



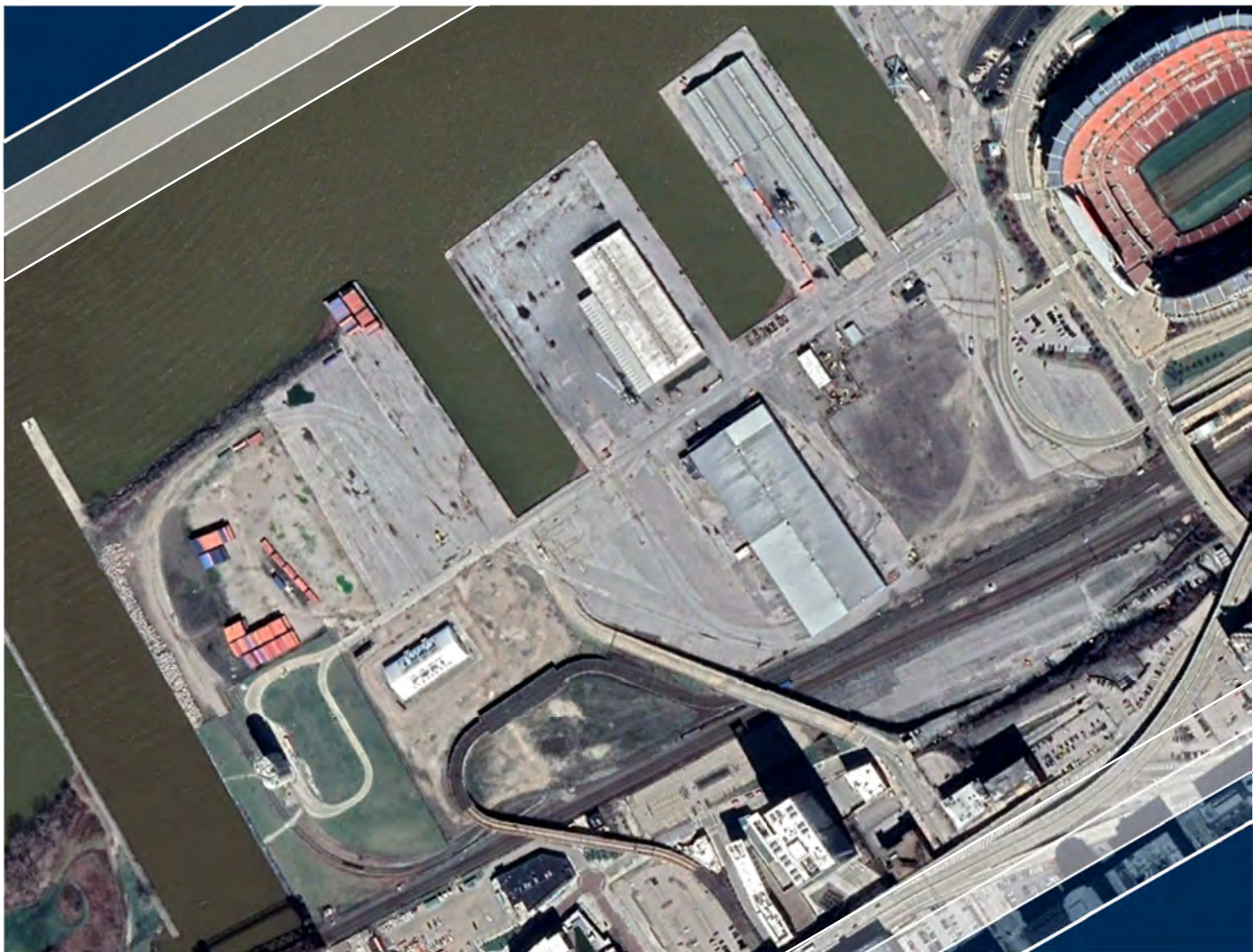
PORT OF CLEVELAND WATER QUALITY MASTER PLAN SUMMARY

Port Rehabilitation Project

Project # 19-00265

Submitted to:

Cleveland-Cuyahoga County Port Authority



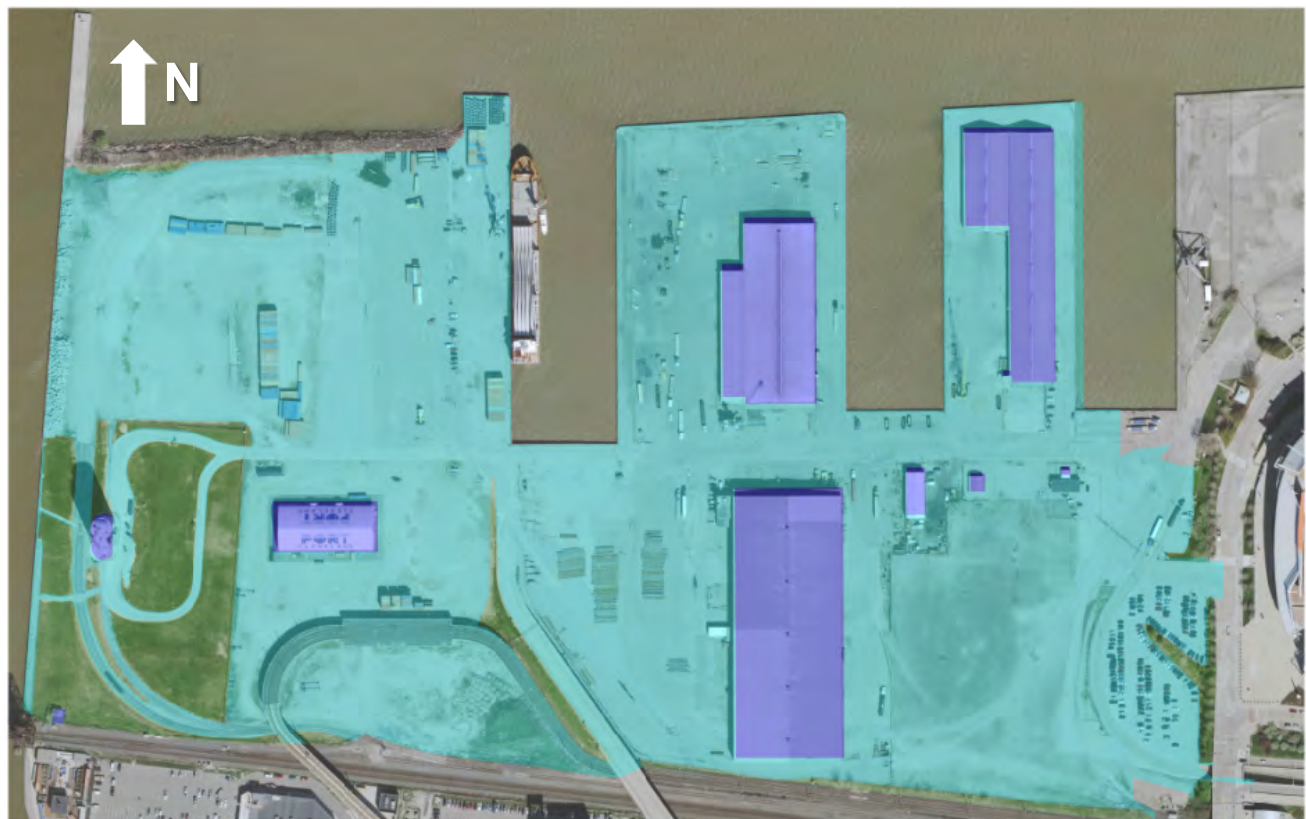
INTRODUCTION

JMT has been tasked with the development of the Port of Cleveland's Water Quality Master Plan using similar techniques employed for Dock 24 and Dock 26 rehabilitations. The Port of Cleveland sits on the edge of Lake Erie in Cleveland, Ohio. The site's stormwater runoff outfalls directly to Lake Erie. The Port is committed to the care and preservation of Lake Erie and is working to reduce the overall impact of stormwater runoff from its facilities. The goal of this Master Plan is to help the Port of Cleveland reach their pollutant load reduction requirements of their industrial discharge permit.

The plan includes discussion of existing conditions, pollution sources, existing stormwater controls, improvement recommendations, and an implementation plan.

EXISTING CONDITIONS

The primary land cover on the facility is impervious, comprised of pavement, buildings, and gravel. Open paved spaces are the most predominant land cover on site. Permanent warehouse buildings are the second largest land cover type by percentage on this site. See below of the existing land cover exhibit.



LEGEND
BUILDINGS (8.1 AC) TURF (6.8 AC)
CONCRETE (60.6 AC)

Presently, runoff from the docks enters directly into Lake Erie via sheet flow or from concentrated discharges of gravity stormwater pipes. This runoff is currently treated on only one dock: Dock 20. There are multiple other discharge locations that range from smaller metallic downspout outfall pipes to larger reinforced concrete pipes within the Port property.

POLLUTION SOURCES

The Port of Cleveland is permitted through the Ohio Environmental Protection Agency under the NPDES permit. Although the Port's stormwater discharge is authorized under this permit, it requires quarterly testing. Samples are tested for color, odor, clarity, floating solids, settled solids, suspended solids, foam, and oil, as well as industrial classified heavy metal pollutants aluminum, lead, and zinc. The sources of the industrial pollution include metal roof surfaces, loading docks and parking areas, truck tire tread, outdoor storage of product materials and equipment, and motor oil. The most recent testing results are tabulated below (2019 and 2020). The data highlighted in red shows the discharge concentrations of aluminum (Al) and zinc (Zn) often exceeding the permitted discharge concentrations at the outfall locations.

