CITY AND BOROUGH OF WRANGELL

Wrangell Water Treatment Plant Project

Addendum No. 5

July 28, 2023

(62 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 question was asked during the pre-bid site visit if it would be possible to demolish the air compressors and oxygen generators associated with the ozone generation system earlier than shown on the proposed construction sequence. This equipment is located in the control building in the area planned for a new electrical room.

Answer: The current oxygen gas feed rate to the ozone generators is 140 l/min per unit for a total requirement of 280 l/min resulting in a maximum oxygen gas demand of 403,200 l/d. Liquid oxygen could be procured, brought to site, and piped directly to the ozone generators, thus eliminating the need for the existing compressors and oxygen generators. Cryogenic liquid oxygen is available in one-ton cylinders or 10'/20'/40' containerized tanks. For planning purposes, 1 liter of liquid oxygen produces 860 liters of oxygen gas. As an example, a single 20-foot containerized cryogenic oxygen tank holds approximately 21,700 liters of liquid oxygen and would produce 18,662,000 liters of gas, which would provide enough gas for 46 days of use. The Contractor at Contractor's expense is free to procure liquid oxygen and pipe it directly to the existing ozone generators. Any and all equipment required to connect the liquid oxygen supply (insulated piping, vaporizer, etc.) and operation of this equipment to provide uninterrupted oxygen supply to the ozone generators is the responsibility of the Contractor. The Contractor is responsible for ensuring all materials and equipment are suitable for cryogenic service. The Contractor is responsible for the safe transport, storage, and use of the oxygen storage and delivery system in accordance with NFPA 99 and all other relevant codes and regulations. Safety considerations include, but are not limited to: overpressure protection, storage area ventilation, separation distance between flammables and combustibles, appropriate safety signage, backflow prevention, and the supply and use of personal protective equipment (PPE).

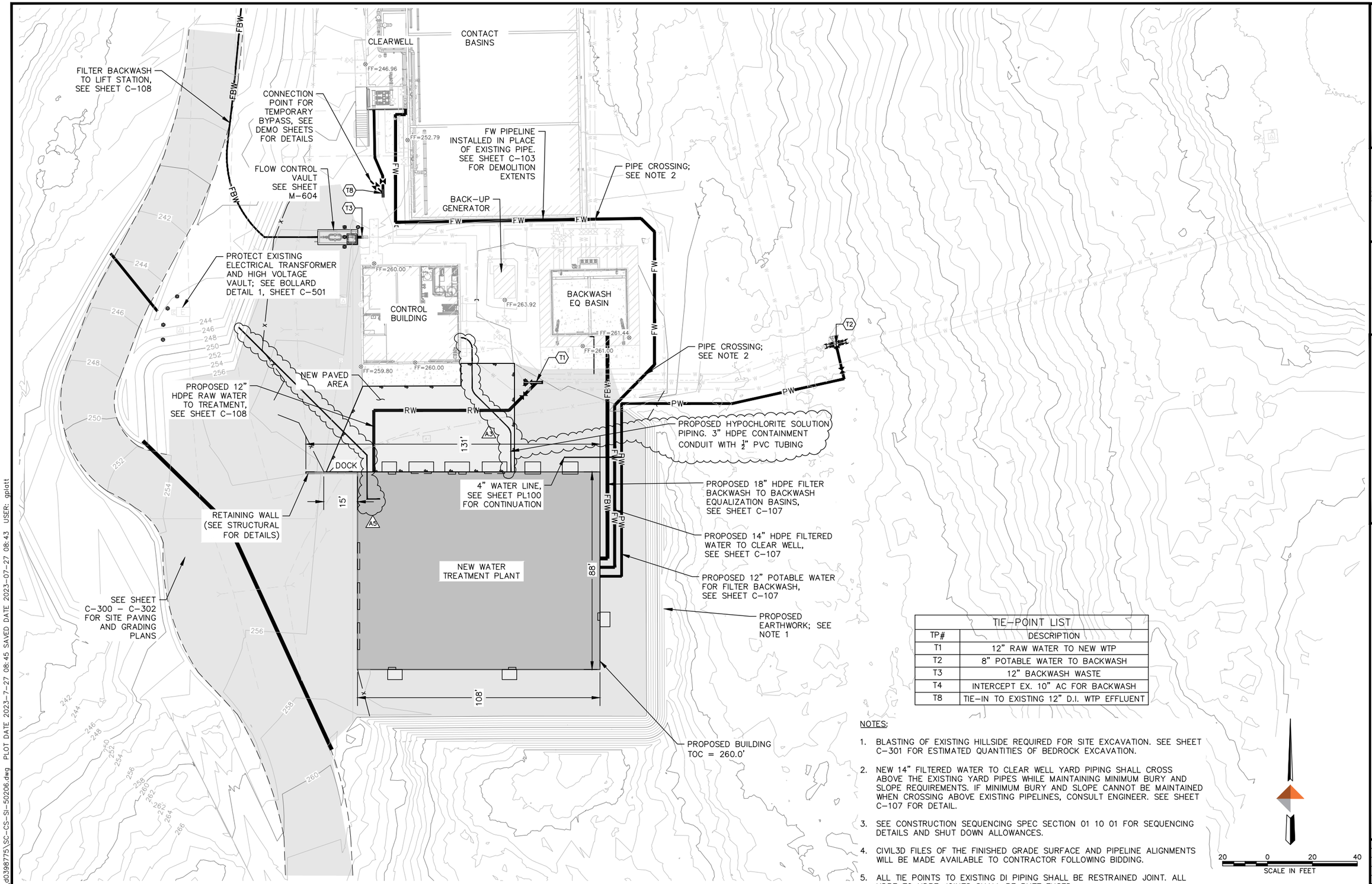
This would allow demolition of the compressor and oxygen generators in the control building as soon as the liquid oxygen was on site. Engineer recommends using the 10-foot containerized tank which would provide approximately 22 days of service but would be much easier to handle from the barge to the site. A minimum of two tanks should be procured and delivered to site on a staggered schedule. As a reminder, the existing treatment plant MUST remain fully operational until the new plant is approved for operation by ADEC; therefore, the Contractor must provide oxygen until ADEC approval is received, and the Owner or Engineer cannot guarantee a schedule for this approval.

End of Addendum No. 5

Attachments:

1. Revised Drawings C-104, C-105, C-107, C-112, C-302, M-100, M-301, M-302, M-503, M-504, M-601, M-602, M-603, SF-001, SF-002, SF-004, SF-011
2. Revised Specification 01 10 01 Construction Sequencing
3. Revised Specification 01 74 19 Construction Waste Management and Disposal
4. Revised Specification 33 05 05 Pressure Testing
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

Attachment 1



PROPOSED PIPING SITE PLAN

TIE–POINT LIST	
TP#	DESCRIPTION
T1	12" RAW WATER TO NEW WTP
T2	8" POTABLE WATER TO BACKWASH
T3	12" BACKWASH WASTE
T4	INTERCEPT EX. 10" AC FOR BACKWASH
T8	TIE–IN TO EXISTING 12" D.I. WTP EFFLUENT

NOTES:

1. BLASTING OF EXISTING HILLSIDE REQUIRED FOR SITE EXCAVATION. SEE SHEET C–301 FOR ESTIMATED QUANTITIES OF BEDROCK EXCAVATION.
2. NEW 14" FILTERED WATER TO CLEAR WELL YARD PIPING SHALL CROSS ABOVE THE EXISTING YARD PIPES WHILE MAINTAINING MINIMUM BURY AND SLOPE REQUIREMENTS. IF MINIMUM BURY AND SLOPE CANNOT BE MAINTAINED WHEN CROSSING ABOVE EXISTING PIPELINES, CONSULT ENGINEER. SEE SHEET C–107 FOR DETAIL.
3. SEE CONSTRUCTION SEQUENCING SPEC SECTION 01 10 01 FOR SEQUENCING DETAILS AND SHUT DOWN ALLOWANCES.
4. CIVIL3D FILES OF THE FINISHED GRADE SURFACE AND PIPELINE ALIGNMENTS WILL BE MADE AVAILABLE TO CONTRACTOR FOLLOWING BIDDING.
5. ALL TIE POINTS TO EXISTING DI PIPING SHALL BE RESTRAINED JOINT. ALL HDPE TO HDPE JOINTS SHALL BE BUTT FUSED.

20 0 20 40
SCALE IN FEET

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

REVISIONS			
REV	DATE	DESCRIPTION	BY
A3	07/11/23	ADDENDUM 3	GP
A5	07/28/23	ADDENDUM 5	GP

STATE OF ALASKA 49TH
CHASE A. WELSON
CE–13867
2023–07–25
REGISTERED PROFESSIONAL ENGINEER

WRANGELL
THE GATEWAY TO ALASKA
ADOPTED AUGUST 1972

DOWL
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Fairbanks, Alaska 99709
907-374-0275

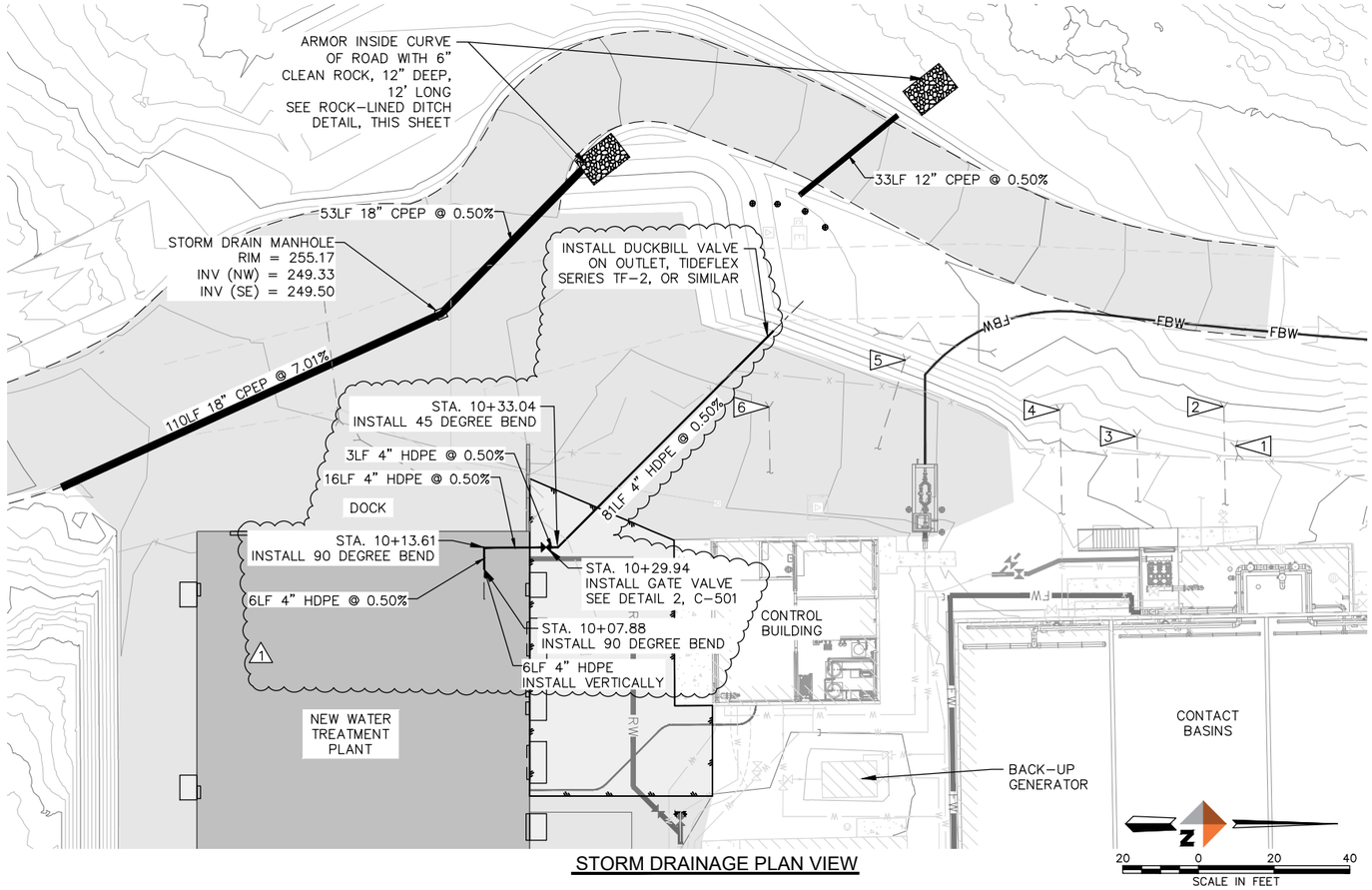
WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

PROPOSED SITE PLAN

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

PROJECT 1528.50206.01
DATE 07/25/2023

SHEET
C-104



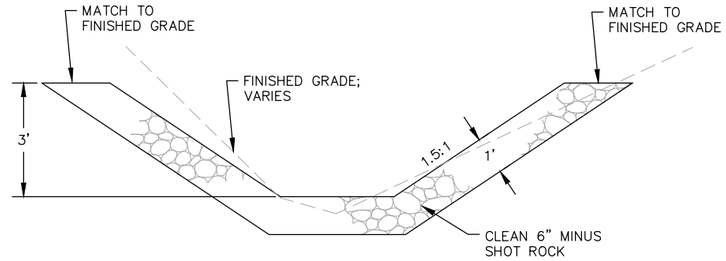
STORM DRAINAGE PLAN VIEW

NOTES:

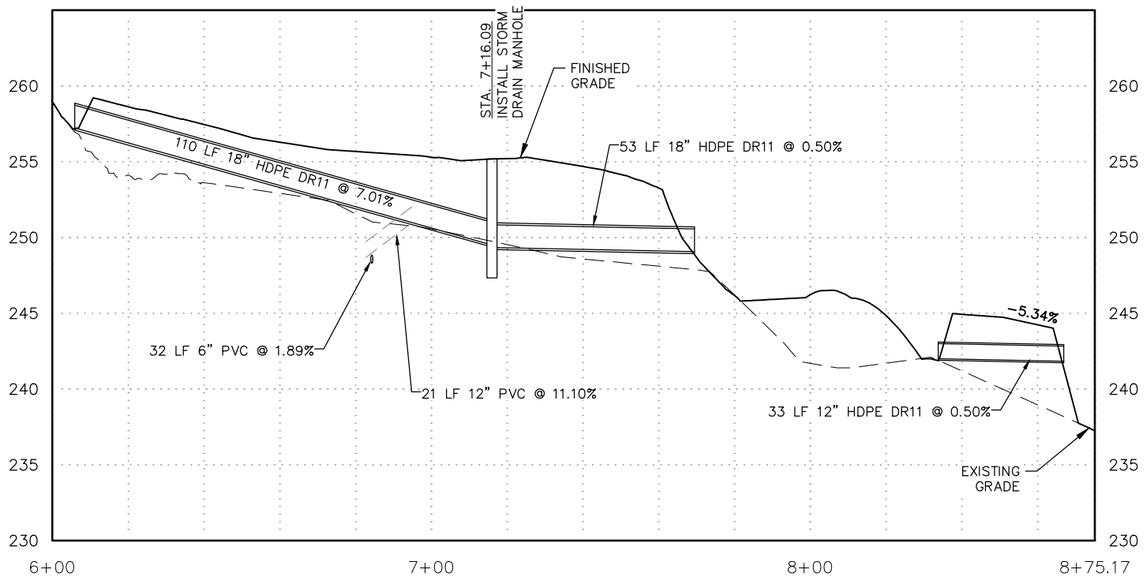
1. PIPE LENGTHS SHOWN ARE FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE.
2. PROTECT EXISTING DRAIN PIPE IN PLACE. ADJUST PIPE LENGTHS AS NECESSARY TO DAYLIGHT FOLLOWING SITE GRADING.

EXISTING DRAIN PIPE DAYLIGHT ELEVATIONS

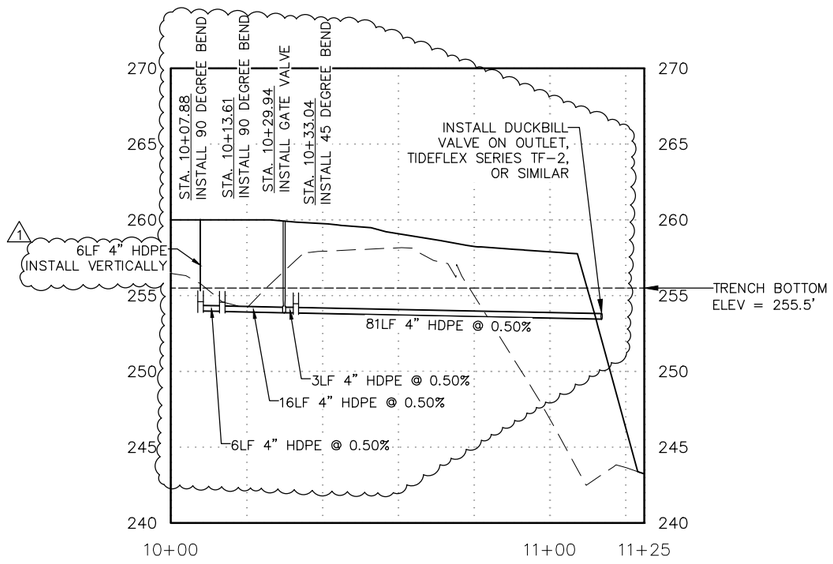
1	12" CPP	245.2'
2	8" DIP	240.5
3	4" PVC	245.7
4	8" DIP	244.0'
5	4" PVC	244.6'
6	4" PVC	253.6'



ROCK-LINED CHANNEL DITCH



STORM DRAINAGE PROFILE VIEW



FLOOR DRAIN PIPING PROFILE VIEW

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

REVISIONS

REV	DATE	DESCRIPTION	BY
1	7/28/23	ADDENDUM 5	CN

STATE OF ALASKA 49TH
CHASE A. NELSON
CE-13867
2023-07-25
REGISTERED PROFESSIONAL ENGINEER

WRANGELL SEAL OF STRENGTH GATEWAY TO ALASKA ADOPTED AUGUST 1972

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3535 College Road, #100
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907-374-0275

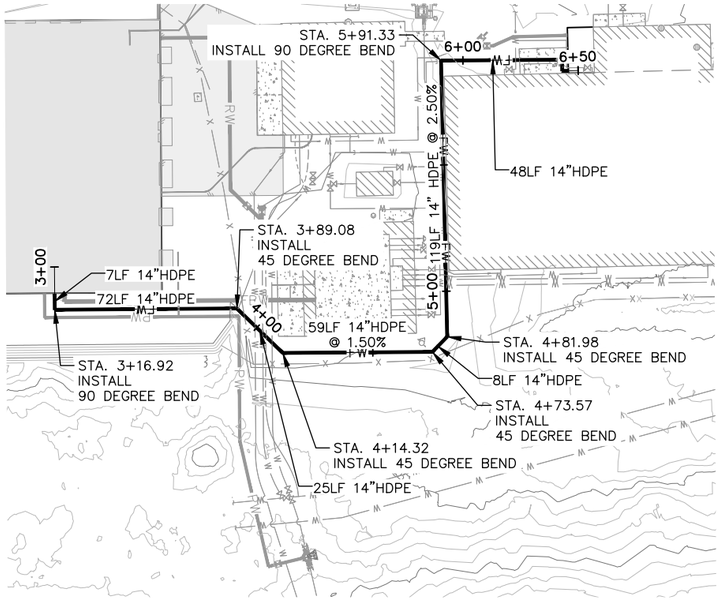
WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

