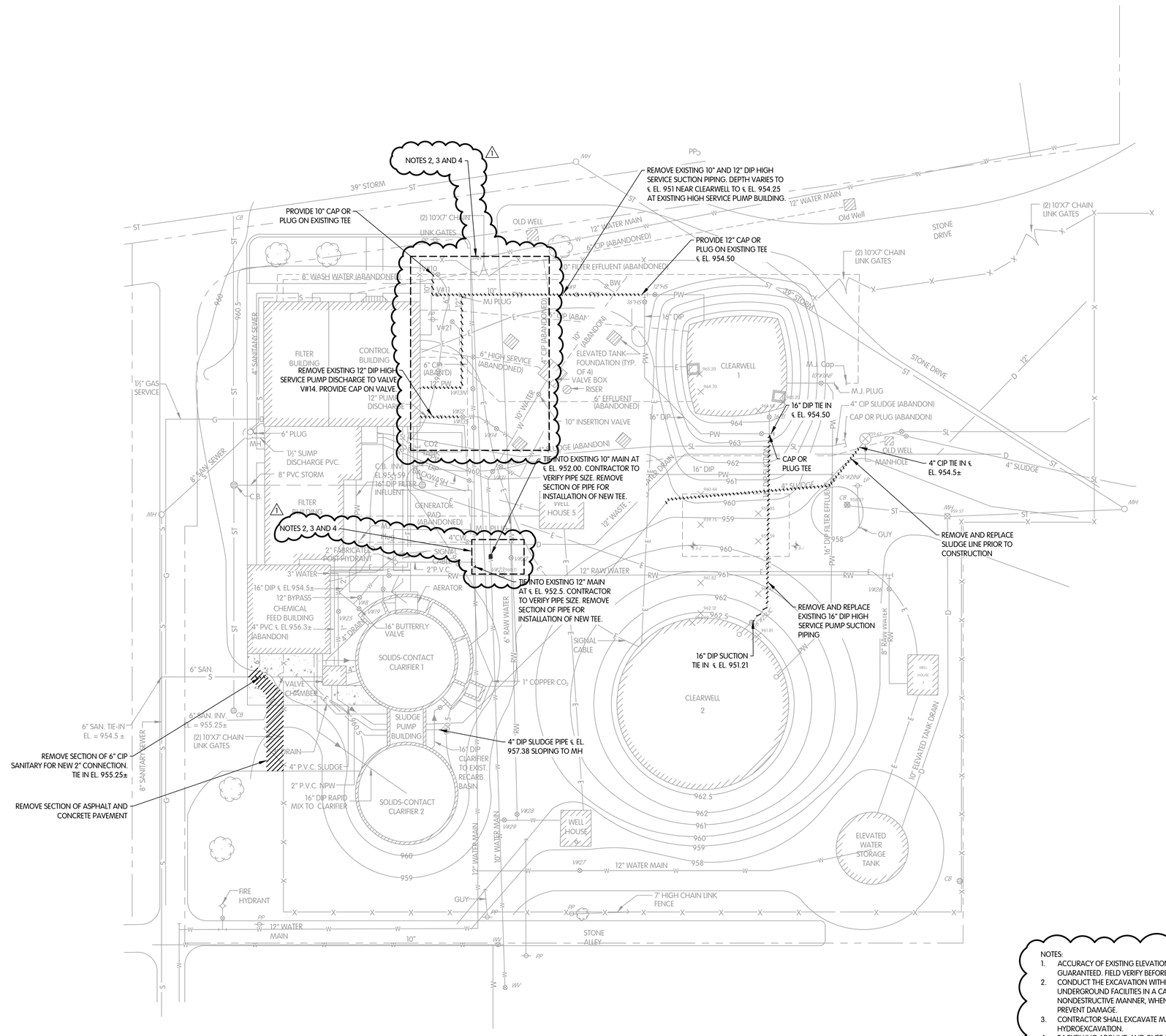
DATE: JULY 2025

SHEET NO.

PE-4.0

45 OF 78

CIN-8046.400\FIELD\PE-4.0 NEW CHEMICAL FEED PIPING PIPING AND EQUIPMENT PLAN
8/14/2025 8:59 AM LBROWN
8/14/2025 8:59 AM




# EXISTING SITE AND REMOVALS PLAN

VILLAGE OF ADA, OHIO - WATER TREATMENT PLANT IMPROVEMENTS
CONTRACT 21

| NO. | DATE | REVISIONS AFTER ISSUED FOR BID | BY |
|---|---|---|---|
| 5 | 8/13/25 | ADDENDUM 2 | JDM |

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| | |
|---|---|
| JOB NO. | 014-8046.002 |
| SCALE | 1:20 |

THIS LINE SCALES 1" WHEN PLOTTED TO NOTED SCALE

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| JDM | LKB | JDM |

STATUS: ISSUED FOR BID
DATE: JULY 2025

SHEET NO.
R-0.1
4 OF 78

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8/13/2025 7:33 AM - LBROWN
8/13/2025 7:33 AM

# SECTION 01021
# ALLOWANCES

## PART 1 GENERAL

### 1.01 SCOPE

A. This Section includes the allowances which are to be furnished by the Contractor per Paragraph GC-13.02 of the General Conditions.

B. The Contractor shall include in the Contract Price all allowances stated in the Contract Documents. These allowances shall cover the net cost of the materials and equipment delivered and unloaded at the Site, and all applicable taxes.

C. The Contractor's handling costs on the Site, labor installation costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Price and not in the allowance.

D. The Contractor shall cause the Work covered by these allowances to be performed for such amounts and by such persons as the Engineer may direct, but he will not be required to employ persons against whom he makes a reasonable objection.

E. If the cost, when determined, is more than or less than the allowance, the Contract Price shall be adjusted accordingly by Change Order.

### 1.02 SUBMITTALS

A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:

1. Shop Drawings for Review:

    a. Contractor shall prepare and submit proposals for the Owner to select the items included in allowance.

2. Information for the Record:

    a. Operation and maintenance manuals as may be required for items included in allowance.

    b. Invoices and delivery slips, for items provided under the allowance, shall be submitted to the resident project representative or Engineer.

### 1.03 PRODUCT HANDLING

A. The Contractor shall provide all labor, material and equipment to insure the safe delivery, handling and storage of goods until acceptance by Owner and Engineer.

### 1.04 GUARANTEE

A. Contractor shall provide manufacturer's warranties to the Owner for all goods provided.

## PART 2 PRODUCTS

Not used.

## PART 3 EXECUTION

### 3.01 COORDINATION

A. Contractor shall advise Owner and Engineer of, and include in the schedule, the timing of the selection, Shop Drawing review and procurement of the goods or services required in the allowance.

B. Contractor shall be responsible for the coordination, of all allowance item(s) provided, with the remainder of the contract work.

### 3.02 ERECTION, INSTALLATION AND APPLICATION

A. Contractor shall assemble, install or apply all goods as may be required to complete the requirements of the allowance.

### 3.03 PROTECTION

A. Contractor shall examine all goods on delivery. All damaged or defective goods shall be returned to the manufacturer for replacement.

## PART 4 SPECIAL PROVISIONS

### 4.01 LIST OF ALLOWANCES

| | | Allowance |
|---|---|---|
| A. | Control Panels, Programming and Systems Integration | $170,000.00 |
| B. | Laboratory Equipment and Furniture | $20,000.00 |
| C. | Camera System | $10,000 |
| D. | General Contingency | $150,000 |

### 4.02 DEFINITION OF ALLOWANCE

A. Control Panels work under this allowance includes the purchasing of control panels, hardware and software not provided by individual vendors. Programming and Systems Integration work under this allowance includes: PLC modifications and HMI programming. This work will be performed by others and invoices provided to the Contractor.

1. The Systems Integrator will design and supply the following panels; to be installed by the Contractor:

a. Remote I/O Panel – RIO-6

b. Sodium Hypochlorite Control Panel

c. Ferric Chloride Control Panel

d. Phosphate Control Panel

2. The Systems Integrator will provide the additional scope:

a. Software upgrades and programming

b. Integration of new panels and I/O into existing PLC and Plant Control System.

c. New SCADA modifications

d. Commissioning and validation on supplied equipment and software

e. Training on supplied equipment and software. **(Addendum 2, Issued 8/22/2025)**

B. Laboratory Equipment and Furniture shall be selected by others and a list provided to the Contractor. This allowance includes tables, desks, chairs, file cabinets, laboratory equipment.

C. Camera System work under this allowance includes furnishing and installing cameras as shown on the Drawings. Camera installer will make all cable terminations. Contractor is responsible for conduit and wiring. This work will be performed by others and invoices provided to the Contractor.

D. This allowance shall be used as directed by the Owner to provide material and labor to enhance the work.

END OF SECTION

# SECTION 01043
# COORDINATION AND CONTROL OF THE WORK

## PART 1 GENERAL

### 1.01 SCOPE

A. This section includes coordination and control of the Work.

### 1.02 SUBMITTALS

A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:

1. Information for the Record:

a. Bypass Pumping plan and procedures.

b. Haul routes to and from Site.

c. Plan and procedures for any shut downs and bypass pumping.

d. Coordination drawings shall include, but not be limited to, all process piping including, but not limited to, bill of material, laying length, embedded conduit runs, and embedded plumbing lines.

### 1.03 LINES AND GRADES

A. All Work under this Contract shall be built in accordance with the lines and grades shown on the Drawings or as altered or modified by authority of the Owner and Engineer.

### 1.04 EXISTING CONDITIONS SHOWN ON DRAWINGS

A. Where underground and surface structures are shown on the Drawings, the location, depth, and dimensions of such structures are believed to be reasonably correct but are not guaranteed.

B. Such structures are shown for the information of the Contractor, but information so given is not to be construed as a representation that such structures will in all cases be found or encountered just where shown, or that they represent all the structures which may be encountered.

### 1.05 COOPERATION OF CONTRACTOR

A. The Contractor shall conduct his operations so as to interfere as little as possible with those of the Owner, other contractors, utilities, or any public authority on or near the Work.

B. The Owner reserves the right to perform other Work by contract or otherwise, and to permit other public bodies, public utility companies, and others to do Work on or near the project during progress of the Work. If a conflict arises, the Owner will determine when and how the Work shall proceed.

C. Claims for delay or inconvenience due to operations of such other parties on Work specified, shown on the Drawings, as directed or which can be reasonably expected to be encountered by the nature and location of the Work will not be considered.

D. Operations entailing the use of construction equipment and lights outside the hours or 8:00 am and 5:00 pm or outside the hours allowed for construction by local ordinances or regulations are prohibited unless otherwise authorized by the Owner or Engineer.

E. Closing off clear access to any public alley, street, road, avenue or boulevard without the prior consent of municipal officials and the Engineer is prohibited.

F. Contractor and subcontractors are required under Ohio Revised Code Section 149.53 to Notify the Ohio Historical society and the Ohio Historic Site Preservation Board of archeological discoveries located in the project area and to cooperate with these entities in archeological and historical surveys.

1. State Historical Preservation Phone number 614-298-2000.

## 1.06 MAINTENANCE OF SANITARY SYSTEM DURING CONSTRUCTION

A. All construction which requires interruption of treatment plant flow shall be executed during periods designated by the Owner. Bypassing of untreated or partially-treated wastewater to the receiving stream is prohibited.

B. The Contractor shall be responsible for adverse environmental effects, or compliance violations at the existing treatment facilities which occur as a result of the Contractor's noncompliance with the requirements and constraints included in the Contract Documents.

C. The Contractor shall be responsible for sampling and testing, and penalties resulting from the non-performance of the Contractor's work.

## 1.07 PERMANENT PAVEMENT AND FINAL RESTORATION

A. Permanent pavement and final restoration shall be completed prior to the close of the last paving season prior to the Contract's final completion.

A.

## 1.08 TEMPORARY PAVEMENT RESTORATION

A. The Contractor shall maintain the treatment plant access roads for operating personnel, deliveries of operating supplies, normal plant maintenance vehicles, and other equipment incidental to the operation and maintenance of the treatment facility.