STORMWATER OUTFALL SAMPLE HISTORY												
OUTFALL	Q1 2018 (NO SAMPLE)			Q2 2019 (4/15/2019)			Q3 2019			Q4 2019		
	Al	Pb	Zn	Al	Pb	Zn	Al	Pb	Zn	Al	Pb	Zn
OU-1	NO QUALIFYING DISCHARGE EVENTS (FROZEN/DRY CONDITIONS)			-	-	-	NO QUALIFYING DISCHARGE EVENTS WHERE SAMPLES TAKEN			-	-	-
OU-2				-	-	-				-	-	-
OU-3				1.110	0.021	0.190				1.850	0.027	0.251
OU-4				-	-	-				-	-	-
OU-5 (PRE FILTER)				-	-	-				1.560	0.013	0.242
OU-5 (POST FILTER)				-	-	-				-	-	-
OU-6				1.260	0.011	0.175				-	-	-
OU-7				2.730	0.022	0.366				0.416	0.084	0.093
OU-8				3.780	0.023	0.463				13.200	0.068	2.400
OU-9				-	-	-				-	-	-
OU-10				4.930	0.042	0.362				3.210	0.026	0.242
OU-11				-	-	-				-	-	-
OU-12				-	-	-				-	-	-
OU-13				7.830	0.237	0.720				1.650	0.017	0.206
OU-14				-	-	-				-	-	-
CONTROL				-	-	-				-	-	-
AVERAGE DISCHARGE CONCENTRATION (mg/L)	n/a	n/a	n/a	3.607	0.059	0.379	n/a	n/a	n/a	3.648	0.039	0.572
PERMITTED DISCHARGE CONCENTRATION (mg/L)	0.750	-	-	0.750	0.227	0.180	0.750	-	-	0.75	0.227	0.180

STORMWATER OUTFALL SAMPLE HISTORY												
OUTFALL	Q1 2020 (NO SAMPLE)			Q2 2020 (NO SAMPLE)			Q3 2020 (9/28/2020)			Q4 2020		
	Al	Pb	Zn	Al	Pb	Zn	Al	Pb	Zn	Al	Pb	Zn
OU-1	NO SAMPLE	NO SAMPLE	NO SAMPLE	NO SAMPLE	NO SAMPLE	NO SAMPLE	-	-	-			
OU-2							-	-	-			
OU-3							0.549	0.008	0.066			
OU-4							2.530	0.043	0.402			
OU-5 (PRE FILTER)							-	-	-			
OU-5 (POST FILTER)							-	-	-			
OU-6							1.450	0.018	0.252			
OU-7							3.010	0.036	0.588			
OU-8							1.770	0.015	0.656			
OU-9							-	-	-			
OU-10							2.860	0.043	0.808			
OU-11							-	-	-			
OU-12							-	-	-			
OU-13							10.300	0.389	0.677			
OU-14							-	-	-			
CONTROL							-	-	-			
AVERAGE DISCHARGE CONCENTRATION (mg/L)	n/a	n/a	n/a	n/a	n/a	n/a	1.404	0.034	0.216	n/a	n/a	n/a
PERMITTED DISCHARGE CONCENTRATION (mg/L)	-	-	-	-	-	-	0.750	0.227	0.180	-	-	-

EXISTING STORMWATER CONTROLS

As part of the “2012 Railroad Improvement Project” a Manufactured Water Quality Treatment Structure, Type 2 was installed on Dock 20. This treatment device is of the Hydrodynamic Separator type. Per these plans, the drainage area to this structure is 5.94 acres with a treatment flow rate of 1.94 cfs. Per ODOT Location and Design Manual Table 1117-1, the max allowable treatment flow rate for this structure is 2 cfs. The Port has also tested individual inlet filtering devices and found the devices did not treat enough of the industrial pollutants and required frequent maintenance. Therefore, inlet filtering devices are excluded from the Master Plan.

IMPROVEMENT RECOMMENDATIONS

The main purpose of Dock 24 and 26W rehabilitation project is to raise the bulkhead elevation of the docks due to rising Lake Erie water surface elevations. The mean low Lake Erie water surface elevation (NAVD88) used in the plan is 569.46', while the mean high Lake Erie water surface elevation (NAVD88) used is 573.66'.



The bulkhead elevation is being raised to 580.50' and all future improvements to the remaining dock bulkheads will be raised to the same elevation. This improvement eliminates sheet flow from the dock areas directly into the Lake. Rising lake elevations are not only a concern to the bulkhead elevations, but also the surface drainage, its collection and discharge into the Lake. Implications of rising water surface elevations include high groundwater table and lake water backflowing into the proposed closed drainage system. Drainage improvements on Docks 24 and 26, as well as any other improvement on Port property, requires that all connections and joints shall be silt tight above mean high Lake Erie water surface elevation and all connections and joints shall be leak resistant below mean high Lake Erie water surface elevation. Sensitive features, such as the underground detention vaults, or in key locations, shall be protected from backflow and a backflow prevention practice shall be placed to limit the tailwater conditions of Lake Erie on the gravity system.

The current industrial permit does not prescribe a precipitation depth or volume for the water quality treatment volume. When this is unknown, industry standard assigns a 24-hour storm distribution (related to geographical location) which generates 1 inch of rainfall in that time span. This duration and depth of rainfall is assumed to detach the surface pollutants and transport them to the receiving water.