STORM PLAN & PROFILE

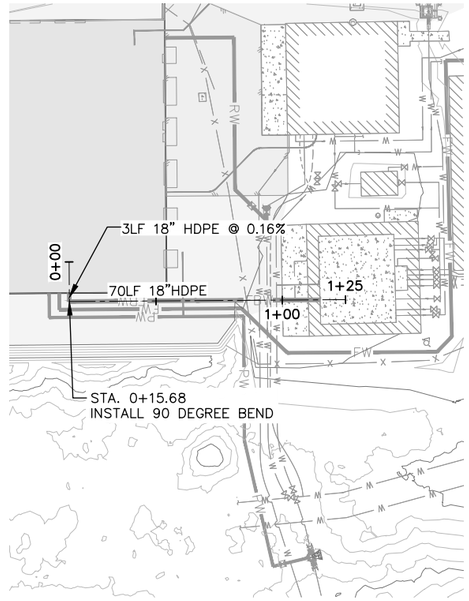
SEC. 31; TOWNSHIP 62S; RANGE 84E
CITY AND BOROUGH OF WRANGELL, ALASKA

PROJECT 1528.50206.01
DATE 07/25/2023

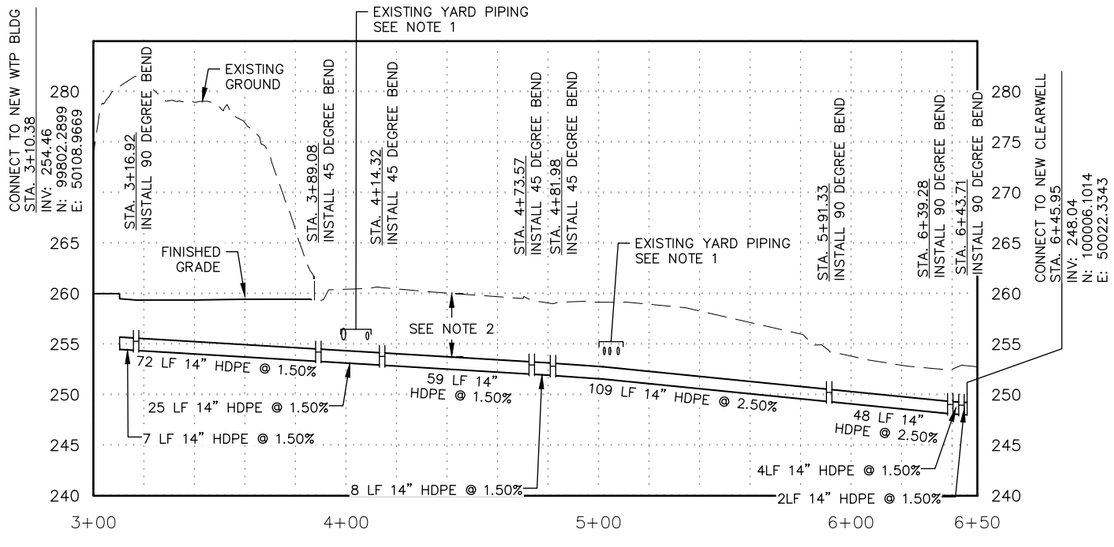
SHEET
C-105



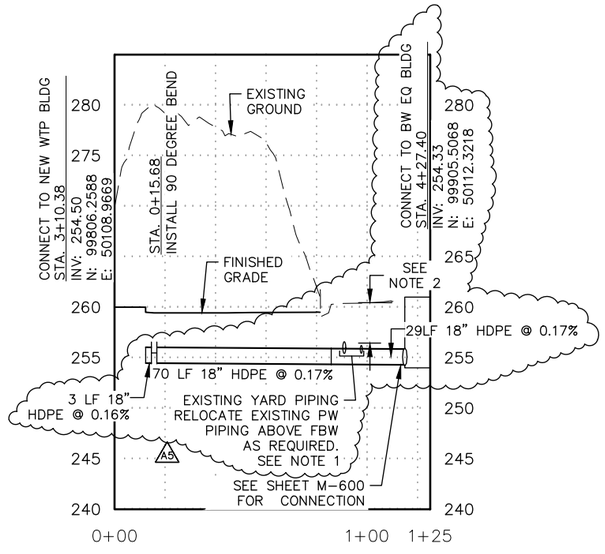
FILTERED WATER YARD PIPING PLAN VIEW



FILTER BACKWASH YARD PIPING PLAN VIEW



FILTERED WATER YARD PIPING PROFILE VIEW



FILTER BACKWASH YARD PIPING PROFILE VIEW

NOTES:

1. INVERT ELEVATIONS OF EXISTING YARD PIPING ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY ALL LOCATIONS OF EXISTING YARD PIPING PRIOR TO CONSTRUCTION OF THE NEW WATER TREATMENT PLANT.
2. MAINTAIN MINIMUM 4' BURY DEPTH OF ALL YARD PIPING. INSULATION BOARD SHALL BE INSTALLED FOR ALL SECTION OF PIPE WHERE BURY DEPTH DOES NOT MEET MINIMUM.

30 0 30 60
SCALE IN FEET

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

REVISIONS			
REV	DATE	DESCRIPTION	BY
A5	07/28/23	ADDENDUM 5	GP

STATE OF ALASKA 49TH
CHASE A. NELSON
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2023-07-25
REGISTERED PROFESSIONAL ENGINEER

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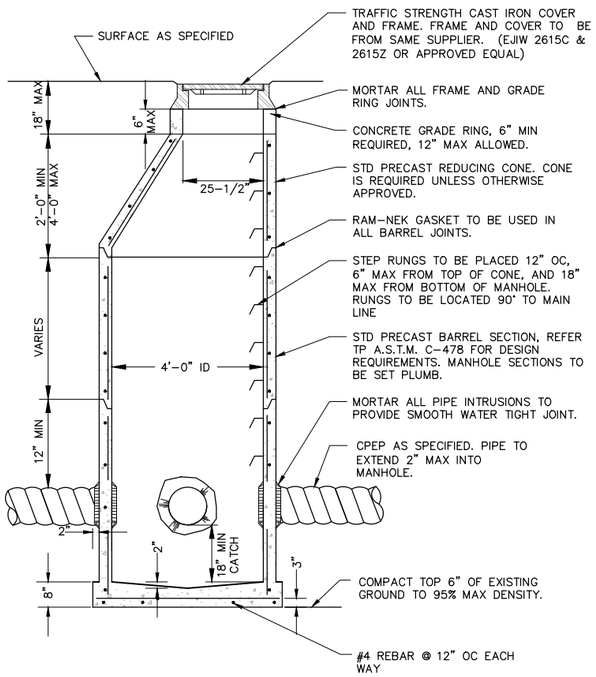
WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

YARD PIPING PLAN & PROFILE

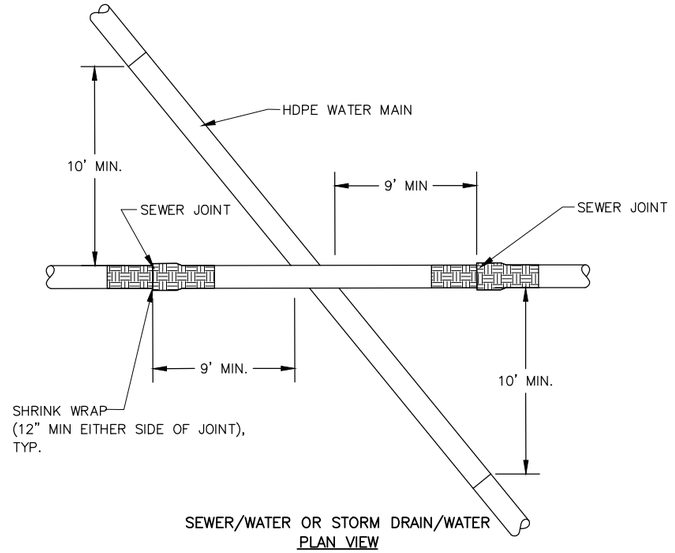
SEC. 31; TOWNSHIP 62S; RANGE 84E
CITY AND BOROUGH OF WRANGELL, ALASKA

PROJECT 1528.50206.01
DATE 07/25/2023

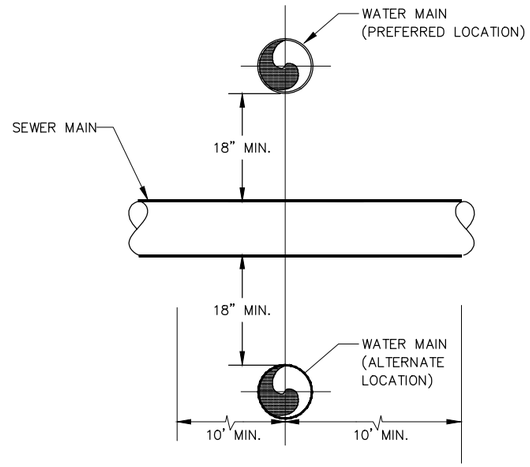
SHEET
C-107



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
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2023-06-02
REGISTERED PROFESSIONAL ENGINEER

WRANGELL GATEWAY TO THE INSIDE PASSAGE ADOPTED AUGUST 1972

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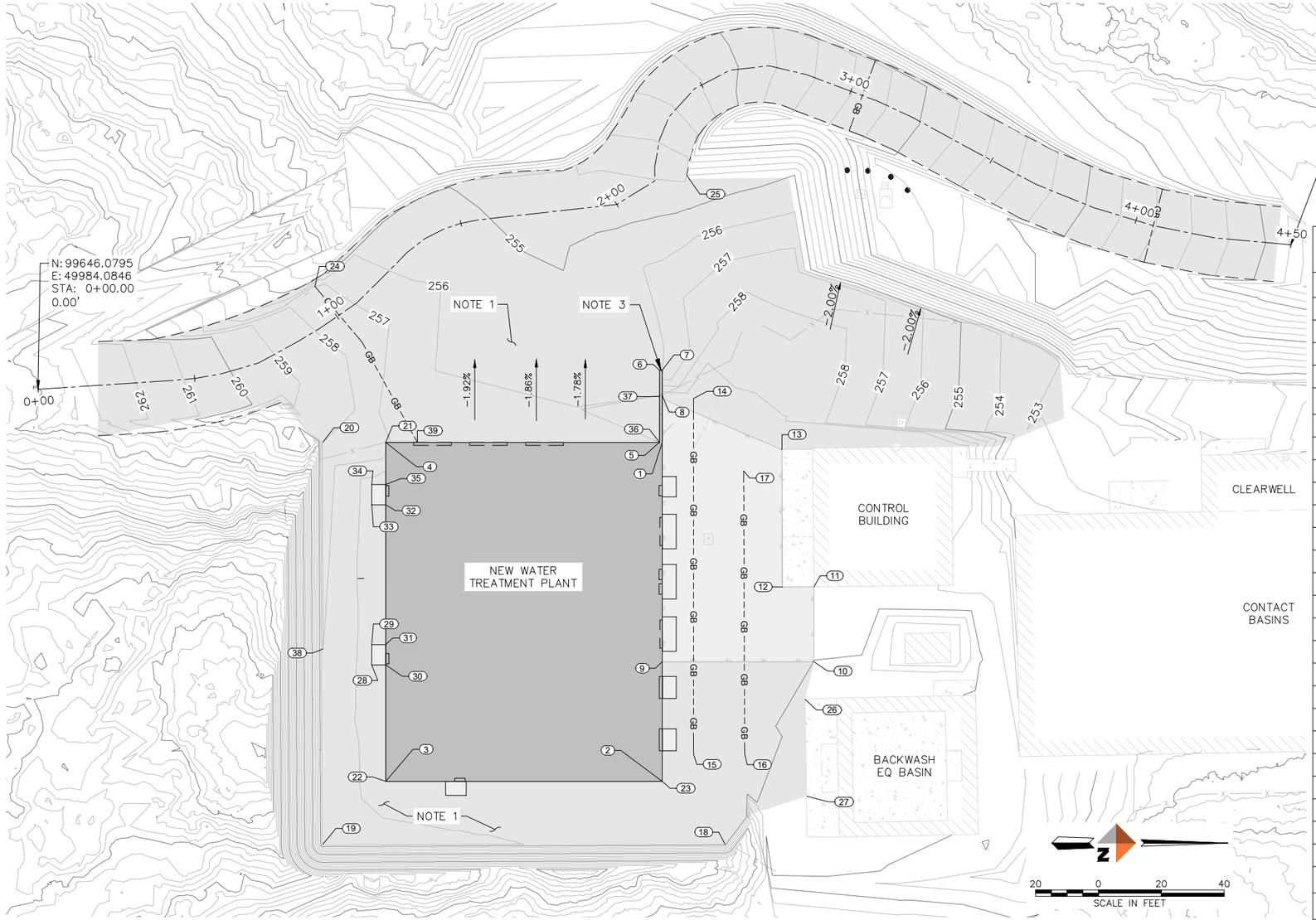
WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

PIPE CROSSING & STORM DRAIN CATCH BASIN DETAILS

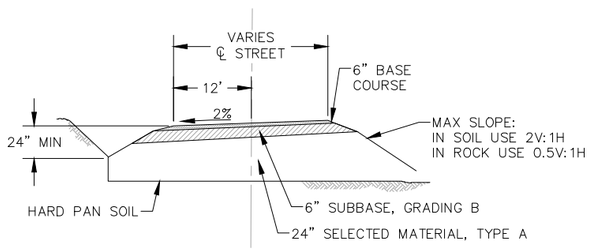
SEC. 31; TOWNSHIP 62S; RANGE 84E
CITY AND BOROUGH OF WRANGELL, ALASKA

PROJECT 1528.50206.01
DATE 06/02/2023

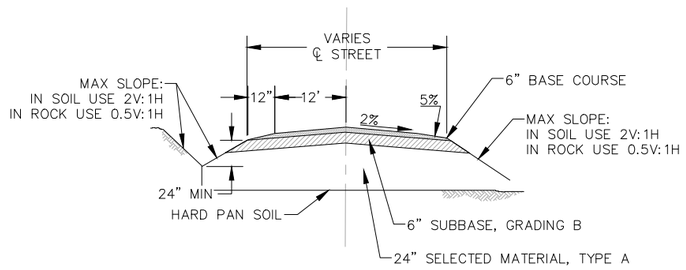
SHEET
C-112



PROPOSED SITE GRADING PLAN



TYPICAL DRIVEWAY SECTION: STA. 0+00 TO 2+14
NTS



TYPICAL DRIVEWAY SECTION: STA. 2+14 TO 4+50
NTS

NOTES:

1. MAINTAIN NEGATIVE SLOPE FOR DRAINAGE AWAY FROM BUILDINGS.
2. GRADING SHALL SLOPE AWAY FROM ALL BUILDINGS.
3. DOCK WALL SHALL BE 15' LONG AT THE NEW WTP FF ELEVATION OF 260', AND SLOPE TO FINISHED GRADE AT 2H:1V. SEE STRUCTURAL FOR DETAILS.

LEGEND

GRAVEL ROAD SURFACE, DETAIL 5/C-501

CONCRETE PAVEMENT SURFACE, DETAIL 8/C-501

POINT TABLE

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	99844.76	50000.99	260.00	NW CORNER NEW BLDG FF
2	99844.75	50108.95	260.00	NE CORNER NEW BLDG FF
3	99756.79	50108.95	260.00	SE CORNER NEW BLDG FF
4	99756.79	50000.99	260.00	SW CORNER NEW BLDG FF
5	99843.94	50000.97	260.00	SE DOCK WALL CORNER (TOP)
6	99843.88	49977.97	255.70	SW DOCK WALL CORNER
7	99844.79	49977.97	256.00	NW DOCK WALL CORNER
8	99844.76	49985.97	260.00	DOCK WALL SLOPE START
9	99844.78	50070.87	260.00	SE PAVEMENT CORNER
10	99893.08	50070.87	260.01	NE PAVEMENT CORNER
11	99893.08	50047.00	259.53	NE PAVEMENT CTE CONTROL BLDG
12	99883.08	50047.02	259.41	SE PAVEMENT CTE CONTROL BLDG
13	99882.92	50003.33	259.40	SW PAVEMENT CTE CONTROL BLDG
14	99854.76	49986.98	259.80	SW PAVEMENT GRADE BREAK
15	99854.77	50100.34	259.85	SE PAVEMENT GRADE BREAK
16	99871.00	50100.22	259.65	NE PAVEMENT GRADE BREAK
17	99870.71	50010.09	259.36	NW PAVEMENT GRADE BREAK
18	99864.77	50128.97	259.50	NE TOE OF CUT SLOPE
19	99736.77	50128.97	258.50	SE TOE OF CUT SLOPE
20	99736.77	50000.97	257.50	SW TOE OF CUT SLOPE
21	99756.77	50000.97	257.50	SW BLDG CORNER SITE FG
22	99756.78	50108.96	259.50	SE BLDG CORNER SITE FG
23	99844.75	50108.95	260.00	NE BLDG CORNER FG
24	99734.22	49951.31	257.02	SW DRIVEWAY GRADE BREAK
25	99852.54	49915.91	254.00	NW DRIVEWAY GRADE BREAK
26	99890.20	50082.82	260.32	CTE BW EQ BASIN PAD (W)
27	99890.82	50113.67	260.41	CTE BW EQ BASIN PAD (E)
28	99752.30	50071.89	259.43	SE DOORWAY PAD BASE ELEV (SE CORNER)
29	99752.30	50065.37	259.43	SE DOORWAY PAD BASE ELEV (SW CORNER)
30	99756.76	50071.89	260.00	SE DOORWAY PAD BASE ELEV (NE CORNER)
31	99756.74	50065.36	260.00	SE DOORWAY PAD BASE ELEV (NW CORNER)
32	99756.78	50020.89	260.00	SW DOORWAY PAD BASE ELEV (NE CORNER)
33	99752.30	50020.89	259.43	SW DOORWAY PAD BASE ELEV (SE CORNER)
34	99752.30	50014.37	259.43	SW DOORWAY PAD BASE ELEV (SW CORNER)
35	99756.79	50014.38	260.00	SW DOORWAY PAD BASE ELEV (NW CORNER)
36	99843.90	50000.97	256.00	SE BASE OF DOCK WALL
37	99843.90	49986.41	255.79	BASE OF DOCK WALL
38	99736.77	50066.79	258.00	TOE OF SLOPE – MIDPOINT (S)
39	99766.83	50000.96	256.00	LOADING DOCK FG – GRADE BREAK

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY
1	7/28/23	ADDENDUM 5	CN

STATE OF ALASKA 49TH
CHASE A. NELSON
CE-13867
2023-07-28
REGISTERED PROFESSIONAL ENGINEER

WRANGELL ... GATEWAY TO SOUTHEAST ALASKA ... ADOPTED AUGUST 1972

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Fairbanks, Alaska 99709
907-374-0275