## 1.09 TEMPORARY PARKING FACILITIES

A. Parking spaces for the Contractor's personnel shall be provided and maintained in usable condition by the Contractor at all times. Provisions shall be made so that sediment is not tracked onto paved roadways from the vehicles operated by the Contractor's personnel. The parking areas shall consist of temporary parking areas or new permanent parking areas shown on the Drawings. Temporary parking areas are to be located in the area designated by the Owner and Engineer. At the completion of the project, temporary parking areas shall be removed and the surface restored as specified, shown on the Drawings, as directed or to its original condition.

B. The Contractor's personnel shall not utilize existing permanent parking areas unless specifically noted otherwise on the Drawings.

## 1.10 TEMPORARY WATER, HEATING, LIGHTING AND POWER

A. The Contractor shall provide all water, heat, lighting, and power required to construct and protect the Work until Final Completion.

B. The source for temporary power shall be as specified in Section 01510.

B. The source for temporary water can be from the water utility if available. The Contractor shall furnish all backflow prevention devices, flow meter and appurtenances as may be required by the water utility. Should the water utility impose a charge for furnishing, to the Contractor, the meter or appurtenances the Contractor shall pay all the fees. The Contractor shall pay all charges for the water metered.

1. If a water utility is not available, the Contractor shall be responsible for furnishing water and all cost associated including, but not limited to, procurement, hauling, pumping equipment, and appurtenances.

C. The Contractor shall pay for all significant amounts of electric power utilized by the Contractor in the construction of the facility. All electric power used for such significant uses as pumping groundwater and heating shall be separately metered and paid for by the Contractor.

D. The installation for electric power shall meet the requirements of federal, state, and local authorities and regulatory agencies.

## 1.11 DISPOSAL OF DEBRIS

A. All debris resulting from construction operations, i.e., packaging, waste materials, damaged equipment, etc., shall be trucked from the Site by the Contractor and disposed of at spoil sites.

B. The Contractor shall police the hauling of debris to ensure that all spillage from haul trucks is promptly and completely removed from public or private rights-of-way.

C. All debris shall be disposed of in accordance with federal, state, and local laws and regulations.

## 1.12 CONTROL OF NOISE

A. The Contractor shall eliminate noise to as great an extent as possible at all times. Air compressors shall be equipped with silencers and the exhaust of all gasoline motors and other power equipment shall be provided with mufflers. In the vicinity of hospitals, libraries, and schools, precautions shall be taken to avoid noise and other nuisance, and the Contractor shall require strict observances of all pertinent ordinances and regulations. Any blasting permitted in such locations shall be done with reduced charges.

## 1.13 SMOKE PREVENTION

A. Strict compliance with all ordinances regulating the production and emission of smoke will be required, and the Contractor shall accept full responsibility for all damage that may occur to property as a result of negligence in providing required control.

## 1.14 DEBRIS AND DUST CONTROL

A. The Contractor shall apply water, dust palliative, or both, for the alleviation or prevention of dust nuisance caused by his operations. Dust control operations shall be performed by the Contractor as site conditions dictate or as order by the Owner and Engineer.

B. The Contractor shall utilize mechanical equipment to remove all debris from all streets, drives and walks to the satisfaction of the Owner and Engineer. Cleaning shall be performed at a minimum of daily and as directed by the Owner and Engineer.

C. The cost of the all debris and dust control methods shall be the responsibility of the Contractor.

## 1.15 SANITARY REGULATIONS

A. The Contractor shall provide all necessary housing accommodations for the workers for changing clothes and for protection during inclement weather. Toilet accommodations shall also be maintained for the use of the employees on the Work. The accommodations shall be in approved locations, properly screened from public observance and shall be maintained in a strictly sanitary manner. The Contractor shall obey and enforce all other sanitary regulations and orders; shall take precautions against infectious diseases and the spread of same; and shall maintain at all times satisfactory sanitary conditions around all shanties, tool and supply houses, and on all other parts of the Work.

## 1.16 USE OF EXPLOSIVES

A. When the use of explosives is authorized for the prosecution of the Work, the Contractor shall use the highest degree of care so as not to endanger life or property. The Contractor shall be responsible for any and all damage resulting from use of explosives.

B. The Contractor agrees and warrants that he will observe state laws and local ordinances and regulations relative to the use and storing of such explosives as may be kept on the job and all such storage places shall be marked clearly, “DANGER -- EXPLOSIVES”.

## 1.17 EMERGENCY MAINTENANCE SUPERVISOR

A. The Contractor shall submit to the Engineer the names, addresses, and telephone numbers of two employees responsible for performing emergency maintenance and repairs when the Contractor is not working. These employees shall be designated in writing by the Contractor to act as his representative and shall have full authority to act on his behalf as specified in GC 6.2 of the General Conditions.

B. Contractor shall post at job Site, in a conspicuous location, the emergency numbers for the project.

C. Contractor shall be responsible for contacting the local fire, police, and emergency response personnel and organizations in advance of the Work. The Contractor shall be responsible for the coordination and compliance with emergency response plans, whether developed by the governing agency, laws, or the Contractor for the project.

D. At least one of the designated employees shall be available for a telephone call any time an emergency arises.

## 1.18 PUBLIC SERVICE STRUCTURES

A. Public service structures shall be understood to include all poles, tracks, pipes, wires, conduits, house-service connections, vaults, manholes, and other appurtenances, whether owned or controlled by the Owner or other public bodies or by privately-owned corporations, used to supply the public with transportation, heating, electric, telephone, gas, water, sewer, or other services.

B. At least a week in advance of breaking ground, the Contractor shall notify the registered underground protection service, all public bodies, and other owners of such facilities of the proposed location of his operations, advising them that their property may be affected and that such measures as they may deem necessary should be promptly taken to protect, adjust, remove, or build them.

C. In developed residential and commercial areas, the Contractor shall assume each building and dwelling has water and sewer services and that they shall be protected and repaired as needed as part of the pipeline installation. No additional payment will be made for Work associated with supporting or repairs of such services.

D. Three conditions which may be encountered will be dealt with as follows:

1. Structures which are adjacent to but not included within the limits of an excavation required for performance of the Work shall be protected, supported, and maintained in service by the Contractor at his expense.

2. Structures within the limits of the Work which can be satisfactorily supported and maintained in service and which do not require removal and rebuilding in

the judgment of the Engineer shall be thus supported by the Contractor at his expense, including cost of repair of damage incident to his operations.

a. Supports for water and gas mains, sewers, conduits, and similar structures shall be constructed of timber or other acceptable materials; shall be supported from undisturbed foundations, and shall be sufficiently substantial to ensure against settlement when pipe trenches or other excavations are backfilled. In all cases where permits or inspection fees are required by utilities in connection with changes to or temporary support of their conduits, the Contractor shall secure such permits and pay all permit and inspection fees.

b. The Contractor shall assume full responsibility for maintaining all public service structures in service and shall support and protect, or remove and rebuild them at his own expense. Such services shall not be interrupted without permission of the owner of the public service structure.

3. In case relocation of pipelines or other utility structures is required because of direct interference, as determined jointly by the Owner, Engineer, and Contractor, with the installation of the Work, the Contractor shall notify the Owners of the utility structure involved.

a. The Contractor will not be reimbursed for the cost of the relocation if the interference is shown on the Drawings, described in the Specifications, apparent on visual inspection, or specifically included in the Work to be performed by the Contractor.

b. The Contractor will not be paid for time lost because of such direct interference. Where it is the policy of any utility owner to perform such Work with his own forces, the Contractor shall cooperate to the fullest extent with such utility owner.

## 1.19 UNAUTHORIZED OR PROHIBITED WORK

A. Work done beyond the lines shown on the Drawings or ordered, Work done without required inspection, except as herein provided, or any extra work done without authority will be considered as unauthorized and will not be paid for under the provisions of the Contract. Work so done may be ordered removed at the Contractor’s expense. Work done without lines and grades being given shall be considered as unauthorized and subject to rejection.

B. Disposing of excess or unsuitable materials, including but not limited to excavated material, demolition debris, clearing and grubbing debris, in wetlands or flood plains.

C. Locating stockpiles in environmentally sensitive areas.

D. Pumping of sediment-laden water from trenches or excavations directly into any surface waters, stream, wetlands, or sewers. Pumped water shall be properly filtered and desilted prior to discharge.

E. Open burning without a permit.

F. Discharging injurious silica dust concentrations into the atmosphere within 200 feet of any residential or commercial, or public or private places of human occupancy.

### 1.20 DRAINING OF TANKS AND PIPELINES

A. Unless otherwise indicated, tanks, pipelines, and other similar structures that are to be removed from service, to complete the Work will be initially drained by the Owner.

B. Draining will be by gravity or by a permanently installed pump, if available.

C. After the tank has been drained by the Owner to the lowest level possible with existing means for drainage, the Contractor shall remove and dispose of remaining liquid and accumulated solids, as required to complete the Work.

## PART 2 PRODUCTS

Not used.

## PART 3 EXECUTION

Not used.

## PART 4 SPECIAL PROVISIONS

### 4.01 MAINTAINING FLOW IN EXISTING SEWERS

A. Flow in existing storm, sanitary and private sewers shall be maintained at all times during construction of this project. The Contractor shall furnish and install all necessary temporary facilities required to maintain the flow in existing sewers including bulkheads, plugs, stop planks, flumes, coffer dams, pumping equipment, valves, etc.

### 4.02 MAINTAINING CRITICAL OPERATIONS

A. The Contractor shall closely coordinate any needed equipment shutdowns with the Owner. The Contractor shall not take out of service more than one piece of process equipment at a time.

B. The power and control work for existing equipment shall be arranged and sequenced to minimize the downtime of all equipment. In general, only one item of equipment can be out of service at any one time and the unavailability of equipment shall be kept to a minimum duration. No demolition of the existing high service pump room can be started until the new high service pumps have been operational for at least two weeks.

C. Any Work that requires any plant equipment to be unavailable for use by the plant staff must be scheduled one week in advance of the planned outage.

## 4.03 SEQUENCE OF CONSTRUCTION

A. The following is a sequence of construction for the Contractor to follow. Items are required unless otherwise stated as suggested. The required items must be followed as stated.

B. Clarifiers 1 and 2:

1. Work on clarifiers shall not commence until all new equipment, products, personnel, and any other appurtenances required for the work are on site or available for the removals or installation of the equipment.

2. Work on Clarifier 2 shall be completed before work on Clarifier 1.

3. The first clarifier taken out of service shall be disinfected, started up, commissioned and fully operational with the new equipment for a period of one week before work on the second clarifier can commence.

4. Structural improvements shown on Drawings S-1.1 and S-1.2 shall occur simultaneously with the clarifier equipment shutdown and installation.

5. Owner will be responsible for draining and removing sludge from each clarifier. Contractor to notify Owner of shutdown at least two weeks prior to clarifier required to be taken offline. **(Addendum 2, Issued 8/22/2025)**

C. Chemical Feed Building:

1. Work in the Chemical Feed Building shall not commence until given authorization by the Owner.

2. Entire Sodium Hypochlorite system including tanks, spill containment, pumps, piping, and instrumentation shall be fully operational before demolition of the existing gaseous chlorine equipment commences.

D. New High Service Pump Building and Site Work:

1. 16” DIP High Service Suction Piping and 4” PVC Sludge Piping shall be relocated and placed in service before excavation for new High Service Pump Building commences.

2. New 16” High Service Piping shall be temporary capped or plugged at the tee connecting to the new High Service Pump Building to allow both clearwells to be in service during the construction of the new Building.

E. Existing High Service Pump Room

1. The new Main Distribution Panel (MDP-4), replacement Lighting Panel LP-C, and associated transformer shall be installed and brought online. The existing MCC and original LP-C shall remain in service for as long as practicable during this phase to maintain continuous plant operations. Due to the proposed location of MDP-4, the distribution transformer for existing lighting panel LP-C shall be replaced as shown on the drawings prior to demolition of the existing MCC to ensure lighting panel circuit functionality throughout the duration of construction. The electrical cutover to MDP-4 and the new LP-C shall be

carefully coordinated to minimize service interruption. At least one high service pump (existing or new) and two wells must remain online at all times. The final location of MDP-4 shall be determined by the owner on-site.