The new Ohio EPA permit however offers an equation to determine water quality volume as the following:

$$WQ_v = Rv * P * \frac{A}{12}$$

Where:

Rv is the volumetric runoff coefficient (based on site impervious cover),

P is a 0.90-inch precipitation depth and

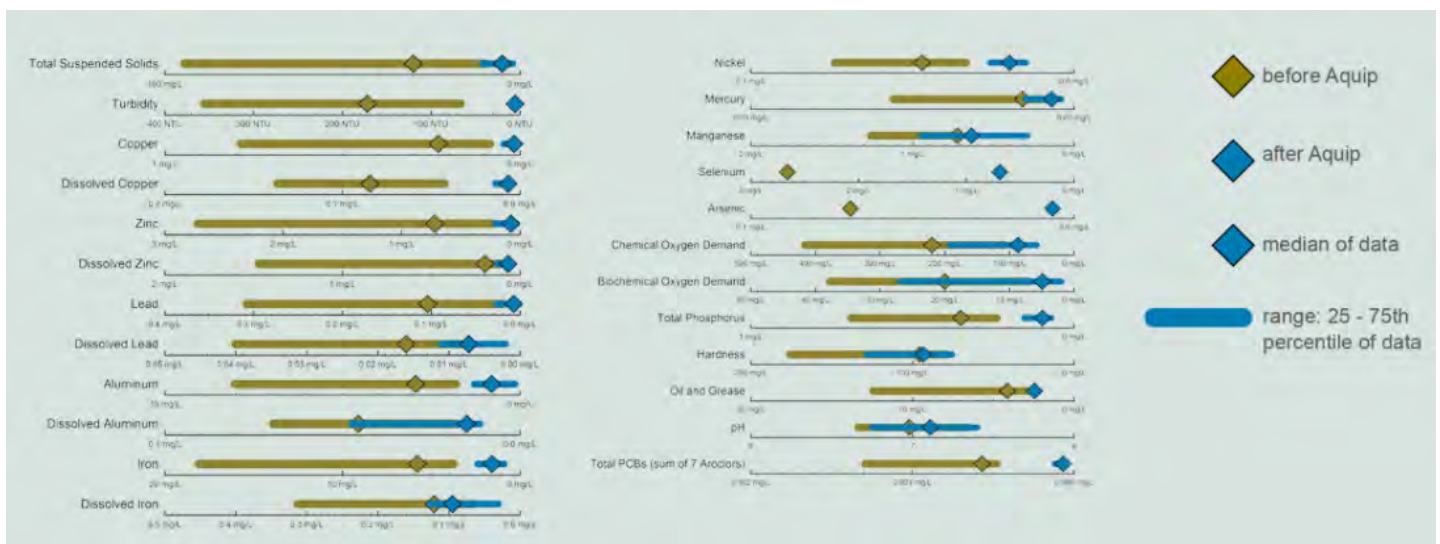
A is the drainage area in acres.

The new requirement rainfall depth is less than what was used for the master planning dock vault sizes, therefore, it is anticipated the presented design will adhere to the permit requirements; but shall be confirmed once detailed design commences.

Where underground detention vaults are proposed throughout the property, their size was established by routing the 1-inch, 24-hour storm into a HydroCAD storage node and, accounting for a constant discharge rate provided by the pumps, the required peak storage volume was determined. Diversion of the 1-inch storm into the underground vault is achieved through a concrete weir placed upstream of the vault in a catch basin. The weir elevation is to be set just above the 1-year Hydraulic Grade Line elevation at the specific bypass structure location. The volume provided by the underground detention vault, set by the weir elevation, shall provide more storage than the resulting peak storage volume of the HydroCAD storage node.

The water within these vaults will be pumped and discharged into an above ground filtration device. The treatment device filters the water and can remove nutrients such as phosphorus and nitrogen along with sediment and heavy metals such as zinc, lead, and aluminum. Filtration devices were selected in highly impervious areas due to the media's ability to treat heavy metals and its simplified maintenance compared to inground/belowground treatment devices. The pumps associated with the vaults and filter devices shall be sized to match the treatment flow rate of the selected filter while not allowing for the underground detention vault to reach 100% capacity.

Below is a representation of the expected pollutants and their removals. Exact data is site specific, but it is expected filtering practices will bring the stormwater discharge into compliance with the discharge permit due to their high efficiency removal rate.



The sky blue and pink hatching on the maps provided in Appendix A highlights the intended treatment area of Docks 24 and 26 which detailed design is already complete. The brown hatching indicates the additional area that is intended be sent to Dock 24 for treatment once the stormdrain system from the Master Plan is fully designed and installed in this area.

Similarly, the green and yellow hatching on the same maps show treatment areas using the same filtering technique as Docks 24 and 26, but without detailed design of the closed system and pump sizing. This step will follow once the master planning drainage improvements efforts commence.



Indicated in the previous section, there is a single treatment device already installed on Dock 20. It is intended to keep this structure functioning as part of this Plan.

Any future grading will not change the contributing drainage area as this area is nearly at the maximum allowed for the Type 2 separator. The red hatching on the maps provided in Appendix A highlights the existing treatment area of Dock 20 with its previously installed Type 2 device.

The Main Gate Improvements project shall be unimpacted by this Master Plan. This plan has left intact the Manufactured Water Quality Treatment Structure installed as part of the separate project. This is the same hydrodynamic separation practice that is previously installed on Dock 20. These hydrodynamic separators offer non-heavy metal treatment of stormwater runoff, which includes but is not limited to high specific gravity suspended solids, oil, grease, and debris. The only change to the Main Gate project is the potential regrading of the surface adjacent to the base of wall gutter to better treat the area east of Warehouse A through filtration and not hydrodynamic separation practices. The orange hatching on the maps provided in Appendix A highlights the existing treatment area of the Main Gate project area with its previously installed Type 4 device.