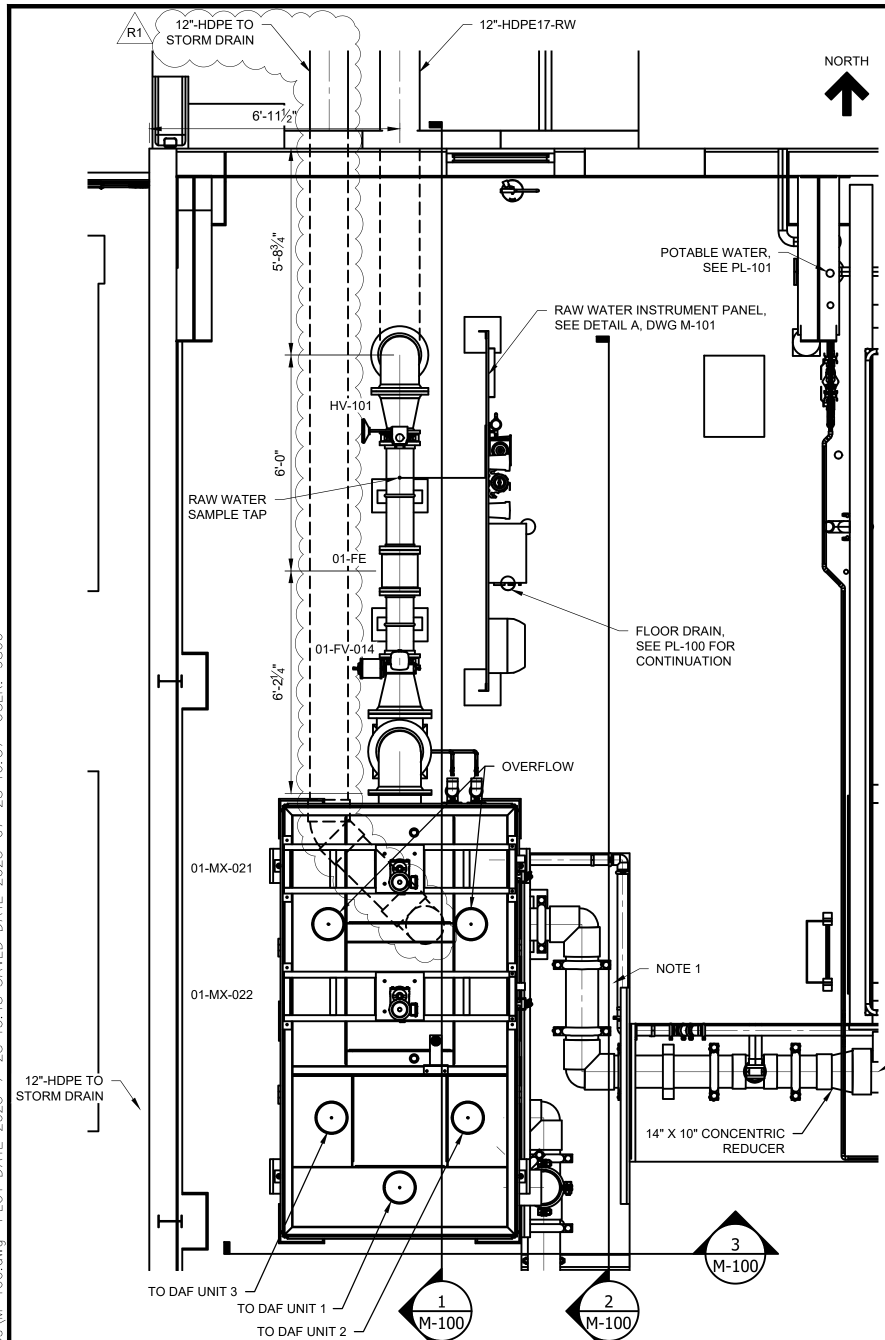
WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

PROPOSED SITE GRADING PLAN

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

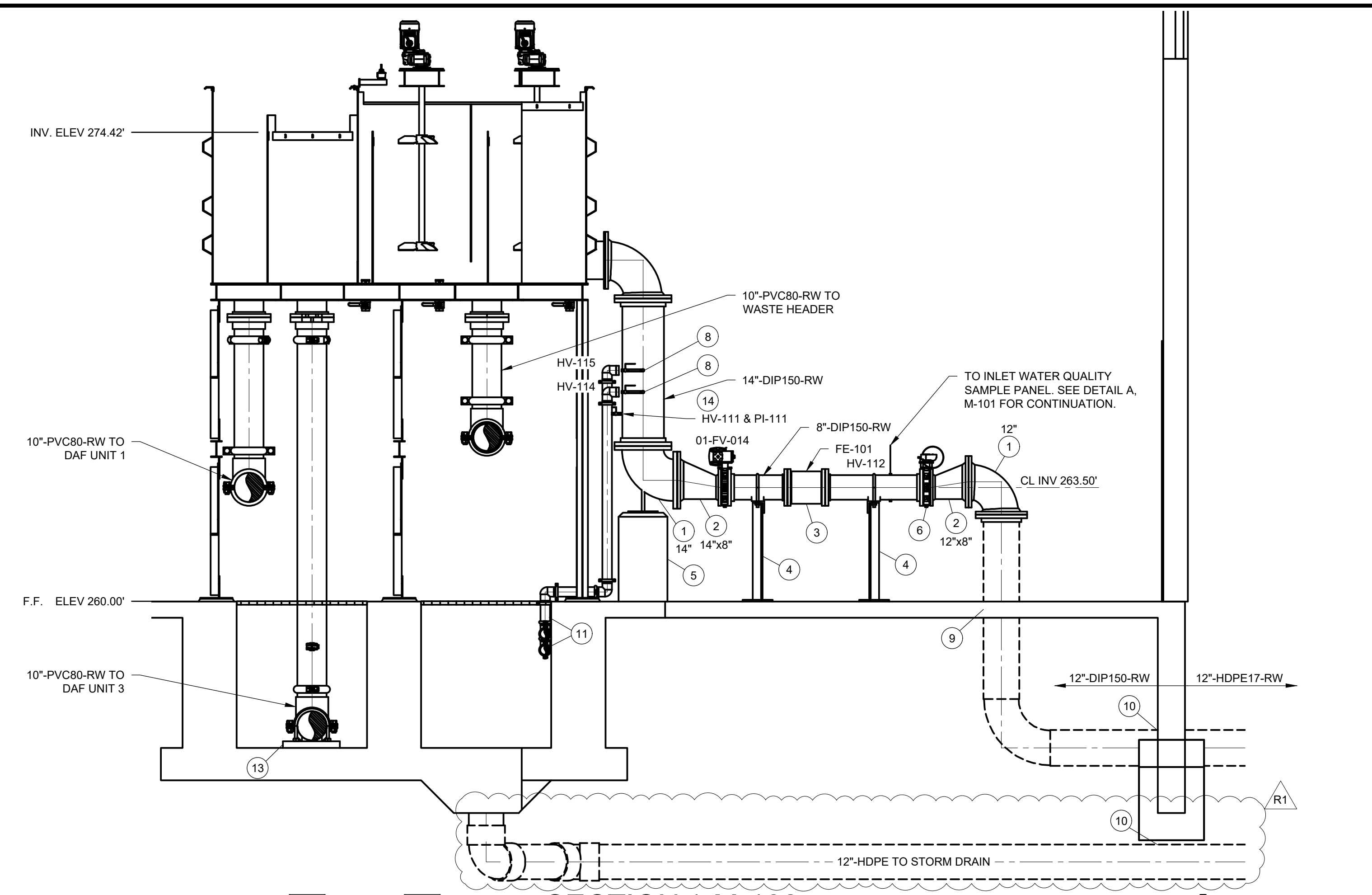
PROJECT 1528.50206.01
DATE 07/28/2023

SHEET
C-302



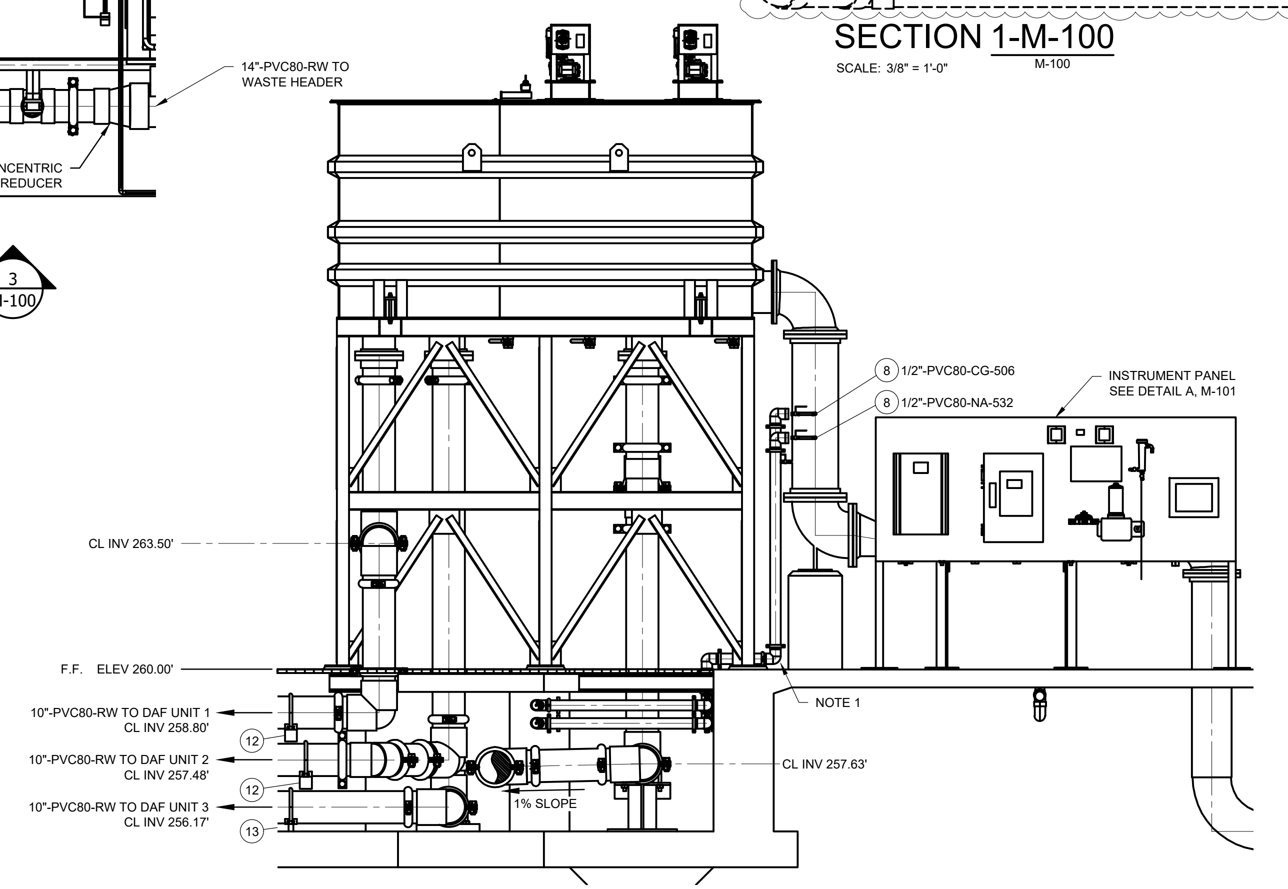
INLET AND RAPID MIX AREA PLAN

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



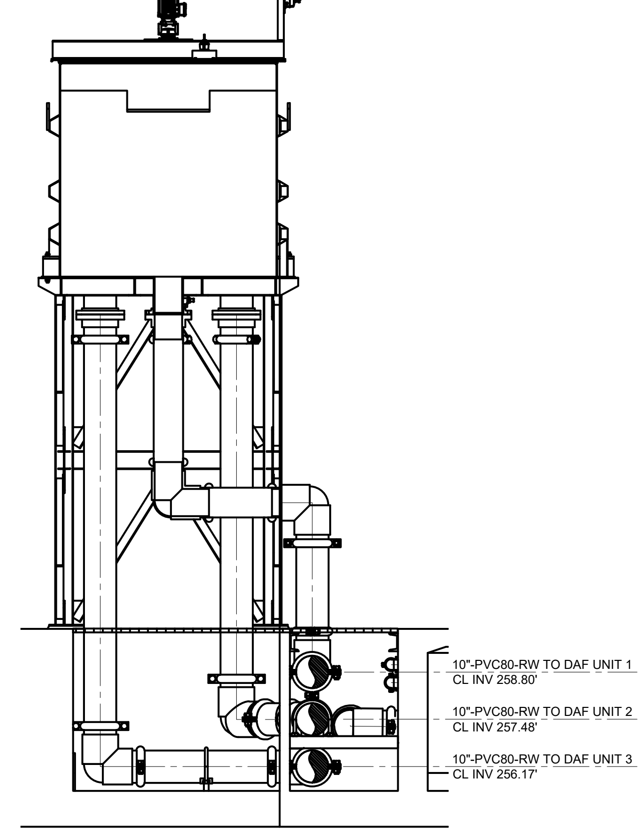
SECTION 1-M-100

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



SECTION 2-M-100

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



SECTION 3-M-100

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

KEYED NOTES:

1. 90° BEND
2. ECCENTRIC REDUCER
3. 8" FLOW METER
4. PIPE SUPPORT PER DETAIL 1, M-901
5. PIPE SUPPORT PER DETAIL 2, M-901
6. 1" BALL VALVE WITH CORP STOP AT PIPE CONNECTION
7. 1/2" SAMPLE PORT WITH 1/2" BALL VALVE WITH CORP STOP AT PIPE CONNECTION
8. INJECTION QUILL
9. PIPE PENETRATION, SEE DETAIL 2, M-904
10. PIPE PENETRATION, SEE DETAIL 1, M-904
11. PIPE SUPPORT PER DETAIL 4, M-901
12. PIPE SUPPORT PER DETAIL 1, M-907
13. PIPE SUPPORT PER DETAIL 2, M-907
14. PRESSURE GAUGE PER DETAIL 1, M-905

GENERAL NOTES:

1. CHEMICAL PIPING ILLUSTRATED SCHEMATICALLY.
2. RAPID MIXER/FLOW DISTRIBUTION CHAMBER STRUCTURE, MIXERS, ELEVATED WALKWAYS, STAIRS AND CONTROL PANELS PROVIDED BY PACKAGED WTP MANUFACTURER. CONTRACTOR TO INSTALL PER MANUFACTURERS INSTRUCTIONS.

BID DOCUMENTS

AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

REVISIONS

REV	DATE	DESCRIPTION	BY
1	07/28/2023	CIVIL COORDINATION	

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

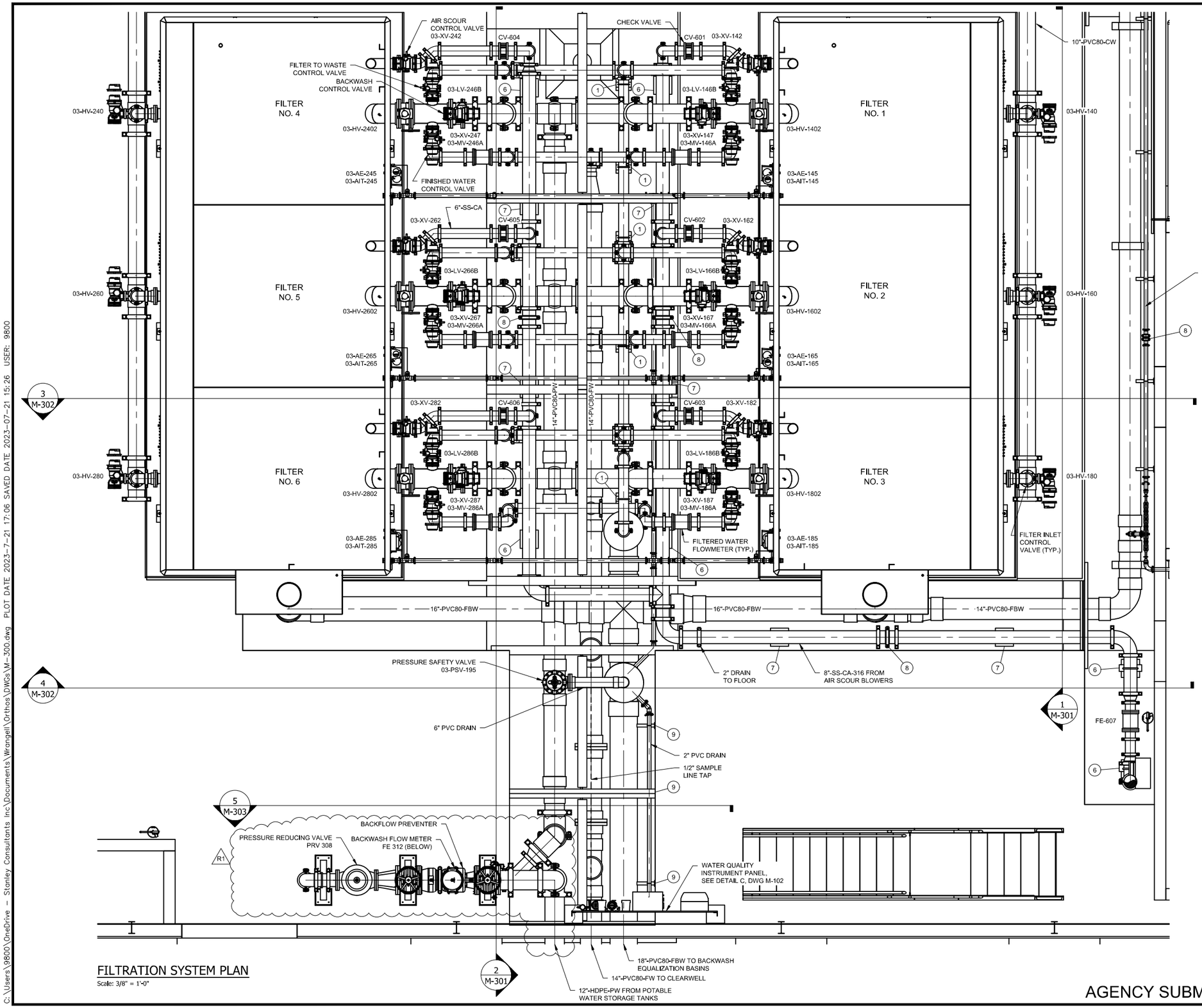
WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

RAPID MIX
PLAN AND SECTIONS

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

PROJECT 1528.50206.01
DATE 5/31/2023

SHEET
M-100



FILTRATION SYSTEM PLAN

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

NORTH

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 INDICATING 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

