CITY AND BOROUGH OF WRANGELL

Wrangell Water Treatment Plant Project

Addendum No. 4

July 21, 2023

(54 pages)

The information in this Addendum modifies and changes the original bidding contract documents. In case of conflicts between this Addendum and previously issued documents, this Addendum shall take precedence.

The Bid Due Date remains Wednesday, August 9th, 2023 at 11:30 am. Questions will be accepted until July 31st, 2023. Contact Brita Mjos at bmjos@dowl.com with questions.

Questions Received From Interested Parties/Bidders

Question 1:

a) 28 31 13 Fire Detection 1.04.A.2: Please clarify an "independent third party to verify intelligibility and decibel levels". Is this intended to be performed by the fire alarm certified installer/designer, who will be certifying the installation, or a further removed party? Shall intelligibility be software modeled before design, and what is the standard for the intelligibility testing?
b) 28 31 13 Fire Detection 1.04 C. Are 4 bound hard copies of all these documents required? If we provide all the NFPA standards, drawings, internal schematics, technical sheets, programming guide, etc., this will be a huge document.
c) 28 31 13 Fire Detection 209 B2 states that ambient sound levels shall be determined while the process is running, before design. How shall that be accomplished before bid and/or construction? Are these numbers already determined, and available to us for bidding and design purposes?
d) Shall smoke detection be provided, in addition to one over the fire panel? Beam detection would be suitable.

Answer:

a) Intent is to be performed by fire alarm installer/designer.
b) Delete – Technical explanation of complete system
   Delete – Copy of test procedures list to be used at final acceptance
   Delete – Drawing of conduit layout, with physical wiring layout by color codes
   Delete – Copy of NFPA standards by which fire alarm system was installed
c) Maximum ambient sound levels expected to not exceed 90 dBA. Provide speakers as required to exceed ambient decibel level when process is in operation.
d) Per IBC, smoke detection shall not be required.

Question 2: My query regards the peristaltic metering pump skids, to request approved equal for the Grundfos skids that can match all items in paragraph 1.2 C. We have capacity for the output as called out in 2.1 B. Also, we have chemical compatibility with 2.1. L, capacity, and chemical acceptance. Grundfos can also match the complete packaged and pretested chemical feed skids under 2.2 A.

Answer: Diaphragm pumps submitted will not be approved as an “or equal” to peristaltic pumps. Further “as equal” requests will be considered post-bidding.

Question 3:

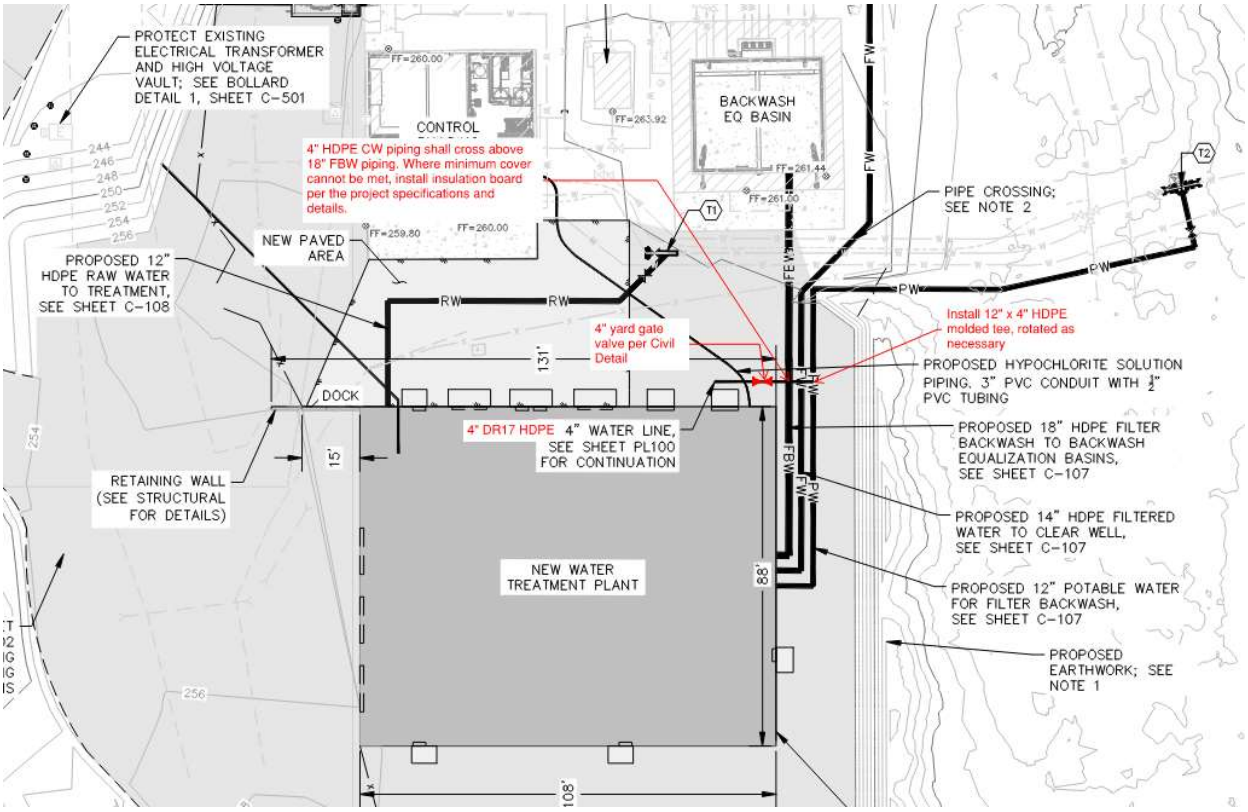
a) The specification for storm drains 33 41 00 calls for PVC SDR 35, a normal gravity sewer pipe. The drawings on C-105 show the 4’’ drain coming from the new WTP as this specified pipe material. The other two storm drains shown on C-105 are 12’’ and 18’’ HDPE SDR 11 which is not a specified storm drain material. Please clarify this discrepancy. Were these lines meant to be PVC SDR 35? Also, on the 18’’ line, an inlet is shown at the direction change with no detail or spec for storm drain inlets. Please clarify. Also, it appears that the 18’’ line will dump into the ditch and then drain through the 12’’ line and cross the road. Please confirm this is desired.
b) Drawings C-104 and C-108 detail the 12’’ PW line that supplies backwash water for the filters. A 4’’ branch is drawn off this line with reference to drawing P-100 which is the CW supply to the new WTP sprinkler system and misc. CW within the building. There is no further detail given for this 4’’ branch. Should it be constructed using the civil specs or the process pipe specs? Should an isolation valve off the 12’’ and a valve box be provided? Should the branch be a 12x4 molded tee, a side fused tee, a SS saddle type tee? Since this 4’’ branch must immediately cross the 14’’ FW and 18’’ FBW, can a plan and profile and connection detail be provided?

Answer:

a) Storm drain pipe shall be CPEP Type S. See attached detail sheet for storm drain inlets. Yes, the 18” line is intended to drain to the ditch, then into the 12” line.
b) The 4” branch off the 12” backwash line is intended to supply the new WTP Building CW. Outside of the new WTP building, the branch should be constructed per the civil specifications (see Specification section 33 11 13). Once the 4” branch enters the new WTP, it should be constructed per the building plumbing and mechanical specs (see Specification section 20 05 13-10). See the attached revised P&ID drawing PI-19 and the figure below for additional information. For bidding, the Contractor should assume the following:

    1. The 4” CW HDPE branch will tie into the 12” PW line as shown on the plans using a 12” x 4” molded HDPE tee.
    2. The 4” CW branch shall cross above the 18” FBW line. The tee should be rotated as necessary to facilitate the pipe crossings.
    3. If minimum cover requirements cannot be met at the crossing, insulation board should be installed per the project specifications.
    4. Following the crossings, a 4” yard MJ x MJ gate valve shall be installed, per Detail 2, Sheet C-501. Valve shall be installed in accordance with minimum bury requirements as specified by the manufacturer.

    There may be opportunity to install this 4” branch off the 12” potable water line after the 12” enters the new WTP. This change would be considered as part of the change order process with the selected contractor.



Question 4: If the intent is to protect/connect both buildings with fire alarm, shall an annunciator be provided in the control room, and shall that unit have a microphone?

Answer: Intent is not to connect both buildings.

Question 5: The document mentions a catwalk and mezzanine, but no dimensions that can be seen or determined. Where are those located so I can provide a budget quote for the project?

Answer: For AWC provided equipment, see AWC Shop Drawings for location and dimensions. Contractor shall provide all other hardware.

Question 6:

a) The 18'' FBW on C-104 and C-107 does not portray the PEMB well. This pipe will require passing under the foundation (under the east overhead garage door also means removing the exterior concrete apron) or through the foundation, and either tunneling into the basin wall approximately 5 feet or cutting open the slab to trench down to the core hole. Appears demolishing/cutting back the concrete apron will be required, but this is not shown on the demo plans. Please clarify the intent of the design.

b) Drawing C-302, sheet notes 1 and 2 both indicate finish grade should slope away from the building. Point 18 should not be at elevation 260.00 if point 23 is at 259.50 unless a swale is present to drain water away from the building? Also, should a ditch or swale be present at the toe of the blasted slope to pass water from point 18 to point 19 and through point 38 to finish at point 20? Also, should point 21 also be at elevation 256.00 as is point 36 to preserve the 4' tall loading dock face? Should a short loading dock retaining wall be present at point 21?

Answer:

a) The 18'' filter backwash / waste line into the backwash surge basin will require a core drill or cut-out with concrete reinforcement in this area. Some concrete demo and replacement will be required. Sketches to clarify this are attached and this additional information will be included in the final drawing package. Other demo piping can be capped/flanged and grouted from the inside of the basin. Any below-concrete piping that is not in the way of other construction activities can be abandoned in place.
b) See table below for updated point elevations.

Point #	Elevation
18	259.50
19	258.50
38	258.50
20	257.50

A ditch or swale is not needed. The 256.00 grade line shall intersect the building 3 feet to the north of point 21. An updated Site Grading Plan will be issued in a forthcoming addendum. A retaining wall is not needed at point 21.

Question 7: AWC drawings 17805-PI-GAD-100, 17805-PI-GAD-200, 17805-PI-GAD-310/320, 17805-PI-GAD-400, 17805-PI-GAD-910 show the anchoring & seismic system design, procurement, and installation 'By Others'. Will DOWL be providing the anchor & seismic design, or will the Contractor be required to develop a stamped anchoring & seismic design?

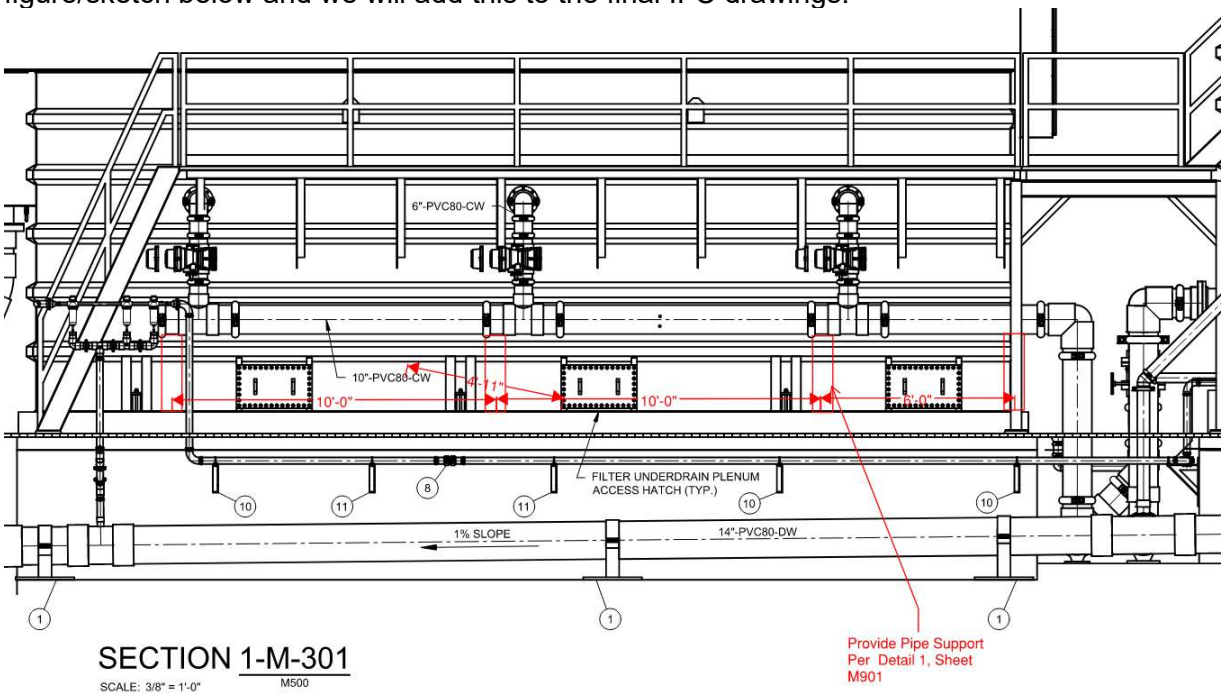
Answer: AWC provided the reaction forces to the engineer (DOWL) for designing/calculating the embedment depth. The resulting anchors to be installed by the Contractor are shown in the Anchor Rod Schedule on Sheet SF-003. Associated anchor rod marks are shown on the individual sheets.

Question 8:

a) Plan sheet M-301 & M-302 show the 10"-PVC80-CW into the filters as suspended; however, there are no callouts for pipe supports. What is the intention for securing this pipe? If pipe supports are desired, please provide additional detail.
b) AWC drawing number 17805-PI-GAD-900, sheet 2 of 6, has a callout for the DAF Unit platform support as "BEAMS SPANNING FROM BUILDING WALL TO TANK WALL TO SUPPORT PLATFORM SEE TABLE 1". The beams do not appear to be designed or supplied by AWC. Can you clarify whose scope (AWC or Contractor) the support beams belong to and if there is a callout in the Contract plans?
c) Concerning question 6 in addendum 3, weather-tightness warranty is not provided on any screwed-down roof panels, a standard 20-year weathertightness is provided on standing seam roofs. Please let us know if a standing seam roof is needed for this job or a screw down without weather tight warranty is acceptable.
d) Much of the PVC schedule 80 piping shown as solvent welded in the new WTP drawings appears to have grooved couplings sketched on each side of elbows and tees. Are these couplings and extra joints required? Also, Specification 40 05 31 for PVC schedule 80 pipe indicates it is cast iron pipe size which is the same as ductile iron pipe size. Was this supposed to read iron pipe size instead?

Answer:

a) Please reference Specification 40 05 07 for piping supports. Not all piping supports will be identified or shown on the drawings. Contractor is responsible for pipe supports as outlined in Part 2, Section 2.2 and the balance of this specification. For this particular line, see the figure/sketch below and we will add this to the final IFC drawings.



b) AWC will supply the referenced beams. They will be supplied longer than required to field fit them. Contractor shall supply bracket to connect the beams to the wall.

c) Specification 13 34 19 Metal Building Systems shall be modified as follows:

Article "2.05 EXTERIOR COVERING MATERIAL"

Change paragraph B. to read:

B. Roof panels: VSR Standing Seam Roof System, 16” (400 mm) wide, 24-gage (0.6 mm) panel.

Change subparagraph D.2. to read:

2. Roof panels: VSR Standing Seam Roof System: Butler-Cote 500, fluoropolymer containing 70% Kynar or Hylar 5000 resin.

d) Grooved couplings are shown in various areas for ease of installation and expansion/contraction allowance. The contractor should assume that grooved fittings shown are required in those locations. Some solvent welded will be required for larger diameter pipe when grooved couplings are not available in that size. All interior pipe shown as PVC is intended to be standard schedule 80 PVC pipe which is the same OD as steel pipe (ignore the reference to cast iron in this case; Specification 40 05 31 will be updated accordingly).

Question 9:

a) AWC Drawing Number 17805-IC-SCD-201, Sheets 1-23 and Drawing Number 17805-EL-SLD-201, Sheets 1-4 identifies a significant amount of wiring disconnected for shipping purposes with a note that “Field Wiring By AWC – Disconnected For Shipping Purposes Then Reinstalled By Others”. Can Dowl confirm that the Contractor is responsible for reinstalling the disconnected wires and AWC is NOT assisting with onsite field wiring?
b) Sheet M-401 depicts the 14” PVC80 filter water piping being supported by pipe supports in the pipe gallery that appear to be drawn as existing and there are no callouts for new pipe supports. Currently there are no existing pipe supports that we are aware of. There are no pipe supports shown for the influent header pipe in the contact basins. Is the intent for the Contractor to provide pipe supports for the filter water? If so, please provide callouts.

Answer:

a) Contractor is responsible for installation of all AWC equipment and will be required to provide an electrical sub-contractor for wiring connections. AWC will provide direction and assistance, however they will not be onsite to perform wiring connections. During the Start Up and Commissioning process, they will review the wiring installation.
b) Contractor shall support the piping per Specification 40 05 07 for piping supports.

Question 10: Will a backflow preventer be required on the Filter Backwash Water pipe between the new treatment plant building and the Backwash basin?