A third unique treatment practice is proposed in the grassed area of Dock 20 between the silos and bulkhead. Due to the nature of the land cover and the lack of vehicular travel, attributed to the existing grades or access to the south side of the raised tracks, an extended detention pond with forebays is proposed. This practice provides both water quality and quantity benefits, but not heavy metal reduction. Since a large percentage of this area is pervious and the remaining impervious has little potential for heavy metals deposition on the surface, this practice was selected for the most removal with the least construction costs. A closed drainage system is proposed to the west of the railroad tracks to intercept upslope drainage and route it to the extended detention basin. It is believed that the existing drainage of the pervious area and the pavement southeast of the raised railroad tracks can also be intercepted and routed to this basin. Two forebays will provide pretreatment before flowing into the main basin and outlet to Cuyahoga River. This basin should be sized using the equation presented earlier in this Plan. The blue hatching on the maps provided in Appendix A highlights the intended treatment area of Docks 20 and 22.

Lastly, while not improving water quality, another goal of the master plan is to consolidate outfalls. This is a request by the Port to reduce the number of outfalls into Lake Erie for ease of water quality testing and maintenance. This is achieved through removal and or abandonment of the existing stormwater infrastructure and tying it to the proposed improvements where applicable. This strategy allows for the maximum treatment area while keeping as much of the existing drainage network operable as possible.



IMPLEMENTATION PLAN

The master plan is to be constructed in phases based on the Port's funding allotment. The various drainage basins outlined in this Plan were designed to function independently, therefore can be installed in phases. A preliminary stormwater cost estimate has been provided for each basin and can be found in the Appendix B. Based on the lowest cost per treated acre provided below, JMT recommends improvements to the Warehouse A West basin area first (brown hatching from Appendix A). However, JMT is unaware of future Port expansion and the Master Plan should be considered when upgrades to Port facilities are being undertaken.

Basin ID	Treatment Acreage	Cost	Cost/Acre
Warehouse A East	11.7	\$1,212,218	\$103,608
Warehouse A West	10.0	\$224,700	\$22,470
Dock 22	12.0	\$1,539,706	\$128,309
Dock 20	15.1	\$381,436	\$25,260

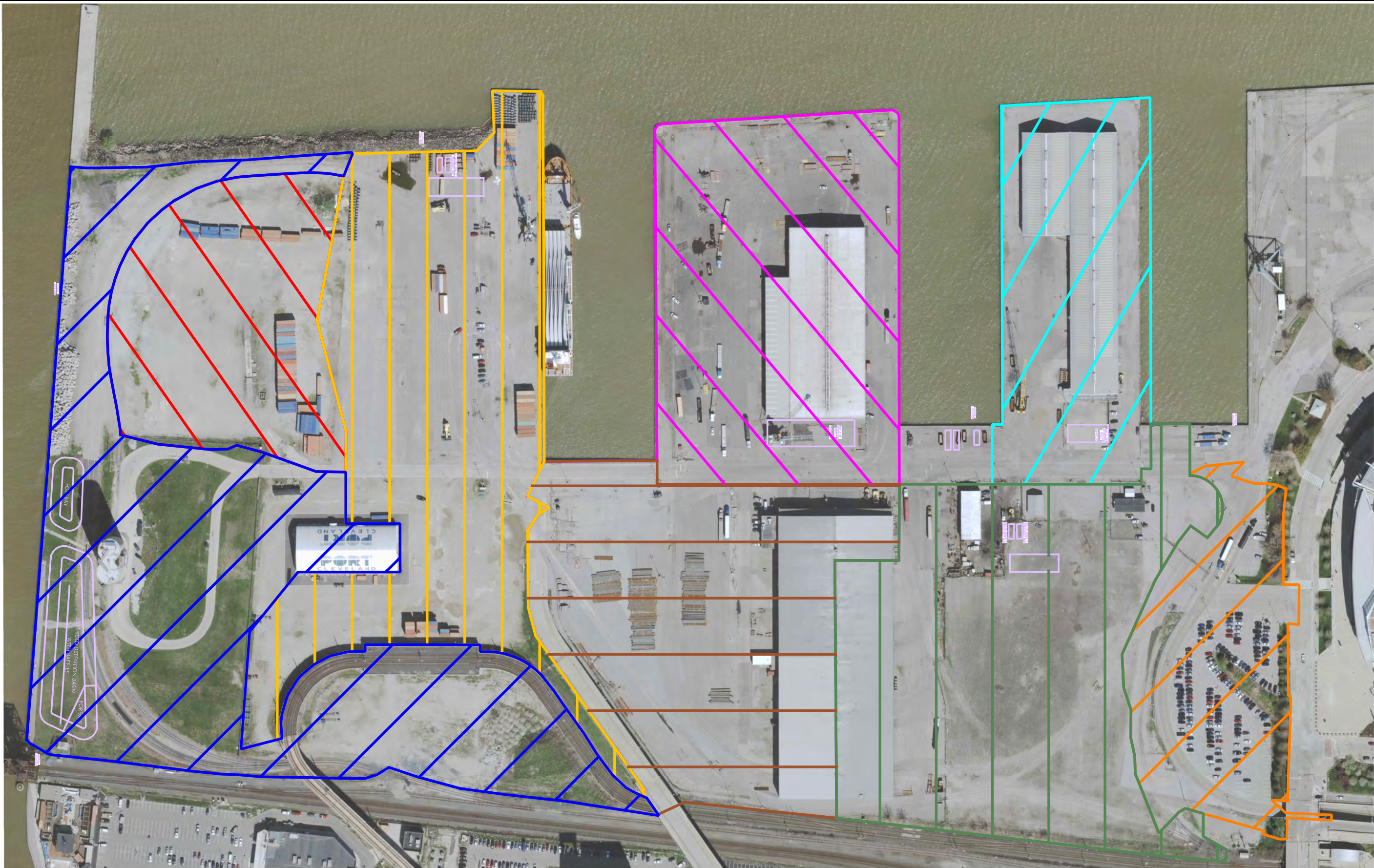
Consideration was also given for the Docks 24 and 26 rehabilitation project when it came to stormdrain layout and final treatment area. For example, the proposed stormwater system, water quality device, vault, and pumps on Dock 26 have been sized to accommodate future expansion of Dock 26 to the east. Similarly, Dock 24 closed drainage and treatment system has been designed to allow for connection of an improved drainage system of the area to the west of Warehouse A. As stated earlier, this plan also allows for the consolidation of outfalls based on the active phase.