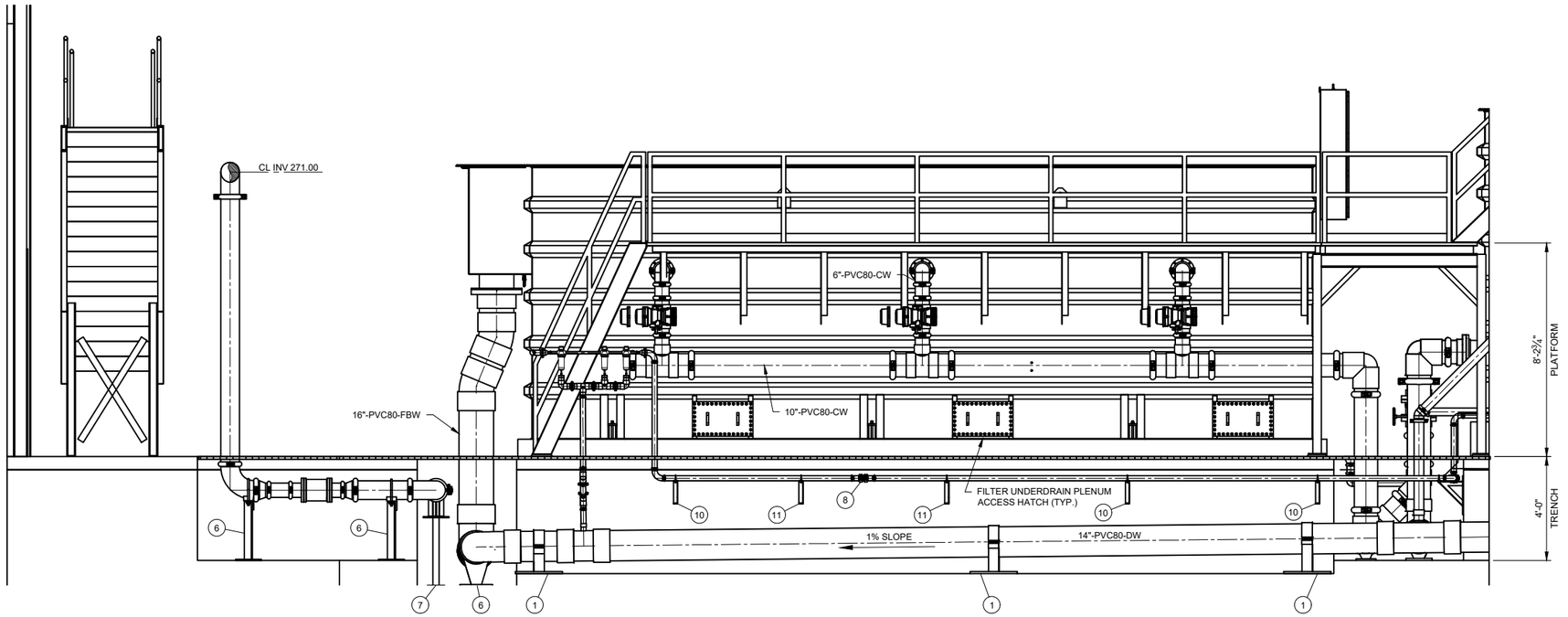
WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

FILTRATION SYSTEM PLAN

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

PROJECT 1528.50206.01
DATE 5/31/2023

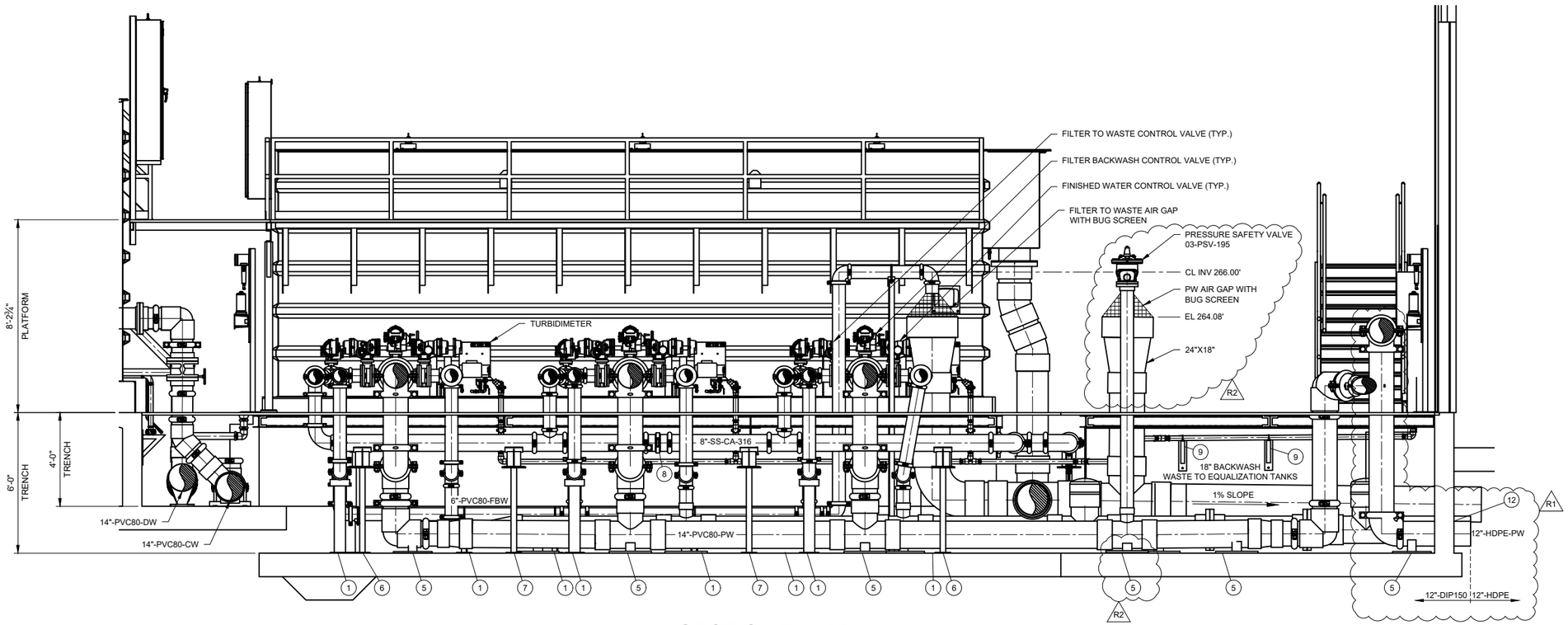
SHEET
M-300



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

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

REVISIONS

REV	DATE	DESCRIPTION	BY
1	7/21/2023	BACKFLOW PREVENTER ADDITION	
2	7/24/2023	PIPELINE HYDRAULICS MODIFICATION	

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WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

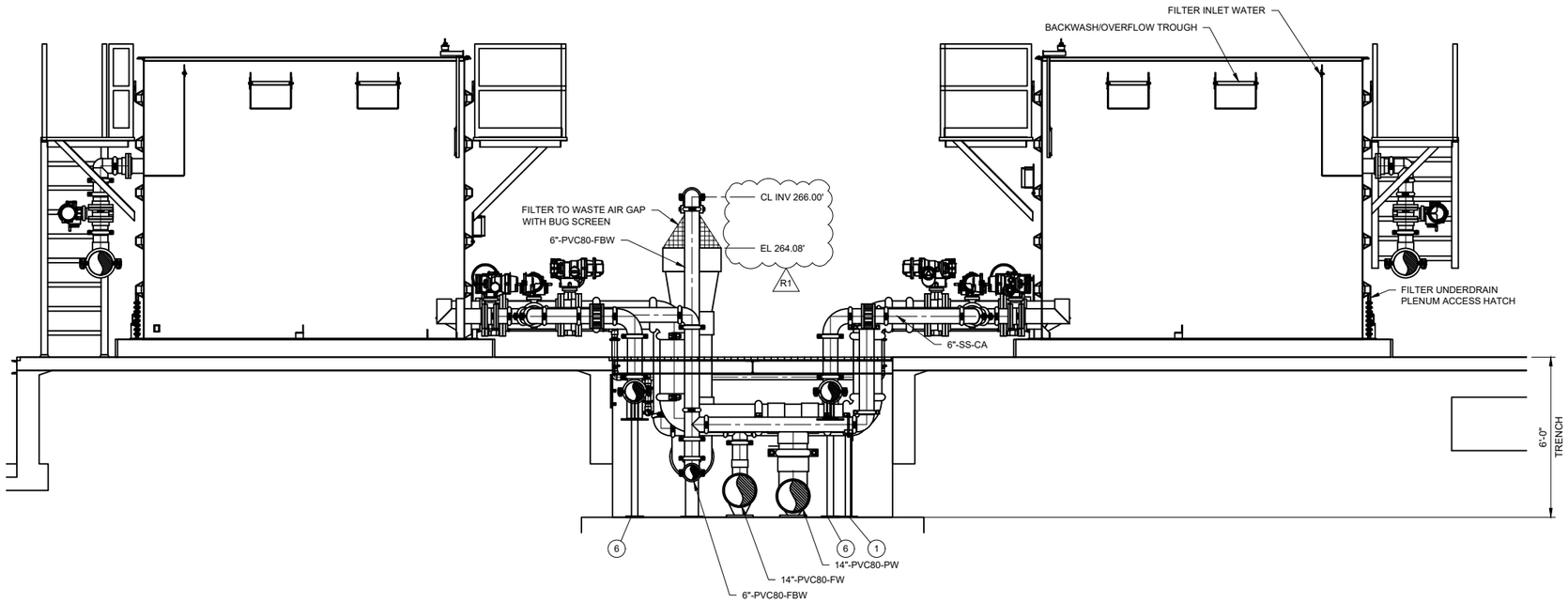
FILTRATION SYSTEM
SECTIONS AND DETAILS

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

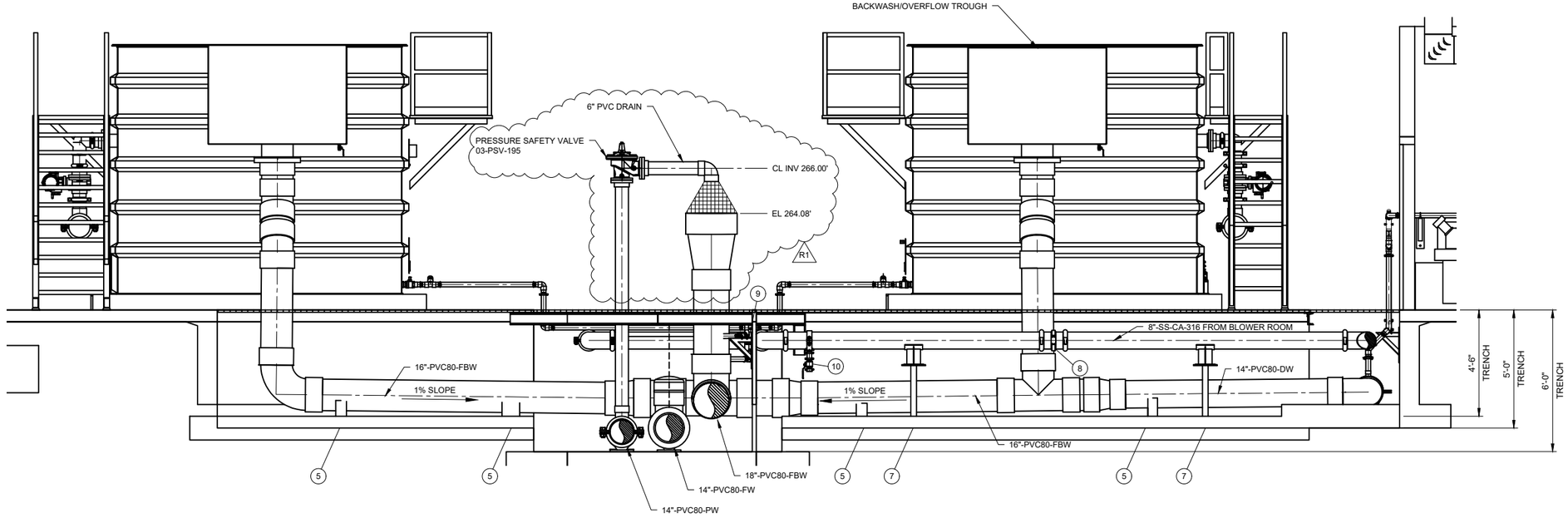
PROJECT 1528.50206.01
DATE 5/31/2023

SHEET

M-301



SECTION 3-M-302
M500
SCALE: 3/8" = 1'-0"



SECTION 4-M-302
M500
SCALE: 3/8" = 1'-0"

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 3, M-901
10. 8" X 2" VIC MECHANICAL-T BOLTED BRANCH WITH 2" DRAIN VALVE

REVISIONS			
REV	DATE	DESCRIPTION	BY
1	7/24/2023	PIPELINE HYDRAULICS MODIFICATION	

Stanley Consultants INC.
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WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

FILTRATION SYSTEM
SECTIONS AND DETAILS

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

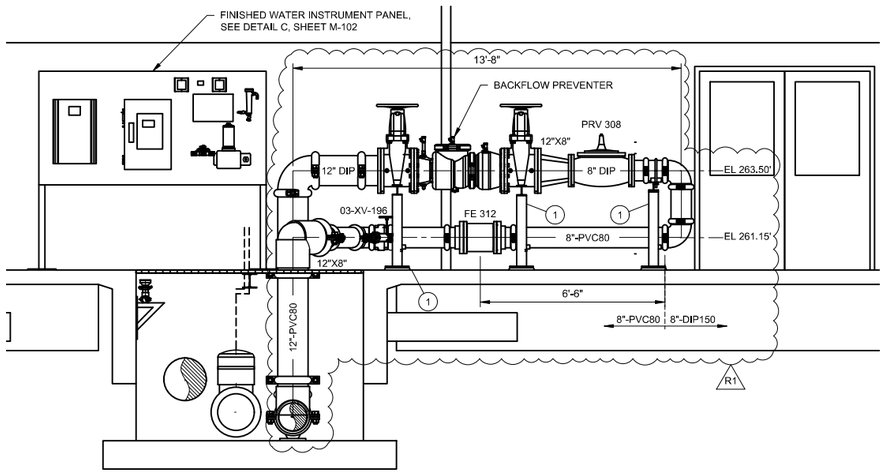
PROJECT 1528.50206.01
DATE 5/31/2023

SHEET
M-302

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	

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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

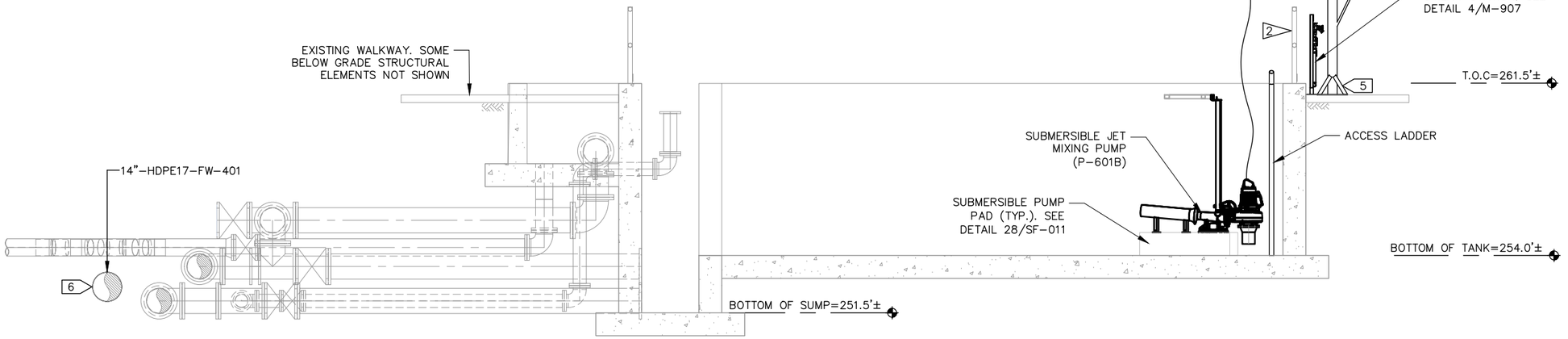
C:\Users\9800\OneDrive - Stanley Consultants Inc\Documents\Wrangell\Orthos\DWGs\M-303.dwg PLOT DATE 2023-7-21 17:04 SAVED DATE 2023-07-21 17:04 USER: 9800

CONSTRUCTION NOTES:

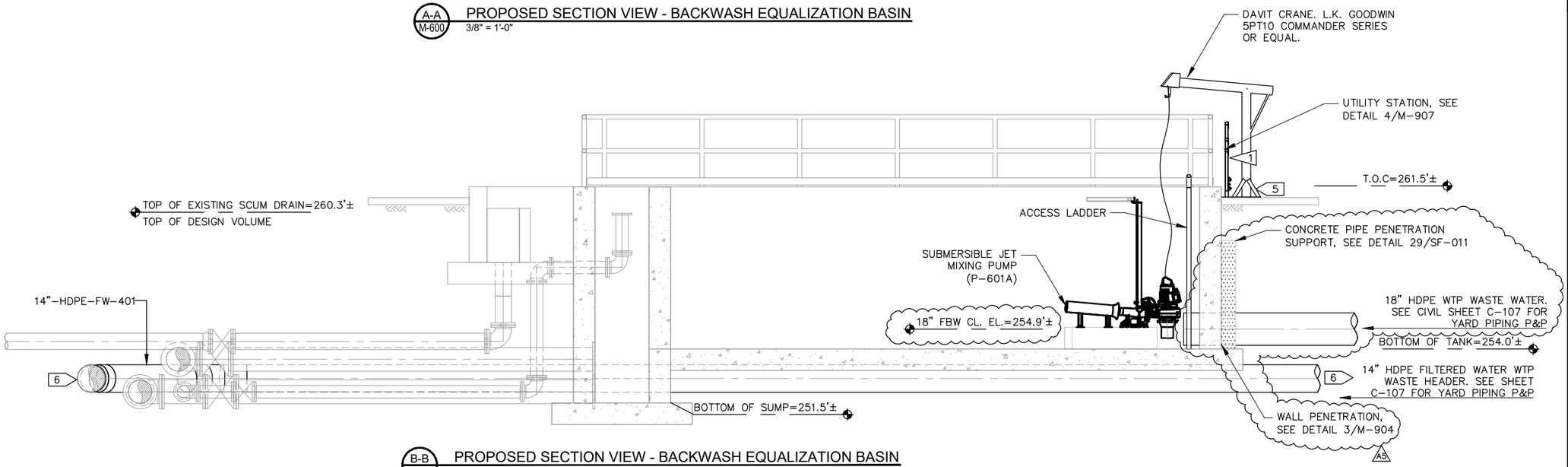
1. ROUTE 1" CU PROCESS WATER LINE FROM PROCESS WATER HEADER BELOW GRADE AND CONNECT TO UTILITY STATION. ABOVE GRADE UTILITY STATION PIPING SHALL BE INSULATED (1" THICKNESS MIN.) AND HEAT TRACED WITH SELF-REGULATING HEAT TRACE (MIN. 5 W/FT).
2. REMOVE SEGMENT OF EXISTING RAILING AND INSTALL LADDER ACCESS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