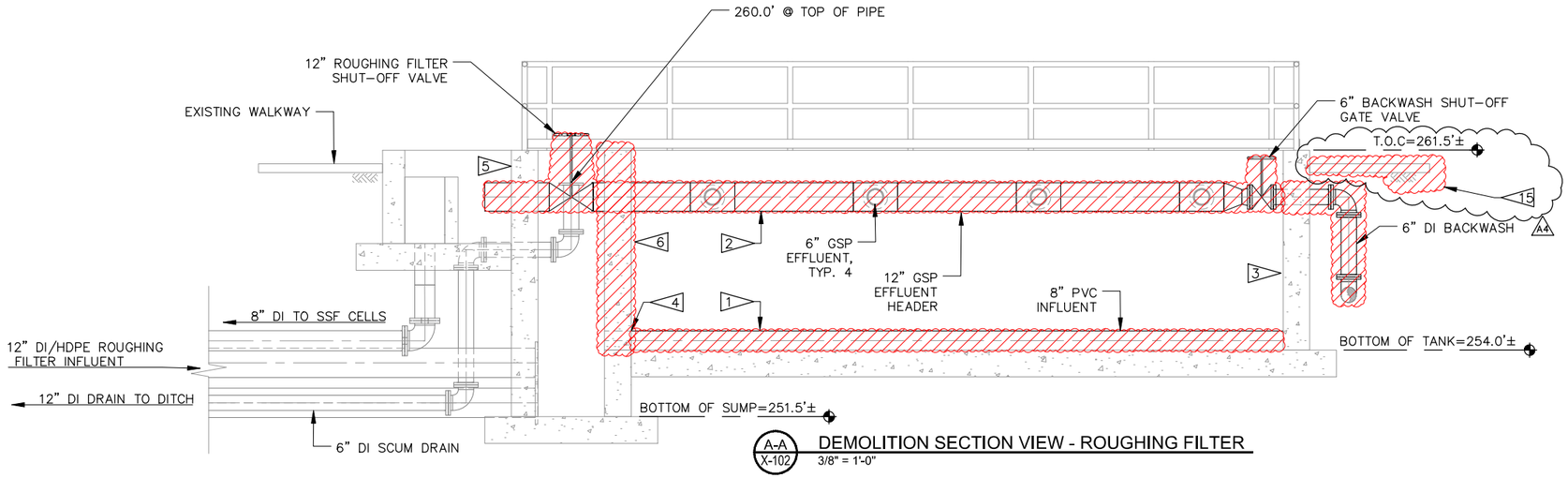
Answer: Yes, see revised sheet M-300. Backflow preventer shall be Ames Model 2000SS or Engineer-Approved Equal.

End of Addendum No. 4

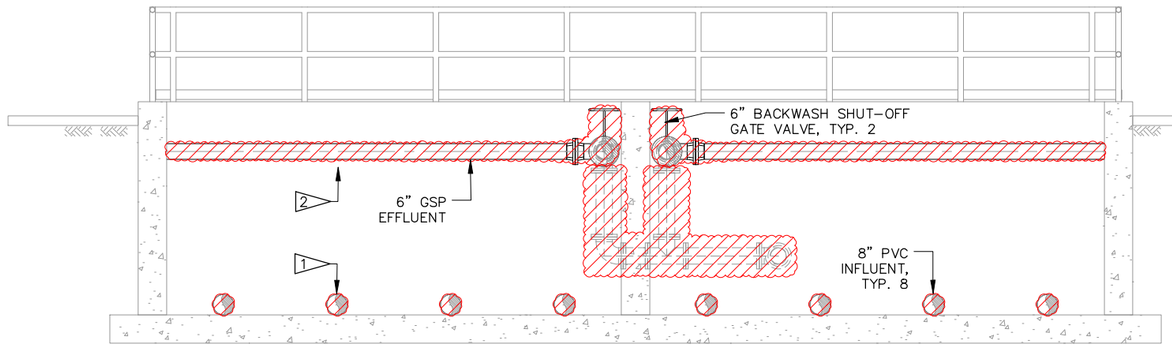
Attachments:

1. Revised drawings X-103, X-102, M-600, M-601, revised record drawing, M-601 markup, and PI-19
2. Revised drawings M-300, M-302, M-303
3. New Detail sheet C-112
4. Revised Specification 01 74 19 Construction Waste Management and Disposal
5. Revised Specification 33 11 13 Public Water Utility Distribution Piping
6. Revised Specification 33 31 13 Public Sanitary Utility Sewerage Piping
7. Revised Specification 33 41 00 Storm Utility Drainage
8. Revised Specification 40 05 31 Polyvinyl Chloride Process Pipe

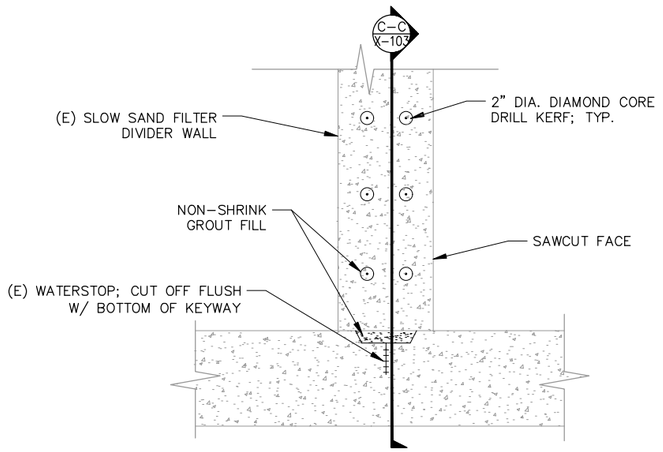
Attachment 1



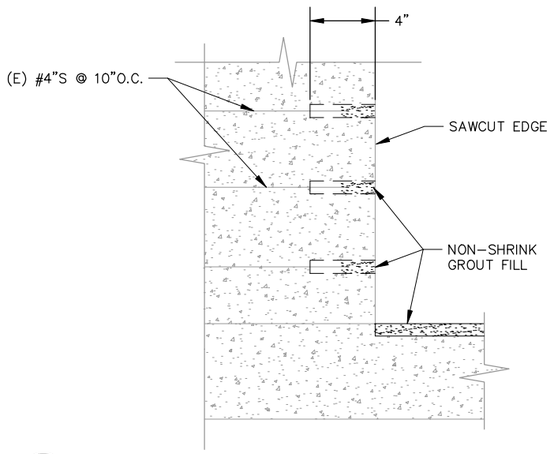
A-A X-102 **DEMOLITION SECTION VIEW - ROUGHING FILTER**
3/8" = 1'-0"



B-B X-102 **DEMOLITION SECTION VIEW - ROUGHING FILTER**
3/8" = 1'-0"



DEMO ELEVATION VIEW - SAWCUT PORTAL TREATMENT
NTS



C-C X-103 **DEMO SECTION VIEW - SAWCUT PORTAL TREATMENT**
NTS

GENERAL NOTES:

1. FLOOR PLAN AND EXISTING PIPING, EQUIPMENT, AND APPURTENANCES BASED ON 1998 PHASE 2 WATER SYSTEM IMPROVEMENTS RECORD DRAWING. SOME PIPING, EQUIPMENT, AND APPURTENANCES OMITTED FOR CLARITY.
2. FINAL DEMOLITION EXTENTS TO BE DETERMINED. CONTRACTOR TO VERIFY DEMOLITION EXTENTS WITH OWNER. DEMOLISHED PIPING AND EQUIPMENT TO BE SALVAGED TO OWNER.
3. SEE SPECIFICATION SECTION 01 10 01 FOR CONSTRUCTION DEMOLITION SEQUENCING.

DEMOLITION NOTES:

1. DEMO EXISTING 8" PVC INFLUENT MANIFOLD.
2. DEMO EXISTING 12" GSP EFFLUENT HEADER, 6" GSP EFFLUENT COLLECTION MANIFOLD. 12" EFFLUENT SHUT-OFF GATE VALVES, AND 6" BACKWASH SHUT-OFF GATE VALVES.
3. PROTECT EXISTING ROUGHING FILTER BASINS.
4. GROUT ABANDONED PIPE PENETRATIONS LIQUID TIGHT.
5. FILL WITH FLOWABLE FILL TO THE TOP OF CONCRETE TO CREATE A PLATFORM, AFTER NEW WTP IS OPERATIONAL.
6. DEMO WALL FLUSH WITH BASIN FLOOR AT EL.= 254 FT AND 18" FROM WALLS.
7. AFTER SAWCUTTING AND REMOVAL OF WALL SECTONS IS COMPLETE, PREPARE EXPOSED SURFACES TO RECEIVE GROUT AND EPOXY COATING.
8. USING A MINIMUM 2" DIAMETER DIAMOND CORE DRILLING BIT, CENTER OVER THE EXPOSED #4 HORIZONTAL REINFORCING BARS AND ADVANCE A KERF, A MINIMUM OF 4 INCHES INTO THE CONCRETE WALL.
9. USING HAND TOOLS OR A LIGHT DUTY ELECTRIC DEMOLITION HAMMER, REMOVE THE CONCRETE IMMEDIATELY AROUND THE EXPOSED REBAR AND WITHIN THE KERF, TO A MINIMUM DEPTH OF 2 INCHES.
10. CUT THE END OF THE EXPOSED REBAR BACK, NO LESS THAN 1", FROM THE EXPOSED FACE OF THE WALL.
11. THOROUGHLY CLEAN ALL SURFACES OF DUST AND CONCRETE DEBRIS, USING A POWER WASHER.
12. AT THE BASE OF THE WALL, TRIM ANY REMAINING WATER STOP FLUSH WITH THE WALL FACE AND BOTTOM OF THE KEYWAY.
13. AMPLY COAT BOTTOM OF KEYWAY AND REBAR POCKETS WITH A NON-REWETTABLE BONDING AGENT.
14. WHILE THE BONDING AGENT IS STILL TACKY, FILL KEYWAY AND REBAR POCKETS WITH NON-FERROUS, NON-SHRINK GROUT TO RESULT IN FLUSH AND PLANAR SURFACES ON BOTH VERICAL AND HORIZONTAL SURFACES.
15. DEMO 8' MIN. WIDE SECTION OF CONCRETE APRON, SLAB, AND FOOTING CENTERED UNDER ROLL-UP DOOR.

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

REVISIONS			
REV	DATE	DESCRIPTION	BY
A4	07/15/23	ADDENDUM 4	GP

STATE OF ALASKA 49TH
STEPHAN A. BRADLEY CE-12444 2023-06-02 REGISTERED PROFESSIONAL ENGINEER

WRANGELL GATEWAY TO THE PANHANDLE ADOPTED AUGUST 1972

DOWL AECL848
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3535 College Road, #100
Fairbanks, Alaska 99709
907-374-0275

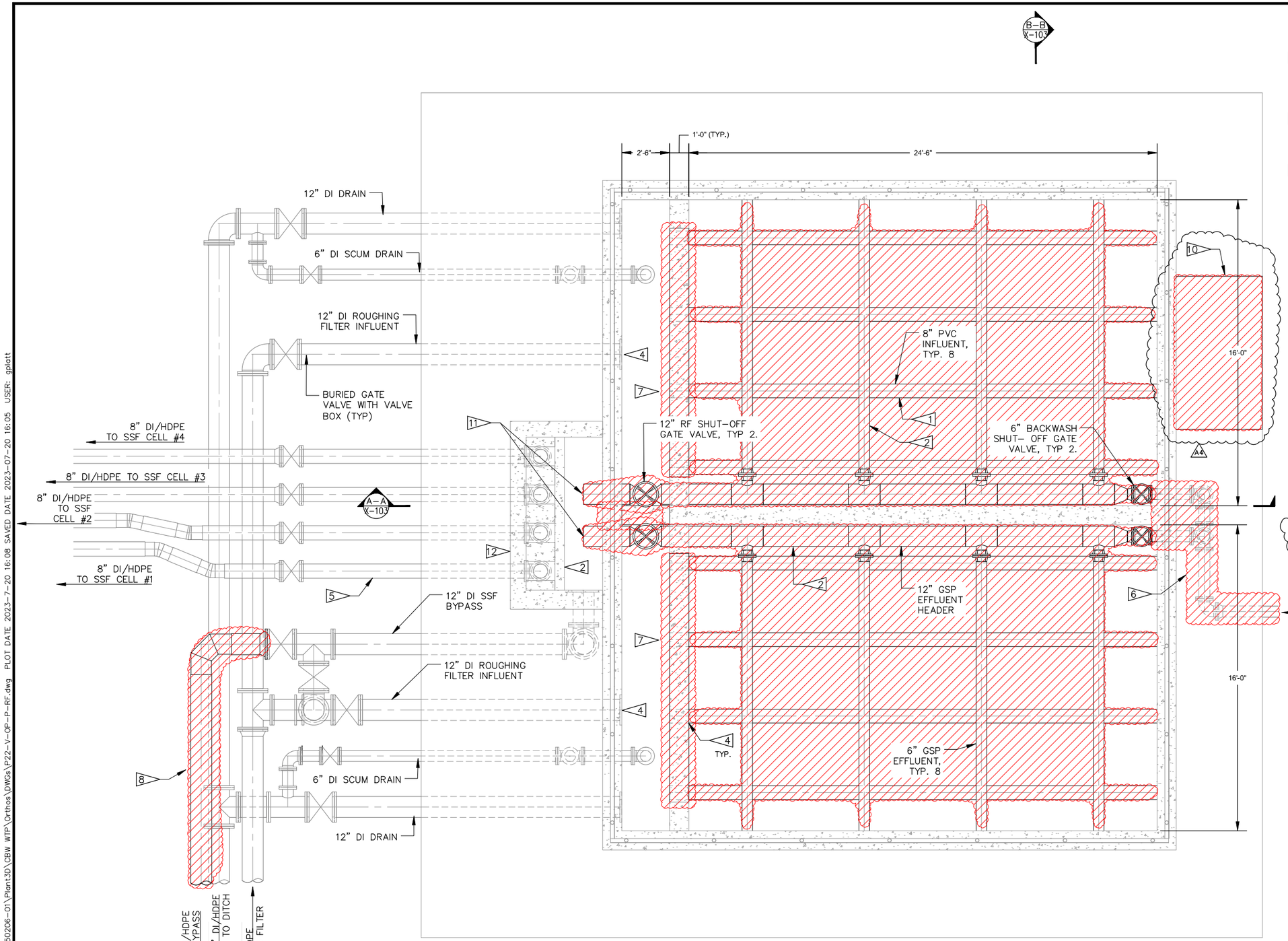
WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

ROUGHING FILTER DEMO - SECTIONS MECHANICAL - DEMOLITION DRAWING

SEC. 31; TOWNSHIP 62S; RANGE 84E
CITY AND BOROUGH OF WRANGELL, ALASKA

PROJECT 1528.50206.01
DATE 06/02/23

SHEET
X-103



GENERAL NOTES:

1. FLOOR PLAN AND EXISTING PIPING, EQUIPMENT, AND APPURTENANCES BASED ON 1998 PHASE 2 WATER SYSTEM IMPROVEMENTS RECORD DRAWING. SOME PIPING, EQUIPMENT, AND APPURTENANCES OMITTED FOR CLARITY.
2. FINAL DEMOLITION EXTENTS TO BE DETERMINED. CONTRACTOR TO VERIFY DEMOLITION EXTENTS WITH OWNER. DEMOLISHED PIPING AND EQUIPMENT TO BE SALVAGED TO OWNER.
3. SEE SPECIFICATION SECTION 01 10 01 FOR CONSTRUCTION DEMOLITION SEQUENCING.

DEMOLITION NOTES:

1. DEMO EXISTING 8" PVC INFLUENT MANIFOLD.
2. GROUT OUTLET, BYPASS PIPE PENETRATION, AND FILL OUTLET BOX WITH FLOWABLE FILL TO CREATE A FLAT PLATFORM. SEE SPECIFICATIONS FOR SEQUENCING, AFTER NEW WTP IS OPERATIONAL.
3. PROTECT EXISTING ROUGHING FILTER BASINS.
4. GROUT AND CAP ABANDONED PIPE PENETRATIONS LIQUID TIGHT.
5. PROTECT EXISTING SSF INFLUENT PIPING.
6. DEMO BACKWASH SUPPLY BACK TO POTABLE WATER MAIN.
7. DEMO WALL FLUSH WITH BASIN FLOOR AND 18" FROM WALL.
8. DEMO EXISTING SLOW SAND FILTER BYPASS PIPING DOWNSTREAM OF GATE VALVE AND CLOSE VALVE, AFTER NEW WTP IS OPERATIONAL.
9. CONNECTS TO NEW FLOW CONTROL VALVE VAULT.
10. DEMO 8' MIN. WIDE SECTION OF CONCRETE APRON, SLAB, AND FOOTING CENTERED UNDER ROLL-UP DOOR. (A4)
11. CAP ENDS PRIOR TO DEMO. SPLITTER BOX WILL BE USED DURING DEMO OF ROUGHING FILTERS.
12. PROTECT EXISTING ROUGHING FILTER BASINS, FLOW SPLITTER BOX, AND EFFLUENT WEIR. THESE WILL BE IN USE DURING DEMO PERIOD AND UNTIL NEW WTP IS OPERATIONAL.