Based on the Upper Cuyahoga River Total Maximum Daily Load (TMDL) report, approved by U.S. EPA on September 27th, the known water quality problems include organic and nutrient enrichment, siltation, low dissolved oxygen, and habitat and flow alterations related issues. The same report provided recommendations for water quality treatment solutions, and it is anticipated that the master plan provides adequate compliance as the proposed filters will remove nutrient contributions from both point and nonpoint sources as long as proper maintenance is performed on the filter units.

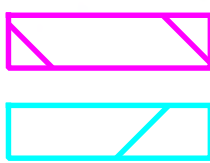
Lastly, The Ohio Industrial Stormwater General Permit expires May 31st, 2022. The renewal of this permit shall be facilitated by the Port. It is anticipated that if the water treatment facilities are not treating for the removal of any new pollutants required by the new permit, the filter media could be changed to target new pollutants with similar removal rates.



APPENDIX A – MASTER PLANNING MAPS

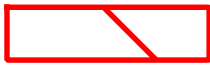


LEGEND



DOCK 24
TREATMENT AREA
9.3 AC

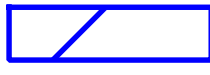
DOCK 26
TREATMENT AREA
6.0 AC



DOCK 20 TREATMENT
AREA (EXISTING)
5.9 AC



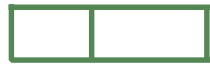
MAIN GATE TREATMENT
AREA (EXISTING)
4.9 AC



DOCK 20
TREATMENT AREA
15.1 AC



DOCK 22
TREATMENT AREA
12.0 AC



WAREHOUSE A EAST
TREATMENT AREA
11.7 AC



WAREHOUSE A WEST
TREATMENT AREA
10.0 AC



WATER
QUALITY
TREATMENT
DEVICE









PROVIDE BACK FLOW REVENTER/CHECK VALVE

MATCHLINE - SEE SHEET 6

LEGEND PIPE TO BE REMOVED PIPE TO BE ABANDONED



LEGEND

PIPE TO BE REMOVED

PIPE TO BE ABANDONED

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MATCHLINE - SEE SHEET 1

MATCHLINE - SEE SHEET 4

LEGEND PIPE TO BE REMOVED PIPE TO BE ABANDONED

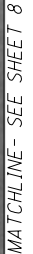
	CALCULATED			HORIZONTAL SCALE IN FEET
	CEG	NBC		
MASTER PLAN LAYOUT SHEET				
SHEET 4A				