2. Once MDP-4 and the new LP-C are operational, the Main Distribution Panel MDP-6 and new High Service Pumps, located in the new High Service Pump Building, shall be fully commissioned and placed into continuous service. These systems shall remain operational for a minimum of one (1) week before decommissioning any existing high service pump equipment.

3. After the new high service pumps are online, SCADA communications shall be re-routed from the existing BIF panel and autodialer to the Main Telemetry Unit (MTU). This step must be executed in coordination with plant operations to ensure uninterrupted monitoring and control of critical systems.

4. Following successful operation and monitoring of the new pump systems and SCADA re-routing, the demolition of the existing High Service Pump Room equipment may proceed. Prior to demolition, all necessary disconnections, terminations, and safety checks shall be completed and verified.

5. Upon completion of the demolition work, construction of the new laboratory in the area previously occupied by the High Service Pump Room shall begin.

6. New potable water line shall be installed with a temporary connection to the existing water heater and other plumbing connections in the restroom before demolition can commence.

7. Once existing equipment in the existing High Service Pump Room are removed and the floor and walls are repaired, work can commence on the new Laboratory.

**4.04 COORDINATION WITH OUTSIDE UTILITIES**

A. Columbia Gas of Ohio – 1-800-344-4077

B. AEP Ohio – 1-800-672-2231

END OF SECTION

# SECTION 02555
# PRESSURE PIPE

## PART 1 GENERAL

### 1.01 SCOPE

A. This Section includes furnishing and installing buried pressure pipe of the materials, class, size, and length as shown on the Drawings, specified, or directed.

B. Pressure pipelines constructed under this Section shall include but not be limited to water mains and sewer force mains.

C. This Section shall include furnishing and installing all required pipe, fittings, specials, adaptors, blind flanges, reducing flanges, closure pieces, tees, bends, joint restraints, granular pipe bedding material, Class B concrete used for encasement or bedding, removing and relaying existing pressure pipe as required, providing temporary services and temporary blocking or harnessing, making connections to new and existing pressure pipe, installing temporary bulkheads and plugs, testing pipe, cleaning and sterilizing water mains, and other work incidental to the pressure pipe installation, unless specifically included under other Items.

### 1.02 SUBMITTALS

A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:

1. Shop Drawings for Review:

   a. Manufacturer's Shop Drawing indicating physical dimensions, joint details, fittings, and special details for each size, type, and class of pipe furnished for the project. Shop Drawings shall also note salient features of a specific pipe, i.e., concrete strength and reinforcing details.

   b. Samples, if requested by the Engineer.

2. Information for the Record:

   a. Manufacturer's certification indicating that the pipe and joints meet Specifications for each production run for each size, type, and class of pipe furnished. The Engineer may request test results to verify certification.

### 1.03 PRODUCT HANDLING

A. Care shall be taken in handling and transporting to avoid damaging pipes and their coatings. Loading and unloading shall be accomplished with the pipe under control at all times and under no circumstances shall the pipe be dropped. Pipe shall be securely

wedged and restrained during transportation and supported on blocks when stored in the shop or field.

## PART 2 PRODUCTS

### 2.01 PRESSURE PIPE SPECIFICATIONS

A. Ductile Iron Pressure Pipe:

1. Ductile Iron Pressure Pipe (DIP) shall conform to ANSI A21.51 or AWWA C151 and shall be pressure class 350 psi for sizes 12-inch and below, and pressure class 300 psi for larger sizes unless otherwise specified herein. Mechanical joint fittings shall be ductile iron and conform to ANSI A21.10 or AWWA C110 and ANSI A21.53 or AWWA C153. Flanged fittings shall be ductile iron and conform to ANSI A21.15 or AWWA C115. All fittings shall have a pressure rating of 250 psi for all pipe sizes unless otherwise specified. Ductile iron pipe buried underground, unless otherwise specified or shown, shall have rubber gasket (slip-on) type joints in straight runs and mechanical joints with retainer glands each way from bends as shown on the Drawings. The gasket shall be a single molded rubber ring fitted into a specially shaped recess in the bell forming a pressure tight seal. The spigot end of each pipe shall be marked to indicate when the pipe is “home.” Fittings shall have mechanical joints with retainer glands unless otherwise specified or shown. Retainer glands shall be ductile iron. The restraining mechanism shall impart multiple wedging action against the pipe. Restraining devices shall be of heat treated ductile iron. Twist-off nuts shall be used to ensure proper actuation of the restraining device. The mechanical joint retainer gland shall be Ebaa Iron, Inc., Series 1100 Megalug, or equal.

2. Ductile iron pipe inside buildings or structures shall be joined with flanged, or mechanical joints as shown on the Drawings, or as indicated in the pipe schedule. All mechanical joints shall have retainer glands. Flanges shall comply with ANSI 21.15 or AWWA C115 and shall be ANSI 125-pound drilling, unless otherwise specified. Flanged joints shall have full face 1/8-inch rubber gaskets or of thickness and type approved by the Engineer. The pipe shall not be threaded or flanged in the field. Flanges shall be firmly bolted with machine, stud, or tap bolts of the proper size and number. Within buildings the bolts and nuts shall be of the best quality mild steel, with true threads, meeting the requirements of ANSI B16.1.

B. Polyvinyl Chloride Pipe:

1. Pressure pipes and fittings 3 inches or smaller in diameter shall be PVC material and shall consist of Class 12454-B rigid PVC compound in conformance with ASTM D1784. Pipe shall be ASTM D1785 Schedule 80 or ASTM D2241, SDR 21 with hydrostatic design stress of 2,000 psi. All joints for ASTM 1785 pipe, unless otherwise shown on the Drawings, shall be solvent welded in conformance with ASTM D2855. Joint solvent shall be as recommended by the pipe manufacturer.

Joints for ASTM D2241 pipe shall be push-on gasketted. Joint restraint for ASTM D2241 pipe shall be provided where specified or shown on the Drawings and shall be United Series 1300 or 1350, or equal. The fittings for ASTM D1785 pipe shall be Schedule 80 and shall conform to ASTM D2467. Fittings for ASTM D2241 pipe shall be ductile cast iron and shall conform to ANSI 21.10/AWWA C110 with mechanical joint.

2. PVC pipe 4 inches to 12 inches in diameter shall meet the requirements of AWWA C900, and unless otherwise specified, shall be Class 235, and have a standard thermoplastic pipe dimension ratio (D.R.) of 18.0.

3. PVC pipe 14-inch diameter and larger shall meet the requirements of AWWA C905 and unless otherwise specified shall have a standard thermoplastic pipe dimension ratio (D.R.) of 21 or less. Pipe OD shall be compatible with ductile iron pipe.

4. All fittings and specials shall be as specified, herein, for ductile iron pipe.

C. HDPE Pipe:

1. Polyethylene pipe shall meet the requirements of AWWA C906. Polyethylene pipe shall conform to the material designations of PPI and ASTM, PE4710, and ASTM F714. The resin shall contain antioxidants and be stabilized for protection against ultra-violet degradation. Pipe shall have a cell classification of PE 445574C and meet or exceed all requirements of ASTM D3350. Pipe shall have a designated use color stripe applied during production.

2. Pipe size shall be DIP nominal diameters. The minimum wall thickness for the directional drilling installation process shall be DR 11. **(Addendum 2, Issued 8/22/2025)**

## 2.02 PRESSURE PIPE JOINTS

A. Ductile Iron Pipe:

1. Pipe buried underground, unless otherwise specified, shall be jointed with rubber gasket (push-on) type joints and shall meet the requirements of AWWA C111 for push-on joints. The gasket shall be a single molded rubber ring fitted into a specially shaped recess in the bell forming a pressure tight seal. The spigot end of each pipe shall be marked to indicate when the pipe is “home.” Fittings shall have mechanical joints with retainer glands unless otherwise specified or shown. Retainer glands shall be ductile iron. The restraining mechanism shall impart multiple wedging actions against the pipe. Restraining devices shall be of heat treated ductile iron. Twist-off nuts shall be used to ensure proper actuation of the restraining device. The mechanical joint retainer gland shall be Ebaa Iron, Inc., Series 1100 Megalug, or equal.

2. Pipe inside buildings or structures shall be joined with flanges unless otherwise specified. Flanges shall be ANSI 125 pounds drilling, unless otherwise specified. Flanged joints shall be made up with full face 1/8-inch rubber gaskets, or of

thickness and type to be approved by the Engineer. Flanges shall not be installed on the pipe in the field. Flanges shall be firmly bolted with machine, stud, or tap bolts of the proper size and number. Flange bolts shall meet the requirements of ANSI B16.1.

3. Mechanical joints, wherever specified or shown, shall conform to ANSI A21.11 (AWWA C111), except as specified herein.

4. Mechanical couplings, if required or permitted, shall be Dresser Style 38, or equal.

5. Victaulic or equal joints, if required or permitted, shall be of the shouldered type, unless otherwise specified. If a grooved joint is permitted, a thicker pipe shall be used.

6. Restrained joints, wherever shown or required, shall be mechanical joint with retainer glands, US Pipe TR Flex Joint System, US Pipe Field LOK Gasket System, or equal.

7. Flange adapters for plain end pipe (not fittings), where specified, shown on Drawings, or approved by Engineer shall be a restrained flange adapter. The restraining mechanism shall be multiple gripping wedges set against the pipe wall. Twist off nuts shall be used to ensure proper actuation of the restraining device. The restrained flange adapter shall be Series 2100 Megaflange by Ebaa Iron, Inc., or equal.

B. Polyvinyl Chloride Pipe:

1. Pipe shall have integral bell push-on type joints meeting the requirements of ASTM D3139. Gaskets shall be rubber ring type meeting the requirements of ASTM F477 (AWWA C900).

2. Fittings shall have mechanical joints meeting all requirements of ANSI A21.11 (AWWA C111).

3. Restrained Joints, where required or shown, shall meet the requirements of the UNI-Bell Plastic Pipe Association Performance Standard UNI-B-13, similar to EBAA Iron Sales, Inc., Series 2000 PV for mechanical joints and Series 1500 for push-on joints.

## 2.03 ACCESSORIES

A. Nuts and bolts for buried pipe shall be as follows:

1. Nuts and bolts used in wall castings shall be of stainless steel Type 316.

2. Nuts and bolts encased in grout on concrete pressure pipe shall conform to recommendations of the pipe manufacturer.

3. Nuts and bolts used on buried pressure pipe and fittings in contact with earth shall be Cor-Blue coated low alloy steel and have a minimum yield strength of 45,000 psi complying with ANSI A21.11 and AWWA C111.

4. All other nuts and bolts shall be low carbon steel in conformance with the chemical and mechanical requirements of ASTM A307, Grade B. Higher strength bolts will be acceptable.

B. Warning Indicators shall be installed as noted in Part 4 and on the drawings.

1. A polypropylene identification tape marked “buried water main” shall be installed 24 inches above all water mains installed by open-cut methods. The tape shall be blue.

## 2.04 COATINGS AND LININGS OF PRESSURE PIPE

A. Ductile Iron Pipe:

1. Interior Linings/Cement Lining - Unless otherwise specified, pipe interiors shall be covered with a standard thickness cement lining meeting ANSI A21.4 and AWWA C104. A seal coat of petroleum asphaltic material shall be applied in conformance with the above Specifications. Pipe used for compressed air shall not receive a concrete lining.

2. Exterior Coating:

a. All cast pipe buried underground shall be coated on the outside with a standard petroleum asphaltic coating, 1 mil thick, meeting AWWA C110, unless otherwise specified. The finished coating shall be continuous, smooth, neither brittle when cold nor sticky when exposed to the sun, and shall be strongly adherent to the pipe. The coating materials, after drying 48 hours, shall impart no objectionable color, odor, or taste to water standing in contact with the coating for a minimum of 48 hours.

b. Where approved, the petroleum asphaltic material specified for interior lining may be used for exterior coating of pipe buried underground.

c. Painting - All cast pipe used within buildings and structures and which are to receive field coats of paint shall not be coated with any black bituminous paint. Such pipe, after proper cleaning, shall be painted with one coat of primer paint that will be compatible with the field coats. Painting specifications shall be followed for cleaning and painting.