BID DOCUMENTS
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A4	07/15/23	ADDENDUM 4	GP

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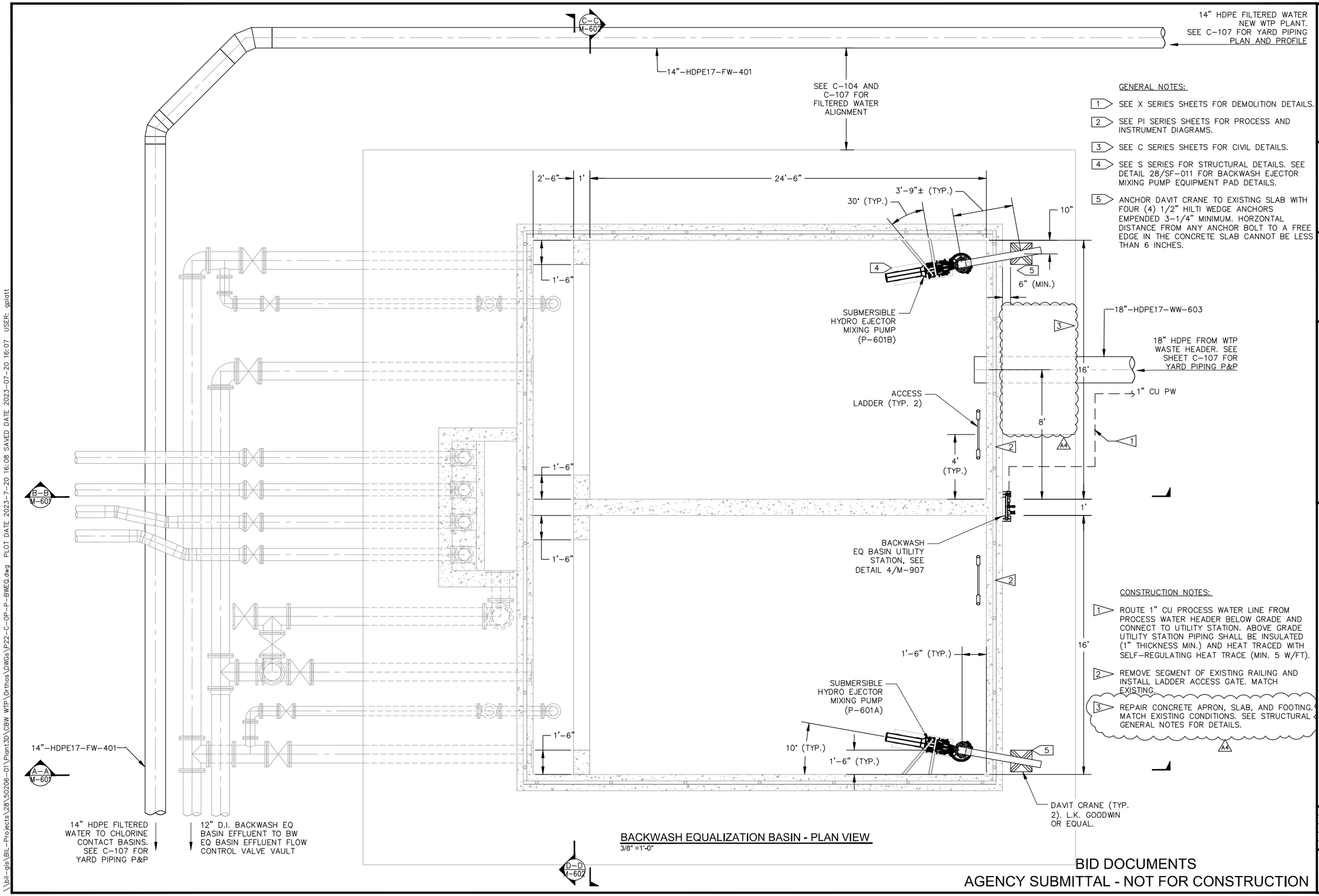
WRANGELL, ALASKA

ROUGHING FILTER DEMO - PLAN MECHANICAL - DEMOLITION DRAWING

SEC. 31; TOWNSHIP 62S; RANGE 84E
CITY AND BOROUGH OF WRANGELL, ALASKA

PROJECT 1528.50206.01
DATE 06/02/23

SHEET
X-102



BACKWASH EQUALIZATION BASIN - PLAN VIEW

3/8" =1'-0"

GENERAL NOTES:

1. SEE X SERIES SHEETS FOR DEMOLITION DETAILS.
2. SEE PI SERIES SHEETS FOR PROCESS AND INSTRUMENT DIAGRAMS.
3. SEE C SERIES SHEETS FOR CIVIL DETAILS.
4. SEE S SERIES FOR STRUCTURAL DETAILS. SEE DETAIL 28/SF–011 FOR BACKWASH EJECTOR MIXING PUMP EQUIPMENT PAD DETAILS.
5. ANCHOR DAVIT CRANE TO EXISTING SLAB WITH FOUR (4) 1/2" HILTI WEDGE ANCHORS EMPENDED 3–1/4" MINIMUM. HORZONTAL DISTANCE FROM ANY ANCHOR BOLT TO A FREE EDGE IN THE CONCRETE SLAB CANNOT BE LESS THAN 6 INCHES.

CONSTRUCTION NOTES:

1. ROUTE 1" CU PROCESS WATER LINE FROM PROCESS WATER HEADER BELOW GRADE AND CONNECT TO UTILITY STATION. ABOVE GRADE UTILITY STATION PIPING SHALL BE INSULATED (1" THICKNESS MIN.) AND HEAT TRACED WITH SELF–REGULATING HEAT TRACE (MIN. 5 W/FT).
2. REMOVE SEGMENT OF EXISTING RAILING AND INSTALL LADDER ACCESS GATE. MATCH EXISTING.
3. REPAIR CONCRETE APRON, SLAB, AND FOOTING. MATCH EXISTING CONDITIONS. SEE STRUCTURAL GENERAL NOTES FOR DETAILS.

BID DOCUMENTS
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WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

BACKWASH EQ BASIN - PLAN

SEC. 31; TOWNSHIP 62S; RANGE 84E
CITY AND BOROUGH OF WRANGELL, ALASKA

PROJECT 1528.50206.01
DATE 06/02/23

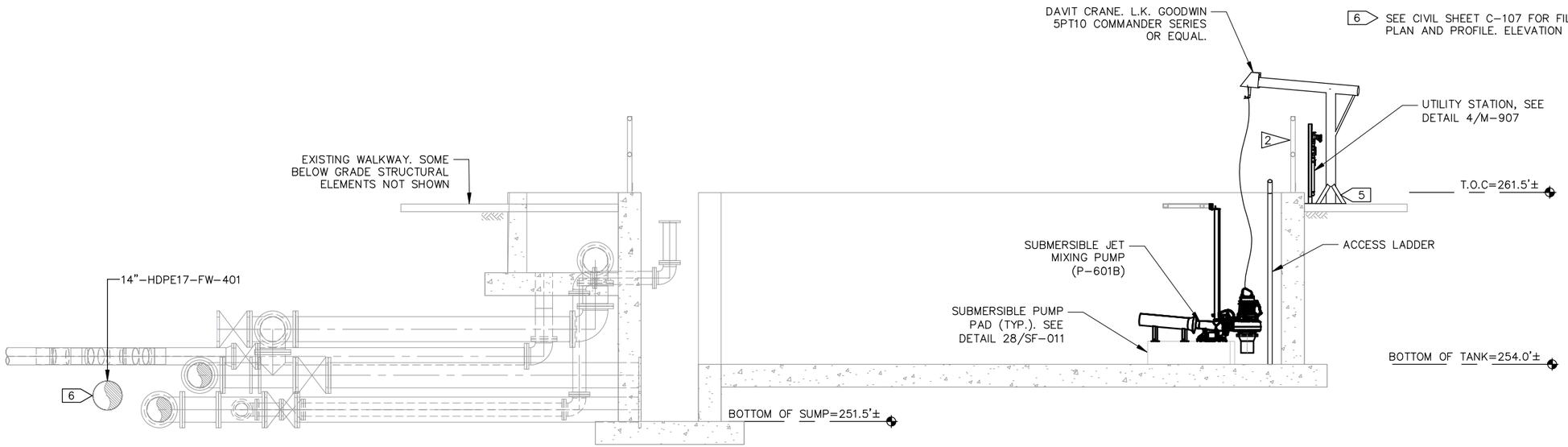
SHEET
M-600

CONSTRUCTION NOTES:

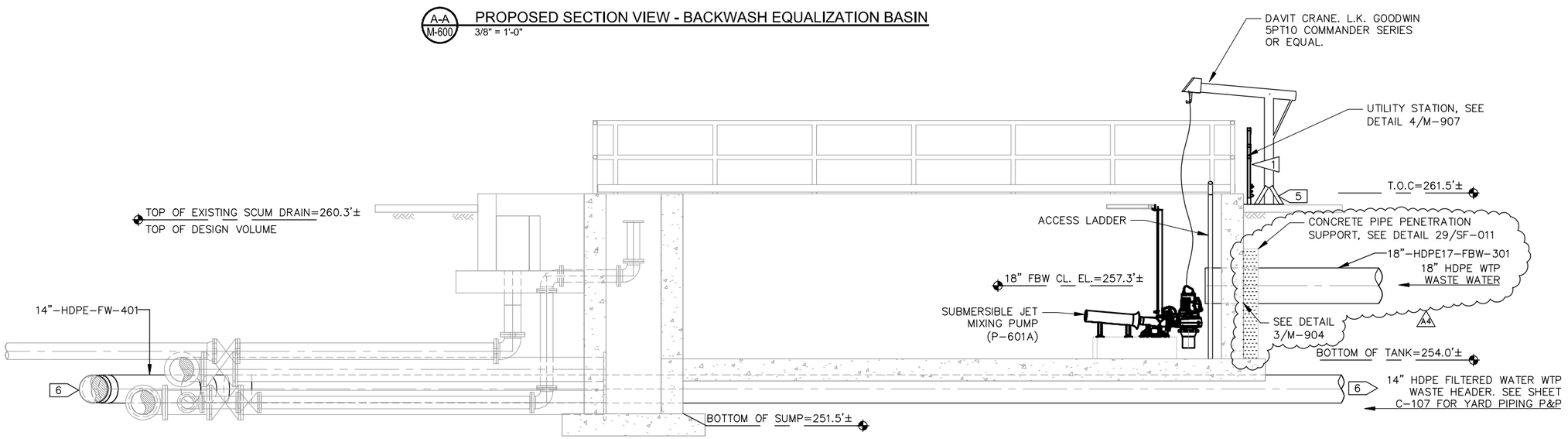
1. ROUTE 1" CU PROCESS WATER LINE FROM PROCESS WATER HEADER BELOW GRADE AND CONNECT TO UTILITY STATION. ABOVE GRADE UTILITY STATION PIPING SHALL BE INSULATED (1" THICKNESS MIN.) AND HEAT TRACED WITH SELF-REGULATING HEAT TRACE (MIN. 5 W/FT).
2. REMOVE SEGMENT OF EXISTING RAILING AND INSTALL LADDER ACCESS GATE. MATCH EXISTING.

GENERAL NOTES:

1. SEE X SERIES SHEETS FOR DEMOLITION DETAILS.
2. SEE PI SERIES SHEETS FOR PROCESS AND INSTRUMENT DIAGRAMS.
3. SEE C SERIES SHEETS FOR CIVIL DETAILS.
4. SEE S SERIES FOR STRUCTURAL DETAILS.
5. ANCHOR DAVIT CRANE TO EXISTING SLAB WITH FOUR (4) 1/2" HILTI WEDGE ANCHORS EMPENDED 3-1/4" MINIMUM. HORZONTAL DISTANCE FROM ANY ANCHOR BOLT TO A FREE EDGE IN THE CONCRETE SLAB CANNOT BE LESS THAN 6 INCHES.
6. SEE CIVIL SHEET C-107 FOR FILTERED WATER PLAN AND PROFILE. ELEVATION MAY VARY.



A-A M-600 PROPOSED SECTION VIEW - BACKWASH EQUALIZATION BASIN
3/8" = 1'-0"



B-B M-600 PROPOSED SECTION VIEW - BACKWASH EQUALIZATION BASIN
3/8" = 1'-0"

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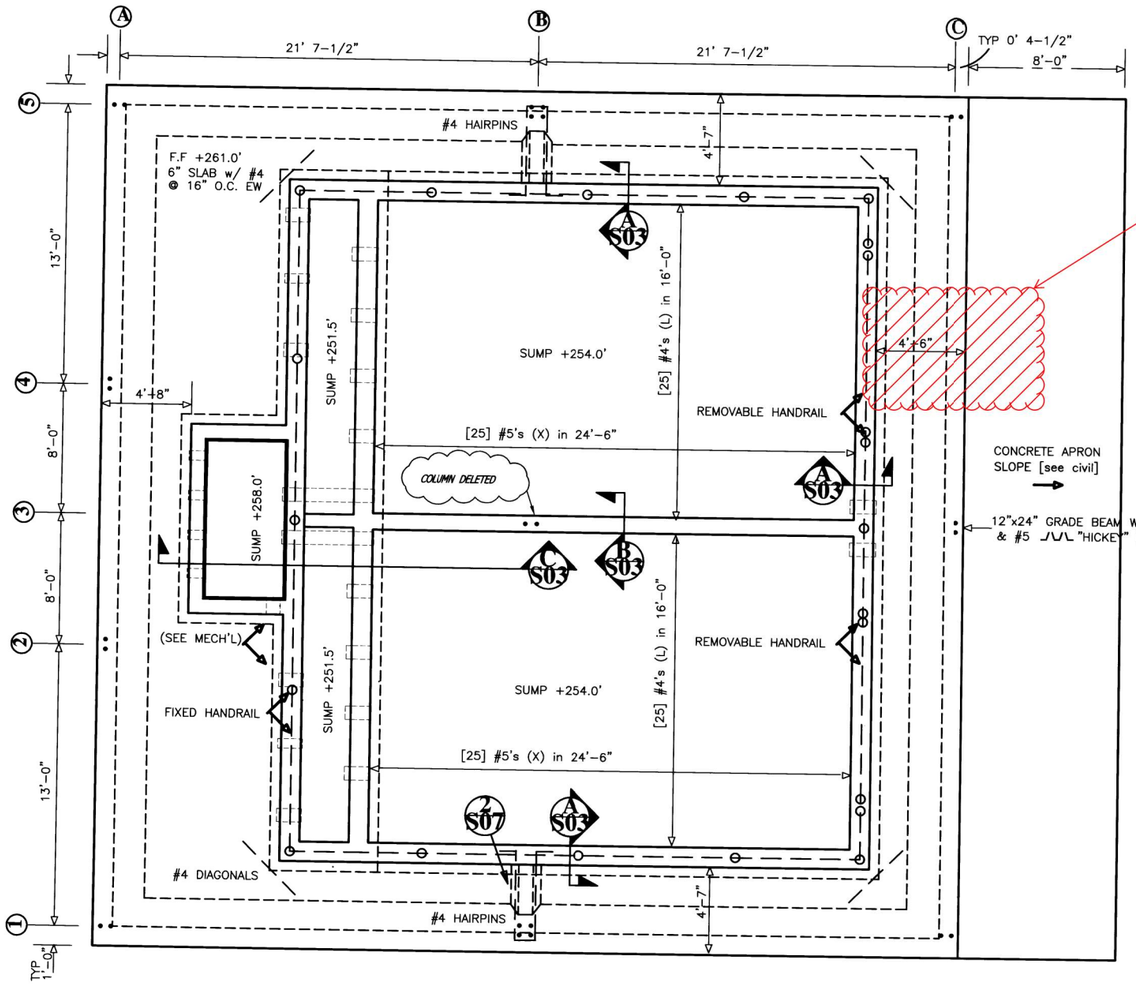
WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

BACKWASH EQ BASIN - SECTIONS

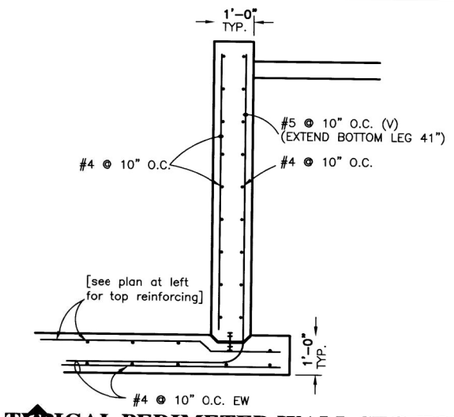
SEC. 31; TOWNSHIP 62S; RANGE 84E
CITY AND BOROUGH OF WRANGELL, ALASKA

PROJECT 1528.50206.01
DATE 06/02/23

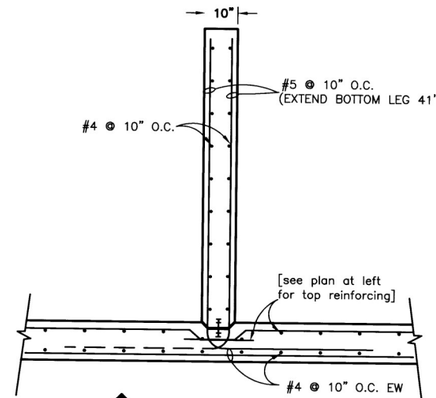
SHEET
M-601



FLOOR PLAN
SCALE: 1/4" = 1'-0"



TYPICAL PERIMETER WALL SECTION
S03 SCALE: 1/2" = 1'-0"



DIVIDER WALL SECTION
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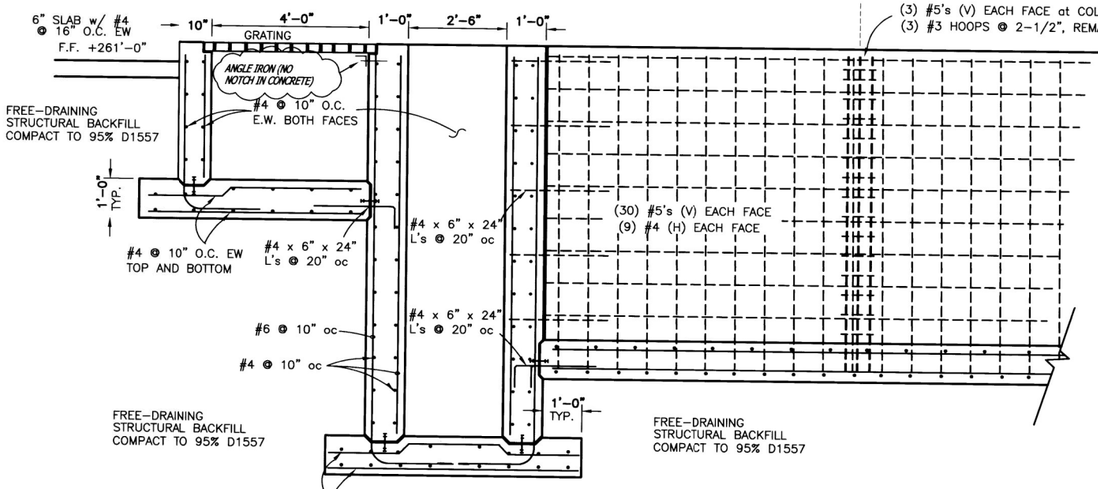