MATCHLINE- SEE SHEET 2

MATCHLINE- SEE SHEET 7

MATCHLINE- SEE SHEET 6





LEGEND

	PIPE TO BE REMOVED
	PIPE TO BE ABANDONED



APPENDIX B – PRELIMINARY STORMWATER TREATMENT AREA COST ESTIMATE

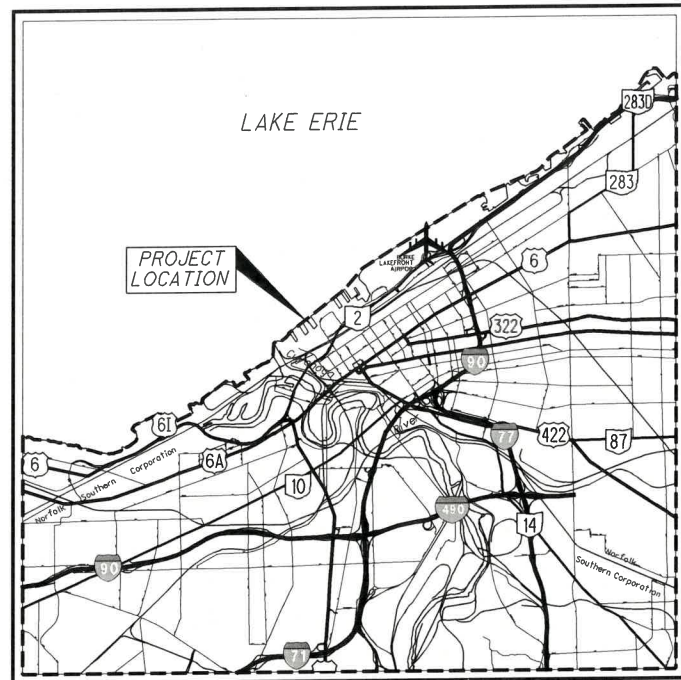
Treatment Area Cost Estimate- Warehouse A East					
Unit	Item Description	Supplemental Description	Quantity	Unit Price	Total Price
FT	PIPE REMOVED, 24" AND UNDER		511	\$ 14.64	\$ 7,480.83
FT	PIPE REMOVED, OVER 24"		150	\$ 32.28	\$ 4,842.60
EACH	CATCH BASIN REMOVED		3	\$ 500.00	\$ 1,500.00
FT	FENCE, TYPE CL		250	\$ 26.00	\$ 6,500.00
EACH	GATE, TYPE CL		2	\$ 2,000.00	\$ 4,000.00
EACH	SPECIAL - BOLLARD		4	\$ 800.00	\$ 3,200.00
FT	8" CONDUIT, TYPE B		125	\$ 18.00	\$ 2,250.00
FT	18" CONDUIT, TYPE B	706.02	1912	\$ 70.00	\$ 133,840.00
FT	24" CONDUIT, TYPE B	706.02	333	\$ 130.00	\$ 43,290.00
FT	30" CONDUIT, TYPE B	706.02	212	\$ 150.00	\$ 31,800.00
FT	36" CONDUIT, TYPE B	706.02	153	\$ 175.00	\$ 26,775.00
FT	8' X 4' CONDUIT, TYPE A, 706.05		408	\$ 650.00	\$ 265,200.00
EACH	CATCH BASIN, NO. 2-2B, AS PER PLAN		13	\$ 1,800.00	\$ 23,400.00
EACH	CATCH BASIN, NO. 2-3, AS PER PLAN		4	\$ 2,000.00	\$ 8,000.00
EACH	CATCH BASIN, NO. 2-2B, AS PER PLAN	DOUBLE STRUCTURE	1	\$ 3,500.00	\$ 3,500.00
EACH	CATCH BASIN, NO. 2-4, AS PER PLAN	DOUBLE STRUCTURE	1	\$ 4,500.00	\$ 4,500.00
EACH	CATCH BASIN, NO. 2-4, AS PER PLAN		1	\$ 2,500.00	\$ 2,500.00
EACH	MANHOLE, NO. 3, AS PER PLAN		4	\$ 3,800.00	\$ 15,200.00
EACH	MANHOLE FRAME AND COVER, AS PER PLAN		6	\$ 400.00	\$ 2,400.00
EACH	DRAINAGE STRUCTURE, MISC.:	PUMP STATION, ADD ALTERNATE INTERIOR COMPONENTS	1	\$ 70,000.00	\$ 70,000.00
LS	DRAINAGE STRUCTURE, MISC.:	WATER QUALITY TREATMENT BMP, ADD ALTERNATE	1	\$ 475,000.00	\$ 475,000.00
FT	SPECIAL - 6" WATER MAIN DIP CLASS 52 PUSH ON JOINTS AND FITTINGS		258	\$ 130.00	\$ 33,540.00
EACH	SPECIAL - BACKFLOW PREVENTER	IN LINE CHECK VALVE	1	\$ 8,500.00	\$ 8,500.00
LS	STORM WATER POLLUTION PREVENTION PLAN		1	\$ 20,000.00	\$ 20,000.00
EACH	EROSION CONTROL		15000	\$ 1.00	\$ 15,000.00
				Total	\$ 1,212,218.43

Treatment Area Cost Estimate- Warehouse A West					
Unit	Item Description	Supplemental Description	Quantity	Unit Price	Total Price
FT	18" CONDUIT, TYPE B	706.02	1073	\$ 70.00	\$ 75,110.00
FT	24" CONDUIT, TYPE B	706.02	208	\$ 130.00	\$ 27,040.00
FT	36" CONDUIT, TYPE B	706.02	110	\$ 175.00	\$ 19,250.00
FT	42" CONDUIT, TYPE B	706.02	198	\$ 200.00	\$ 39,600.00
EACH	CATCH BASIN, NO. 2-2B, AS PER PLAN		6	\$ 1,800.00	\$ 10,800.00
EACH	CATCH BASIN, NO. 2-3, AS PER PLAN		1	\$ 2,000.00	\$ 2,000.00
EACH	CATCH BASIN, NO. 2-4, AS PER PLAN		3	\$ 2,500.00	\$ 7,500.00
EACH	MANHOLE, NO. 3, AS PER PLAN		2	\$ 3,800.00	\$ 7,600.00
EACH	MANHOLE FRAME AND COVER, AS PER PLAN		2	\$ 400.00	\$ 800.00
LS	STORM WATER POLLUTION PREVENTION PLAN		1	\$ 20,000.00	\$ 20,000.00
EACH	EROSION CONTROL		15000	\$ 1.00	\$ 15,000.00
				Total	\$ 224,700.00