B. Polyvinyl Chloride Pipe shall require no special interior or exterior lining or coating less otherwise specified.

## 2.05 RESERVED

## 2.06 SOURCES QUALITY CONTROL

A. Pipe Manufacturer’s Certification:

1. The pipe manufacturer’s certificate shall state that the materials have been sampled and tested in accordance with the provision for and meet the

requirements of the designated specification and shall be signed by an authorized agent of the seller or the manufacturer.

2. A test results report shall accompany the manufacturer's certificate, if requested by the Engineer. The report shall compare test results to Specification requirements. Test specimens shall be selected in conformance with the designated specification for each production run of each size, type, and class of pipe furnished and further, that in case tests are unsatisfactory, additional tests shall be made to the maximum number in the referenced ASTM Specification.

## PART 3 EXECUTION

### 3.01 COORDINATION

A. Construction in Highway Properties

1. Construction in highway properties shall conform to the requirements of Section 02200.

### 3.02 PREPARATION OF TRENCH

A. Trench excavation shall conform to requirements of Section 02200.

B. Unless otherwise specified or called for on the Drawings, the width of trench at the top of pipe 24 inches in diameter or less shall not exceed the outside diameter of the pipe or encasement, plus 9 inches on each side of the pipe measured to the face of the trench or to the back of the sheeting when used. For pipe having a diameter greater than 24 inches, the width of trenches at the top of the pipe shall not exceed the outside diameter of the pipe or encasement, plus 15 inches on each side of the pipe measured as specified above.

C. Unless otherwise directed or called for on the Drawings, all sewer trenches shall be excavated below the proposed pipe invert as required to accommodate the depths of pipe bedding material as scheduled on the Drawings.

### 3.03 PIPE INSTALLATION

A. All pipe fittings and specials shall be laid in accordance with the manufacturer's instructions, with AWWA C600, and as supplemented herein.

B. Precautions shall be taken during construction to protect the pipe interiors, fittings, and valves against contamination. Pipe interiors shall be thoroughly cleaned of dirt and foreign matter before laying, by brushing, swabbing or other method approved by the Engineer, and means shall be provided to prevent entry of dirt during the progress of installation. Groundwater shall be kept out of the pipe at all times.

C. Bedding and Backfilling:

1. Bedding and backfilling shall be in conformance with Section 02200.

2. At joints, enough depth and width shall be provided to permit working entirely around the pipe as needed to make the joints in the proper manner.

D. Handling and Cutting:

1. Suitable tools and appliances for cutting, handling, and laying of the pipes and special castings shall be used and care shall be taken to prevent damage to pipe coatings.

2. Where new or existing pipe requires cutting in the field it shall be done in a manner to leave a smooth end at right angles to the pipe centerline. The finished cut must be approved by the Engineer.

E. Pipe Laying:

1. Pipe and appurtenances shall be installed true to line, grade, and location; with joints centered, spigots home; pipe properly supported and restrained against movement; and all valve stems plumb.

2. All elbows, tees, plugs, etc., shall be properly anchored, blocked, or otherwise restrained to prevent movement of the pipe in the joints due to internal or external pressure.

3. The open ends of all pipes and special castings shall be plugged or otherwise closed with a watertight plug to the approval of the Engineer before leaving the Work for the night, and at other times of interruption of the Work. All pipe ends which are to be permanently closed shall be plugged or capped and restrained against internal pressure.

F. Pipe Jointing:

1. Gaskets - Just prior to joining the pipes, the surfaces of the joint rings shall be wiped clean and the joint rings and rubber gaskets shall be liberally lubricated with an approved type of vegetable oil soap. The spigot end, with the gasket placed in the groove, shall be entered into the bell of the pipe already laid, making sure that both pipes are properly aligned. Before the joint is fully “home,” the position of the gasket in the joint shall be determined by means of a suitable feeler gauge supplied by the pipe manufacturer. If the gasket is found not to be in proper position, the pipes shall be separated and the damaged gasket replaced. The pipe is then forced “home” firmly and fully. In its final position, the joint between the pipes shall not be deflected more than 1/2 inch at any point.

G. Anchoring Pipe:

1. Disjointing hydrostatic pressure at bends, plugs, tees, and wyes shall be counteracted by thrust blocks, restrained joints, or reinforced concrete anchorage as directed on the Drawings or specified.

2. Thrust blocks shall be installed only where directed or specifically called for on the Drawings, unless otherwise specified. Installation shall be in conformance with Drawings.

3. Approved joint restraints shall be installed in locations shown or scheduled on the Drawings.

4. Reinforced concrete joint anchorage shall be installed in conformance with the Drawings.

H. Supports - Where shown on the Drawings, or ordered, pipelines shall be supported in an approved manner by concrete piers, hangers, or inserts. The method selected, and the types and design of hangers and inserts shall be subject to the Engineer's approval.

## 3.04 PIPE PROTECTION

A. Detectable marking tape shall be installed in the trench of each non-metallic pipe. The tape shall be installed directly above the force main at the depth recommended by the manufacturer. The tape shall extend the full length of the force main, and shall be imprinted with a continuous warning message repeated at least every 36 inches. The warning message shall state that a sewer line is buried below. The tape shall consist of one layer of aluminum foil laminated between two layers of inert plastic film. The lamination bond shall be strong enough that the layers cannot be separated by hand. The tape shall be inductively located and conductively traceable using a standard pipe and cable locating device.

B. Utility markers and locator stations shall be installed with 42 inches to 48 inches above ground.

## 3.05 FIELD INSPECTION

A. All pipe sections, specials, and jointing materials shall be carefully examined for defects and no piece shall be laid that is known to be defective. Any defective piece discovered installed shall be removed and replaced with a sound one in a manner satisfactory to the Engineer at the Contractor's expense.

B. Defective material shall be marked with lumber crayon and removed from the job site before the end of the following day.

## 3.06 PRESSURE AND LEAKAGE TESTS

A. The Contractor shall furnish the pump, pipe connections, taps, gauges, auxiliary water container, bulkheads, plugs, and other necessary equipment and make pressure and leakage tests of all lines unless otherwise directed by the Engineer.

B. Tests shall be conducted on all pipelines or valved sections thereof as directed by the Engineer. Testing of pipelines laid in embankments or bedded in concrete shall be done prior to backfilling or placing concrete cover unless otherwise permitted by the Engineer. Tests on lines anchored or blocked by concrete shall not be conducted until the concrete has taken permanent set. A maximum of 1,000 feet of pipe may be included in a test section. All valves shall be tested for leakage.

C. The line or section thereof to be tested shall be filled slowly with water to expel all air. Hydrostatic pressure shall be applied by pumping water from an auxiliary supply. The test pressure shall be maintained two hours minimum and additional time as required for thorough inspection to find any leaks or defects in the force main and appurtenances. The test pressure shall be 100 pounds per square-inch or 50% above the normal operating pressure, whichever is greater. Should the pipe section fail to pass the tests, the Contractor shall find and correct failures and repeat the tests until satisfactory results are obtained.

D. Leakage tests shall be made simultaneously with or following completion of pressure tests of all lines or valved sections thereof. Leakage is defined as the quantity of water added to the pipe under test to maintain the required test pressure for a specified time.

E. Pressure testing shall be performed in accordance with AWWA C600 and C605.

## 3.07 DISINFECTION OF POTABLE WATER PIPING

A. After the pressure test and prior to disinfecting, the lines shall be thoroughly flushed through hydrants or by other means as approved by the Engineer.

B. The Contractor shall furnish required materials and apparatus and perform the Work of disinfection.

C. All water piping shall be cleaned and disinfected in accordance with AWWA C651 and one of the following:

1. Liquid sodium hypochlorite by means of a suitable solution feed machine or pump. Sodium hypochlorite storage conditions and durations shall be controlled to minimize deterioration.

2. Calcium hypochlorite as tablets, powder. Tablets or powder shall be placed in the water line during construction. The water line shall be filled, carefully, with potable water to produce a uniform solution.

3. Calcium hypochlorite as a water mixture. The calcium hypochlorite powder shall be mixed with water to form a paste and then thinned to a slurry, to be introduced into the pipe by pumping.

D. The dosage of chlorinating agent shall be of the amount to produce a chlorine residual of 40 to 50 parts of chlorine per million. Tests with the DPD drop dilution method shall be made at selected points to determine the residual.

E. Treated water shall be retained in the lines for sufficient time to accomplish the desired disinfection but not less than 12 hours. Valves in the line shall be operated during the retention period.

F. Following disinfection, all treated water shall be flushed from the lines at their extremities until the replacement water throughout the lines shall, upon testing, be chemically and bacteriologically acceptable.

1. Two or more successive sets of samples taken at 24-hour intervals shall indicate microbiologically satisfactory water before the lines are placed into service.

2. Should the initial treatment prove ineffective, the disinfection shall be repeated until the test shows acceptable results.

3. The disposal of heavily chlorinated water shall be coordinated with the Owner and regulatory agencies. The heavily chlorinated water may require the addition of a dechlorinating chemical prior to release to a storm sewer or the environment. The dechlorinating method shall be approved by the Owner and Engineer. The heavily chlorinated water shall not be released to sanitary sewers without permission from the Owner of the sanitary sewer system.

G. All testing shall be done by a laboratory acceptable to the public authority having jurisdiction, and all costs shall be paid for by the Contractor.

## PART 4 SPECIAL PROVISIONS

### 4.01 PIPING SCHEDULE

A. The following letter designations are used in the Piping Schedule:

Material Designation:

DIP - Ductile Iron Pipe
PVC - Polyvinyl Chloride

B. Schedule:

| Service | Size | Material | Remarks |
|---|---|---|---|
| Suction to high service pumps | 12, 16” | DIP | N/A |
| High service pump discharge | 12” | DIP | N/A |
| Force Main | 2” | PVC or HDPE | **(Addendum 2, Issued 8/22/2025)** |

C. Schedules are not guaranteed to be complete. All piping shown on the Drawings or specified shall be furnished and installed by the Contractor whether or not listed in the above schedule.

### 4.02 PERMANENT AND TEMPORARY BLOWOFFS/TAPS

A. The Contractor shall provide all blowoffs and taps as necessary to properly exhaust air from test sectioned, flush and disinfect the new pressure pipe system.

### 4.03 PRESSURE PIPE ELEVATIONS

A. Elevations shown on the plans shall be checked as specified in this Section.

B. Any deviation in the pipe elevations shall be brought to the Engineer's attention to permit the Engineer to evaluate the impact upon air release mechanism placements.

END OF SECTION

# SECTION 11821
# SOLIDS-CONTACT CLARIFIER MECHANISMS

## PART 1 GENERAL

### 1.01 SCOPE

A. This Section includes the furnishing of all materials, equipment, labor, and supervision needed to install, test and adjust two solids contact softening unit equipment ready for service as specified, required, and as shown on the Drawings.

B. Each unit shall be installed in two existing softening basins. Each basin is 35-ft diameter with a 16-ft side wall and 15-ft side water depth.

C. Each clarifier mechanism shall include two rotating sludge scraper arms with blades; center assembly with drive unit and controls; an effectively separate reaction/flocculation zone and outer settling zone; effluent launders; anchor bolts or devices; and other appurtenances required by the equipment manufacturer's design for proper operation.

D. The existing bridge and walkway shall be utilized on each clarifier. Manufacturer shall perform site visit and bridge inspection prior to shop drawing submittal. Replacement of the bridge and walkway shall be included as alternative on the Bid Form.

E. It is the specific intent of this Section to limit the equipment furnished to a product of a major process equipment manufacturer that has substantial experience and expertise in similar size treatment installations and that will assume certain responsibilities with respect to the overall functional capability of the equipment provided. The existing clarifier equipment is Contraflo Type by General Filter Company. The replacement equipment shall be compatible with portions of the original equipment to remain in service.