FLOW SPLITTER/SUMP SECTION
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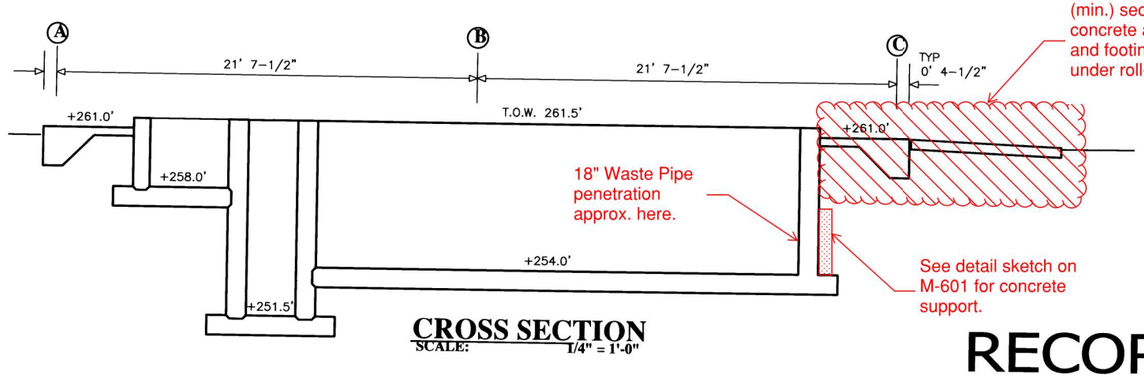
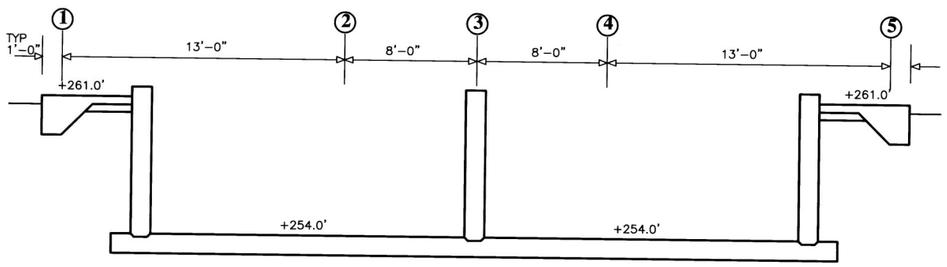


CROSS SECTION
SCALE: 1/4" = 1'-0"



CROSS SECTION
SCALE: 1/4" = 1'-0"

RECORD DRAWING

NO.	REVISIONS	BY	DATE
1.	RECORD INFORMATION	WAH	12/8/99

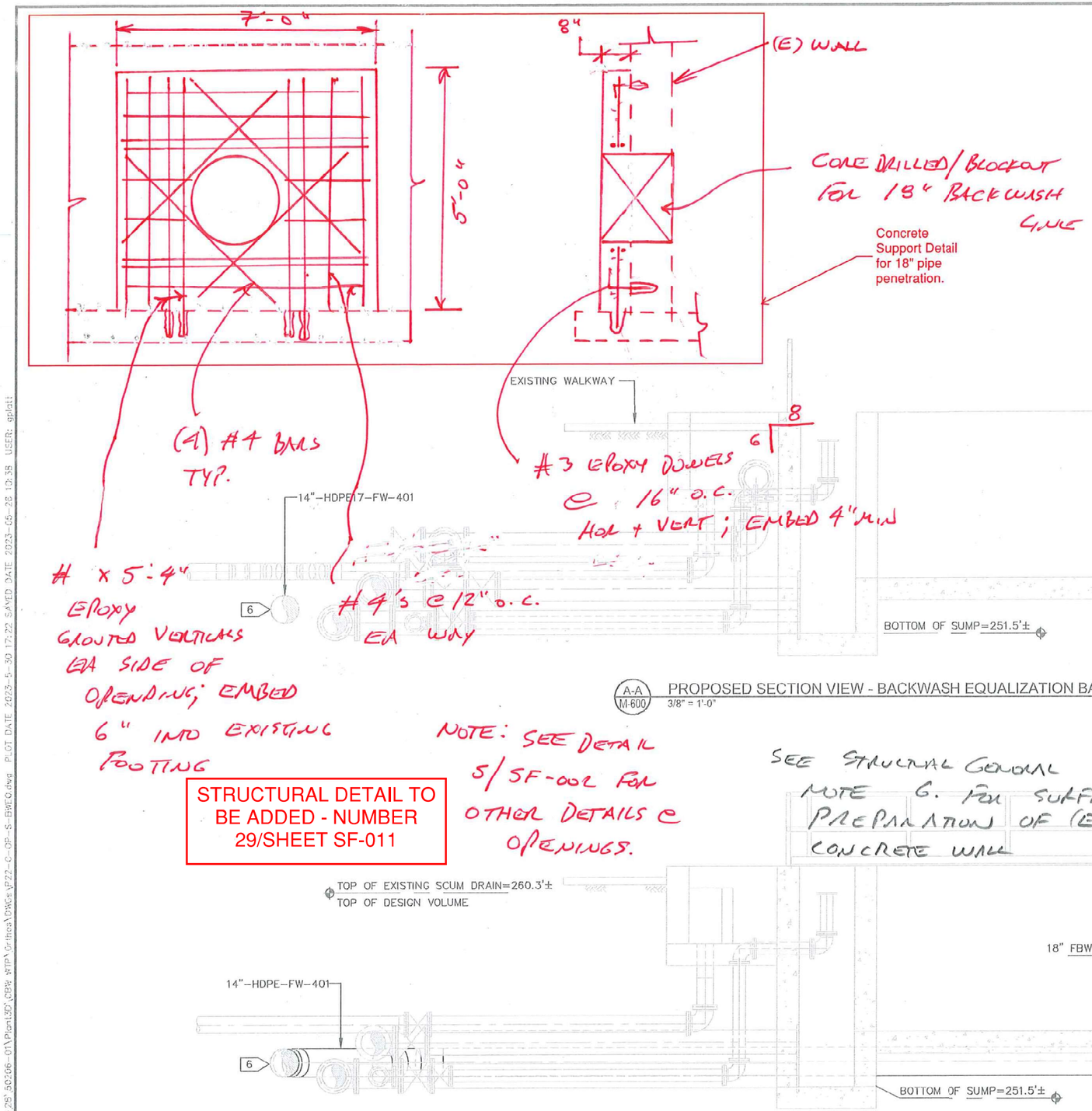
Wilson Engineering
CONSULTING ENGINEERS & SURVEYORS
805 DUPONT STREET
BELLINGHAM, WA 98225
(360) 733-6100
FAX: (360) 647-9061

DESIGNED BY:	SJM
DRAWN BY:	SLM
CHECKED BY:	RAM

CITY OF WRANGELL
WRANGELL ISLAND ALASKA

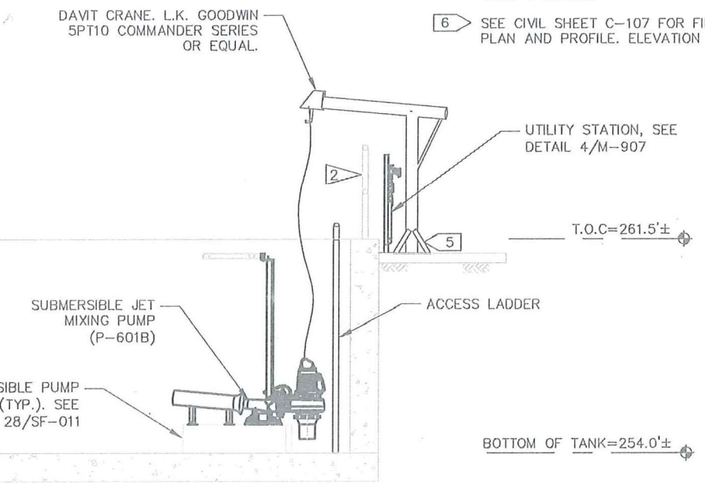
PHASE 2 WATER SYSTEM IMPROVEMENTS
ROUGHING FILTER PLAN

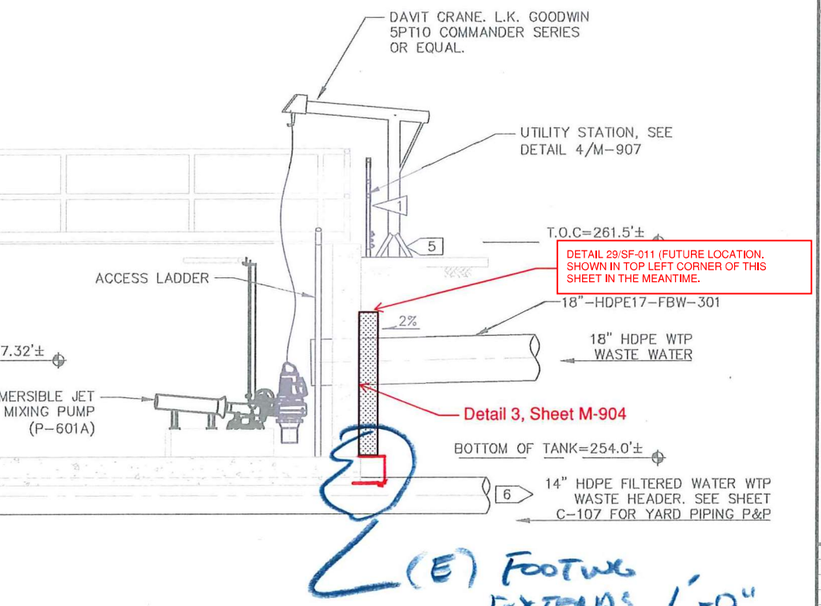
DATE	3/12/98
SCALE	AS SHOWN
JOB NUMBER	97070
SHEET	S03
OF	S07



A-A / M-600 PROPOSED SECTION VIEW - BACKWASH EQUALIZATION BASIN
3/8" = 1'-0"

B-B / M-600 PROPOSED SECTION VIEW - BACKWASH EQUALIZATION BASIN
3/8" = 1'-0"





CONSTRUCTION NOTES:

1. ROUTE 1" CU PROCESS WATER LINE FROM PROCESS WATER HEADER BELOW GRADE AND CONNECT TO UTILITY STATION. ABOVE GRADE UTILITY STATION PIPING SHALL BE INSULATED (1" THICKNESS MIN.) AND HEAT TRACED WITH SELF-REGULATING HEAT TRACE (MIN. 5 W/FT).
2. REMOVE SEGMENT OF EXISTING RAILING AND INSTALL LADDER ACCESS GATE. MATCH EXISTING.

GENERAL NOTES:

1. SEE X SERIES SHEETS FOR DEMOLITION DETAILS.
2. SEE PI SERIES SHEETS FOR PROCESS AND INSTRUMENT DIAGRAMS.
3. SEE C SERIES SHEETS FOR CIVIL DETAILS.
4. SEE S SERIES FOR STRUCTURAL DETAILS.
5. ANCHOR DAVIT CRANE TO EXISTING SLAB WITH FOUR (4) 1/2" HILTI WEDGE ANCHORS EMPENDED 3-1/4" MINIMUM. HORZONTAL DISTANCE FROM ANY ANCHOR BOLT TO A FREE EDGE IN THE CONCRETE SLAB CANNOT BE LESS THAN 6 INCHES.
6. SEE CIVIL SHEET C-107 FOR FILTERED WATER PLAN AND PROFILE. ELEVATION MAY VARY.

REVISIONS

REV	DATE	DESCRIPTION	BY

STATE OF ALASKA 49TH
STEPHAN A. BRADLEY
CE-12444
2023-06-02
REGISTERED PROFESSIONAL ENGINEER

WRANGELL GATEWAY TO THE ADVENTURE OF A LIFETIME

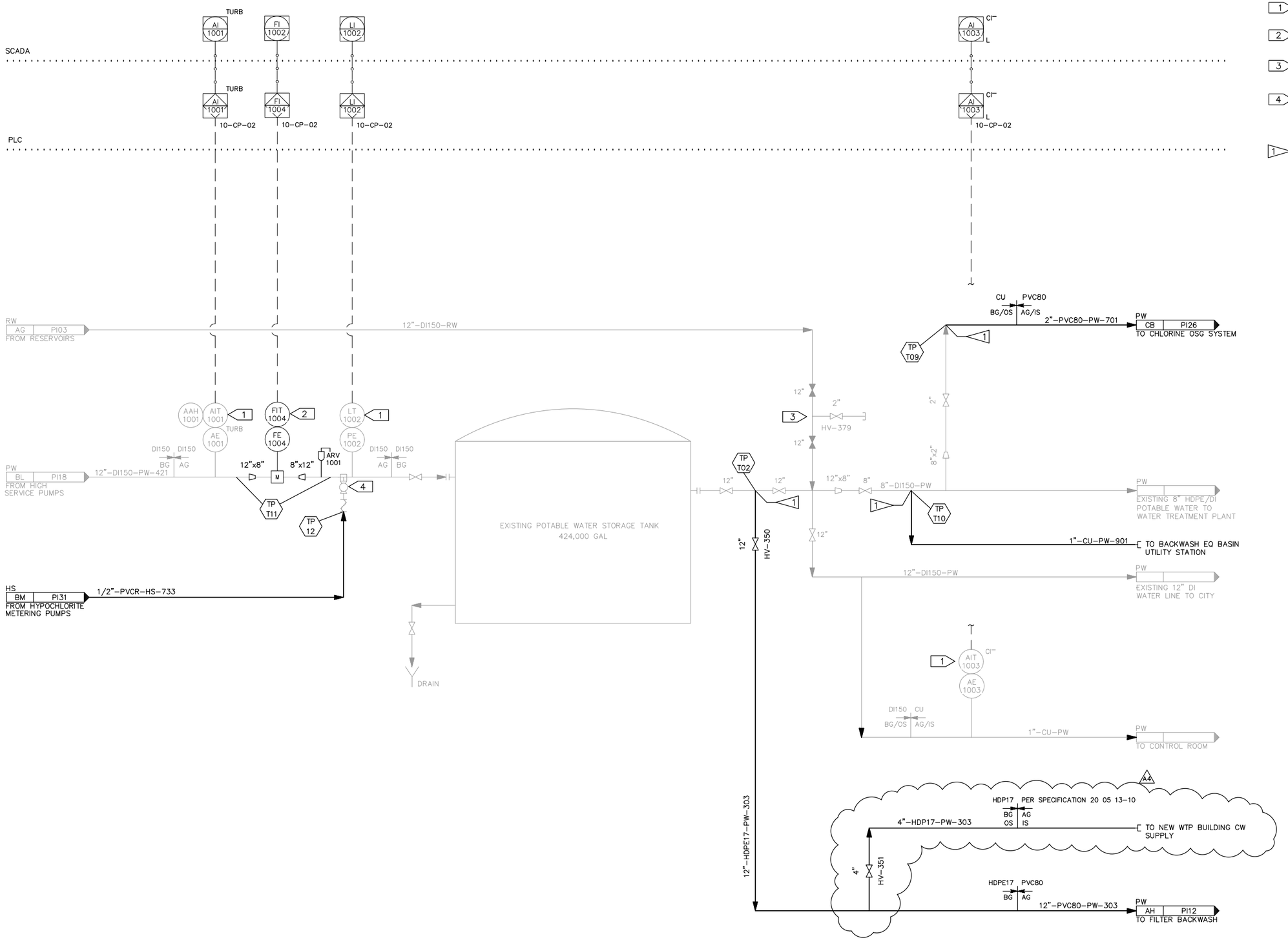
DOWL
AECL848
3535 College Road, #100
Fairbanks, Alaska 99709
907-374-0275
WWW.DOWL.COM

WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA
BACKWASH EQ BASIN - SECTIONS
SEC. 31; TOWNSHIP 62S; RANGE 84E
CITY AND BOROUGH OF WRANGELL, ALASKA

PROJECT 1528.50206.01
DATE 06/02/23

SHEET
M-601

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION



GENERAL NOTES:

1. VERIFY EXISTING TRANSMITTERS CAN BE REUSED.
2. LOCATED INSIDE EXISTING CONTROL ROOM BUILDING IN SHOP/STORAGE AREA.
3. DOUBLE BLOCK AND BLEED VALVE ARRANGEMENT TO ISOLATE RAW WATER FROM POTABLE WATER.
4. INJECTION QUILL IS EXISTING.