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

REVISIONS			
REV	DATE	DESCRIPTION	BY
A4	07/15/23	ADDENDUM 4	GP
A5	07/28/23	ADDENDUM 5	GP

STATE OF ALASKA 49TH STEPHAN A. BRADLEY CE-12444 2023-07-28 REGISTERED PROFESSIONAL ENGINEER

WRANGELL GATEWAY TO THE INSIDE PASSAGE ADOPTED AUGUST 1972

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

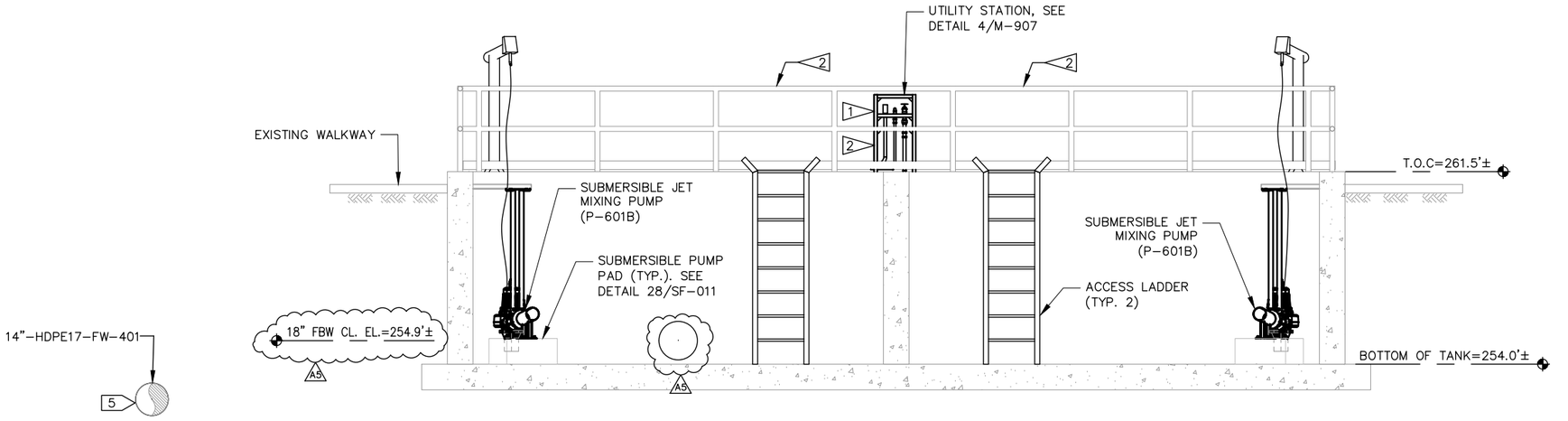
WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

BACKWASH EQ BASIN - SECTIONS

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

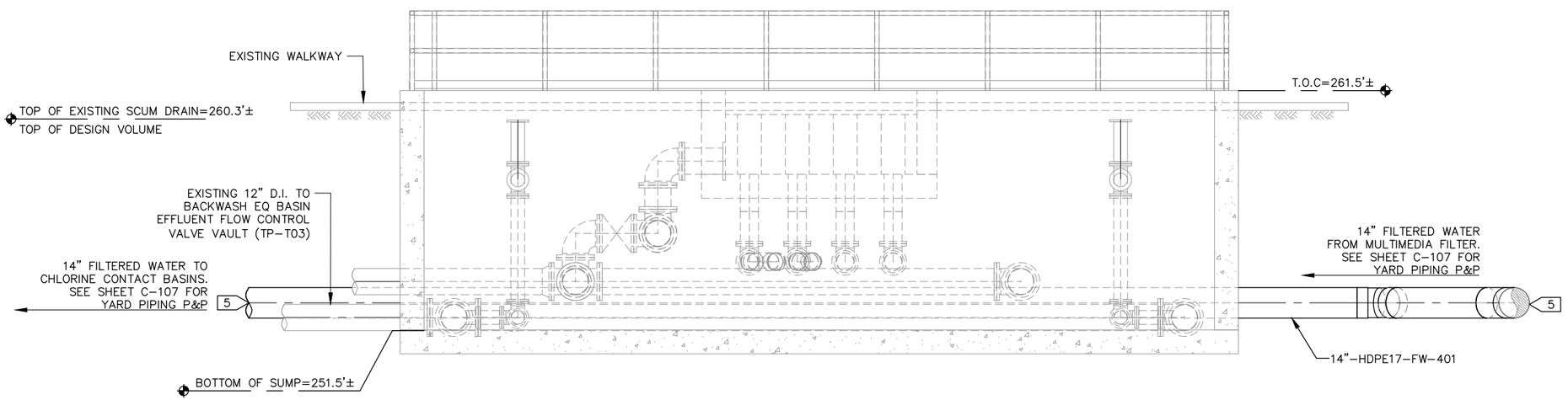
PROJECT 1528.50206.01
DATE 06/02/23

SHEET
M-601



C-C / M-600 PROPOSED SECTION VIEW - BACKWASH EQUALIZATION BASIN

3/8" = 1'-0"



D-D / M-600 PROPOSED SECTION VIEW - BACKWASH EQUALIZATION BASIN

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.
5. SEE CIVIL SHEET C-107 FOR FILTERED WATER PLAN AND PROFILE. ELEVATION MAY VARY.

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.

REVISIONS			
REV	DATE	DESCRIPTION	BY
A5	07/28/23	ADDENDUM 5	GP

STATE OF ALASKA 49TH STATE
STEPHAN A. BRADLEY
CE-12444
2023-07-28
REGISTERED PROFESSIONAL ENGINEER

WRANGELL GATEWAY TO THE INLAND WATERWAY ADOPTED AUGUST 1972

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3535 College Road, #100
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907-374-0275

WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

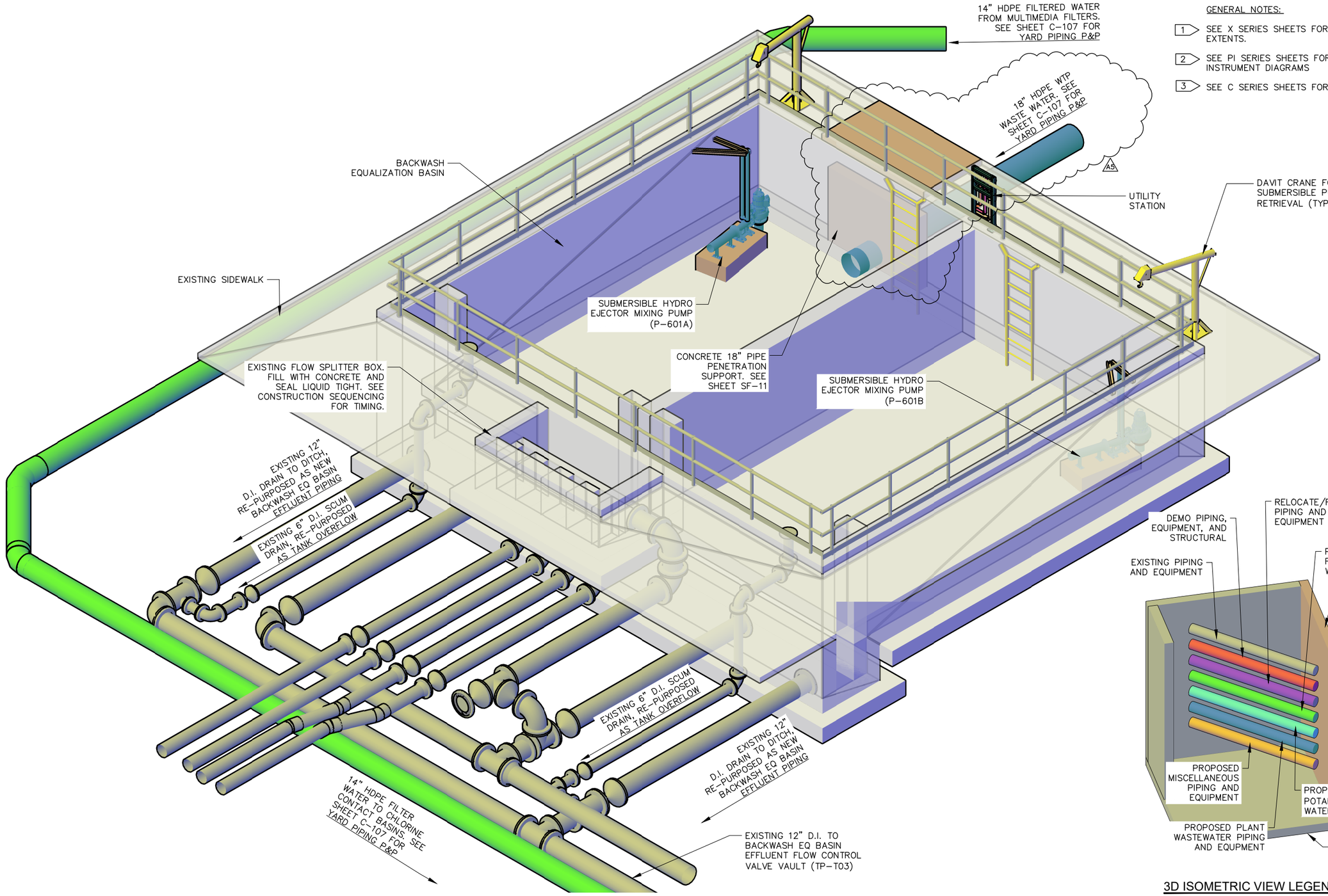
BACKWASH EQ BASIN - SECTIONS

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

PROJECT 1528.50206.01
DATE 06/02/23

SHEET
M-602

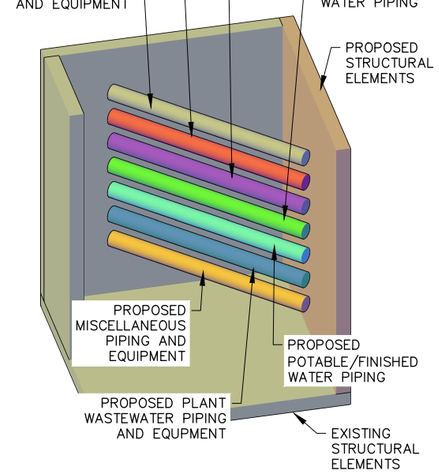
BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION



PROPOSED NW ISOMETRIC VIEW - BACKWASH EQUALIZATION BASIN

GENERAL NOTES:

1. SEE X SERIES SHEETS FOR FINAL DEMOLITION EXTENTS.
2. SEE PI SERIES SHEETS FOR PROCESS AND INSTRUMENT DIAGRAMS
3. SEE C SERIES SHEETS FOR CIVIL DETAILS



3D ISOMETRIC VIEW LEGEND

NOTE: SOME PIPING, EQUIPMENT, AND STRUCTURAL ELEMENTS HIDDDEN OR SHOWN AS TRANSPARENT FOR CLARITY.

BID DOCUMENTS
AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

REVISIONS			
REV	DATE	DESCRIPTION	BY
A5	07/28/23	ADDENDUM 5	GP

STATE OF ALASKA 49TH STEPHAN A. BRADLEY CE-12444 2023-07-28 REGISTERED PROFESSIONAL ENGINEER

WRANGELL COMPREHENSIVE PLAN GATEWAY TO THE INLAND 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

BACKWASH EQ BASIN - 3D ISOMETRIC

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

PROJECT 1528.50206.01
DATE 06/02/23

SHEET
M-603

STRUCTURAL GENERAL NOTES:

1. APPLICABLE SPECIFICATIONS AND CODES
   CONSTRUCTION AND DESIGN SHALL BE IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE (IBC) 2021 EDITION, AND WITH THE LATEST EDITION OF THE APPLICABLE SPECIFICATIONS AND THE REQUIREMENTS NOTED AS FOLLOWS.

2. SPECIAL INSPECTION
   a. SOILS – TABLE 1705.6 OF THE IBC
      i. PERIODIC INSPECTION OF FOUNDATION SOIL BEARING CAPACITY, DEPTH, FILL MATERIALS CLASSIFICATION AND SUBGRADE PREPARATION AND COMPACTION.
      ii. FULL TIME INSPECTI0N OF ENGINEERED FILL PLACEMENT AND COMPACTION.
   b. CONCRETE – TABLE 1705.3 OF THE IBC
      i. PERIODIC INSPECTION OF REINFORCEMENT BEFORE CONCRETE IS PLACED.
      ii. FULL TIME INSPECTION OF ANCHOR RODS AND OTHER EMBEDDED ITEMS AS IDENTIFIED HEREIN.
      iii. FULL TIME INSPECTION DURING PLACEMENT OF CONCRETE INCLUDING THE TAKING OF TEST SPECIMENS, SLUMP AND AIR CONTENT MEASUREMENT. INSPECTION AND TESTING SHALL BE LIMITED TO STRUCTURAL REINFORCED CONCRETE WITH TESTING FREQUENCY IN ACCORDANCE WITH THE PROJECT TECHNICAL SPECIFICATIONS.
   c. STEEL – AISC 360 FOR STRUCTURAL STEEL, IBC SECTION 1705.2 FOR STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL (COLD-FORMED STEEL, REBAR, ETC.)
      i. FULL TIME INSPECTION FOR HIGH-STRENGTH BOLTING FOR SLIP CRITICAL CONNECTIONS PER AISC SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS.
      ii. PERIODIC INSPECTION FOR HIGH STRENGTH BOLTING FOR BEARING TYPE CONNECTIONS PER AISC SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS.
      iii. FULL TIME INSPECTION OF COMPLETE AND PARTIAL PENETRATION GROVE WELDS, MULTI-PASS FILLET WELDS AND SINGLE PASS FILLET WELDS GREATER THAN 5/16" IN ACCORDANCE WITH AWS D1.1.
      iv. PERIODIC INSPECTION OF FRAME JOINT DETAILS FOR COMPLIANCE WITH THE PLANS AND SPECIFICATIONS.

3. DESIGN LOADS
   a. DESIGN LOADS AND LOAD APPLICATIONS SHALL BE IN ACCORDANCE WITH IBC.
   b. UNIFORM FLOOR LIVE LOADS
      i. ALL FLOOR AREAS, UNLESS OTHERWISE INDICATED — 125 PSF
   c. ROOF LOADS
      i. MINIMUM ROOF SNOW LOAD — 55 PSF
      ii. DRIFT SURCHARGE LOADS IN ACCORDANCE WITH ASCE 7
         (a) BASIC GROUND SNOW LOAD — 60 PSF
         (b) IMPORTANCE FACTOR — I = 1.10
   d. WIND LOADS IN ACCORDANCE WITH CHAPTER 26 OF ASCE 7
      i. OCCUPANCY OR RISK CATEGORY — III
      ii. BASIC WIND SPEED (3-SEC GUST) — 147 MPH
      iii. EXPOSURE CATEGORY — D
   e. SEISMIC LOADS
      i. IMPORTANCE FACTOR — I= 1.25
      ii. MAPPED SPECTRAL RESPONSE S_S — 0.249
      iii. MAPPED SPECTRAL RESPONSE S_1 — 0.255
      iv. SITE CLASS — C
      v. SPECTRAL RESPONSE COEFFICIENT S_{DS} — 0.216
      vi. SPECTRAL RESPONSE COEFFICIENT S_{D1} — 0.255
      vii. SEISMIC DESIGN CATEGORY — D
   f. SPECIAL LOADS
      i. MECHANICAL EQUIPMENT LOADS — ACTUAL OPERATING LOADS
   g. ADDITIONAL LOADS REFERENCED ON THE DRAWINGS.

4. CONSTRUCTION LOADS
   STRUCTURES HAVE BEEN DESIGNED FOR DEAD LOADS AND THE DESIGN LOADS NOTED ABOVE. PROVIDE TEMPORARY BRACING, SHORING OR OTHER SUPPLEMENTAL SUPPORT DURING CONSTRUCTION AS NECESSARY TO PROTECT THE STRUCTURES FROM EXCESSIVE CONSTRUCTION LOADS.

5. FOUNDATIONS
   a. FOUNDATION DESIGN CRITERIA
      i. MAXIMUM ALLOWABLE SOIL BEARING PRESSURE - 5,000 PSF
      ii. LATERAL SOIL PRESSURE — 60 PCF EQUIVALENT FLUID PRESSURE (AT-REST)
      iii. DESIGN FROST DEPTH BELOW EXTERIOR GRADE - 2 FEET FOR WARM BUILDINGS AND 3 FEET FOR COLD STORAGE
   b. AVOID EXCESSIVE WETTING OR DRYING OF THE FOUNDATION EXCAVATIONS DURING CONSTRUCTION.

6. CONCRETE
   a. CONCRETE CONSTRUCTION SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318).
   b. DETAILING, FABRICATION AND PLACEMENT OF REINFORCEMENT SHALL CONFORM TO DETAILS AND DETAILING OF CONCRETE REINFORCEMENT (ACI 315).
   c. MATERIALS
      i. CONCRETE
         (a) STRUCTURAL CAST - IN - PLACE — f'c = 4,000 PSI
         (b) EXTERIOR WALKS, CURBS, RAMPS — f'c = 4,000 PSI
      ii. REINFORCING MATERIALS
         (a) REINFORCING BARS — ASTM A615, GRADE 60
         (b) WELDED WIRE FABRIC — ASTM A185, FURNISH IN SHEETS ONLY
      iii. POST-INSTALLED ANCHOR OR REBAR DOWEL ADHESIVE
         (a) HILTI HIT HY-200 OR HIT-RE 500 V3
   d. ALL BENT REINFORCING BARS SHALL BE SHOP FABRICATED ONLY. REBENDING OR WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED UNLESS AUTHORIZED BY ENGINEER.
   e. END HOOKS IN REINFORCING BARS, SHOWN ON THE DRAWINGS BUT NOT DIMENSIONED, SHALL CONFORM TO ACI 318.
   f. CONCRETE COVER OVER REINFORCEMENT SHALL BE 2" CLEAR, EXCEPT FOR THE FOLLOWING, UNLESS OTHERWISE NOTED.
      i. CONCRETE PLACED AGAINST AND PERMANENTLY IN CONTACT WITH EARTH — 3" CLEAR
      ii. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH EARTH OR WATER
         (a) BEAMS, COLUMNS — 1 ½" CLEAR
         (b) WALLS — 1 ½" CLEAR
   g. REINFORCEMENT SPLICES NOT PERMITTED EXCEPT AS DETAILED OR AUTHORIZED BY THE ENGINEER. LAP REINFORCING BARS THE FOLLOWING MINIMUMS AT ALL SPLICES, CORNERS AND INTERSECTIONS, UNLESS OTHERWISE INDICATED. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF CONCRETE CAST BELOW THE BAR.