F. Each clarifer shall be supplied by the same manufacturer. This specification and drawings are based on WesTech models SCX63 **(Addendum 2, Issued 8/22/2025)** (bottom center column feed) and SCD73 (side feed).

G. Other manufacturers must meet the requirements herein and on the drawings. Other acceptable manufacturers include ClearStream Environmental and Kusters Water. **(Addendum 2, Issued 8/22/2025)**

H. Additional product requirements are specified in Section 01350. **(Addendum 2, Issued 8/22/2025)**

### 1.02 SUBMITTALS

A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:

1. Shop Drawings for Review:

a. The Contractor shall indicate all variances from the requirements of the Contract Documents.

b. Scaled dimensional drawings.

c. Wiring schematics with termination point identification.

d. Materials of construction.

e. Manufacturer's catalog data.

f. General Arrangement Drawings.

g. Motor information per 11050.

2. Information for the Record:

a. The Contractor shall submit a manufacturer's written one-year warranty covering workmanship and materials on the equipment when used as intended for this installation. The one-year period shall commence on the date of Substantial Completion. Under terms of this warranty, the Contractor shall furnish and install all replacement parts for any defective component at no cost to the Owner. The provisions of this warranty shall not be construed as relieving or reducing the obligations of the Contractor outlined elsewhere in these Specifications.

b. Any change to the Drawings required by the equipment provided shall be submitted for approval prior to field construction on the new basin and basin piping.

c. Manufacturer's guarantee.

3. Operation and maintenance manual.

## 1.03 GUARANTEE

A. The equipment supplier shall guarantee that with the proper operation and appropriate dosage rates of chemicals, the process unit provided will effectively soften the water influent to the plant.

B. As a condition of the guarantee, the equipment manufacturer shall agree to provide extended start-up services as necessary at no cost to the Owner until the unit can be demonstrated to perform as specified.

# PART 2 PRODUCTS

## 2.01 GENERAL

A. The clarifier equipment shall be designed to soften well water treated with lime, soda ash, and ferric chloride. Average raw water characteristics expected are as follows:

| | |
|---|---|
| Total Hardness: | 650 mg/L as $CaCO_3$ |
| Final Hardness (Design): | 300 mg/L as $CaCO_3$ |

| | |
|---|---|
| ~~Final Clarifier Turbidity (Goal):~~ | ~~2 NTU or less~~ **(Addendum 2, Issued 8/22/2025)** |

B. The equipment shall be designed to operate in basins having the following dimensions:

1. Tank diameter: 35-feet
2. Side water depth: 15-feet, Clarifier 1; 14.75-feet, Clarifier 2
3. Freeboard: 1-feet
4. Bottom floor slope: 12:1
5. Influent feed pipe diameter: 12-inch

C. Clarifier 1 shall be a side feed model WesTech Contraflo SCD73 or approved equal. Clarifier 2 shall be bottom feed model WesTech Contraflow SCX63 or approved equal. Specific dimensions and additional information on each clarifier is found in Part 4.

D. Clarifier manufacturer shall measure the existing dimensions and field verify locations of existing equipment and match existing equipment when possible.

## 2.02 EQUIPMENT DESIGN REQUIREMENTS

A. Equipment shall be designed to operate as a solids contact softener that provides chemical mixing and flocculation in the presence of previously formed precipitate, clarification by settling and automatic removal of excess sludge.

B. The unit's design shall effectively divide the basin into an inner mixing, flocculation and reaction zone; and an outer settling zone. The inner zone shall be equipped with mixing equipment designed to thoroughly mix the incoming water with chemicals and previously formed precipitate.

C. As a minimum, the equipment shall be capable of recirculating solids at a rate of six times the design flow rate. No external sludge pumping for recirculation will be allowed.

D. The reaction zone mixer shall be capable of re-suspending and continuously maintaining a minimum slurry concentration of 1% or more by weight.

E. All steel plates and structural members designated for submerged service shall have a minimum thickness of 1/4-inch. All steel used shall conform to the requirements of the Standard Specification for Structural Steel, ASTM A36. Welding shall conform to the standards of the American Welding Society.

F. The equipment design shall be such that the ASCI allowable stress is not exceeded for any structural steel member under normal operating condition nor is it exceeded by more than 60% when subject to a loading twice the running torque of the drive.

G. The structural design (stall) torque shall be at least two times the continuous normal running torque.

H. Allsubmerged or partially submerged steel components shall be Type 304 stainless steel. All motors and gear reducers shall be furnished with the manufacturer's standard finish.

I. Clarifier units shall be approved by the Ohio EPA for the use intended.

**2.03 SIDE FEED CLARIFIER (CLARIFIER 1)**

A. Scraper Drive: The center drive mechanism shall consist of concentric drive units and gearing for the mixing equipment and for the sludge collecting equipment. The sludge collecting equipment shall be driven by a steel turntable supported by a grease lubricated ball bearing having a minimum L10 life of 30 years when subjected to the following loadings; axial load equal to the weight of the entire rotating mechanism, radial load equal to the unbalanced separation force of the final drive gear which is a minimum of 50 percent of the tangential force at the pitch line of the final gear, and a moment load equal to an unbalanced force of 400 pounds at the end of one scraper arm. The ball races shall be hardened to Rockwell 60 C. The center mechanism shall be designed so that the bearing balls or the entire bearing can be replaced without removing the access walkway or drive platform.

B. A steel ring gear shall be provided on each turntable. Ring gear teeth of roller tooth design shall be pinned in place. Gearing having an input shaft speed of 100 rpm or less will not be required to bear an AGMA nameplate. All large slowly rotating gearing shall be designed on the basis of torque loads using conservative values for wear and beam strength.

C. Each turntable shall be equipped with a direct connected constant speed parallel helical gearmotor. Each drive unit shall be anchored to the drive platform. All drive units shall be suitable for outdoor service.

D. All gear reducers having an input speed greater than 100 rpm shall be AGMA rated with a service factor of at least 1.40.

E. The drive assembly for the rotating scraper shall be equipped with an indicating overload mechanism with two independently adjustable contacts. An "Alarm" contact shall be provided to operate an alarm device when the load reaches approximately 100 percent of the specified running torque. A "Stop" contact shall be provided to stop the motor at approximately 120 percent of the specified running torque. The "Alarm" contact setting shall not exceed the rated motor horsepower. The alarm devices operated by the contacts shall be furnished under the electrical section of the specifications.

F. The existing mixing equipment shall be reinstalled is a marine propeller driven by a directly connected gear reducer with independent propeller shaft bearings. The mixer drive shall be concentric with the scraper drive.

1. The existing variable speed mixer drive shall be utilized and consists of a parallel helical gear reducer and motor combined with an electronic variable frequency drive (VFD). The entire assembly shall flange mount to a torque tube housing the independent propeller shaft bearings.

G. Draft Tube: The mixing equipment shall be reinstalled in the rotating center draft tube extending to the bottom of the basin to ensure that precipitated solids are recirculated

from the floor of the basin. Units without this design feature will not be acceptable. Properly sized velocity control discharge ports shall be provided in the draft tube near the water surface under the cone so that flocculation occurs under the cone. The draft tube shall include an access door in line with the propeller for cleaning and maintenance of the impeller. The access doors shall be of the same material as the draft tube. **(Addendum 2, Issued 8/22/2025)**

H. Cone Section: The cone section shall effectively divide the treating basin into an inner flocculating reaction zone and an outer settling zone. The cone shall be fabricated from (3/16 inch) steel and have a slope of at least 50 degrees from the horizontal plane.

I. Sludge Rake Arms: Each unit shall be provided with two rotating scraper arms. The rotating arms shall be attached to and supported by the rotating draft tube, designed with adequate strength and rigidity to support and rotate the scraper arms under maximum load conditions with an adequate factor of safety and shall be reinforced at top and bottom for proper distribution of loads. Scraper arms shall be fabricated from steel members specially designed to keep the vertical and horizontal deflection within acceptable limits.

J. Fixed steel scraper blades shall be provided on the rotating arms to move settled sludge to the central sludge collection hopper. Blades shall be spaced on each arm so settled sludge is collected over the full area of the basin by each arm.

K. The scraper arms shall conform to the slope of the bottom of the basin.

L. Inlet Muffle Ring: A muffle ring assembly shall be provided to transfer raw water from a side inlet pipe connection to inlet ports in the rotating center draft tube. Guide rings shall be provided on the center tube to mate with the muffle ring. The muffle ring shall be a stationary fabricated steel channel arrangement supported by rods to the cone section and will have a plain end inlet pipe nozzle for connecting to the inlet pipe with a Dresser coupling.

M. Influent Pipe: A steel influent pipe shall be provided between the tank and draft tube. The pipe shall have a plain end with rigid coupling to connect to the wall pipe. Wall pipe and coupling are to be provided by the contractor. Pipe hangers shall be provided to support the influent pipe from the walkway or the tank wall as required.

N. Launders: Perimeter type launders are acceptable providing the horizontal travel of water does not exceed 10 feet at any point. All launder parts shall be free of winds, warps, local deformations, or unauthorized bends. Holes and other provisions for field connections shall be accurate and shop checked, so that proper fit will be provided when the units are assembled in the field.

O. The launder trough sections shall be fabricated by bending a single plate or by welding flat plates. If welding is used, the welds shall be continuous. All joints in the effluent launder troughs shall be watertight. Flow velocity in the launders and collection troughs shall not exceed 2 feet/second.

P. Fixed orifices shall be provided in each side of the launder troughs. They shall be designed to pass the design rate with approximately 3 inch head loss. The orifices shall

be spaced to provide uniform collection of the water from the surface area of the basin. All burrs or irregularities on cut edges shall be removed by grinding.

## 2.04 BOTTOM FEED CLARIFIER (CLARIFIER 2)

A. Scraper Drive: The center drive mechanism shall consist of concentric drive units and gearing for the mixing equipment and for the sludge collecting equipment. The sludge collecting equipment shall be driven by a steel turntable supported by a grease lubricated ball bearing having a minimum L10 life of 30 years when subjected to the following loadings; axial load equal to the weight of the entire rotating mechanism, radial load equal to the unbalanced separation force of the final drive gear which is a minimum of 50 percent of the tangential force at the pitch line of the final gear, and a moment load equal to an unbalanced force of 400 pounds at the end of one scraper arm. The ball races shall be hardened to Rockwell 60 C. The center mechanism shall be designed so that the bearing balls or the entire bearing can be replaced without removing the access walkway or drive platform.

B. A steel ring gear shall be provided on each turntable. Ring gear teeth of roller tooth design shall be pinned in place. Gearing having an input shaft speed of 100 rpm or less will not be required to bear an AGMA nameplate. All large slowly rotating gearing shall be designed on the basis of torque loads using conservative values for wear and beam strength.

C. Each turntable shall be equipped with a direct connected constant speed parallel helical gearmotor. Each drive unit shall be anchored to the drive platform. All drive units shall be suitable for outdoor service.

D. All gear reducers having an input speed greater than 100 rpm shall be AGMA rated with a service factor of at least 1.40.

E. The drive assembly for the rotating scraper shall be equipped with an indicating overload mechanism with two independently adjustable contacts. An "Alarm" contact shall be provided to operate an alarm device when the load reaches approximately 100 percent of the specified running torque. A "Stop" contact shall be provided to stop the motor at approximately 120 percent of the specified running torque. The "Alarm" contact setting shall not exceed the rated motor horsepower. The alarm devices operated by the contacts shall be furnished under the electrical section of the specifications.

F. The existing mixing equipment shall be reinstalled is a marine propeller driven by a directly connected gear reducer with independent propeller shaft bearings. The mixer drive shall be concentric with the scraper drive.

1. The existing variable speed mixer drive shall be utilized and consists of a parallel helical gear reducer and motor combined with an electronic variable frequency drive (VFD). The entire assembly shall flange mount to a torque tube housing the independent propeller shaft bearings.