CONSTRUCTION NOTES:

1. SEE SPECIFICATION SECTION 01 10 01 FOR CONSTRUCTION SEQUENCING.

REVISIONS			
REV	DATE	DESCRIPTION	BY
A4	07/15/23	ADDENDUM 4	GP

STATE OF ALASKA 49TH
STEPHAN A. BRADLEY
CE-12444
2023-06-02
REGISTERED PROFESSIONAL ENGINEER

WRANGELL GATEWAY TO THE STIKINE
ADOPTED AUGUST 1972

DOWL
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WWW.DOWL.COM
3535 College Road, #100
Fairbanks, Alaska 99709
907-374-0275

WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

STORAGE AND DISTRIBUTION PROCESS AND INSTRUMENT DIAGRAM

SEC. 31; TOWNSHIP 62S; RANGE 84E
CITY AND BOROUGH OF WRANGELL, ALASKA

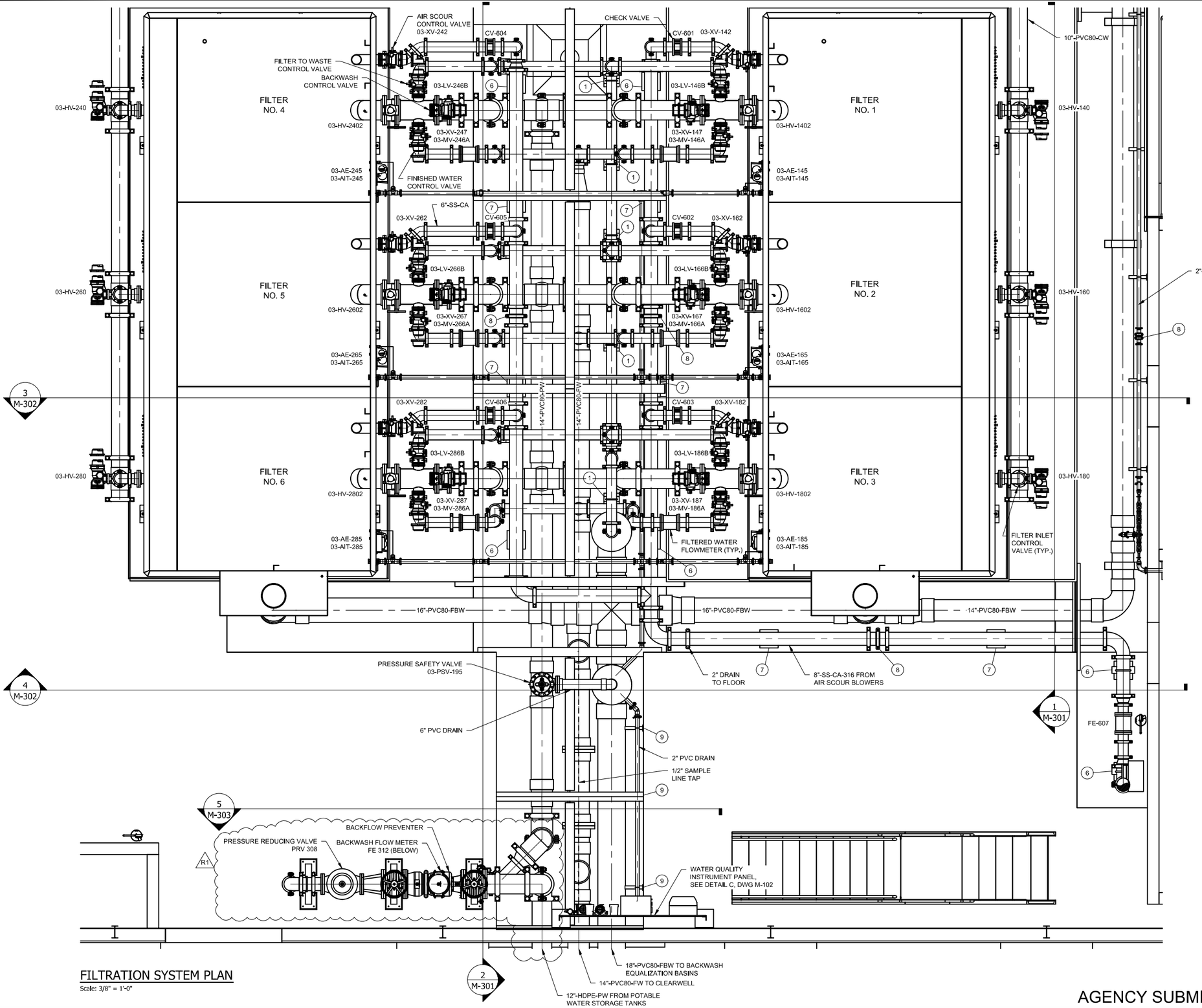
PROJECT 1528.50206.01
DATE 06/02/23

SHEET
PI-19

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

\\bil-gis\BIL-Projects\28\50206-01\Plant3D\CBW WTP\PID DWG\P22-C-PID-19.dwg PLOT DATE 2023-7-20 11:04 SAVED DATE 2023-7-20 11:00 USER: gplatt

Attachment 2



FILTRATION SYSTEM PLAN

Scale: 3/8" = 1'-0"

NOTES:

1. RAISED PLATFORMS AROUND FILTERS NOT SHOWN FOR CLARITY.
2. GRATING ABOVE TRENCHES NOT SHOWN FOR CLARITY.
3. FINISHED WATER INSTRUMENTATION NOT SHOWN.
4. FILTERS, INLET AND DISCHARGE VALVES, ELEVATED WALKWAYS, LADDERS, STAIRS AND CONTROL PANELS PROVIDED BY PACKAGED WTP MANUFACTURER. CONTRACTOR TO INSTALL PER MANUFACTURERS INSTRUCTIONS.
5. FILTER LEVEL INDICTING TRANSMITTERS, PRESSURE INDICATORS AND TURBIDIMETER VALVES NOT CALLED OUT ON THIS DRAWING. SEE P&IDS

KEYED NOTES:

1. PIPE SUPPORT, FIXED PER DETAIL 1, M-901
2. PIPE SUPPORT, SLIDING PER DETAIL 1, M-901
3. PIPE SUPPORT PER DETAIL 4, M-901
4. PIPE SUPPORT PER DETAIL 1, M-907
5. PIPE SUPPORT PER DETAIL 2, M-907
6. PIPE STANCHION PER DETAIL 3, M-907, AND FIXED PIPE SUPPORT PER DETAILS 1 & 2, M-903
7. PIPE STANCHION PER DETAIL 3, M-907 AND SLIDING PIPE SUPPORT DETAILS 1 & 3, M-903
8. EXPANSION JOINT
9. PIPE SUPPORT PER DETAIL 6, M-901

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

REVISIONS

REV	DATE	DESCRIPTION	BY
1	7/21/2023	BACKFLOW PREVENTER ADDITION	

Stanley Consultants INC.
5775 Wayzata Boulevard, Suite 300, Minneapolis, MN 55416-1235
www.stanleyconsultants.com

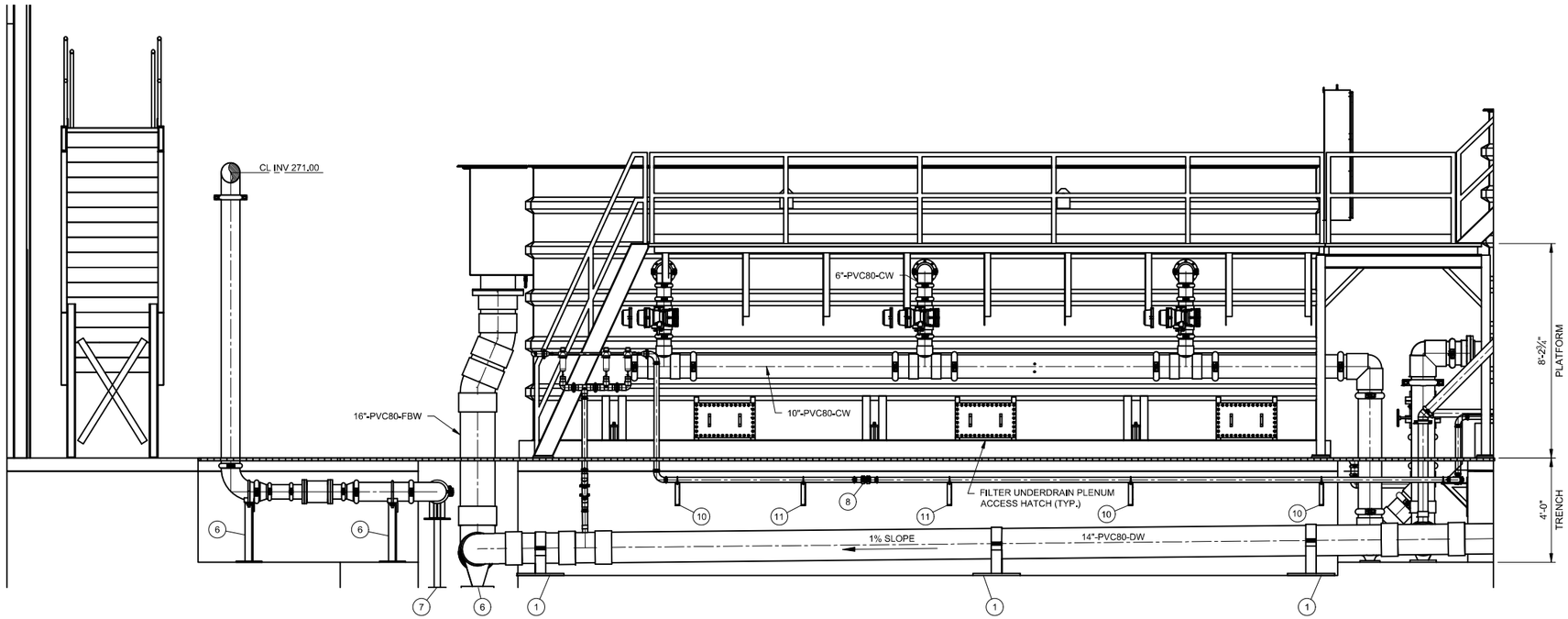
WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

FILTRATION SYSTEM PLAN

SEC. 31; TOWNSHIP 62S; RANGE 84E
CITY AND BOROUGH OF WRANGELL, ALASKA

PROJECT 1528.50206.01
DATE 5/31/2023

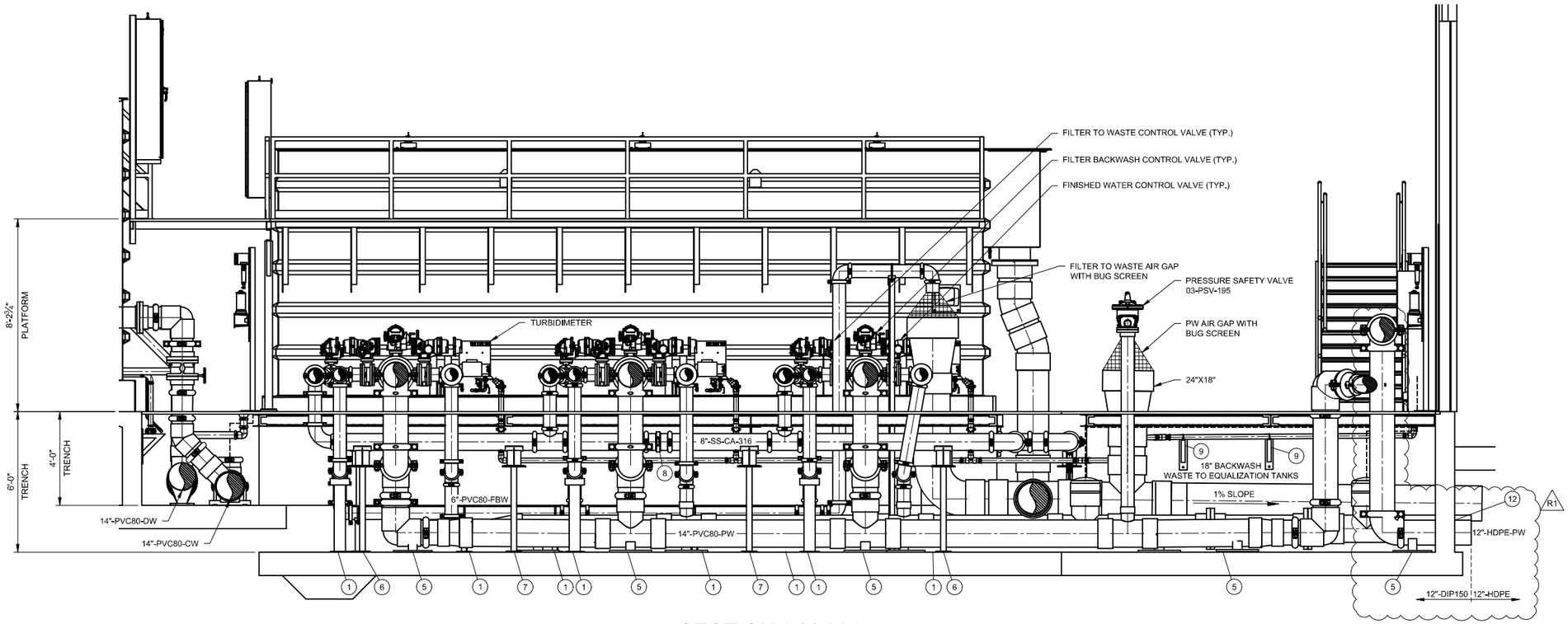
SHEET
M-300



SECTION 1-M-301

SCALE: 3/8" = 1'-0"

M500



SECTION 2-M-301

SCALE: 3/8" = 1'-0"

M500

KEYED NOTES:

1. PIPE SUPPORT, FIXED PER DETAIL 1, M-901
2. PIPE SUPPORT, SLIDING PER DETAIL 1, M-901
3. PIPE SUPPORT PER DETAIL 4, M-901
4. PIPE SUPPORT PER DETAIL 1, M-907
5. PIPE SUPPORT PER DETAIL 2, M-907
6. PIPE STANCHION PER DETAIL 3, M-907, AND FIXED PIPE SUPPORT PER DETAILS 1 & 2, M-903
7. PIPE STANCHION PER DETAIL 3, M-907 AND SLIDING PIPE SUPPORT DETAILS 1 & 3, M-907
8. EXPANSION JOINT
9. PIPE SUPPORT PER DETAIL 3, M-902
10. PIPE SUPPORT, FIXED PER DETAIL 6, M-902
11. PIPE SUPPORT, SLIDING PER DETAIL 6, M-902
12. PIPE PENETRATION, SEE DETAIL 1, M-904

REVISIONS

REV	DATE	DESCRIPTION	BY
1	7/21/2023	BACKFLOW PREVENTER ADDITION	

Stanley Consultants INC.
5775 Wayzata Boulevard, Suite 300, Minneapolis, MN 55416-1235
www.stanleyconsultants.com

WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

FILTRATION SYSTEM
SECTIONS AND DETAILS

SEC. 31; TOWNSHIP 62S; RANGE 84E
CITY AND BOROUGH OF WRANGELL, ALASKA

PROJECT 1528.50206.01
DATE 5/31/2023

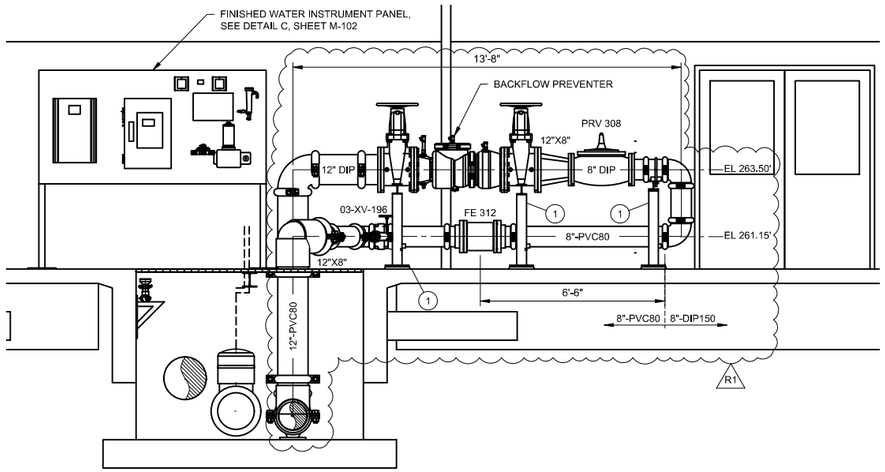
SHEET

M-301

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

KEYED NOTES:

1. PIPE SUPPORT PER DETAIL 3, M-902



SECTION 5-M-303
M500
SCALE: 3/8" = 1'-0"

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

REVISIONS

REV	DATE	DESCRIPTION	BY
1	7/21/2023	BACKFLOW PREVENTER ADDITION	

Stanley Consultants INC.
5775 Wayzata Boulevard, Suite 300, Minneapolis, MN 55416-1235
www.stanleyconsultants.com

WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

FILTRATION SYSTEM SECTIONS AND DETAILS

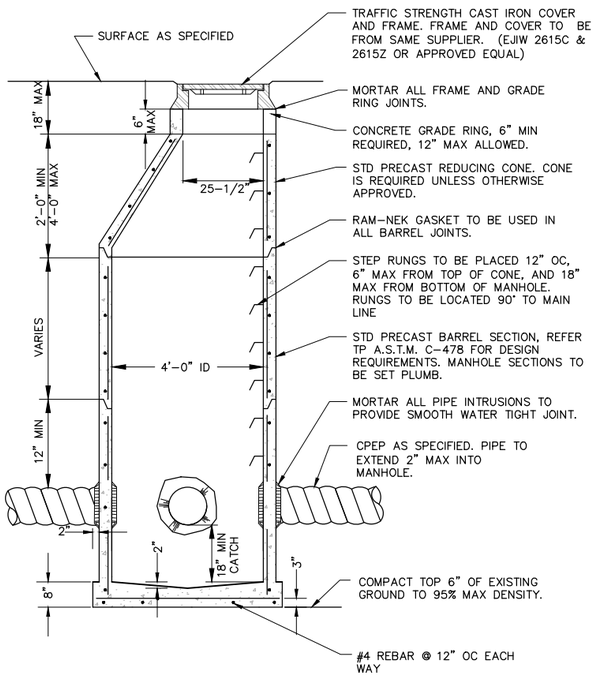
SEC. 31; TOWNSHIP 62S; RANGE 84E
CITY AND BOROUGH OF WRANGELL, ALASKA

PROJECT 1528.50206.01
DATE 5/31/2023

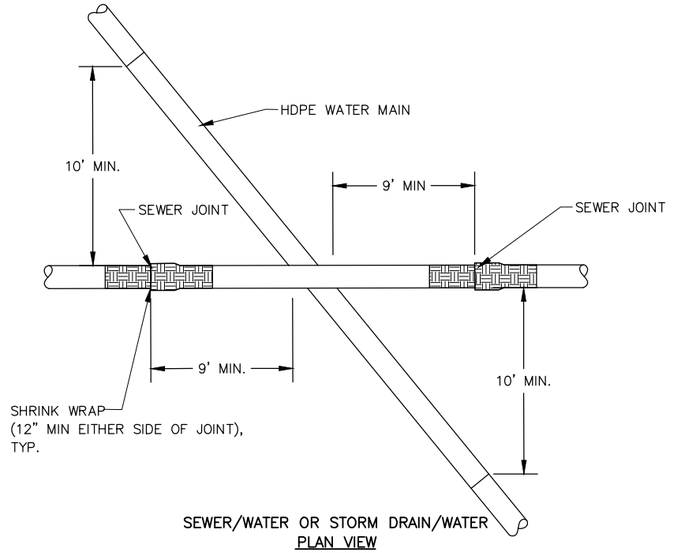
SHEET
M-303

C:\Users\9800\OneDrive - Stanley Consultants Inc\Documents\Wrangell\Orthos\DWGs\M-303.dwg PLOT DATE 2023-7-21 17:04 SAVED DATE 2023-07-21 17:04 USER: 9800

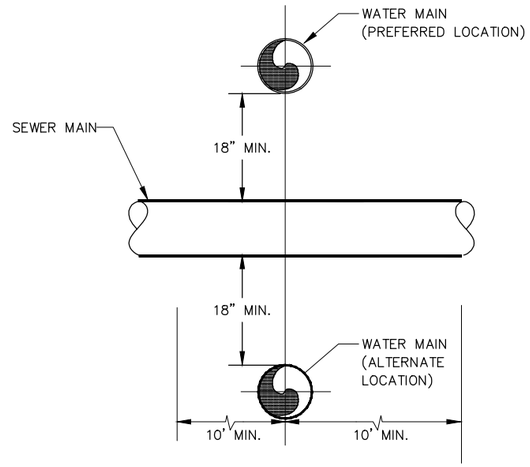
Attachment 3



2 C112 **STORM DRAIN MANHOLE**
NTS



SEWER/WATER OR STORM DRAIN/WATER
PLAN VIEW
N.T.S.