BAR SIZE	REG BARS	TOP BARS
#3	1'-3"	1'-7"
#4	1'-9"	2'-3"
#5	2'-0"	2'-9"
#6	2'-5"	3'-3"
#7	3'-6"	4'-9"
#8	4'-0"	5'-2"
#9	4'-6"	5'-10"
#10	5'-1"	6'-7"

   h. LAP WELDED WIRE FABRIC ONE FULL MESH AT SPLICES.
   i. STAGGER ADJACENT REINFORCEMENT LAP SPLICES IN WALLS 18" MINIMUM.
   j. PROVIDE BAR SUPPORTS TO PROPERLY SECURE AND SUPPORT REINFORCING BARS AND WELDED WIRE FABRIC AT POSITIONS SHOWN ON THE DRAWINGS. IN ADDITION TO NORMAL ACCESSORIES PROVIDE #5 STANDEES AT 36" O.C. TO SUPPORT TOP REINFORCEMENT IN BASE SLABS, AND #3 U OR Z SHAPE SPACERS AT 72" O.C. EACH WAY IN WALLS WITH TWO CURTAINS OF REINFORCEMENT.
   k. DOWELS, PIPES AND OTHER INSTALLED MATERIALS AND ACCESSORIES SHALL BE HELD SECURELY IN POSITION DURING CONCRETE PLACEMENT.
   l. REINFORCING BARS AND ACCESSORIES SHALL NOT BE IN CONTACT WITH ANY PIPE, PIPE FLANGE OR METAL PART EMBEDDED IN CONCRETE. PROVIDE 2" CLEARANCE IN ALL CASES UNLESS OTHERWISE INDICATED. NO EMBEDDED ITEM SHALL BE SUSPENDED FROM, SUPPORTED BY, OR BRACED IN PLACE FROM THE STRUCTURAL REINFORCEMENT.
   m. LOCATE CONSTRUCTION JOINTS WHERE SHOWN ON THE DRAWINGS OR AS AUTHORIZED BY THE ENGINEER. SLABS, JOISTS AND BEAMS SHALL NOT HAVE JOINTS IN A HORIZONTAL PLANE EXCEPT WHERE DETAILED ON DRAWINGS.
   n. THOROUGHLY CLEAN BY MECHANICAL SCARIFICATION ALL KEYWAYS AND CONSTRUCTION JOINTS PRIOR TO PLACING CONCRETE IN ADJACENT POUR.
   o. PROTECT ALL PROJECTING WATERSTOPS FROM DAMAGE AND EXPOSURE DURING CONSTRUCTION. FIRMLY TIE ALL ENDS AND EDGES OF WATERSTOPS AT 18" MAXIMUM TO PREVENT MOVEMENT DURING CONCRETE PLACEMENT.
   p. BEGIN SPACING OF BARS WHICH PARALLEL CONSTRUCTION AND EXPANSION JOINTS 2" CLEAR EACH SIDE OF JOINT.
   q. UNLESS OTHERWISE SHOWN, PLACE 2-#5 (1 EACH FACE) WITH 2'-0" PROJECTIONS AROUND ALL OPENINGS IN CONCRETE WALLS OR SLABS.
   r. PROVIDE AN ADDITIONAL 500 LINEAL FEET EACH OF #4 AND #5 REINFORCING BARS FOR USE AS DIRECTED DURING CONSTRUCTION.
   s. CHAMFER ALL EXPOSED CONCRETE EDGES ¾", UNLESS OTHERWISE INDICATED.

7. SLABS ON GRADE
   a. SLAB ON GRADE CONTROL JOINTS ARE DENOTED "CJ" ON DRAWINGS. SLAB ON GRADE CONSTRUCTION JOINTS ARE DENOTED "CONST JT." AT CONTRACTOR'S OPTION CONSTRUCTION JOINTS MAY BE SUBSTITUTED FOR CONTROL JOINTS.
   b. LOCATE WELDED WIRE FABRIC 1 ½" CLEAR FROM TOP OF SLAB.
   c. PROVIDE 1-#4 X 4'-0" PARALLEL TO EDGE OF SLAB OPPOSITE THE END OF ALL DISCONTINUED SLAB JOINTS, AND 1-#4 X 4'-0" DIAGONAL BAR AT ALL REENTRANT CORNERS. PLACE BARS MID-DEPTH IN SLAB AND 2" CLEAR FROM EDGE OR CORNER.
   d. SLOPE BOTTOM SURFACE OF SLABS AS NECESSARY TO MAINTAIN MINIMUM THICKNESS NOTED ON DRAWINGS FOR ALL SLABS WITH SLOPING TOP SURFACE OR DEPRESSION FOR TILE.

8. STRUCTURAL STEEL
   a. STRUCTURAL STEEL CONSTRUCTION SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL BUILDINGS.
   b. MATERIAL
      i. STRUCTURAL STEEL W-SHAPES — ASTM A992, GRADE 50
      ii. STRUCTURAL STEEL PLATES, BARS, ANGLES, AND CHANNELS — ASTM A36
      iii. HOLLOW STRUCTURAL STEEL — ASTM A500, GRADE B
      iv. STEEL PIPE — ASTM A53, GRADE B
      v. HIGH – STRENGTH BOLTS — ASTM F3125, GRADE A325
      vi. ANCHOR RODS — ASTM F1554
      vii. HEADED ANCHOR STUDS (HAS) — ASTM A108, TYPE B
   c. ALL STRUCTURAL STEEL BOLTED CONNECTIONS SHALL BE SNUG-TIGHTENED, ¾" DIAMETER A325 – N BOLTS WITH STANDARD HOLES, UNLESS OTHERWISE NOTED.
   d. ALL WELDING SHALL CONFORM TO AMERICAN WELDING SOCIETY STRUCTURAL WELDING CODE – STEEL (AWS D1.1) AND SHALL BE PERFORMED BY WELDERS QUALIFIED BY THE APPROPRIATE AWS TEST FOR THE WELDING PERFORMED.

9. EQUIPMENT INSTALLATION
   a. ALL OPENINGS SHOWN SHALL BE VERIFIED, AND ALL STRUCTURAL DIMENSIONS AND DETAILS PERTAINING TO EQUIPMENT INSTALLATION SHALL BE COORDINATED BY THE CONTRACTOR WITH THE ACTUAL EQUIPMENT FURNISHED.
   b. EQUIPMENT SUPPORTS, ANCHORAGES AND OPENINGS NOT SHOWN ON THE STRUCTURAL DRAWINGS, BUT REQUIRED BY OTHER CONTRACT DRAWINGS, SHALL BE PROVIDED PRIOR TO PLACING CONCRETE.

10. ARCHITECTURAL ELEVATION 100'-0" = CIVIL ELEVATION 260.00' FOR THE NEW FILTER BUILDING. THE ELEVATIONS SHOWN AT THE PIPE GALLERY ADDITION ARE BASED ON EXISTING PLAN ELEVATIONS LISTED IN THE RECORD DRAWINGS FOR THAT STRUCTURE.

SIEVE SIZE	PERCENT FINER	SIEVE SIZE	PERCENT FINER
3"	100*	1"	100%
1 1/2"	70-100	3/4"	90% TO 100%
3/4"	30-100	3/8"	20% TO 55%
1/2"	25-100	#4	0% TO 10%
NO. 4	20-49	#8	0% TO 5%
NO. 40	0-25		
NO. 200	0-6		
0.02mm	0-3		

STRUCTURAL FILL GRADATION
CRUSHED STONE

DRAIN GRAVEL GRADATION
CRUSHED STONE

REV	DATE	DESCRIPTION	BY
1	6/30/2023	ADDENDUM 2	MJM

REVISIONS

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WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

STRUCTURAL FOUNDATION NOTES

PROJECT 1528.50206.01
DATE 05/02/2023

SHEET
SF-001

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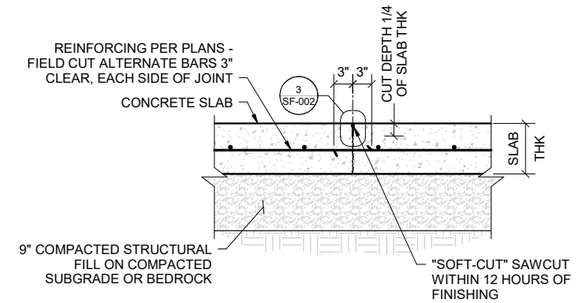
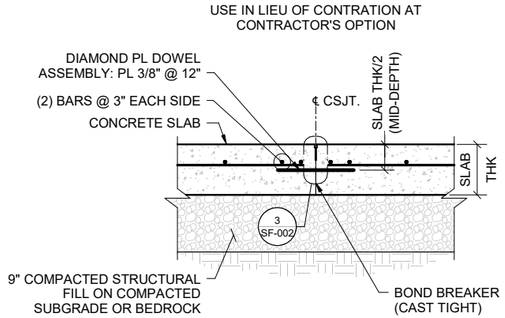
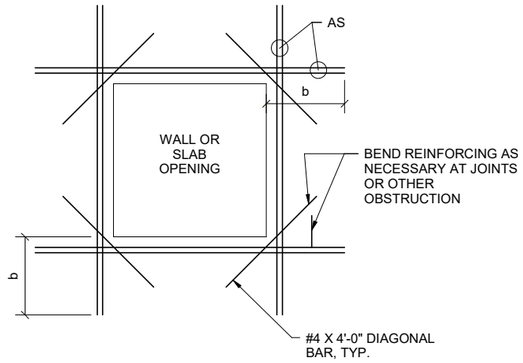


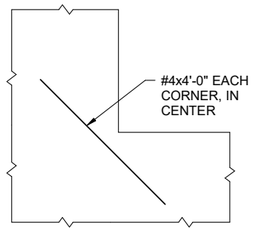
1 SF-002 **DETAIL**
SLAB ON GRADE CONTRACTION JOINT



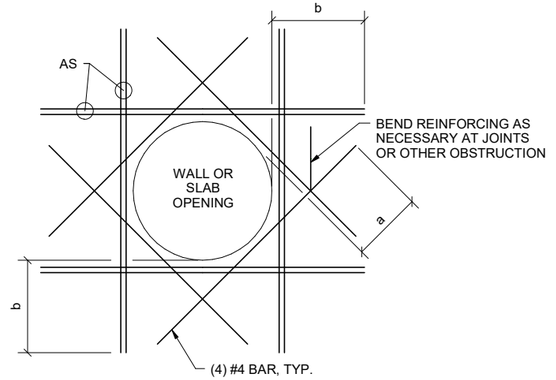
2 SF-002 **DETAIL**
CONSTRUCTION JOINT



RECTANGULAR OPENINGS



ISOLATED RE-ENTRANT CORNERS

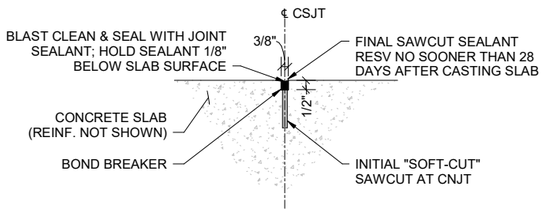


CIRCULAR OPENINGS

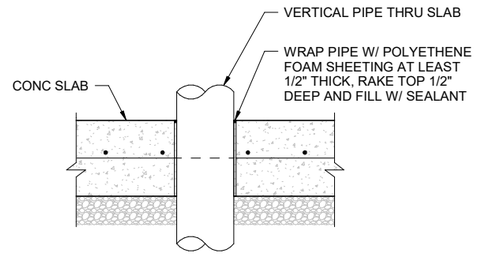
NOTES:

1. 'AS' = ADDITIONAL BARS EQUAL IN TOTAL NUMBER TO REGULAR REINFORCEMENT CUT BY THE OPENING. PLACE ONE-HALF TOTAL BARS TO EACH SIDE OF OPENING & IN THE SAME TRANSVERSE POSITION AS THE REGULAR REINFORCEMENT.
2. 'AS' BAR SIZE TO BE SAME AS REGULAR REINFORCEMENT IN EACH DIRECTION.
3. THIS DETAIL APPLIES UNLESS ADDITIONAL REINFORCEMENT SPECIFICALLY INDICATED AT OPENINGS ON DRAWINGS.
4. ADDITIONAL BARS TO PLACED AT OF WALL OR SLAB WHERE ONE LAYER OF REINFORCING IS PROVIDED AND AT EACH FACE WHERE TWO LAYERS OF REINFORCING ARE PROVIDED.
5. ADDITIONAL HORIZONTAL AND VERTICAL BARS ARE NOT NECESSARY FOR HOLES 8 TO 11 INCHES. USE ONLY THE DIAGONAL BARS. FOR HOLES SMALLER THAN 8 INCHES DO NOT CUT BARS, SPREAD NORMAL REINFORCING AROUND HOLE (NO DIAGONALS NEEDED).

BAR SIZE	a	b
#4	18"	24"
#5	24"	30"
#6	30"	36"
#7	42"	54"
#8	48"	62"
#9	54"	70"
#10	61"	79"



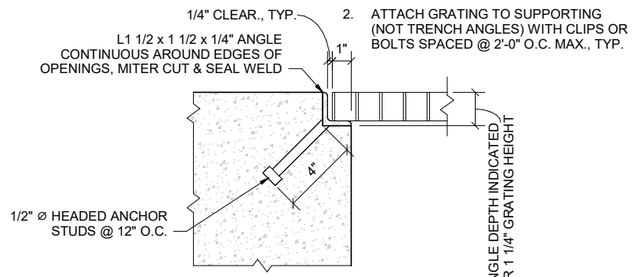
3 SF-002 **DETAIL**
ENLARGED SLAB JOINT



4 SF-002 **DETAIL**
PIPE PENETRATION THRU SLAB

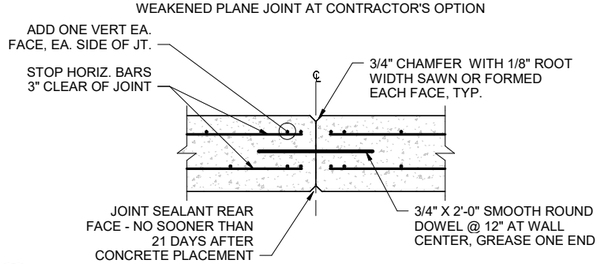
NOTES:

1. TOP OF GRATING TO MATCH TOP OF ADJACENT CONCRETE.
2. ATTACH GRATING TO SUPPORTING (NOT TRENCH ANGLES) WITH CLIPS OR BOLTS SPACED @ 2'-0" O.C. MAX., TYP.



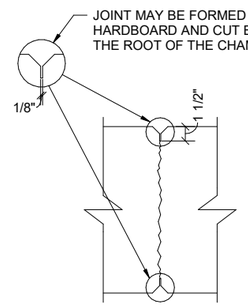
6 SF-002 **DETAIL**
GRATING - HEADED ANCHOR STUDS

WALL CONSTRUCTION JOINT MAY BE PLACED IN LIEU OF A WEAKENED PLANE JOINT AT CONTRACTOR'S OPTION

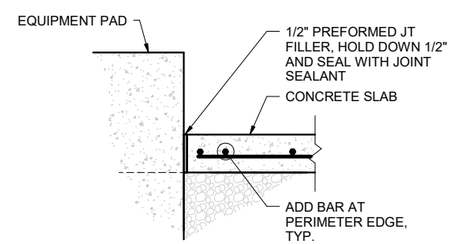


10 SF-002 **SECTION**
CONCRETE WALL CONSTRUCTION JOINT

WALL CONTRACTION JOINT SPACING IS 15' MAX

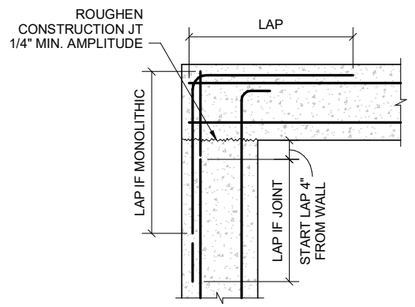


7 SF-002 **SECTION**
CONCRETE WALL CONTRACTION JOINT - WEAKENED PLANE JOINT

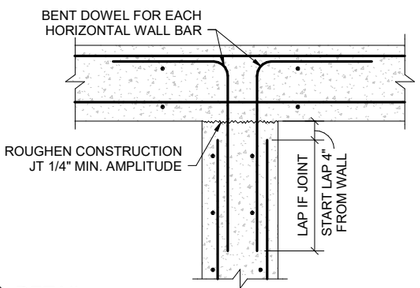


11 SF-002 **SECTION**
SLAB ISOLATION JOINT

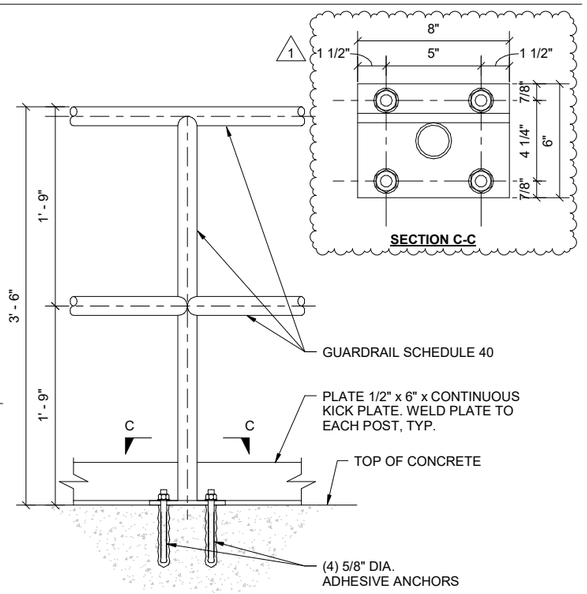
5 SF-002 **DETAIL**
TYPICAL ADDITIONAL REINFORCEMENT AT OPENINGS



8 SF-002 **DETAIL**
TYP. CONCRETE WALL CORNER



9 SF-002 **DETAIL**
CONSTRUCTION JOINT AT TEE INTERSECTION



ELEVATION

GUARDRAIL TOP MOUNTED TO CONCRETE FLOOR

12 SF-002 **SECTION**
TYPICAL GUARDRAIL - STEEL TO CONCRETE

REV	DATE	REVISIONS DESCRIPTION	BY
1	7/27/2023	ADDENDUM 5	MJM

STATE OF ALASKA 49TH
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WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