G. Stationary Center Column/Draft Tube: A tubular steel column shall be provided to support loads of the center drive mechanism, sludge collecting equipment, access bridge, conical baffle wall, and the effluent launders. The column shall be designed to support all loads imposed thereon, including torque and eccentric loads from the rotating mechanisms. The center support shall be of proper height to permit level installation of the access walkway and to support the turntable above the water level.

1. The mixing equipment shall be reinstalled in the combination center column/draft tube extending to the bottom of the basin to ensure that precipitated solids are recirculated from the floor of the basin. Units without this design feature will not be acceptable. Properly sized velocity control discharge ports shall be provided in the draft tube near the water surface under the cone so that flocculation occurs under the cone.

H. ~~Center Cage: The center cage shall be of steel box truss construction. It shall be provided with connections for the two sludge rake arms. The cage top shall be bolted to the main gear which shall rotate the cage with the attached arms. The cage and rake arms shall be designed to withstand 150 percent of the design running torque of the drive without overstressing the members. Loading to develop the torque shall be considered as uniform loads applied to each arm individually.~~ **(Addendum 2, Issued 8/22/2025)**

I. Cone Section: The cone section shall effectively divide the treating basin into an inner flocculating reaction zone and an outer settling zone. The cone shall be fabricated from (3/16 inch) (1/4 inch) steel and have a slope of at least 50 degrees from the horizontal plane.

J. Sludge Rake Arms: Each unit shall be provided with two rotating scraper arms (of Maxi-member design). The rotating arms shall be attached to and supported by the rotating cone or central drive cage. Scraper arms shall be fabricated from steel members specially designed to keep the vertical and horizontal deflection within acceptable limits.

K. (Fixed steel scraper blades) (Blades with adjustable Type 304/304L stainless steel squeegees) shall be provided on the rotating arms to move settled sludge to the central sludge collection hopper. Blades shall be spaced on each arm so settled sludge is collected over the full area of the basin by each arm.

L. The scraper arms shall conform to the slope of the bottom of the basin.

M. Launders: Perimeter type launders are acceptable providing the horizontal travel of water does not exceed 10 feet at any point. All launder parts shall be free of winds, warps, local deformations, or unauthorized bends. Holes and other provisions for field connections shall be accurate and shop checked, so that proper fit will be provided when the units are assembled in the field.

N. The launder trough sections shall be fabricated by bending a single plate or by welding flat plates. If welding is used, the welds shall be continuous. All joints in the effluent launder troughs shall be watertight. Flow velocity in the launders and collection troughs shall not exceed 2 feet/second.

O. Fixed orifices shall be provided in each side of the launder troughs. They shall be designed to pass the design rate with approximately 3 inch head loss. The orifices shall be spaced to provide uniform collection of the water from the surface area of the basin. All burrs or irregularities on cut edges shall be removed by grinding.

### 2.05 ACHORS AND FASTENERS

A. Anchor Bolts: All anchor bolts shall be a minimum of 1/2 inch diameter and made of type 304 stainless steel. The equipment supplier shall furnish all anchor bolts, nuts, and washers required for the equipment.

B. Fasteners: All structural fasteners shall be a minimum of 1/2 inch diameter and made of type 304 stainless steel. The equipment supplier shall furnish all fasteners required for the assembly of the equipment.

### 2.06 ACCESS BRIDGES AND HANDRAILING

A. The clarifier supplier shall field measure the bridge and it's components prior to shop drawing submittals to ensure all connections to their mechanism are compatible with the existing bridge. The connections shall be designed by the clarifier manufacturer and all steel components necessary shall be supplied and installed. Manufacturer to verify the existing bridges will support the new internals.

## PART 3 EXECUTION

### 3.01 INSTALLATION

A. Equipment shall be installed complete ready for service in accordance with the manufacturer's recommendations and Engineer's instructions.

### 3.02 LUBRICATION

A. Lubrication required for initial operation shall be furnished and applied in accordance with the manufacturer's recommendations.

### 3.03 INSPECTION, STARTUP, AND TRAINING

A. The Contractor shall furnish a qualified representative of the manufacturer to perform inspection, startup, and training services. The manufacturer's representative shall be experienced in the installation, startup, operation, and maintenance of the equipment.

B. The representative shall check the installation and supervise final adjustments and initial startup of the equipment. The representative shall certify that the installation is correct and that the equipment is operating satisfactorily. This service shall be for a minimum period of one trip and one day.

C. Within two weeks of startup, the manufacturer shall submit to the Engineer a written report (minimum 4 copies) covering the representative's inspection and startup of the

equipment. This report shall include the manufacturer's certification that the installation is correct and that the equipment is operating satisfactorily.

D. After the installation and operation of the equipment has been certified, the manufacturer's representative shall train the Owner's personnel for one, eight-hour day in the proper operation and maintenance of the equipment. The Owner may videotape the training.

E. In addition to the initial training, the manufacturer shall provide one, eight-hour day of training at the time requested by the Owner within the one-year maintenance and guarantee period. This service would be in addition to any warranty work.

## PART 4 SPECIAL PROVISIONS

### 4.01 CLARIFIER MECHANISMS

A. Clarifier 1:

1. One mechanism shall be installed in an existing 35-feet – 0-inch diameter concrete treatment basin. Total side wall depth of the basin is 16-feet – 0-inches. The side water depth is 15-feet.

2. The unit to be installed in the new treatment basin shall have:

| | | |
|---|---|---|
| a. | Internal Mechanism Design (i.e., cone, draft tube, mixer): | 1.0 mgd |
| b. | Maximum Recirculation Rate: | 7,000 gpm |
| c. | Launder System Design: | 2.0 mgd |
| d. | Detention time at 1 mgd: | 160 minutes |
| e. | Scraper design torque: | 7,000 ft-lbs |

3. Headloss between the basin's water surface and water level at the outlet of the collector effluent launder shall not exceed 10-inches.

4. Flow into the new treatment basin shall be through a new 12-inch diameter pipe from the side of the center cone as shown on the Drawings. Contractor to coordinate elevation of side feed pipe.

5. Flow out of the treatment basin shall be via a collector effluent launder to a drop box as shown on the Drawings.

6. Clarifier mechanism shall be WesTech Contraflo SCD73

B. Clarifier 2:

1. One mechanism shall be installed in an existing 35-feet – 0-inch diameter concrete treatment basin. Total side wall depth of the basin is 16-feet – 0-inches. The side water depth is 14.75-feet.

2. The unit to be installed in the new treatment basin shall have:

a. Internal Mechanism Design (i.e., cone, draft tube, mixer): 1.0 mgd

| | | |
|---|---|---|
| b. | Maximum Recirculation Rate: | 7,000 gpm |
| c. | Launder System Design: | 2.0 mgd |
| d. | Detention time at 1 mgd: | 160 minutes |
| e. | Scraper design torque: | 7,000 ft-lbs |

3. Headloss between the basin's water surface and water level at the outlet of the collector effluent launder shall not exceed 10-inches.

4. Flow into the new treatment basin shall be through an existing 16-inch diameter pipe from the bottom of the center of the basin as shown on the Drawings.

5. Flow out of the treatment basin shall be via a collector effluent launder to a drop box as shown on the Drawings.

6. Clarifier mechanism shall be WesTech Contraflo SCX63

**4.02 BRIDGE AND WALKWAY REPLACEMENTS (ALTERNATIVE BID ITEM 7A)**

A. Clarifier 1 (Side feed, bridge supported) – in lieu of reusing the existing bridge and walkway; a new system shall be supplied and installed.

1. Support Bridge:

a. A steel support bridge spanning the treating basin shall be provided to support loads of the center drive mechanism, muffle ring, inlet piping, draft tube, sludge collecting equipment, access walkway, conical baffle wall, and the effluent launders. The bridge shall be designed to support all loads imposed thereon, including torque and eccentric loads from the rotating mechanisms. The bridge shall be of proper height to permit level installation of the access walkway and to support the turntable above the water level.

2. Walkway:

a. One 36 inch wide walkway with handrails shall be supported by the influent column and the tank wall at its outer ends, and shall be designed to safely withstand a live load of 50 pounds per square foot. Deflection shall not exceed L/360 when both the dead load and live load are applied. It shall consist of two trusses or beams with 1 1/4 inch x 3/16 inch aluminum grating between the beams. The walkway shall be diagonally braced against lateral movement, and provided with handrails 42 inches high, of double row 1 1/2 inch diameter horizontal aluminum pipe, and 1/4 inch x 4 inch high kickplates on both sides.

b. Stainless steel bearing plates, UHMWPE slide plates, and anchor bolts for the wall supports shall be provided by the equipment supplier and installed by the contractor. Bearing plate dimensions and anchor bolt diameter, length, quantity, and arrangement shall be per the equipment

supplier. The contractor shall block out or otherwise modify the tank or support structure to accommodate walkway and supports, if required.

3. Center Drive Platform:

a. A center drive platform shall be provided which allows 24" clearance outside the center drive components. It shall consist of 1/4" aluminum checkered plate with necessary stiffeners and supports, resting on the center column, and provided with connections to the walkway. The entire platform shall be surrounded by handrails 42 inches high of double row 1 1/2 inch diameter horizontal aluminum pipe with 1/4 inch x 4 inch high kickplates.

B. Clarifier 2 (Bottom feed, column supported) – in lieu of reusing the existing bridge and walkway; a new system shall be supplied and installed.

1. Walkway:

a. One 36 inch wide walkway with handrails shall be supported by the influent column and the tank wall at its outer ends, and shall be designed to safely withstand a live load of 50 pounds per square foot. Deflection shall not exceed L/360 when both the dead load and live load are applied. It shall consist of two trusses or beams with 1 1/4 inch x 3/16 inch aluminum grating between the beams. The walkway shall be diagonally braced against lateral movement, and provided with handrails 42 inches high, of double row 1 1/2 inch diameter horizontal aluminum pipe, and 1/4 inch x 4 inch high kickplates on both sides.

b. Stainless steel bearing plates, UHMWPE slide plates, and anchor bolts for the wall supports shall be provided by the equipment supplier and installed by the contractor. Bearing plate dimensions and anchor bolt diameter, length, quantity, and arrangement shall be per the equipment supplier. The contractor shall block out or otherwise modify the tank or support structure to accommodate walkway and supports, if required.

2. Center Drive Platform:

a. A center drive platform shall be provided which allows 24" clearance outside the center drive components. It shall consist of 1/4" aluminum checkered plate with necessary stiffeners and supports, resting on the center column, and provided with connections to the walkway. The entire platform shall be surrounded by handrails 42 inches high of double row 1 1/2 inch diameter horizontal aluminum pipe with 1/4 inch x 4 inch high kickplates

END OF SECTION

# SECTION 16902
# METERING AND CONTROL EQUIPMENT

## PART 1 GENERAL

### 1.01 SCOPE

A. Work under this Section includes furnishing and installing all metering and control equipment which is part of the Plant Control System except the programmable controller system and the graphic user interface system.

B. All Work performed shall comply and be in accordance with all approved trade practices and manufacturer's recommendations.

### 1.02 SUBMITTALS

A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:

1. Shop Drawings for Review:

a. Manufacturer's literature including model number, type, size, materials, quantity, connections, equipment number, mounting hardware, and installation information.

2. Information for the Record:

a. Equipment suppliers report that equipment is properly installed and satisfactory operation is obtained.

b. Software, cables, etc. for configuration, programming or operation of meters or equipment, minimum of two each is required.

c. Operation and maintenance manuals.

d. Schedule of Owner's training for all new equipment.

## PART 2 PRODUCTS

### 2.01 PRODUCT REQUIREMENTS

A. All metering and control equipment shall be as indicated on the Drawings and as specified, and shall include, but not be limited to those devices hereinafter defined. Should additional devices be required, but not specifically indicated elsewhere, in order to affect the intent of the Contract Documents, such devices shall be furnished.