ELEVATION VIEW
N.T.S.

1 C112 **PIPE CROSSINGS**
NTS

NOTES:
1. FOR SEWER/WATER CROSSINGS WHERE THE WATER MAIN IS LESS THAN 18 INCHES ABOVE THE SEWER MAIN, OR THE WATER MAIN IS BELOW THE SEWER MAIN, OR THE WATER MAIN IS LESS THAN 10 HORIZONTAL FEET FROM THE SEWER MAIN, THE SEWER MAIN SHALL BE SHRINK WRAPPED 1 FOOT PAST THE NEAREST JOINTS TO THE CROSSING.
2. FOR STORM DRAIN/WATER CROSSINGS WHERE THE WATER MAIN IS LESS THAN 18 INCHES ABOVE THE STORM DRAIN, OR THE WATER MAIN IS BELOW THE STORM DRAIN, OR THE WATER MAIN IS LESS THAN 10 HORIZONTAL FEET FROM THE STORM DRAIN, JOINTS SHALL NOT BE WITHIN 9 FEET OF THE STORM DRAIN/WATER CROSSING.

ALASKA DEC WATER, & WASTE REQUIREMENTS:
1. THE WATER MAIN, SEWER MAIN, AND STORM DRAIN WILL BE IN SEPARATE TRENCHES.
2. DISTANCE FROM WATER MAINS TO SEWER MAINS AND STORM DRAINS SHALL MAINTAIN A 10' MINIMUM HORIZONTAL, AND 1.5' MINIMUM VERTICAL SEPARATION.
3. AT LOCATIONS WHERE SEWER/STORM DRAIN AND WATER MAINS MUST CROSS AND WHERE THE ELEVATION OF A WATER MAIN IS BELOW SEWER/STORM DRAIN PIPE,
   A) PRESSURE TEST WATER MAINS. SEE SPECIFICATIONS 33 01 10 AND 33 05 05.
   B) SHRINK WRAP THE SEWER/STORM LINE JOINTS WITH CANUSA WRAP OR APPROVED EQUAL.
   C) STORM PIPE WILL MEET ASTM D3212 WATER TIGHT JOINT SPECIFICATIONS.
   D) PRESSURE TEST STORM AND SEWER MAINS AT POTABLE OR RAW WATER MAIN CROSSINGS, IN ACCORDANCE WITH WATER MAIN TESTING.

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

REVISIONS			
REV	DATE	DESCRIPTION	BY
4	7/21/23	ADDENDUM 4	BRM

STATE OF ALASKA 49TH
CHASE A. NELSON
CE-13867
2023-06-02
REGISTERED PROFESSIONAL ENGINEER

WRANGELL GATEWAY TO THE INSIDE PASSAGE ADOPTED AUGUST 1972

DOWL
WWW.DOWL.COM
3535 College Road, #100
Fairbanks, Alaska 99709
907-374-0275
AECL848

WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

PIPE CROSSING & STORM DRAIN CATCH BASIN DETAILS

SEC. 31; TOWNSHIP 62S; RANGE 84E
CITY AND BOROUGH OF WRANGELL, ALASKA

PROJECT 1528.50206.01
DATE 06/02/2023

SHEET
C-112

Attachment 4

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Construction waste management plan.

1.2 PLAN REQUIREMENTS

A. Develop and implement construction waste management plan as approved by the Engineer. **The waste management plan shall include demolition, handling, and removal of asbestos containing material (ACM), including asbestos cement pipe, in compliance with federal and state requirements.**

B. Intent:
   1. Divert construction, demolition, and land-clearing debris to landfill or other Borough approved location for disposal.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures contains requirements for submittals.

B. Construction Waste Management Plan: Submit construction waste management plan describing methods and procedures for implementation and monitoring compliance including the following:
   1. Transportation company hauling construction waste to waste processing facilities.
   2. Recycling and adaptive reuse processing facilities and waste type each facility will accept.
   3. Construction waste materials anticipated for recycling and adaptive reuse.
   4. Stockpiling location for sand and gravel from existing filters.
   5. On-Site sorting and Site storage methods.

1.4 CONSTRUCTION WASTE MANAGEMENT PLAN

A. Implement construction waste management plan at start of construction.

B. Review construction waste management plan at preconstruction meeting and progress meetings specified in Section 013000 - Administrative Requirements.

C. Distribute approved construction waste management plan to Subcontractors and others affected by plan requirements.

D. Oversee plan implementation, instruct construction personnel for plan compliance, and document plan results.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 CONSTRUCTION WASTE COLLECTION

A. Collect construction waste materials in marked bins or containers and arrange for transportation to recycling centers or adaptive salvage and reuse processing facilities.

B. Maintain recycling and adaptive reuse storage and collection area in orderly arrangement with materials separated to eliminate co-mingling of materials required to be delivered separately to waste processing facility.

C. Store construction waste materials to prevent environmental pollution, fire hazards, hazards to persons and property, and contamination of stored materials.

D. Cover construction waste materials subject to disintegration, evaporation, settling, or runoff to prevent polluting air, water, and soil.

3.2 CONSTRUCTION WASTE DISPOSAL

A. Dispose of construction waste not capable of being recycled or adaptively reused by delivery to landfill, incinerator, or other legal disposal facility.

B. Hazardous materials shall not be disposed of in the Wrangell Class III Landfill. ACM or other materials not accepted by the landfill shall be handled and disposed of in accordance with the requirements of Alaska Department of Environmental Conservation and the Environmental Protection Agency.

END OF SECTION

Attachment 5

SECTION 33 11 13 – PUBLIC WATER UTILITY DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. SCOPE: The work covered by this section includes furnishing of ductile iron and HDPE pipe, fittings and appurtenances for buried yard piping in raw and potable water service.

1.2 RELATED DOCUMENTS

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

1.3 SUMMARY

A. This Section includes water-distribution piping and related components outside the building for water mains.

B. Related Requirements:
1. Section 09 90 00 Special Coatings
2. Section 33 01 10 Disinfection of Water Utility Piping System
3. Section 40 05 06 Couplings, Adapters, and Specials for Process Piping
4. Section 40 05 07 Hangers and Supports for Process Piping
5. Section 40 11 11 Valves and Actuators

1.4 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

AWWA C104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water

AWWA C110 Ductile-Iron and Gray-Iron Fittings, 3 in through 48 in for Water

AWWA C111 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

AWWA C115 Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges

AWWA C116 Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service.

AWWA C150 Thickness Design of Ductile-Iron Pipe

AWWA C151 Ductile-Iron Pipe, Centrifugally Cast for Water

AWWA C153 Ductile-Iron Compact Fittings. for Water Service

AWWA C600 Installation of Ductile Iron Water Mains and Their Appurtenances

AWWA C606 Grooved and Shouldered Joints

ASTM C 150 Portland Cement

1.5 DEFINITIONS

A. EPDM: Ethylene propylene diene terpolymer rubber.

B. LLDPE: Linear, low-density polyethylene plastic.

C. PE: Polyethylene plastic.

D. PP: Polypropylene plastic.

E. PVC: Polyvinyl chloride plastic.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.

1.7 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.

B. Field quality-control test reports.

1.8 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.9 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
   2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
   3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

D. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

E. NSF Compliance:
   1. Comply with NSF 14 for plastic potable-water-service piping.
   2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.10 DELIVERY, STORAGE, AND HANDLING

A. The CONTRACTOR shall be responsible for all such material furnished by him and shall replace, at his own expense, all such material found defective in manufacture or damaged in handling after delivery by the manufacturer. This shall include the furnishing of all materials and labor required for the replacement of installed material discovered defective prior to the final acceptance of the Work or during the guarantee period.

B. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
   1. Ensure that valves are dry and internally protected against rust and corrosion.
   2. Protect valves against damage to threaded ends and flange faces.
   3. Set valves in best position for handling. Set valves closed to prevent rattling.

C. During Storage: Use precautions for valves, including fire hydrants, according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

D. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

E. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

F. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

G. Protect flanges, fittings, and specialties from moisture and dirt.

H. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.11 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
1. Notify Construction Manager no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of water-distribution service without Construction Manager's written permission.

1.12 COORDINATION

A. Coordinate connection to water main with the City. The Contractor shall give the City a minimum of 48-hours notice.

B. Only the City personal shall operate existing water valves.

PART 2 - PRODUCTS

2.1 FUSED JOINT POLYETHYLENE (HDPE) PIPE:

A. HDPE pipe may be used for potable water and wastewater, See Section 33 31 13 - “Sanitary utility Sewerage Force Mains” for requirements.

2.2 DUCTILE IRON PIPE, JOINTS, AND FITTINGS

A. The pipe shall be designed, manufactured, tested, inspected, and marked according to AWWA

B. Flanged Pipe: Fabricate in accordance with ANSI/AWWA C115.

C. Non-Flanged Pipe: Conform to ANSI/AWWA CI51 for material, pressure, dimensions, tolerances, tests, markings, and other requirements.

D. Exposed Piping: If not otherwise specified, use Special Thickness Class 53 for three-inch to 54-inch diameter.

1. Pipe greater than 16-inch and intended for grooved pipe joining application shall be thickness class as required by pipe manufacturer for grooved connections.

E. Flanged Joints: Conform to ANSI/AWWA 0110 and ANSI/AWWA C111 capable of meeting the pressure rating or special thickness class, and test pressure specified in Section 400505 Exposed Piping Installation and the piping schedule.
   a. Gaskets: Unless otherwise specified, gaskets shall be at least 1/8-inch thick, ring or full-face as required for the pipe, of synthetic rubber compound containing not less than 50 percent by volume nitrile or neoprene, and shall be free from factice, reclaimed rubber, and other deleterious substances. Gaskets shall be suitable for the service conditions specified, specifically designed for use with ductile iron pipe and fittings.
   b. Bolts: Comply with ANSI B18.2.1.
      i. Buried or Submerged: ASTM A193, Grade B8M, Class 2, Heavy hex, Type 316 stainless steel.
      ii. Exposed: ASTM A307, Grade B.
   c. Nuts: Comply with ANSI B18.2.2.
      i. Exposed: ASTM A563, Grade A, Heavy hex.
      ii. Buried or Submerged: ASTM A194, Grade B8M, Heavy hex, Type 316 stainless steel.

F. Grooved End Joints: Comply with ANSI/AWWA C606.
   a. Gaskets: Flush seal type designed for ductile iron that complies with or exceeds requirements of ASTM D2000
   b. Bolts and nuts: As specified for flanged joints.
   c. Unless otherwise specified, grooved end couplings shall be rigid joint for exposed service and flexible joint for buried service.
   d. Products and Manufacturers:
      i. See Section 400506 – COUPLINGS, ADAPTERS, SPECIALS FOR PROCESS PIPING.

2.3 GATE VALVES

A. AWWA, Cast-Iron Gate Valves:
   1. Buried valves shall be epoxy coated gate valves.
   2. All gate valves shall also include valve boxes for elevations specified shown on the construction drawings.
      a. Valve boxes shall be cast iron, adjustable, slip type, round base, 5¼-inch stem opening with necessary extensions to adjust the box height from the valve to the ground level, or future finished street level. Lids for valve boxes shall be cast iron and shall have the word "WATER" clearly cast on the top surface of the lid.
      b. Boxes shall be painted in accordance with the provisions and requirements set forth in AWWA Standard C550, latest edition. Valve boxes shall be Tyler 6855, or Engineer approved equal. Boxes shall be double wrapped in an 8-mil thick sheet of polyethylene encasement.
      c. Valve boxes of the length required to reach the ground surface, while maintaining a 6-inch overlap in height adjustment, shall be provided. If the top of the operating nut is more than 6 feet from the ground surface, an extension shall be provided. The nut on the extension shall be centered in the box and attached to the operating nut on the valve.
      d. Valves with a bury depth of 8 feet or more shall be supplied with a valve stem extension that ends approximately 6-12 inches below finished grade. The extension stem shall be pinned to the valve operating nut. In addition to the valve stem extensions the

CONTRACTOR shall provide to the OWNER 2 Tee handle wrenches with a total length of 12 feet and 2 Tee handle wrenches with a total length of 4 feet.

3. Gate valves shall be iron body gate valves conforming to AWWA C500. The gate valves shall be made with flanged ends conforming to ANSI B16.1 Class 125.
4. Gate valves shall have a non-rising stem, "O" ring seals and shall have iron bodies, parallel seats, and shall be fully bronze mounted. The valve interior shall be coated with an epoxy coating conforming to AWWA C550.
5. All metal valves shall be installed with a polyethylene encasement meeting the provisions and requirements of AWWA C105, latest edition. The polyethylene film shall have a minimum nominal thickness of 0.008 inches (8 mils)
6. The direction of opening shall be counter-clockwise.
7. Manufactured by Mueller, or Engineer approved equal.

2.4 CEMENT-MORTAR LINING

A. Cement-Mortar Lining for Shop Application: Except as otherwise provided herein, interior surfaces of ductile iron pipe, fittings, and specials shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with AWWA C104. During the lining operation and thereafter, the pipe shall be maintained in a round condition by suitable bracing or strutting. The lining machines shall be of a type that has been used successfully for similar work. Every precaution shall be taken to prevent damage to the lining. If lining is damaged or found defective at the Site, the damaged or unsatisfactory portions shall be replaced with lining conforming to these Specifications.

1. Cement: Cement for mortar lining shall conform to the requirements of AWWA C104; provided, that cement for mortar lining shall be Type II or V. Cement shall not originate from kilns that burn metal-rich hazardous waste fuel, nor shall a fly ash or pozzolan be used as a cement replacement.

B. The minimum lining thickness shall be as follows:

Nominal Pipe Diameter, inches	Minimum Lining Thickness, inches
3 - 12	1/16
14 - 24	3/32
30 - 64	1/8

C. Protection of Pipe Lining/Interior: Shop-applied cement mortar lining shall be given a seal coat of asphaltic material in conformance with AWWA C104.

2.5 EXTERIOR PROTECTION OF PIPE

A. Exterior Coating of Exposed Piping: The exterior surfaces of pipe which will be exposed to the atmosphere inside structures or above ground shall be thoroughly cleaned and then given a shop coat of primer conforming to the requirements of Section 09 97 00 – Special Coatings.

2.6 INSULATION BOARD:

A. As indicated in the drawings and/or where a minimum depth of 4 feet of cover cannot be maintained over the water line, rigid, extruded polystyrene insulation board is to be provided. The board is to comply with ASTM C578 Type IV. The board shall have a minimum aged R-value per inch of 5.0 per ASTM C518, a minimum compressive strength of 25 psi per ASTM D1621; a maximum water absorption per ASTM C272 of 0.2% by volume, and a maximum linear change according to ASTM D2126 of 3%. The board is to be 2 inches thick with a composite thickness as identified in Table 1 below. The board is to be Dow Styrofoam Brand or approved equal.

TABLE 1 – INSULATION BOARD COVER

Depth of Backfill over Insulation	Insulation Thickness	Insulation Width
24"	2.0"	4.0'
36"	1"	4.0'
48"	-	-
60"	-	-
72"	-	-

2.7 WARNING TAPE, TRACER WIRE, AND REFERENCE MARKER:

A. Warning Tape: tape shall have a minimum overall thickness of 5 mils without conductor wires. Tape shall be impervious to all known alkalis, chemical reagents, and solvents found in the soil. Color coding shall be in conformance with the APWA/ULCC Color Code. Warning tape shall have a minimum width of 3 inches for pipe 12 inches and smaller, and a minimum width of 12 inches for larger pipe. The maximum imprint length shall be thirty-six inches. Tape shall be Carsonite Tuff-Tape or approved equal.

B. Tracer wire shall be a minimum of 10-gauge, insulated copper wire suitable for buried pipeline conditions attached to all pipelines and services lines. The tracer wire shall be terminated and brought to the surface prior to entering buildings or vaults, located in a tracer wire access/termination box or valve box. Tracer wire access boxes shall be rated for light or heavy duty traffic, having a cast iron lid with stainless steel terminal ends mounted to the lid and indicate the type of use, i.e. “Water”, “Sewer”. Access boxes shall be manufactured by Valvco, Copperhead, or equal.

C. Pipeline reference marking posts shall be placed at the State rights-of-way lines on the directional drill. The reference markers shall have tracer wire test terminals at the surface of each marking post. Reference markers shall be color coded to conform to the APWA/ULCC Color Code. Tracer wire reference posts shall be manufactured by Carsonite International or approved equal

2.8 CORROSION-PROTECTION PIPING ENCASEMENT

A. Encasement for Underground Metal Piping, Fittings, and Valves:
   1. Standards: AWWA C105.
   2. Form: Sheet or tube.
   3. Material: LLDPE film of 0.008-inch minimum thickness.
   4. Color: Black.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Division 31.

3.2 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.

B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

C. Do not use flanges or unions for underground piping.

D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.

3.3 VALVE APPLICATIONS

A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts.

B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
   1. Underground Valves, NPS 3 and Larger: AWWA, cast-iron, nonrising-stem, resilient-seated gate valves with valve box.

3.4 PIPING INSTALLATION

A. Water-Main Connection: Tap water main according to requirements of City and of size and in location indicated. The City and Engineer shall be present to observe all connections to the existing water system.

B. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.

C. Install HDPE pipe according to AWWA M55.

D. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

E. Install pipe following the manufacturer's specifications and instructions. Provide all tools and equipment required to install each type of pipe used.