STANDARD CONCRETE DETAILS

PROJECT 1528.50206.01
DATE 05/02/2023

SHEET
SF-002

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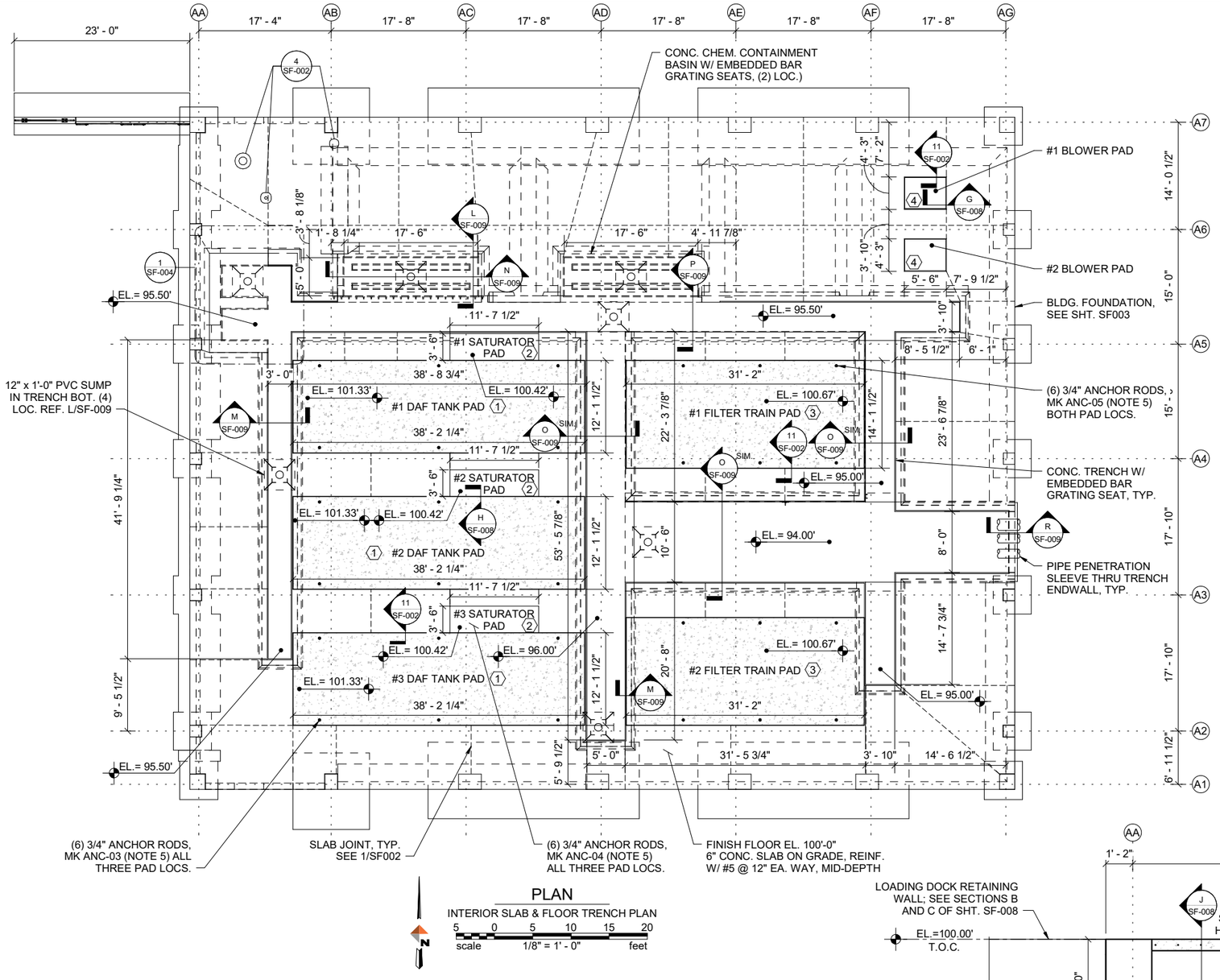


PLAN

INTERIOR SLAB & FLOOR TRENCH PLAN

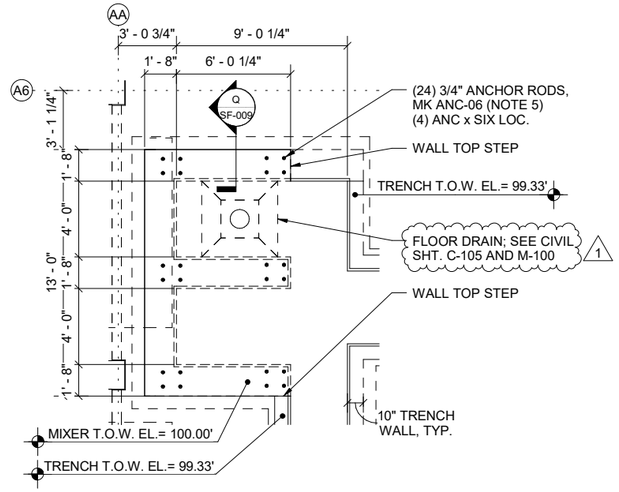
scale 1/8" = 1' - 0" (5 0 5 10 15 20 feet)

NOTES:

1. SEE SHEET SF001 FOR STRUCTURAL GENERAL NOTES.
2. SEE SHEET SF003 FOR THE BUILDING FOUNDATION.
3. NO UNDERGROUND UTILITY INFORMATION IS SHOWN HERE, SEE PROCESS MECHANICAL PIPING AND BUILDING PLUMBING DRAWINGS.
4. NO ELECTRICAL GROUNDING IS SHOWN HERE, SEE ELECTRICAL DRAWINGS.
5. SEE AWC EQUIPMENT DRAWINGS FOR EQUIPMENT LOCATION AND ANCHOR ROD LAYOUT.
6. PLAN SIZE AND T.O.C. ELEVATION OF CONCRETE PADS SUPPORTING EQUIPMENT ARE BASED ON AWC EQUIPMENT DRAWINGS. CAST CONCRETE PADS BEFORE BUILDING SLAB.
7. CMU WALL REINFORCING DOWELS ARE NOT SHOWN IN PLAN, REFER TO CONCRETE SECTIONS & DETAILS.

LEGEND:

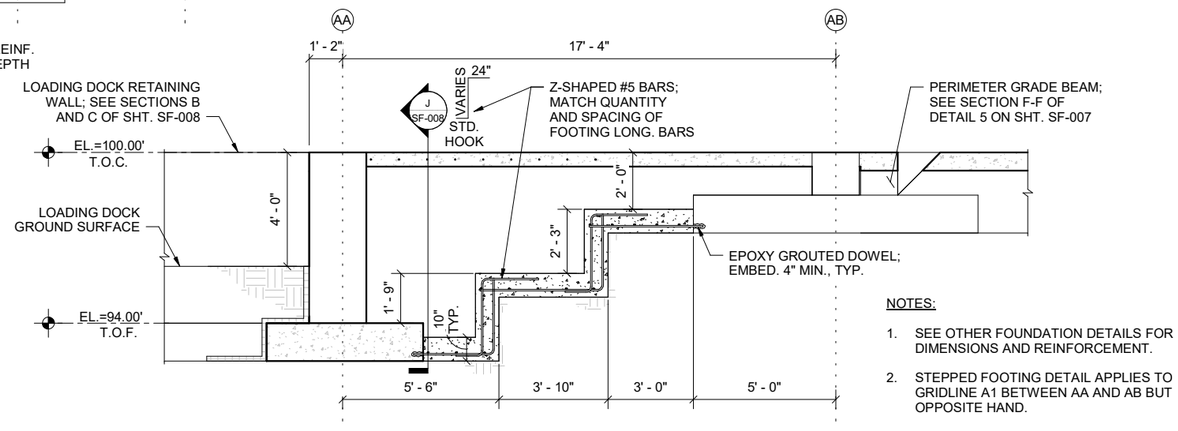
1. DAF TANK PAD, (3) LOCATIONS T.O.C. EL. 101'-4", 22" THICK
2. SATURATOR PAD, (3) LOCATIONS T.O.C. EL. 100'-5", 11" THICK
3. FILTER TRAIN PAD, (2) LOCATIONS T.O.C. EL. 100'-8", 14" THICK
4. BLOWER PAD, (2) LOCATIONS T.O.C. EL. 100'-6", 18" THICK



1 SF-004 PARTIAL PLAN DETAIL

MIXER AREA TRENCH

scale 1/4" = 1' - 0" (2 0 2 4 6 8 10 feet)



ELEVATION

STEPPED FOOTING DETAIL ON GRIDLINE A7

scale 1/2" = 1' - 0" (1 0 1 2 3 4 5 feet)

NOTES:

1. SEE OTHER FOUNDATION DETAILS FOR DIMENSIONS AND REINFORCEMENT.
2. STEPPED FOOTING DETAIL APPLIES TO GRIDLINE A1 BETWEEN AA AND AB BUT OPPOSITE HAND.

BID DOCUMENTS AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

REV	DATE	REVISIONS DESCRIPTION	BY
1	7/27/2023	ADDENDUM 5	MJM

STATE OF ALASKA 49TH — MATTHEW J. METTLER — SE 13920 — 06-01-2023 — PROFESSIONAL STRUCTURAL ENGINEER

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WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

BUILDING FLOOR TRENCH AND SLAB PLAN

PROJECT 1528.50206.01
DATE 05/02/2023

SHEET
SF-004

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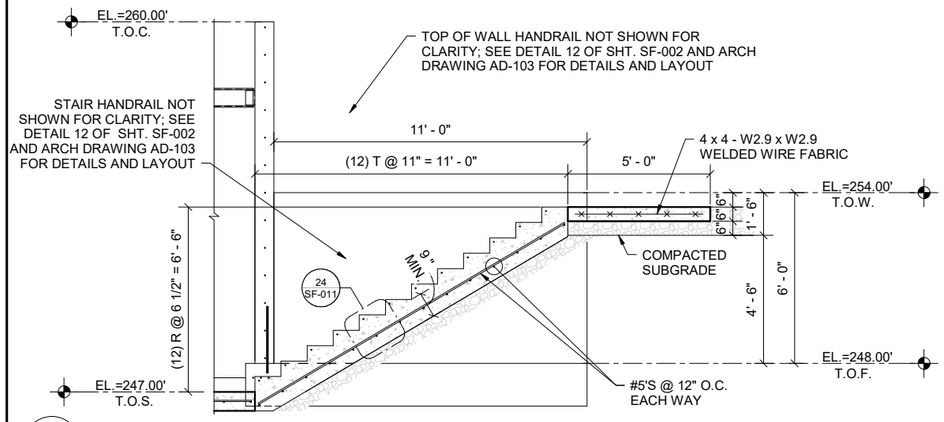
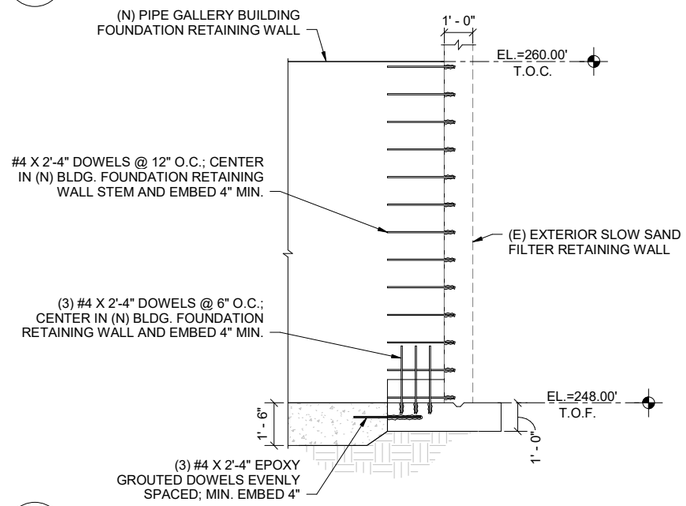


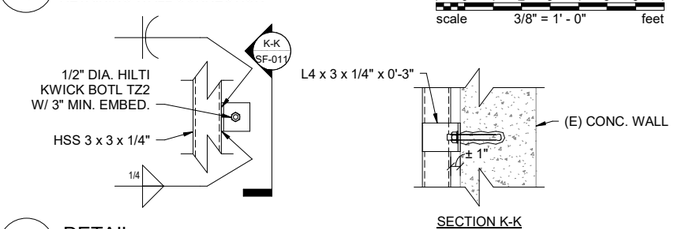
V SF-011 **SECTION**
RETAINING WALL ELEVATION & STAIRS

scale 3/8" = 1' - 0" feet

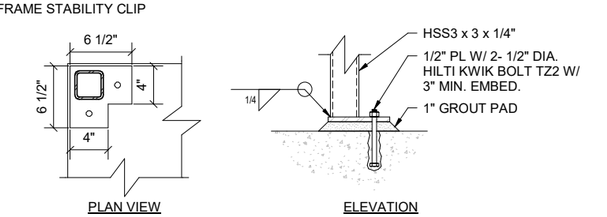


W SF-011 **SECTION**
RETAINING WALL CONNECTION

scale 3/8" = 1' - 0" feet

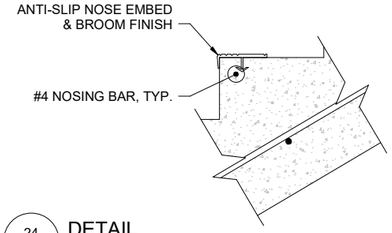


22 SF-011 **DETAIL**
FRAME STABILITY CLIP

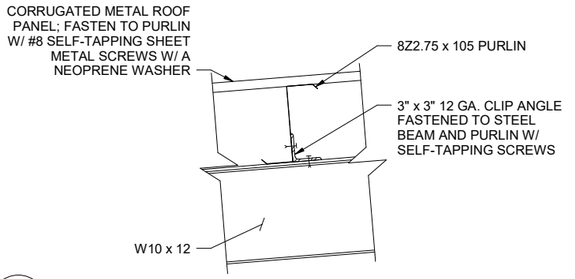


23 SF-011 **DETAIL**
BASE PLATE FOR HSS 3x3 COLUMNS

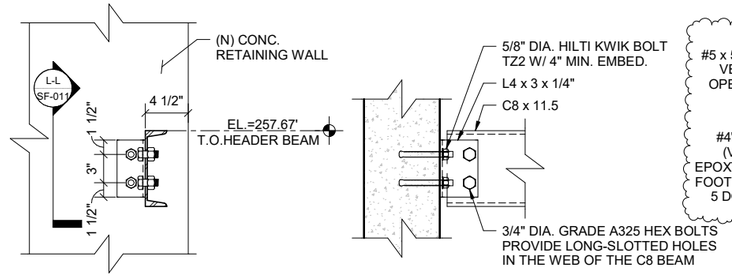
scale 1-1/2" = 1' - 0" feet



24 SF-011 **DETAIL**
NOSING DETAIL

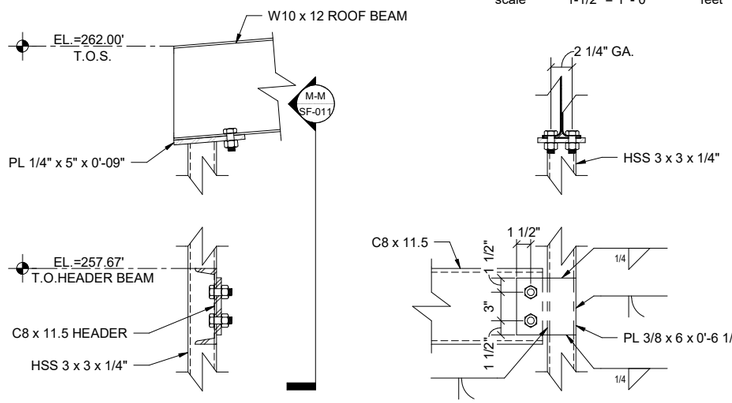


25 SF-011 **DETAIL**
ROOF PURLIN TO STEEL BEAM AND METAL BUILDING WALL CONNECTION



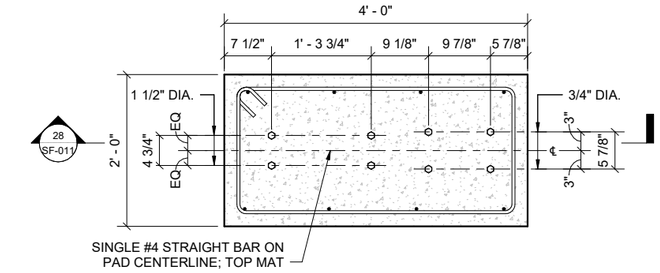
26 SF-011 **DETAIL**
HEADER BEAM TO WALL CONNECTION

scale 1-1/2" = 1' - 0" feet

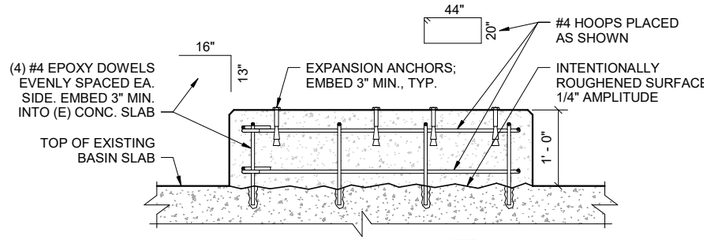


27 SF-011 **DETAIL**
HEADER & ROOF BEAM CONNECTION

scale 1-1/2" = 1' - 0" feet



PLAN



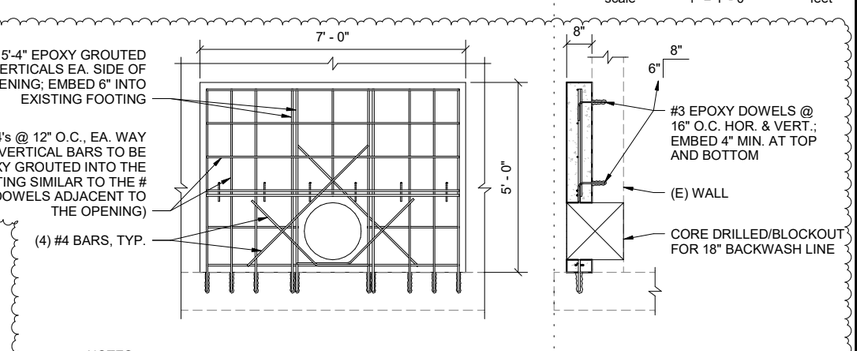
NOTE:
BASIS OF DESIGN FOR ANCHOR BOLT SIZE AND PLACEMENT IS A FLYGT JP 4710 PUMP.

SECTION

28 SF-011 **DETAIL**
EQ. BASIN CIRCULATION PUMP PAD*
*SEE MECHANICAL DRAWINGS FOR PAD LOCATION

4

scale 1" = 1' - 0" feet



NOTES:
1. SEE DETAIL 5/SF-002 FOR OTHER DETAILS AT OPENINGS.
2. THIS DETAIL APPLIES TO MECHANICAL SHEET M-601.

29 SF-011 **DETAIL**
CONCRETE SUPPORT DETAIL FOR 18" PIPE PENETRATION

scale 1/2" = 1' - 0" feet

1

REV	DATE	REVISIONS DESCRIPTION	BY
1	7/27/2023	ADDENDUM 5	MJM

STATE OF ALASKA 49TH
MATTHEW J. METTLER
SE 13920
06-01-2023
PROFESSIONAL STRUCTURAL ENGINEER

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WRANGELL WATER TREATMENT PLANT IMPROVEMENTS
WRANGELL, ALASKA

PIPE GALLERY BUILDING ADDITION STRUCTURAL DETAILS

PROJECT 1528.50206.01
DATE 05/02/2023

SHEET
SF-011

BID DOCUMENTS AGENCY SUBMITTAL - NOT FOR CONSTRUCTION

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Attachment 2

SECTION 01 10 01 – CONSTRUCTION SEQUENCING PLAN

PART 1 - GENERAL

The following proposed construction sequencing plan is one method by which the new water treatment plant can be constructed while maintaining operability of the existing water treatment plant. Always having the existing water treatment plant fully operational during construction is a requirement of the project. At some point in the construction process, both water treatment plants will be fully operational, and the installation must allow the operators to easily switch between plants during commissioning and testing. The contractor may propose and execute an alternative sequence, pending Engineer, Owner, and Alaska Department of Environmental Conservation (DEC) approval.

PART 2 - PRE-CONSTRUCTION REQUIREMENTS

2.01 The Contractor shall establish and maintain survey benchmarks to ensure all elevations shown on the drawings can be maintained. Final grading elevations reference the project standard benchmark as shown on the survey drawings.

2.02 Thoroughly examine the construction site to facilitate planning the drilling and blasting required. Coordinate all blasting activities with Owner and Operators to minimize disruptions to the existing treatment plant operations.

2.03 A cellular tower operator also uses the entry road to the existing water treatment plant to access their equipment further up the road. Coordinate all road work to ensure access is available to other users located past the existing WTP. Road access shall also be made available to water department staff to access the two raw water reservoirs beyond the WTP.