B. All metering and control equipment used for similar applications shall be the product of a single manufacturer.

C. All features and requirements listed in the individual instrument specifications are required.

D. All field instrument enclosures shall be NEMA 4X construction except in hazardous locations where the enclosures shall be NEMA 7 for Class I, Division 1, Group D service, unless otherwise noted. Equipment in hazardous locations shall indicate temperature rating as specified in the NEC.

E. All faces of panel mounted instruments shall be NEMA 4X construction except where the panel is located in a protected Control Room environment.

F. Whenever an "or equal" equipment item is proposed in lieu of that specified it will not be considered equal if it is of non-potted construction and the specified item is potted construction.

## 2.02 PERFORMANCE REQUIREMENTS

A. Intrinsically safe equipment shall be Factory Mutual approved for Class I, Division 1, Group D service.

B. Analog signals for input to a programmable controller system shall be isolated 4-20 mA DC and where required, current to current transducers or other device shall be furnished to produce an isolated signal to the programmable controller analog input modules.

C. Digital input signal sources shall provide an isolated contact rated at 5-amp minimum, 115 VAC, to the programmable controller system.

D. Power supplies shall be furnished for two-wire transmitters and other devices requiring DC power. No more than four loops shall be powered from one power supply. Separate power supplies shall be provided for duplicate instruments to ensure failure of one power supply will not inhibit operation of secondary equipment.

E. The Site is in an area subject to radio frequency activity. Any equipment sensitive to radio frequency interference (RFI) shall be provided with the proper RFI filters, be properly shielded and grounded, or otherwise protected to allow proper operation of the equipment.

## 2.03 POWER AND POWER CONDITIONING

A. Instrument Power Supply

| | |
|---|---|
| Function: | Power for up to six 4-20 mADC signal loops. If more than six loops, use additional units of the same size. |
| Type: | Electronic Solid State |
| Input: | 120 VAC, 60 Hz |
| Output: | As required, +/- 1 VDC adjustable |
| Load: | Load +/-0.05%, Line +/- 0.05% |
| Ripple and Noise: | 0.5 mv RMS |
| Mounting: | Plug-in with octal base and screw terminals. |
| Features: | Overvoltage protection |
| Manufacturer: | Acopian, or equal |
| Model: | V"x"J Series ("x" is required output voltage) |

## 2.04 SIGNAL CONDITIONING

A. Relay ((EY))

| | |
|---|---|
| Function: | Logic Control |
| Type: | General Purpose (plug-in octal base) |
| Contacts: | 120 volt 60 Hz, 10 amps, DPDT |
| Coil Voltage: | 120 volt, 60 Hz, with LED indicator |
| Mounting: | Plug in 8 pin with screw terminals |
| Manufacturer: | Allen-Bradley, or equal |
| Model: | 700-HA32A1-4 with 700-HN125 socket, or 700-HN202 socket with 700-HS surge suppressor as required\ |

B. Relay ((EY))

| | |
|---|---|
| Function: | Logic Control |
| Type: | General Purpose (plug in octal base) |
| Contacts: | 120 VAC, 60 Hz, 10 amps, DPDT |
| Coil Voltage: | 24 VDC, with LED indicator |
| Mounting: | Plug-in 8 pin socket w/screw terminals |
| Manufacturer: | Allen Bradley, or equal |
| Model: | 700-HA32Z24-4 with 700-HN125 socket |

## 2.05 SIGNAL CONTROL

A. Pushbutton ((HN))

| | |
|---|---|
| Function: | Manual Operator Control |
| Type: | Momentary contact pushbutton unit,<br>NEMA rating as required |
| Contacts: | 1 NO and 1 NC minimum |
| | Provide contact arrangement as required to perform necessary functions |
| Contact Rating: | 10 amps at 120 VAC, 60 Hz |
| Operator Type: | Momentary, color and designation per function |
| | Black - (Start, Run, or Open) |
| | Red - (Stop or Close) |
| | Green - (Silence) |
| Mounting: | Panel face, with legend plate |
| Manufacturer: | Allen-Bradley, or equal |
| Model: | 800H |

B. Pushbutton ((HN))

| | |
|---|---|
| Function: | Manual Operator Control |
| Type: | Maintained contact push-pull unit,<br>NEMA rating as required |
| Contacts: | 1 NO and 1 NC minimum |
| | Provide contact arrangement as required to perform necessary functions |

| | |
|---|---|
| Contact Rating: | 10 amps at 120 VAC, 60 Hz |
| Operator Type: | Maintained, color and designation per function |
| | Red - (Stop or Close) |
| | Red Mushroom Head (Emergency Stop) |
| Mounting: | Panel face, with legend plate |
| Manufacturer: | Allen-Bradley, or equal |
| Model: | 800H |

C. Selector Switch ((HS))

| | |
|---|---|
| Function: | Manual Operator Control |
| Type: | 2, 3, or 4 Position Selector Switch Unit,<br>NEMA rating as required |
| Contacts: | 1 NO and 1 NC maintained, |
| | Provide contact arrangement as required to perform necessary functions |
| Contact Rating: | 10 amps at 120 VAC, 60 Hz |
| Operator Type: | Knob Lever, all positions maintained<br>unless indicated otherwise |
| Operation: | Provide 2-3-4 position switch as required |
| | Where indicated, provide locking cylinder to prevent unauthorized switching |
| | Where indicated, provide spring return arrangement |
| Mounting: | Panel face, with legend plate |
| Manufacturer: | Allen-Bradley, or equal |
| Model: | 800H |

D. Selector Switch Station ((HS))

| | |
|---|---|
| Function: | Manual Operator Control |
| Type: | Heavy Duty Operators within enclosure, “Local-Off-PLC” selector switch, “Open,” “Close” pushbuttons, UL listed for use in Class I, Division II, Groups A, B, C, and D |
| Contacts: | Hermetically sealed power reed contact blocks. Provide contact arrangement as required to perform necessary functions. |
| Contact Rating: | 10 amps at 120 VAC, 60 Hz |
| Operator Type: | Type, color, and designation per function<br>“Local-Off-PLC” - 3-position maintained selector switch<br>Open and Close - Black momentary contact pushbutton unit |
| Materials: | Stainless steel enclosure, heavy-duty operators |
| Cable: | Provide separately |
| Manufacturer: | Square D, or equal |
| Model: | KYSS enclosure, KS43B selector switch, KR “Open” and “Close” pushbuttons, and KA50 series contact blocks |

E. Pushbutton Station ((HN))

| | |
|---|---|
| Function: | Manual operator control and status indication |

| | |
|---|---|
| Type: | Heavy Duty Operators within enclosure, “Stop” and “Start” pushbuttons, “Running” and “Alarm” indicator lights, UL listed, NEMA 4X |
| Contacts: | Hermetically sealed power reed contact blocks. Provide contact arrangement as required to perform necessary functions. |
| Contact Rating: | 10 amps at 120 VAC, 60 Hz |
| Operator Type: | Type, color, and designation per function<br>Stop - Red Illuminated Mushroom Head maintained contact push-pull unit<br>Start - Black momentary contact pushbutton unit |
| | Running - Green transformer style push-to-test pilot light |
| Materials: | Stainless steel enclosure, heavy-duty operators |
| Cable: | Provide separately |
| Manufacturer: | Square D, or equal |
| Model: | KYSS enclosure, KR “Start” pushbutton, K2LR “Stop” mushroom button, KA5 contact blocks, and KT pilot lights |

## 2.06 INDICATION

A. Pilot Indicator Light ((JJ))

| | |
|---|---|
| Function: | Visual indication of process parameter, transformer type; push-to-test, 120 VAC |
| Type: | NEMA rating as required |
| Lamps: | 120 VAC, 60 Hz,<br>Incandescent, lens color as required<br>GREEN (running or open)<br>RED (stopped or close)<br>AMBER (alarm)<br>WHITE (status) |
| Mounting: | Front face of control panel with legend plate |
| Manufacturer: | Allen-Bradley, or equal |
| Model: | 800H |

B. Indicator ((*I))

| | |
|---|---|
| Function: | Visual display of process variable |
| Type: | Electronic Solid State |
| Input: | Analog |
| Value: | 4-20 mADC |
| Impedance: | 100 ohms |
| Accuracy: | Linear, ±0.05% of calibrated span, +/- 1 count |
| Output: | Visual 4-1/2 digit digital display |
| Value: | As required by process, for scaling unit |
| Noise Rejection: | |
| Normal Mode: | 55 db (typical) at 60 Hz |
| Common Mode: | 110 db (min) |
| Power: | 117 VAC +/- 10%, 47-400 Hz, 3.5 watts normal |

| | |
|---|---|
| Display: | |
| Type: | High-Brightness, 0.56-inch LED |
| Polarity: | Positive assumed, negative sign displayed |
| Decimal Points: | Selected by internal “solder bridge” |
| Overrange: | An above range input will blank out all digits and display a “1” |
| Environmental: | |
| Operating: | +5 to 55 degrees C |
| Storage: | -20 to +85 degrees C |
| Dimensions: | 4.5-inch W x 2.24-inch H x 2.92-inch D |
| Manufacturer: | Precision Digital Corporation, or equal |
| Model: | PD6000 |

## 2.07 LEVEL

A. Level Switch ((LS))

| | |
|---|---|
| Function: | High or low level shutdown of equipment. |
| Type: | Displacement bulb with dry contact switch mechanism |
| Output Contacts: | SPDT, Non-inductive, 21 A at 120 VAC |
| Specific Gravity | 0.6 - 1.5 $g/cm^3$ |
| Process Temperature: | 0 to 60 degrees C (32 to 140 degrees F) |
| Cable Length: | 18 AWG, 41 strand, 20 feet minimum, length as required |
| Materials: | PVC with adjustable neoprene strain relief and butyl cosmetic ring |
| Manufacturer: | Magnetrol, or equal |
| Model: | T10 |

## 2.08 FLOW

A. Flow Element and Transmitter ((FE)/(FIT))

| | |
|---|---|
| Function: | Measure, indicate and transmit the process flow in a full pipe. Meter must be a full bore meter with the magnetic field traversing the entire cross section of the flow tube. Insert magmeters or multiple single point probes inserted into a spool piece are not acceptable. Magnetic flow meter, operating based with high impedance electrodes. Flow tube with two coils mounted outside a 304 stainless steel tube, transmitter, interconnection cables and mounting hardware. |
| Type: | Pulsed DC magnetic induction with absolute zero stability |
| Size: | As specified on Drawings and in Schedule |
| Input Signal: | Analog Process Flow |
| Conductivity: | Minimum 5 Micromho/cm |
| Process Temperature: | -10 to +130 degrees F |
| Outputs: | Isolated 4-20 mA DC into 1,000 ohms. Scaled pulse outputs as standard. |

| | |
|---|---|
| | Flow direction, empty pipe detection, configurable status two contact outputs and one contact input for zero contact return. |
| Display: | Backlight LCD capable of simultaneously displaying flow rate and totalization |
| Calibration: | Provide with each flow meter a printout of two points of calibration starting at 1 FPS with measurement devices traceable to NIST standards. Three minute 1.5 x PN. All meters shall have internal meter verification diagnostic. |
| Accuracy: | +/- 0.25 percent rate or less (3 to 33 ft/sec) |
| | or +/- 0.005 percent FPS below 1 FPS |
| Repeatability: | +/- 0.1 percent of reading |
| Range ability: | 100:1 turndown |
| Selectable Damping: | 0.01 to 99.99 seconds, configurable |
| Low Flow cutoff: | 0 to 10 percent, configurable |
| Electrodes: | Hastelloy C, bullet nosed electrodes on wastewater and flush electrodes on clean fluid.<br>Titanium or others for chemical feed applications. It is the manufacturer's responsibility to provide materials comparable with the process medium. |
| Liner: | Polyurethane, hard rubber, neoprene for sewage meters. Ebonite, Teflon or Tefzel for all sludge meters (RAS, WAS, thickened). Meters 14 inches and larger shall have a polyurethane or hard rubber liner. All meters specified in potable water lines shall have an NSF 61 or FDA approved liner. |
| Flow Tube: | |
| 0-12 inches: | 304 or 316 stainless steel, meters 0-12 inches shall be capable of accidental submergence with 30 feet of cable to remote converter. Meters located below grade or in a meter vault shall be NEMA 6P rated with 100 foot cable. Cable shall be factory installed and potted. Compound mixtures installed in the field are not acceptable. All meter housings shall be of a welded design. |
| 12-72 inches: | 304 or 316 stainless steel shall be capable of continuous submergence in 30 feet of water with cable to remote converter. |
| End Connections: | |
| 0-4 inches | 150 lb. ANSI carbon steel or wafer design |
| 6-24 inches | 150 lb. ANSI carbon steel flanges |
| 30-78 inches | Class D AWWA flanges |
| Lay length | All meters should comply with ISO 13359 lay lengths |
| Grounding: | All meters must be supplied with orifice type 316 stainless steel grounding rings. Grounding electrodes are not acceptable. Meters shall have 316 grounding straps. |
| Converter: | Microprocessor based remote converter. Refer to drawings for cable length. Only one conduit between flow tube and converter. Three totalizers for forward, reverse and net. |
| Power Requirements: | 110/120 VAC 50/60 Hz. |