F. The Contractor is responsible for all contractor furnished material. Replace all defective material or material damaged by handling after delivery by the manufacturer. This includes the furnishing of all materials and labor required to replace installed material discovered damaged or defective before final acceptance of the work, or during the guarantee period.

G. Store all material safely and to prevent damage. Keep pipe interior and other accessories free from dirt and foreign matter at all times.

H. Deliver and distribute all Contractor furnished pipe at this site. Load and unload pipe, fittings, specials, valves and accessories to prevent damage. Do not permit pipe handled on skidways to skid or roll against pipe already on the ground.

I. When distributing material at the work site, lay each piece adjacent to its installation point. Repair or replace all damaged pipe at no cost to the OWNER.

J. Remove all water in the trench during pipe laying and maintain a dry trench until the pipe ends area sealed. Do not permit the pipe to float. Do not allow any trench water to enter the pipe at any time.

K. Separation With Sewers: Water mains and water service lines shall be installed to provide at least a 10-foot horizontal separation from any existing sanitary or storm sewer. This distance shall be measured from edge-of-pipe to edge-of-pipe. These requirements include service lines. At crossings, a minimum vertical distance of 18-inches from edge-of-pipe to edge-of-pipe shall be maintained

between the water and the sewer pipes. This shall be the case when the water main is either above or below the sewer. **At locations where water and sewer lines must cross, the water line joints shall be at least nine feet from the sewer line joints.**

1. At all crossings, pipe and backfill shall be properly installed to support the pipes. The material is to be tamped and rodded to fill all voids adjacent to and below both pipes and to compact the fill material.
2. Where unusual situations are encountered that make it impossible to follow the requirements of this section a different approach might be required. That approach is to be designed on a case-by-case basis with the design for that particular separation approved by the Owner and the Alaska Department of Environmental Conservation. The Contractor shall be paid for this particular work as required as a changed site condition.

3.5 JOINT CONSTRUCTION

A. Make pipe joints according to the following:
   1. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
   2. HDPE butt-fusion joints according to AWWA M55. HDPE to Ductile Iron adaptors can be used for connections to existing ductile iron pipe.

3.6 CONNECTIONS TO EXISTING MAINS

A. Make all connections to existing water mains in use unless otherwise specified. Furnish the special fittings, as shown on the plans, and all other material required. Make all necessary excavations to assure gradual transition between the new and existing water main and perform all necessary backfilling.

B. Where the connection of new work to old requires a service interruption and customer notification, the Owner and the Contractor are to mutually agree upon a date for connections to permit adequate time to assemble labor and materials, and to notify all affected customers. All notifications are the Contractor's responsibility.

C. The Owner will operate all existing valves.

3.7 ANCHORAGE INSTALLATION

A. Anchorage, General: Install water-distribution piping with restrained joints as indicated in the drawings. Anchorages and restrained-joint types that may be used include the following:
   1. Concrete thrust blocks.
   2. Locking mechanical joints.
   3. Set-screw mechanical retainer glands.
   4. Bolted flanged joints.
   5. Pipe clamps and tie rods.

B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
   1. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
   2. HDPE pipe according to AWWA M55.

C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.8 VALVE INSTALLATION

A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.

3.9 FIELD QUALITY CONTROL

A. Piping Tests: See Section 33 01 10 Disinfection of Water Utility Piping System.

3.10 STERILIZING WATER MAINS:

A. See Section 33 01 10 Disinfection of Water Utility Piping System.

3.11 IDENTIFICATION

A. Warning Tape: Install utility warning tape and tracer wire along the entire route of new water main. Install warning tape 18 inches below the finished grade. Install the tracer wire 18 inches above the water main and fire hydrant leads. Install the tracer wire to the ground surface in each gate valve box and physically connect the wire to the inside of each valve box to ensure that the tracer wire does not interfere with insertion or operation of the valve key. Costs associated with furnishing and installing the warning tape and tracer wire shall be merged with the cost for water main installation.

B. Tracer Wire: Tracer wire shall be installed on all pipe as shown in the details, and shall be located above the pipe as shown on the details. The tracer wire shall be insulated and brought to the surface in test station boxes at all appurtenances, or as indicated in the drawings. The continuing wire shall also have a lead which begins at the surface and follows appurtenances to the underground pipe. Tracer wire shall be attached to top of pipe by tape at 10-foot maximum intervals.
The system of tracer wire shall be continuous. Splicing or other means used to provide a continuous wire, along with leads for testing, shall be approved by the ENGINEER.

END OF SECTION

Attachment 6

SECTION 33 31 13 - PUBLIC SANITARY UTILITY SEWERAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The Work covered under this section includes furnishing and installing all gravity sanitary sewer piping on this project. Requirements of this section also apply to water treatment plant waste piping and any exterior potable water piping.

B. Related Requirements:
   1. Section 33 01 10 Disinfection of Water Utility Piping Systems
   2. Section 31 20 00 Earth Moving
   3. Section 31 50 00 Excavation Support and protection

1.3 ACTION SUBMITTALS

A. Furnish submittals in accordance with Section 013300 – Contractor Submittals.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from sewer system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

B. Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.

C. Field quality-control reports.

1.5 DELIVERY, STORAGE, AND HANDLING

A. The CONTRACTOR shall be responsible for all such material furnished by him and shall replace, at his own expense, all such material found defective in manufacture or damaged in handling after delivery by the manufacturer. This shall include the furnishing of all materials and labor required for the replacement of installed material discovered defective prior to the final acceptance of the Work or during the guarantee period.

B. The CONTRACTOR shall be responsible for the safe storage of material furnished by him or to him and accepted by him and intended for the Work, until it has been incorporated in the completed project. The interior of all pipe and other accessories shall be kept free from dirt and foreign matter at all times.

C. Pipe shall be carefully inspected for soundness before being installed in the trench. Rejected pipe and fittings shall be removed from the site immediately and permanently.

D. Do not store plastic pipe, and fittings in direct sunlight.

E. Protect pipe, pipe fittings, and seals from dirt and damage.

F. Handle manholes according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
   1. Notify Owner and Engineer no fewer than two (2) days in advance of proposed interruption of service.
   2. Do not proceed with interruption of service without written permission for the Engineer.

1.7 FUSIBLE PIPE – SPECIFIC REQUIREMENTS

A. Fusion Technician Requirements: Fusion Technician shall be fully qualified by the pipe supplier to install fusible polyvinylchloride or HDPE pipe of the type(s) and size(s) being used. Qualification shall be current as of the actual date of fusion performance on the project.

A. Submittals
   1. The following PRODUCT DATA is required from the pipe supplier and/or fusion provider:
      a. Name of the pipe manufacturer and a list of the piping and quantities to be provided by manufacturer.
      b. Product data and pipe supplier data indicating conformance with this specification and applicable standards, including written documentation regarding any intended variance from this specification and applicable standards. This will include experience of pipe supplier by years and number of projects; warranty information; and independent laboratory testing certification.
      c. Material and pipe property testing in conformance with this specification and applicable standards indicating conformance from the pipe extruder per AWWA C900 and AWWA C905:
      d. Dimensional Checks
      e. Pipe Burst
      f. Flattening
      g. Extrusion Quality (Acetone Immersion)
      h. Test results will be prepared and made available from the pipe extruder to the Owner or Engineer upon request, for each extrusion run.
      i. Fusion joint data and fusion technician data indicating conformance with this specification and applicable standards, including written documentation regarding any intended variance from this specification and applicable standards. This will include fusion joint warranty information and recommended project specific fusion parameters, including criteria logged and recorded by data logger.
      j. Material, pipe property, and dimensional data for casing pipe, if used.
   2. The following AS-RECORDED DATA is required from the contractor and/or fusion provider:
      a. Fusion report for each fusion joint performed on the project, including joints that were rejected. Submittals of the Fusion Technician's joint reports are required as requested by the Owner or Engineer. Specific requirements of the Fusion Technician's joint report shall include:
      b. Pipe Size and Dimensions
      c. Machine Size
      d. Fusion Technician Identification
      e. Job Identification Number
      f. Fusion Number
      g. Fusion, Heating, and Drag Pressure Settings
      h. Heat Plate Temperature
      i. Time Stamp

j. Heating and Cool Down Time of Fusion
k. Ambient Temperature

PART 2 - PRODUCTS

2.1 FUSED JOINT POLYETHYLENE (HDPE) PIPE:

A. Fused joint Polyethylene (HDPE D.I.P.S.) pipe may be used as specified on the construction drawings. It must meet the pressure rating and minimum outside diameter requirements of the D.I. pipe and be installed per Part 3.0 of this section. The pipe shall be WL Polyethylene Pipe or approved equal. The minimum pressure ratings shall be:

- DR17 (pressure rating of 125 psi) as a minimum

The Contractor shall provide acceptable restrained joint transition fittings to D.I. pipe (or other pipe) at both ends of the HDPE. All joints and connections within the HDPE section shall be fusion welded, or restrained per these specifications.
The pipe, fittings and accessories shall conform to the following standards as applicable:

- AWWA C906 - Polyethylene (PE) Pressure Pipe and Fittings, 4" – 63" for Water Distribution.
- ASTM D2683 - Socket Type Polyethylene fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
- ASTM D3261 - Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
- ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
- PPI TR-3 - Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials.
- PPI TR-4 - Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds
- NSF Standard #14 - Plastics Piping Components and Related Materials.

B. Material. Materials used for the manufacturing of polyethylene pipe and fittings shall be PE4710 High Density Polyethylene (HDPE) meeting the ASTM D3350 cell classification of 345434C. The material shall have a minimum Hydrostatic Design Basis (HDB) of 1600 psi at 75°F when tested in accordance with PPI TR-3 and shall be listed in the name of the pipe and fitting manufacturer in PPI TR-4. The material used in the production of potable water pipe shall be approved by the National Sanitation Foundation (NSF). The Manufacturer shall certify that the materials used to manufacture pipe and fittings meet the requirements of this specification.

C. Pipe. Polyethylene pipe shall be manufactured in accordance with AWWA C901 for sizes ½" through 3" and in accordance with AWWA C906 for sizes 4" through 54".

D. Fittings. Polyethylene fittings shall be made from material meeting the same requirements as the pipe. Polyethylene fittings shall be molded or fabricated by the manufacturer of the pipe. Where applicable, fittings shall meet the requirements of AWWA C906. Molded fittings shall be manufactured in accordance with either ASTM D2683 (socket fused) or ASTM D3261 (butt fused) and shall be so marked. HDPE to Ductile Iron transition fittings are allowed as follows:

1. Transition fittings and flange adaptors shall be of the same materials allowed in the Buried Valve specification below and shall be installed with polyethylene encasement.
2. HDPE flange adapter with steel backing rings or Mega-lug style as provided by EBAA Iron series 2100 are allowed.

E. Mechanical Fittings used with polyethylene pipe shall be specifically designed for, or tested and found to be acceptable for use with polyethylene pipe. Mechanical fittings designed for other materials shall not be used unless authorized by the mechanical fittings manufacturer. Special precautions may exist with certain mechanical fittings or additional components may be required – consult the manufacturer of the fitting prior to its use.

F. Couplings used to make the connection between HDPE and D.I. shall be restrained. Restraint can be made using a butt-fused flange adaptor with stainless steel backup ring onto the HDPE end and an approved restrained flanged coupling adaptor on the D.I side. Alternatively, an MJ adaptor may be butt-fused to the HDPE pipe and a restrained MJ coupling with Meg-a-Lug restraints connection on the D.I end. The CONTRACTOR shall submit the coupling and the restraint system to the ENGINEER for approval.

G. Manufacturer's Quality Control. The pipe and fitting Manufacturer shall have an established quality control program responsible for inspecting incoming and outgoing materials. Incoming polyethylene materials shall be inspected for density, melt flow rate, and contamination. The cell classification properties of the material shall be certified by the supplier. Incoming materials shall be approved by Quality Control before processing into finished goods. Outgoing products shall be tested as required in AWWA C901 or C906. The Manufacturer shall maintain permanent Quality Control (QC) and Quality Assurance (QA) records. Certification or copy of these records shall be made available to the purchaser on request.

2.2 Lateral Wyes: All lateral tees shall be manufactured of the same material as the main line pipe. The connection to the main shall be made by a 45° wye. The lateral connection shall be in line type for new construction or a saddle type for existing installations, as approved by ENGINEER. All lateral connections shall be sized as required by the drawings.

2.3 Manholes: Manholes shall be constructed of precast reinforced concrete according to Section 330513 "Manholes and Structures".

2.4 Cleanouts

A. Cast-Iron Cleanouts:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Smith, Jay R. Mfg. Co.
   b. WADE
   c. Tyler Pipe.
   d. Watts Water Technologies, Inc.
   e. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.
2. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
3. Top-Loading Classification(s): Heavy Duty.

2.5 FITTINGS

A. Sleeve Type Couplings: Coating shall be fusion bonded epoxy coated and be a minimum of 10-mils thick. Couplings shall be ductile iron Dresser Style 253 or 254 Long Sleeve, or approved, equal, for ductile iron or PVC. Bolts, nuts and washers are to be series 300 stainless steel.

2.6 JOINT RESTRAINTS:

A. If called for in the drawings or in other cases where conditions warrant and approved by the ENGINEER, mechanical restraints shall be used. They shall be as follows:
   1. DIP Pipe: Joint restraints on fittings and valves shall include a restraining mechanism which when installed, imparts a multiple wedging action against the pipe. Flexibility in joints shall be maintained after burial. All metal in the joint restraint shall be stainless steel, or coated as noted below. T-bolts and gland bolts shall be stainless steel or coated with 10 mils of fusion bonded epoxy. The restraining device shall have working pressure of at least 250 psi and a minimum safety factor of 2:1. The restraint shall be EBAA Iron MEGALUG, or approved equal.
   2. Flange Adaptor with Gap: If called for on the drawings, a flange adaptor shall be used which provides a gap for future disassembly. This shall be an EBAA Iron 2100, or approved equal.
   3. Coatings: The coating on mechanical restraints shall be electrostatically applied polyester, 4 mils minimum, following surface preparation of a minimum of an iron phosphate bath, rinse and heat drying. The coating shall be EBAA-Iron Mega-Bond, or approved equal. Wedge assemblies may be Xylan fluoropolymer coated, 2 coats minimum.

2.7 TAPPING-SLEEVE ASSEMBLIES:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Mueller Co.; Water Products Div.
   2. Ford Meter Box Company, Inc.

B. Description: Sleeve and valve compatible with drilling machine.
   1. Standard: MSS SP-60 *"Connecting Flange Joint Between Tapping Sleeve and Tapping Valve".*
   2. Tapping Sleeve: Sleeve shall be stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
   3. Valve: AWWA, cast-iron, nonrising-stem, resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.

2.8 BURIED GATE VALVES

A. AWWA, Cast-Iron Gate Valves:
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. McWane, Inc.; Kennedy Valve Div.
      b. Mueller Co.; Water Products Div.
   2. Nonrising-Stem, Resilient-Seated Gate Valves:
      a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut for buried applications.
         1) Standard: AWWA C509.
         2) Minimum Pressure Rating: 200 psig.
         3) End Connections: Mechanical joint or flange.
         4) Interior Coating: Complying with AWWA C550.

2.9 VALVE BOXES

A. Valve boxes shall be cast iron, adjustable, slip type, round base, 5¼-inch stem opening with necessary extensions to adjust the box height from the valve to the ground level, or future finished street level. Lids for valve boxes shall be cast iron and shall have the word "SEWER" clearly cast on the top surface of the lid. Boxes shall be painted in accordance with the provisions and requirements set forth in AWWA Standard C550, latest edition. Valve boxes shall be Tyler 6855, or approved equal. Boxes shall be double wrapped in an 8-mil thick sheet of polyethylene encasement.

B. Valve boxes of the length required to reach the ground surface, while maintaining a 6-inch overlap in height adjustment, shall be provided. If the top of the operating nut is more than 6 feet from the ground surface, an extension shall be provided. The nut on the extension shall be centered in the box and attached to the operating nut on the valve.

2.10 VALVE STEM EXTENSIONS

A. Valves with a bury depth of 8 feet or more shall be supplied with a valve stem extension that ends approximately 6-12 inches below finished grade. The extension stem shall be pinned to the valve operating nut.

2.11 INSULATION BOARD:

C. As indicated in the drawings and/or where a minimum depth of 6 feet of cover cannot be maintained over the water line, rigid, extruded polystyrene insulation board is to be provided. The board is to comply with ASTM C578 Type IV. The board shall have a minimum aged R-value per inch of 5.0 per ASTM C518, a minimum compressive strength of 25 psi per ASTM D1621; a maximum water absorption per ASTM C272 of 0.2% by volume, and a maximum linear change according to ASTM D2126 of 3%. The board is to be 2 inches thick with a composite thickness of 4 inches. The board is to be Dow Styrofoam Brand, or approved equal.

TABLE 1 – INSULATION BOARD COVER

Depth of Backfill over Insulation	Insulation Thickness	Insulation Width
24"	2.0”	4.0'
36"	1"	4.0'
48"	-	-
60"	-	-
72"	-	-

2.12 WARNING TAPE, TRACER WIRE, AND REFERENCE MARKER:

D. **Warning tape.** Warning tape shall have a minimum overall thickness of 5 mils without conductor wires. Tape shall be impervious to all known alkalis, chemical reagents, and solvents found in the soil. Color coding shall be in conformance with the APWA/ULCC Color Code. Warning tape shall have a minimum width of 3 inches for pipe 12 inches and smaller, and a minimum width of 12 inches for larger pipe. The maximum imprint length shall be thirty-six inches. Tape shall be Carsonite Tuff-Tape, or approved equal.

E. Tracer wire shall be a minimum of 10-gauge, insulated copper wire suitable for buried pipeline conditions attached to all pipelines and services lines. The tracer wire shall be terminated and brought to the surface prior to entering buildings or vaults, located in a tracer wire

access/termination box or valve box. Tracer wire access boxes shall be rated for light or heavy duty traffic, having a cast iron lid with stainless steel terminal ends mounted to the lid and indicate the type of use, i.e. “Water”, “Sewer”. Access boxes shall be manufactured by Valvco, Copperhead, or equal.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling shall conform to the applicable portions of Division 31. Bedding pertains to both mains and service lines.