PART 3 - CONSTRUCTION SEQUENCING

3.01 PHASE 1: Civil Site Preparation and New Yard Piping Tie-Ins.

A. Civil:

1. To prepare for construction of the new Water Treatment Plant (WTP) Building, the existing topography shall be cleared, grubbed, blasted, and graded per the plans and specifications. Access to the existing treatment plant shall be maintained at all times. Alternate access via the gate located at the northwest of the site can be utilized for this purpose if needed.
2. Note: significant rock blasting, crushing, and site grading work is required for this phase of the project. The contractor is encouraged to review site grading requirements with the Engineer to resolve questions prior to starting work. The site has been balanced as much as possible to minimize import/export of materials. On-site rock crushing may be required, and pipe bedding materials will need to be imported.

B. Process / Yard Piping:

1. During one or two scheduled shut-down(s) as required:
2. Tie Point 1 – The intent of tie-point 1 is to create a split in the raw water supply line such that raw water can be sent to either the existing or the new water treatment plants.
   a) The existing 12” DI Raw Water Supply pipeline shall be isolated and drained.
   b) Two new valves shall be installed to allow isolation of the existing and new water treatment plants as follows:
      1) One new 12” gate valve with valve box to isolate the existing WTP.

2) One new 12” gate valve with valve box to isolate the new WTP.

c) After the new block valves have been installed, the existing 12” DI Raw Water Supply pipeline shall be returned to service.

d) Construction on the new 12” HDPE DR 17 raw water supply pipeline can then commence on the Contractors’ schedule.

3. Tie Point 2 – The intent of tie-point 2 is to provide a new connection to supply potable water to the new WTP for filter backwash.

a) The new 12” HDPE Filter Backwash Supply pipeline connection point shall be made upstream of an existing 12” isolation valve located approximately 55 feet to the East of the existing fence. A new 12” yard valve with valve box shall be installed, closed, and protected with a blind flange until the new piping is installed. This is an active potable water line and procedures outlined in AWWA C651 for cutting into existing water mains shall be followed. Construction on the new 12” DR17 HDPE Filter Backwash Supply pipeline can occur on the Contractors schedule.

4. Tie Point 3 – The intent of tie-point 3 is to provide a new connection for the waste outlet to the sanitary sewer system at tie-point 6 next to Zimovia Highway.

a) The outlet flow structure can be installed in this phase or in parallel with the EQ basin work.

b) After ensuring the existing 12” Roughing Filter drain to ditch pipeline is empty and Roughing Filter drain gate valves are closed, the pipeline can be located by following it back from the gate valve near the ditch to the East and to tie-point 3.

c) After completion of the backwash EQ basin outlet flow control structure, the proposed 6” HDPE Filter Backwash Pipeline can be constructed. The new pipeline shall be routed west from the flow control structure and then down the road to tie-point 5 at the repurposed 10” asbestos cement water main. The balance of this pipeline down to the new wastewater manhole can then be completed.

d) Connection of controls inside the outlet flow control structure can occur during Phase 3; however, all piping and valves should be installed at this time to provide a drain point for the existing system until later phases are completed.

C. Electrical:

1. Protect existing electrical and communications cabling located near the existing roadway. This electrical main supplies users located further up the access road. Complete utility locates as required.

D. Status during Phase 1:

1. Source of potable water: Old Plant

2. Number of shutdowns to existing potable water production: 1 or 2

3.02 PHASE 2: Construction of The New Water Treatment Plant.

After civil site preparation has been completed and yard piping tie-ins have been constructed, construction on the New WTP building and treatment process shall commence. Contractor shall maintain access to the existing treatment plant building at all times. Coordinate work with Owner and Operators to ensure no interruption of service at the existing plant occurs during construction. Pay particular attention to site drainage and storm water pollution prevention planning.

A. Civil:

1. Continue site civil / drainage work. Ensure existing drain lines to the ditch located between the existing roadway and the existing treatment building are maintained and/or rerouted to provide uninterrupted use of these lines. Provide temporary parking and/or temporary building access as required.

B. Electrical:

1. Install temporary power drops as required for construction.

C. Status:

1. Source of potable water: Old Plant

2. Number of shutdowns to existing potable water production: 0

3.03 PHASE 3: Demolition of Existing Roughing Filters, Construction of Backwash Equalization Basins, and Installation of Pipe Gallery Expansion at Clearwell.

A. Civil:

1. Continue site civil / drainage work. Ensure existing drain lines to the ditch located between the existing roadway and the existing treatment building are maintained and/or rerouted to provide uninterrupted use of these lines. Provide temporary parking and/or temporary building access as required.

2. Construction trenching and grading will be required to the north of the roughing filters, between the existing slow sand filters and the control room / ozone contact basin, and around the front of the existing slow sand filters to accommodate piping installation. Finish grading to match site and ensure surface drainage is continuous.

B. Process / Mechanical:

1. Roughing Filter conversion to Backwash Equalization Basins:

a) The existing roughing filters shall be decommissioned and converted to Backwash Equalization Basins. To do so, the existing roughing filters must be placed in bypass mode and a temporary ozone venting system installed as follows:

1) Tent the existing flow splitter box with heavy plastic sheeting and install a small exhaust fan with minimum 4” diameter hose to the exterior of the building and a minimum of 20 feet from proposed work areas. The fan must be capable of moving a minimum of 10CFM. Follow all required safety protocols, including testing for the presence of ozone in work areas, as required by OSHA 1910 or other statutes as applicable.

2) Close the roughing filter influent valves and plug the end of line (valves do not provide tight seal when closed), close the slow sand filter bypass valve, and open the roughing filter bypass valve. This will direct flow into the roughing filter flow splitter box and out the four (4) 8” Slow Sand Filter Influent pipelines.

3) Close the existing Roughing Filter Backwash inlet valves.

4) Demo and cap the potable water line used for backwashing the slow sand filters. A shut-down will be required and AWWA C651 procedures utilized. A cap or blind flange shall be installed as close to the potable water header as possible.

b) Once the above items are complete, the existing roughing filter internals can be demolished, media removed, and partial concrete demolition completed per the drawings and specifications. The existing 12” DI roughing filter influent pipelines can be cut, grouted, and capped liquid tight. After the demolition of the piping is complete, all exposed pipe penetrations can be grouted and sealed liquid tight. After

concrete cuts are complete, follow details on drawings to protect exposed concrete and support steel.

c) Once all concrete work is complete, the installation of the jet mixing system can be completed and the new 18” backwash / waste inlet header installed.

2. Clearwell pipe gallery expansion and new High Service Pump Installation

a) Before commencing work in this area, install a tented area over the existing clearwell with heavy plastic sheeting to prevent contamination of potable water in the clearwell. Use care to protect this area during construction. This shall be maintained throughout the project while any work in the clearwell building is underway.

b) A temporary bypass pipe must be installed from the existing high service pumps in the pipe gallery to a connection point to the south to allow piping demolition in this area. The temporary bypass pipe allows for demolition of existing piping and installation of an expanded pipe gallery that provides space for the new high service pumps. Additional details:

1) The temporary bypass will be constructed as shown on Sheet C-104, Sheet X-105, X-110, and Sheet M-400. The bypass will be constructed as follows:

2) During a planned shutdown, the existing High Service pump header will be partially demolished. The existing 8" D.I. tee on the pump discharge header will be rotated, exposing a flange without a connection.

3) A portion of the existing 12" DI slow sand effluent to reservoir pipeline will be demolished, as shown on C-103 and a new tie-in valve assembly, as shown on C-104, will be installed. This tie-in is in the yard upstream of the control room, allowing all of the existing infrastructure in the control room to remain online and usable.

4) A 6" temporary bypass pipeline will be installed between the exposed flange on the High Service Pump discharge header and the new tie-in assembly on the 12" effluent to reservoir pipeline. Suitable materials for the bypass pipeline include 6" HDPE SDR11 or 6" Schedule 80 PVC, both of which are NSF 61 approved. The contractor is responsible for the final design and construction of the temporary bypass pipeline pending Engineer approval.

5) Following the installation of the new High Service Pumps and short section of new 12" D.I. discharge yard piping, the temporary bypass piping will be removed, the valve used to connect at the yard tie-in will be closed and a permanent blind flange will be installed on the lateral wye used for the temporary tie-in.

6) The temporary bypass pipe routing is shown on sheet X-105. The tie in is shown on C-104 and M-400. The bypass line will cross above the existing, buried Slow Sand Filter Cell #1 and Cell #2 overflow/drain.

c) Piping demolition and concrete work can progress per the drawings while continuing to use the existing high service pumps. The new high service pumps can be installed and only a small pipe section on either side of the new high service pumps will need

to be connected during a shut-down. After completing the installation, disinfection, and testing of the new high service pumps, the existing pumps can be demolished.

d) The new filtered water piping can be completed from the new WTP, around the back of the Backwash EQ Basins, along the south side of the existing slow sand filters, and to the clearwell pipe gallery. The line should be completed to the clearwell and all three motor operated valves installed. The two motor operated valves that direct water to the future contact basins should have a temporary blind installed until the piping is completed to the new contact basins.

e) Additional piping demolition in this area can be completed on the Contractors schedule.

f) Install the new flow meter and associated potable water piping inside the existing control building. Follow AWWA C651 procedures to return this section of piping to service.

C. Electrical:

1. Complete electrical work as required for temporary power to the ventilation fan and permanent power and controls wiring for level instruments and the mixing pumps in the backwash equalization basins.

2. Complete electrical demolition and new electrical work as required in the pipe gallery and expanded pipe gallery areas. Install all conduits between the pipe gallery and future electrical room inside the existing control building.

3. Complete new electrical room and install conduits for wiring between the new building and existing control building. This work cannot be completed until the existing ozone generation equipment has been demolished.

D. Status:

1. Source of potable water: Old Plant and/or New Plant

2. Number of shutdowns to existing potable water production: 1 or 2

3.04 PHASE 4: Testing and Commissioning of the New WTP

A. After completion of the new WTP building, new filtration equipment, new backwash EQ basin, and backwash waste piping is completed, the contractor shall provide all equipment testing, process testing, functional testing, and commissioning of the new WTP Process for a period of 4 Weeks.

B. All filtered water shall be routed to waste until DEC Temporary Approval to Operate has been obtained. No water can be sent from the new WTP to the new chlorine contact tank or clearwell until this DEC approval has been received. All backwash and sludge shall be directed to the new backwash EQ basins and on to lift station 6.

C. All operational training associated with this phase shall occur prior to commissioning and all electronic O&M manuals shall be provided to the Owner. During this time the new WTP building and treatment process punch list shall be completed. If finished water does not meet water quality requirements, the commissioning period shall restart. See commissioning specifications for further details.

3.05 PHASE 5: Demolition of Existing Slow Sand Filters and Construction of Chlorine Contact Basins, Demolition of Existing Ozone System and Construction of New On-Site Hypochlorite Generation System, Construct New Electrical Room

A. Civil:

1. Continue site civil / drainage work. Provide temporary parking and/or temporary building access as required.

2. Construction trenching and grading will be required in the area around the existing ozone contact basin to prepare for demolition in this area. Finish grading around the new back-up generator pad (placed over old ozone contact basin) is required to match site and ensure surface drainage is continuous.

B. Process / Mechanical:

1. Following the commissioning and acceptance of the new treatment process, the existing Ozone System in the Control room shall be decommissioned to provide space for the new On-Site Hypochlorite Generation System (OSHG). The associated ozone contact basin shall be demolished down to the first waterstop joint (approximately elevation 258.3'). The new OSHG system shall be constructed, tested, and commissioned. Once commissioned, disinfection shall be switched over to the new hypochlorite metering pump system. Following the testing and acceptance of the disinfection metering system, the existing OSHG system and soda ash metering system shall be decommissioned.

2. A 3" conduit that will carry the new sodium hypochlorite supply tubing from the new Chlorine Generation Room (inside the existing Control Building) shall be routed to the new Water Treatment Plant.

3. The existing Slow Sand Filters shall be demolished and converted to Chlorine Contact Basins. The existing filtration cell numbers will become the new basin numbers to maintain consistency. The existing Slow Sand Filters shall be drained, and the media shall be removed. This step requires removal and off-site disposal of a significant amount of filter media. Existing 6'x6' ships doors are located on the west side of each cell for this purpose. Sand from sand filters shall be transported by the Contractor to the lower reservoir parking area, or at a Borough specified location within two miles.

4. The existing influent headers and effluent collection manifolds shall be removed, and the existing overflow header shall be relocated. New 14" perforated PVC influent manifolds shall be installed in Cell 1 and Cell 4, and new 8" PVC perforated outlet header shall be installed in Cell 2 and Cell 3. The perforated outlet headers shall be tied into the existing Cell 2 and Cell 3 outlet / clearwell inlet pipelines (existing 8"). The existing concrete walls separating Cell 1 / Cell 2, and Cell 3 / Cell 4 shall have a section removed per the demolition drawings to facilitate flow between cells. This section shall be flush with the existing floor. The Chlorine Contact Basin Effluent Isolation valves shall remain closed until the completion of this phase. After completion of the required modifications, procedures outlined in AWWA C652 shall be followed prior to placing the new contact basins into service.

5. A short shut-down will be required to facilitate final isolation of the existing clearwell once old influent piping from Cell 1 and 4 are removed. Similar procedures as outlined in AWWA C652 must be followed to complete this work.

C. Electrical:

1. Once the existing ozone equipment has been demolished, the new electrical room can be constructed. Complete electrical work as required for permanent power and controls wiring as indicated in the plans and specifications.

D. Status:

1. Source of Potable Water: New Plant

2. Number of Shutdowns to Existing Potable Water Production: 1

3.06 PHASE 6: Demolition of Existing Chlorine Generation and Soda Ash Equipment

A. Civil:

1. None

B. Electrical:

1. Demolish electrical wire and conduit as required to completely remove this equipment from service back to the control panel as shown on the drawings.

C. Status:

1. Source of Potable Water: New Plant
2. Number of Shutdowns to Existing Potable Water Production: 0

PART 4 - FINAL COMPLETION

4.01 See Specifications for Final Completion and Project Closeout Requirements.

END OF SECTION

Attachment 3

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 4

SECTION 33 05 05.31 - PRESSURE TESTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Hydrostatic testing of pressure piping.

1.2 REFERENCE STANDARDS

A. AWWA C605-21 – Underground Installation of PVC Pressure Pipe and Fittings

B. AWWA C906-21 – Polyethylene Pressure Pipe and Fittings, 4 inch through 65 inch

C. AWWA C906-90 – Polyethylene Pressure Pipe and Fittings, 4 inch

D. AWWA C906-08 – Polyethylene Pressure Pipe and Tubing, ½ inch through 3 inch

E. AWWA C600-17 – Installation of Ductile Iron Mains and their Appurtenances

F. ASME B31.3 – Process Piping (for air pressure testing requirements)

G. Plastic Pipe Institute:
   1. Handbook of PE Pipe
   2. PEX Design Guide
   3. PEX Pipe Design Manual for Water, Oil, Gas, and Industrial Applications
   4. Polyethylene Piping Systems Field Manual for Municipal Water Appplications

1.3 SUBMITTALS

A. Submit following items prior to start of testing:
   1. Testing procedures.
   2. List of test equipment.
   3. Testing sequence schedule.
   4. Provisions for disposal of flushing and test water.
   5. Certification of test gage calibration.

B. Test and Evaluation Reports: Provide a final testing report to demonstrate results of piping pressure tests for all pipe segments, including gravity flow pipe segments.

C. Qualifications Statement: Contractors' Construction Manager or Site Supervisor shall be qualified to provide pipeline testing having completed a minimum of 5 projects of similar size and complexity to the current project.

1.4 QUALITY ASSURANCE

A. Perform Work according to standards and/or guidelines listed in the Reference Standards section of this document.

B. All piping shall be pressure tested at 1.5 x Operating Pressure or a minimum of 65 psig for atmospheric or gravity flow pipelines. Reference project piping line list for operating pressures.

C. Piping containing water shall be tested with potable water.

D. Piping used in air service may be pressure tested with air.

PART 2 - PRODUCTS

2.1 HYDROSTATIC TESTING

A. Equipment:
1. Pressure pump.
2. Pressure hose.
3. Water meter.
4. Test connections.
5. Pressure relief valve.
6. Pressure Gage: Calibrated to 0.1 psi.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that piping is ready for testing.

B. Verify that trenches are backfilled to a minimum of ½ pipe diameter.

C. Verify that pressure piping thrust restraints have been installed.

3.2 FIELD QUALITY CONTROL

A. Testing of Pressure Piping:
1. Test system according to AWWA C600 and following:
a. Hydrostatically test each portion of pressure piping, including valved sections **and water main hardware,** but excluding vendor equipment.
b. Conduct hydrostatic testing for at least two hours.
c. Slowly fill with water portion of piping to be tested, expelling air from piping at high points.
d. Install corporation cocks at high points for buried piping and air release valves inside the building as shown on the drawings.
e. Close air vents and corporation cocks after air is expelled.
f. Raise pressure to specified test pressure.
g. Observe joints, fittings, and valves undergoing testing.
h. Remove and renew cracked pipes, joints, fittings, and valves that show visible leakage.
i. Retest.
j. Correct visible deficiencies and continue testing at same test pressure for additional two hours to determine leakage rate.
k. Maintain pressure within plus or minus 5.0 psi of test pressure.
l. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of testing.
m. Compute maximum allowable leakage using following formula:
1) L = testing allowance (gph) = [SD x sqrt(P)]/C.
2) S = length of pipe tested, feet.
3) D = nominal diameter of pipe, inches.
4) P = average test pressure during hydrostatic testing, psig.
5) C = 148,000.
6) If pipe undergoing testing contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each pipe size.
2. If testing of piping indicates leakage greater than that allowed, locate source of leakage, make corrections, and retest until leakage is within acceptable limits.
3. Correct visible leaks regardless of quantity of leakage.

B. Test Pressures by Piping Service

1. The following test pressure table provides information required to calculate the maximum available leakage:

Service	Fluid	Operating Pressure Range	Test Pressure
Raw Water	Water	0 – 45 psig	65 psig
Clarified Water	Water	0 – 6 psig	65 psig
Filtered Water	Water	0 – 6 psig	65 psig
Air Scour	Air	0 -10 psig	65 psig
DAF Air	Air	0 -175 psig	195 psig
Chlorinated Water	Water	0 – 60 psig	90 psig
Chemical Injection	Varies	0 – 60 psig	90 psig

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 017430 - Buried Pipe Testing and Disinfection~~
   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

2.1 PVC PIPE AND FITTINGS

A. PVC Gravity Sewer Piping:
   1. Pipe and Fittings: ASTM D3034 (sizes 4" – 15"), ASTM F679 (18" – 36") SDR35,T-1 wall thickness, PVC gravity sewer pipe with bell-and-spigot ends and with integral ASTM F 477, elastomeric seals for gasketed joints.
   2. Fittings: ASTM D 3034/F679, PVC with bell ends.
   3. Service or Lateral Connections: PVC 45 deg wye or tee with sweep.

2.2 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.

2.3 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.

2.4 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 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