| | |
|---|---|
| Transmitter Enclosure: | NEMA 4X die cast aluminum rectangular housing immune to RFI inference, with flow rate and totalization indication. |
| Electrical Rating | All meters installed in a wastewater treatment plant shall be FM approved Class 1 Division 2 Grounds A, B, C and D. Meter shown on drawings in Class 1 Div 1 area shall be rated for that area. |
| Ambient Temperature: | -40 to 150 degrees F |
| Manufacturer: | Endress & Hauser 53W Promag, Rosemount 8700 Series or Johnson Yokagawa ADmag, Siemens 3100, or equal. |
| Model: | Manufacturer shall be ISO 9001 compliant and meters shall have a two year standard warranty. All meters shall have a stainless steel tag. All meters shall have internal meter verification along with coating, ground loop and process noise diagnostics. All meters shall have empty pipe direction with contact inputs for zero return. |

## 2.09 RESERVED

## 2.10 POSITION

A. Intrusion Switch ((ZS))

| | |
|---|---|
| Function: | Indicate door not closed |
| Type: | Magnetic, having a minimum of two hermetically sealed reed contacts |
| Switch Contacts: | SPDT, Form C, closed when door is closed |
| Consumption: | 3W max |
| Enclosure: | Completely encapsulated within high strength aluminum housing, moisture and corrosion resistant, rated for Class I Group B when located below grade or for hazardous location |
| Mounting: | Screw terminals, screw mounting |
| Accessories: | Interface/isolation relays as required |
| Manufacturer: | GE Interlogix/Sentrol, or equal |
| Model: | 2500 Series, 2800T Series |

## 2.11 RESERVED

## 2.12 ANALYTICAL

A. Chlorine Residual Analyzer ((AE)/(AIT))

| | |
|---|---|
| Function: | Continuous free residual chlorine monitoring, transmit signal proportional to chlorine residual |
| Type: | Free and total residual analysis, microprocessor based control unit using DPD colorimetric method, integrated LCD display |
| Performance Criteria: | Standard Methods 408.E |

| | |
|---|---|
| Range: | 0 to 5 mg/l free or total chlorine residual |
| Outputs: | 4-20 mA programmable over span, 130V isolation from earth ground, |
| | Two SPDT, 5A @ 230 VAC, relay contacts configurable for sample concentration alarm, system warning, and system shutdown alarms |
| Display: | Integral LCD indicator and alarm status LED |
| Resolution: | 0.035 mg/l |
| Accuracy: | +/- 5% or 0.035 mg/l, whichever is greater |
| Repeatability: | Within 0.05 mg/l |
| Cycle Time: | Programmable: one sample every 2.5 – 60 minutes |
| Sample Flowrate: | Minimum 200 ml/min |
| Sample Inlet Pressure: | 1.5 to 75 psig |
| Ambient Temperature: | 41 to 104 degrees F |
| Power Requirements: | 120 VAC, 90 VA max |
| Enclosure: | IP66 |
| Installation: | Sample supply line shall be provided with hot tap in process piping. Tap location and drain line routing shall be approved by Owner/Engineer. |
| Accessories: | Sample supply line including ball valve and pressure regulators (adjustable and preset), drain line, maintenance kit, Y-strainer, and (3) reagent kits for each analyzer |
| Manufacturer: | Xylem |
| Model: | 3017M |

**(Addendum 2, Issued 8/22/2025)**

## 2.13 ACCESSORIES

A. All piping and tubing for connections to instruments shall be stainless steel. Threaded pipe shall be ASTM A312, Grade TP304, Schedule 40S, and fittings shall be AISI Type 304. Tubing shall be ASTM Grade TP304, 0.028-inch minimum wall thickness for flareless “bite” type with threaded nut and ferrule fittings.

B. Valves shall be stainless steel eccentric plug valves with a bolted-on non-removable lever actuator. Valves shall be equal to DeZuric Figure 130 with synthetic rubber faced plugs. Valves shall have screwed or flanged ends as required. Valves for gas service shall be designed for gas service and shall provide leak-proof shutoff.

C. Diaphragm seals shall provide continuous isolation between pressure gauges, switches, and transmitters from process fluid. Upon instrument removal or failure, there shall be no leakage. Seals shall be of the type to allow instrument and diaphragm top housing to be removed from the process piping with no leakage of process fluid. Seal fill fluid shall be incompressible, non-corrosive, and suitable for materials of construction and temperature encountered, and shall be selected to minimize temperature effect. Sludge piping process connections shall be 1-1/2-inch, 150 pound flanged. Gas and water piping process connections shall be 3/4-inch NPT. All instrument piping connections shall be 1/2-inch or 1/4-inch NPT, as required. All process connections shall have a 1/4-inch NPT flushing connection with a 316 SS plug.

D. All mechanical fasteners such as bolts, nuts, screws, cinch anchors, clamps, etc., shall be stainless steel.

E. All special mounting brackets shall be stainless steel, galvanized, or nonferrous non-corrosive metal.

F. All equipment mounted outdoors that includes any type of visual indicator, LCD, etc., shall be furnished with a sun visor.

G. All equipment located outdoors shall include a thermostatically controlled space heater.

H. All field instruments and devices shall be equipped with a 1-inch x 3-inch stainless steel identification tag firmly affixed to the instrument or device with stainless steel fasteners. Each tag shall show the manufacturer's name, serial number, part number, tag number (to be approved by the Engineer), calibrated ranges, or calibration constants.

I. For each type of device installed, the Contractor shall supply two complete sets of software, hardware, calibration devices, and cabling, used to configure, calibrate, or make adjustments.

## PART 3 EXECUTION

### 3.01 GENERAL

A. The features and installation of the instrumentation shall be coordinated for optimal performance with the characteristics of the process material to be metered.

B. Care must be exercised to identify locations that meet the requirements of the manufacturer including upstream and downstream distances, pressures, temperatures, and accessibility for maintenance.

C. Verify equipment requirements and dimensions with provisions specified under this Section. Check actual field conditions, report necessary changes, and submit equipment reflecting changes.

D. Coordinate Work with other trades to avoid conflict and to provide correct rough-in and electrical connection requirements. Inform Contractors of other trades of the required access to and clearances around equipment to maintain serviceability and code compliance.

E. Where the installation of any device is dependent on, or affected by, Work performed under other sections of these specifications, the Contractor shall coordinate the Work. Installation coordination includes the correct location and placement of devices, piping to the equipment, pipe taps, control power circuits, connections to the control system, etc.

F. Installation of instrumentation in an existing system being modified, replaced, or abandoned, shall be coordinated with the Owner and shall be performed to minimize operational disruptions and minimize time that equipment may be out of service.

### 3.02 INSTALLATION

A. Installation shall include the provision of materials, and the coordination of all details, necessary to properly install the instruments including location, arrangement in piping, power source, signal wiring and conduit, special brackets, and all mounting hardware.

B. All instrumentation devices shall be installed in accordance with the manufacturer's installation requirements.

C. Wiring practices for intrinsically safe systems shall be in accordance with ISA RP12.06.01.

D. Instruments shall be installed so that the various components are accessible for maintenance. Care shall be taken in the installation to ensure sufficient space is provided between instruments and other equipment, including piping, for ease of removal and servicing. All instruments shall be readily accessible from grade, permanent platforms, or fixed ladders.

### 3.03 STARTUP AND TRAINING

A. The Contractor shall provide the services of component manufacturer's factory trained personnel for the supervision of installation, initialization, and calibration of equipment.

1. These services shall also include a minimum of one eight-hour day to instruct the Owner's personnel in the operation and maintenance of the equipment. Specifically, these services shall be provided for but not limited to the following equipment items: All new equipment that is provided by Contractor.

| Specification Subsection | Description |
|---|---|
| 2.07 | Level Switch |
| 2.08 A | Flow Meter |

## PART 4 SPECIAL PROVISIONS

### 4.01 GENERAL

A. Schedules included herein are intended to supplement the Drawings and are not guaranteed to be complete. All instrumentation devices shown in the Contract Documents or otherwise required to complete the Work shall be furnished and installed.

### 4.02 LEVEL INSTRUMENT SCHEDULE

A. The following schedule is a listing of level instruments to be installed including: radar and sonic transducers, capacitance probes, and floats.

B. The following letter designations are used in the schedule:

Item Designation:

| | | | | |
|---|---|---|---|---|
| LT-1 | First Letter | L | = | Indicates Level Device |
| | Second Letter | T | = | Function, Indicator and Transmitter |

Number 1 = Item Number

Function:
- S Switch
- I Indicator
- T Transmitter

Range: As noted

C. Level instruments are numbered on the Drawings and scheduled as follows:

| Item Designation. | Process Function | Range | Process Conditions | Power Supply | NEMA Rating | Dwg No. | Spec No. |
|---|---|---|---|---|---|---|---|
| LS-6-1 | Sump Pump Pit High Level Switch | | Water | 120 V | 4X | E-6.1 | 2.07 A |

## 4.03 FLOW INSTRUMENT SCHEDULE

A. The following schedule is a listing of new flow devices to be installed.

B. The following letter designations are used in the schedule:

Item Designation:

| | | | | |
|---|---|---|---|---|
| FT-1 | First Letter | F | = | Indicates Flow Device |
| | Second Letter | T | = | Function, Transmitter |
| | Number | 1 | = | Item Number |

Function:
- S Switch
- I Indicator
- T Transmitter

C. Flow devices are numbered on the Drawings and scheduled as follows:

| Item Designation | Function | Pipe Size | Range scfm/gpm | Process psig/in. H20 | Process Conditions | Power Supply | NEMA Rating | Dwg No. | Spec No. |
|---|---|---|---|---|---|---|---|---|---|
| FE/FIT-6-1 | Finished Water Flow Rate | 12” | 0-1000 gpm | | Water | 120 V | 4X | E-6.1 | 2.08A |

## 4.04 RESERVED

## 4.05 RESERVED

## 4.06 RESERVED

A. Analytical instruments are numbered on the Drawings and scheduled as follows:

| Item No. | Function | Range | Power Supply | NEMA Rating | Dwg No | Spec No. |
|---|---|---|---|---|---|---|
| AE/AIT | Lab Chlorine Residual | Total chlorine residual | 120 VAC | 12 | E-4.1 | 2.12A |

## 4.07 SPARE PARTS

A. The Contractor shall furnish spare parts as shown in the Spare Parts Schedule. The spare parts shall be individually packaged for protection against dirt and moisture. Each package shall be labeled as to its contents with a description and part number.

B. All spare parts shall become the property of the Owner. The Contractor shall maintain the spare parts inventory level as shown in the Spare Parts Schedule, and replace at no cost to the Owner all spare parts consumed during the one-year warranty period.

## 4.08 SPARE PARTS SCHEDULE

A. Specification

| Subsection Number | Description | Quantity | Remarks |
|---|---|---|---|
| | | | |

B. Where a unit is indicated it shall be a complete unit as specified herein and installed including enclosure.

END OF SECTION