3.2 PIPING INSTALLATION

A. Handling of Pipe:
   1. All pipe furnished by the CONTRACTOR shall be delivered and distributed at the site by the CONTRACTOR. Pipe and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skid-ways shall not be skidded or rolled against pipe already on the ground. Metal bands around pipe bundles shall be cut with a hand-held snips.
   2. In distributing the material at the site of the Work, each piece shall be unloaded opposite or near the place where it is to be installed. All material shall be stored in a neat and orderly manner.
   3. Pipe with plastic joint rings shall be handled in such a manner that no weight, including the weight of the pipe, will bear on or be supported by the plastic joint rings at any time. Care shall be taken to avoid dragging the spigot ring on the ground or allowing it to come in contact with gravel, crushed stone, rocks, or other hard objects. Joint rings, which have been damaged in any way, will not be accepted and shall not be incorporated in the Work.

B. Laying Pipe:
   1. All pipe shall be laid and maintained to the required lines and grades with fittings and tees installed at the required locations. Pipe runs shall be installed where indicated if the piping is dimensioned. Where piping is not dimensioned, the CONTRACTOR shall install the pipe as close as possible to the locations indicated, as approved by the ENGINEER.
   2. Wherever obstructions not shown on the plans are encountered during the progress of the Work and interfere to such an extent that an alteration in the plan is required, the ENGINEER shall have the authority to change the plans and order a deviation from the line and grade or arrange for the removal, relocation or reconstruction of the obstructions. If the change from the plans results in a change in the amount of Work by the CONTRACTOR, such altered Work shall be done on the basis of payment to the CONTRACTOR for extra work or credit to the OWNER for less work.
   3. Proper implements, tools, and facilities satisfactory to the ENGINEER shall be provided and used by the CONTRACTOR for the safe and convenient execution of the Work. All pipe and fittings shall be carefully lowered into the trench piece by piece by means of a derrick, ropes or other suitable tools or equipment, in such a manner as to prevent damage to pipe. Under no circumstances shall materials be dropped or dumped into position.
   4. Water shall not be allowed to accumulate in the trench during the laying of the pipe or the initial backfill operations. The trench shall be dewatered in accordance with Section

332319. The CONTRACTOR shall take all necessary precautions to prevent surface water from entering the sewer trench. The cost of dewatering the trench shall be included in the CONTRACTOR's bid.

5. Pipe shall be protected from lateral displacement by means of pipe embedment material installed as provided in Section 312000. Under no circumstances shall pipe be laid in water and no pipe shall be laid under unsuitable weather or trench conditions.
6. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. If the pipe laying crew cannot put the pipe into the trench and in place without getting earth into it, the ENGINEER may require that before lowering the pipe into the trench, a heavy, tightly woven canvas bag of suitable size shall be placed over each end and left there until the connection is to be made to the adjacent pipe. Before final acceptance the CONTRACTOR shall remove from the pipe any foreign material which may have gotten into the line.
7. During laying operations, no debris, tools, clothing or other material shall be placed in the pipe. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by the ENGINEER.
8. Unless otherwise approved by the ENGINEER, the laying of pipe shall begin at the lowest point. For bell and spigot pipe, the pipe shall be installed so that the spigot ends point in the direction of flow.
9. Preparatory to making the joints, the pipe grade and alignment shall be checked and all dirt or other foreign matter shall be removed from the bell or coupling.

C. Rubber Gasketed Joints: Jointing of pipe made with a rubber gasket joint shall be made as recommended by the manufacturer. The rubber gasket and gasket seat inside the bell shall be wiped clean with a cloth. A thin film of lubricant, furnished with the pipe, shall be applied to the inside surface of the gasket. The plain end of the adjoining pipe shall be wiped clean and inserted into the bell a sufficient distance to make contact with the gasket. The plain end shall then be forced "home" by the use of a crow bar, fork tool or jack assembly.

D. Testing and Disinfection: Pipelines and appurtenances shall be tested and disinfected as specified in Section 33 01 10. Only potable water mains are to be disinfected.

E. Water and Sewer Main Separation: The sewer shall be laid at least 10-feet horizontally from any existing or proposed water main. This distance shall be measured from edge-of-pipe to edge-of-pipe. These requirements include service lines. At crossings, a minimum vertical distance of 18-inches from edge-of-pipe to edge-of-pipe shall be maintained between the water and the sewer pipes. This shall be the case when the water main is either above or below the sewer. At crossings, one full length of water main shall be located so both joints are as far as possible from the sewer.

F. At all crossings, pipe and backfill shall be properly installed to support the pipes. The material is to be tamped and rodded to fill all voids adjacent to and below both pipes and to compact the fill material.

G. Prior to final acceptance of the sewers, the CONTRACTOR must thoroughly flush and clean lines of any construction debris. The CONTRACTOR is responsible for collecting any debris in these lines and preventing it from passing on downstream into the sewer system.

H. Support of Sewer Crossings: Where a new pipeline crosses under an existing sewer main or sewer service, lean concrete (class E) will be placed between the two pipes to support the upper pipe. Lean concrete must extend fully between the lower pipeline and the upper pipe.

I. Warning Tape: Warning tape shall be buried eighteen to twenty-four inches below finish surface grade unless specified otherwise.

J. Tracer Wire: Tracer wire shall be installed on all pipe as shown in the details, and shall be located above the pipe as shown on the details. The tracer wire shall be insulated and brought to the surface in test station boxes at all appurtenances, or as indicated in the drawings. The continuing wire shall also have a lead which begins at the surface and follows appurtenances to the underground pipe. Tracer wire shall be attached to top of pipe by tape at 10-foot maximum intervals. The system of tracer wire shall be continuous. Splicing or other means used to provide a continuous wire, along with leads for testing, shall be approved by the ENGINEER.

K. Polyethylene Encasement: All buried metallic (ductile, cast iron, steel, etc) fittings, piping, valves and valve boxes, shall be double wrapped with polyethylene encasement and tightly taped to the adjoining pipe.

3.3 HDPE PIPE INSTALLATION

A. Installation and Testing. The Manufacturer shall supply an Installation Manual to the Project Engineer which outlines guidelines for handling, joining, installing, embedding and testing of polyethylene pipeline. These guidelines shall be used as reference material for the Project Engineer in his determination of the required procedures.

B. Joints between plain ends of polyethylene pipe shall be made by butt fusion when possible. The pipe manufacturer's fusion procedures shall be followed at all times as well as the recommendations of the fusion machine manufacturer. The wall thicknesses of the adjoining pipes shall have the same DR at the point of fusion.

C. When saddle connections are fusion welded, the Manufacturer's recommended saddle fusion procedures shall be used.

D. If mechanical fittings (which are designed for, or tested and found acceptable for use with polyethylene pipe) are utilized for transitions between pipe materials, repairs, joining pipe sections, saddle connections, or at other locations; the recommendation of the mechanical fitting manufacturer must be followed. These procedures may differ from other pipe materials.

E. On each day butt fusions are to be made, the first fusion of the day shall be a trial fusion. The trial fusion shall be allowed to cool completely, then fusion test straps shall be cut out. The test strap shall be 12" or 30 times the wall thickness in length (minimum) and 1" or 1.5 times the wall thickness in width (minimum). Bend the test strap until the ends of the strap touch. If the fusion fails at the joint, a new trial fusion shall be made, cooled completely and tested. Butt fusion of pipe to be installed shall not commence until a trial fusion has passed the bent strap test.

F. Socket and Saddle fusions shall be tested by a bent strap test as described by the pipe manufacturer. The pipe manufacturer shall provide visual guidelines for inspecting the butt, saddle, and socket fusion joints.

G. Pressure testing shall be conducted in accordance with the manufacturer's recommended procedures and **Section 33 01 10 Disinfection of Water Utility Piping.**

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts, and use cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
   1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
   2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
   3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
   4. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads.

B. Set cleanout frames and covers in earth in cast-in-place-concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding grade.

C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

END OF SECTION

Attachment 7

SECTION 33 41 00 - STORM UTILITY DRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Pipe and fittings.
   2. Non-pressure transition couplings.
   3. Expansion joints and deflection fittings.
   4. Stormwater Chases
   5. Cleanouts.

B. Related Requirements:
   1. Section 330110 - Disinfection of Water Utility Piping Systems
   2. Section 312000 - Earth Moving
   3. Section 312319 - Dewatering
   4. Section 315000 - Excavation Support and Protection

1.3 ACTION SUBMITTALS

A. Furnish submittals in accordance with Section 013300 – Submittals.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.

B. Field quality-control reports.

1.5 DELIVERY, STORAGE, AND HANDLING

A. The CONTRACTOR shall be responsible for all such material furnished by him and shall replace, at his own expense, all such material found defective in manufacture or damaged in handling after delivery by the manufacturer. This shall include the furnishing of all materials and labor required for the replacement of installed material discovered defective prior to the final acceptance of the Work or during the guarantee period.

B. The CONTRACTOR shall be responsible for the safe storage of material furnished by him or to him and accepted by him and intended for the Work, until it has been incorporated in the completed project. The interior of all pipe and other accessories shall be kept free from dirt and foreign matter at all times.

C. Do not store plastic manholes, pipe, and fittings in direct sunlight.

D. Protect pipe, pipe fittings, and seals from dirt and damage.

E. Handle manholes according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
   1. Notify Engineer no fewer than two days in advance of proposed interruption of service.
   2. Do not proceed with interruption of service without Engineer's written permission.

PART 2 - PRODUCTS

A. Corrugated Polyethylene Pipe (CPEP).

1. All CPEP shall conform to the requirements of AASHTO M-252 and ASTM 405-85 for pipes 10 inches and smaller in diameter and AASHTO M-294 and ASTM F-667-84a for diameters of 12 inches and greater.
2. All CPEP fittings shall be rotational or blow-moulded and shall conform to the fitting requirements of AASHTO M-252 or M-294. Jointing for 10-inch CPEP shall be with couplings corrugated to match the pipe connections or with push-on couplings with locking detents. Jointing for 12-inch and larger CPEP shall be made using couplings corrugated to match and index in the pipe corrugations and in a width not less than three-quarters of the nominal pipe diameter. All couplings shall be manufactured to lap equally to a distance, on each jointed pipe, to no less than the diameter of the pipe.
3. CPEP may be connected to CMP or may be used between and/or connected to dissimilar metals.
4. End sections for CPEP may be galvanized, steel, aluminum, or high-density polyethylene and shall be factory-assembled units to serve as structural, hydraulic, and/or aesthetic end treatment to CPEP culverts. Connections to the CPEP shall be as recommended by the manufacturer.
5. The piping shall be ADS N-12 Corrugated Polyethylene Pipe (CPEP), manufactured by Advanced Drainage Systems, Inc., 3300 Riverside Drive, Columbus, Ohio 43221, (614) 457-3051 or an approved equal.

B. Pipe

1. Corrugated Polyethylene Pipe (CPEP): All CPEP shall conform to the requirements of AASHTO M-294 and ASTM F 667-84a. Piping shall be ADS N-12 Corrugated Polyethylene Pipe manufactured by Advanced Drainage Systems, Inc., 3300 Riverside Drive, Columbus, Ohio 43221, (614) 457-3051, or approved substitution.

2.1 NON-PRESSURE TRANSITION COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:
   1. For Concrete Pipes: ASTM C 443, rubber.
   2. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
   3. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Unshielded, Flexible Couplings:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   a. Dallas Specialty & Mfg. Co.
   b. Fernco Inc.
   c. Logan Clay Pipe.
   d. Mission Rubber Company; a division of MCP Industries, Inc.
   e. NDS Inc.
   f. Plastic Oddities; a division of Diverse Corporate Technologies, Inc.
2. Description: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.

2.2 STORMWATER CHASES

A. Sidewalk chase shall be constructed as indicated on the project drawings.
   1. The sidewalk chase grates and frames shall be EJ Iron model V-7600 series or approve equal.

B. Roadway chases shall be constructed as indicated on the project drawings.
   1. The roadway chase grates and frames shall be EJ Iron model V-7320 series or approve equal.

2.3 CLEANOUTS

A. Cast-Iron Cleanouts:
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Smith, Jay R. Mfg. Co.
      b. WADE
      c. Tyler Pipe.
      d. Watts Water Technologies, Inc.
      e. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.
   2. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
   3. Top-Loading Classification(s): Heavy Duty.

2.4 CATCH BASINS

A. Materials used in the construction of catch basins shall conform to the requirements of ASTM Specification Designation C-478-82A. Cement for mortar used in the construction of catch basins shall conform to ASTM Specification Designation C-150, Type II. Sand shall conform to AASHTO Specification Designation M-45.

2.5 MANHOLES

A. Standard Precast Concrete Manholes: See Section 330513 – Manholes and Structures

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. Install gravity-flow, non-pressure drainage piping according to the following:
   1. Install piping pitched down in direction of flow.
   2. Install piping with 36-inch minimum cover.
   3. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.

F. Pressure testing shall be conducted in accordance with the manufacturer’s recommended procedures and Section 33 01 10 Disinfection of Water Utility Piping.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, non-pressure drainage piping according to the following:
   1. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasketed joints.
   2. Join dissimilar pipe materials with non-pressure-type flexible couplings.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts, and use cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
   1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
   2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
   3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
   4. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads.

B. Set cleanout frames and covers in earth in cast-in-place-concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding grade.

C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.5 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318.

3.6 CONNECTIONS

A. Make connections to existing piping and underground manholes.

1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
    a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
    b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

B. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
1. Use non-pressure-type flexible couplings where required to join gravity-flow, non-pressure sewer piping unless otherwise indicated.
    a. Unshielded flexible couplings for same or minor difference OD pipes.
    b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
    c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.
2. Use pressure-type pipe couplings for force-main joints.

3.7 IDENTIFICATION

A. Materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
1. Use warning tape or detectable warning tape over ferrous piping.
2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.8 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with water.

END OF SECTION

Attachment 8

SECTION 40 05 31 – POLYVINYL CHLORIDE PROCESS PIPE

PART 1 -- GENERAL

1.1 DESCRIPTION

A. Scope: CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified, and required to install and test all thermoplastic pipe and associated fittings.

B. Related Sections:

1. Section 40 11 09 Interior Piping
2. Section 40 11 11 Valves and Actuators
3. Section 40 05 06 - Couplings, Adapters, and Specials for Process Piping: Pipe penetrations, restrained joints, flexible connections, expansion joints and loops, and sleeve-type couplings.
4. Section 40 05 07 - Hangers and Supports for Process Piping: Hangers, anchors, sleeves, and sealing of piping to adjacent structures.

1.2 REFERENCES

A. Standards referenced in this Section are:

1. ASTM D1784, Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
2. ASTM D1785, Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120.
3. ASTM D2466, Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
4. ASTM D2467, Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
5. ASTM D2564, Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
6. ASTM D2665, Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
7. ASTM D3034, Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
8. ASTM D3035, Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
9. ASTM D3139, Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
10. ASTM D3212, Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
11. ASTM D3261, Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
12. ASTM F441/F441M, Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
13. ASTM F477, Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
14. ASTM F1336, Specification for Poly (Vinyl Chloride) (PVC) Gasketed Sewer Fittings.
15. NSF 61, Drinking Water System Components – Health Effects.

1.3 SUBMITTALS

A. Shop Drawings:

1. Submit piping layout Shop Drawings in accordance with Section 40 11 09, Interior Piping.
2. Submit product data on pipe, fittings, gaskets, hardware, and appurtenances sufficient to demonstrate compliance with the Contract Documents.
3. Submit manufacturer's certificate of compliance standards referenced in this Section.

PART 2 -- PRODUCTS

2.1 SERVICE CONDITIONS

A. General:

1. Pipe materials shall be suitable for services intended. Refer to piping schedules in Section 40 11 09, Interior Piping.
2. Pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, and other defects. Unless otherwise shown or indicated, pipe shall be uniform in color, opacity, density, and other physical properties.
3. Pipe, fittings, and appurtenances in contact with potable water or water that will be treated to become potable shall be listed in ANSI/NSF 61 as being suitable for contact with potable water, and shall comply with requirements of the authorities having jurisdiction at the Site.

2.2 POLYVINYL CHLORIDE (PVC) PIPING

A. PVC Pipe — General Applications: Unless otherwise shown or indicated, PVC pipe shall comply with the following:

1. Manufacturers: Provide products of one of the following:
   a. Victaulic, Inc.
   b. Ipex, Inc.
   c. Spears Manufacturing Company.
   d. Or equal.

2. Material: Unless otherwise specified, comply with the following:
   a. Type and Grade: Type 1, Grade 1.

3. Wall Thickness: Schedule 80 complying with ASTM D1784 and ASTM D1785, and US Product Service PS 21-70 as having same outside diameter dimension as steel pipe.
4. Temperature Rating: Rated for temperature to 140 degrees F.
5. Color: Gray.

B. Fittings: Type, grade, schedule, and color of fitting shall match the associated pipe.

1. Solvent Weld: Comply with ASTM D2467.
2. Threaded: Threaded fittings shall comply with ASTM D2464.
3. Flanged: Provide flanged fittings with Neoprene gaskets.
4. Grooved: Provide couplings with elastomer seals.

C. Joints:

1. Solvent Weld: Use primer and solvent cement recommended by PVC pipe manufacturer for the application. Primer shall be in accordance with ASTM F656, and solvent cement shall be in accordance with ASTM D2564.
2. Threaded: Use 100 percent virgin polytetrafluoroethylene (Teflon or PTFE) tape for threaded fittings. Pipe shall not be threaded.
3. Flanged: Provide with backup flange minimum 1/8-inch thick. Backup flanges and connecting bolts shall be Type 304 stainless steel.
4. Grooved: Provide grooved Piping with steel couplings and stainless-steel connection bolts.
5. Grooved to Flanged: Where required, provide piping with flanged and grooved joints on opposite ends.

PART 3 -- EXECUTION

3.1 INSPECTION

A. Inspect pipe materials for defects in material and workmanship. Verify compatibility of pipe and fittings.

3.2 INSTALLATION

A. For exposed piping installation, refer to Section 40 11 09, Interior Piping.

END OF SECTION