Treatment Area Cost Estimate- Dock 22					
Unit	Item Description	Supplemental Description	Quantity	Unit Price	Total Price
FT	PIPE REMOVED, 24" AND UNDER		800	\$ 14.64	\$ 11,711.67
EACH	CATCH BASIN REMOVED		5	\$ 366.79	\$ 1,833.95
EACH	REMOVAL MISC.:	OUTFALL ABANDONED, 13" TO 25"	3	\$ 300.00	\$ 900.00
FT	FENCE, TYPE CL	ADD ALTERNATE	225	\$ 26.00	\$ 5,850.00
EACH	GATE, TYPE CL	ADD ALTERNATE	2	\$ 2,000.00	\$ 4,000.00
EACH	SPECIAL - BOLLARD		4	\$ 800.00	\$ 3,200.00
FT	8" CONDUIT, TYPE B		130	\$ 18.00	\$ 2,340.00
FT	18" CONDUIT, TYPE B	706.02	1508	\$ 70.00	\$ 105,560.00
FT	24" CONDUIT, TYPE B	706.02	891	\$ 130.00	\$ 115,830.00
FT	36" CONDUIT, TYPE B	706.02	338	\$ 150.00	\$ 50,700.00
FT	42" CONDUIT, TYPE B	706.02	256	\$ 200.00	\$ 51,200.00
FT	48" CONDUIT, TYPE B	706.02	182	\$ 210.00	\$ 38,220.00
FT	8' X 4' CONDUIT, TYPE A, 706.05		460	\$ 650.00	\$ 299,000.00
EACH	CATCH BASIN, NO. 2-2B, AS PER PLAN		9	\$ 1,800.00	\$ 16,200.00
EACH	CATCH BASIN, NO. 2-3, AS PER PLAN		7	\$ 2,000.00	\$ 14,000.00
EACH	CATCH BASIN, NO. 2-4, AS PER PLAN		3	\$ 2,500.00	\$ 7,500.00
EACH	CATCH BASIN, NO. 2-5, AS PER PLAN		2	\$ 3,000.00	\$ 6,000.00
EACH	CATCH BASIN, NO. 2-5, AS PER PLAN	DOUBLE STRUCTURE	1	\$ 4,500.00	\$ 4,500.00
EACH	MANHOLE, NO. 3, AS PER PLAN		2	\$ 3,800.00	\$ 7,600.00
EACH	MANHOLE FRAME AND COVER, AS PER PLAN		3	\$ 400.00	\$ 1,200.00
EACH	DRAINAGE STRUCTURE, MISC.:	PUMP STATION, ADD ALTERNATE INTERIOR COMPONENTS	1	\$ 70,000.00	\$ 70,000.00
LS	DRAINAGE STRUCTURE, MISC.:	WATER QUALITY TREATMENT BMP, ADD ALTERNATE	1	\$ 650,000.00	\$ 650,000.00
FT	SPECIAL - 6" WATER MAIN DIP CLASS 52 PUSH ON JOINTS AND FITTINGS		222	\$ 130.00	\$ 28,860.00
EACH	SPECIAL - BACKFLOW PREVENTER	IN LINE CHECK VALVE	1	\$ 8,500.00	\$ 8,500.00
LS	STORM WATER POLLUTION PREVENTION PLAN		1	\$ 20,000.00	\$ 20,000.00
EACH	EROSION CONTROL		15000	\$ 1.00	\$ 15,000.00
				Total	\$ 1,539,705.62

Treatment Area Cost Estimate- Dock 20					
Unit	Item Description	Supplemental Description	Quantity	Unit Price	Total Price
FT	PIPE REMOVED, OVER 24"		77	\$ 32.28	\$ 2,485.87
FT	FENCE, TYPE CL		800	\$ 26.00	\$ 20,800.00
EACH	GATE, TYPE CL		2	\$ 2,000.00	\$ 4,000.00
FT	18" CONDUIT, TYPE B	706.02	480	\$ 70.00	\$ 33,600.00
FT	24" CONDUIT, TYPE B	706.02	285	\$ 130.00	\$ 37,050.00
FT	30" CONDUIT, TYPE B	706.02	532	\$ 150.00	\$ 79,800.00
EACH	CATCH BASIN, NO. 2-2B, AS PER PLAN		2	\$ 1,800.00	\$ 3,600.00
EACH	CATCH BASIN, NO. 2-3, AS PER PLAN		3	\$ 2,000.00	\$ 6,000.00
EACH	MANHOLE, NO. 3, AS PER PLAN		2	\$ 3,800.00	\$ 7,600.00
EACH	MANHOLE FRAME AND COVER, AS PER PLAN		2	\$ 400.00	\$ 800.00
EACH	DRAINAGE STRUCTURE, MISC.:	WATER QUALITY OUTFALL STRUCTURE	1	\$ 2,000.00	\$ 2,000.00
CY	GRADING	WATER QUALITY TREATMENT BMP	8600	\$ 15.00	\$ 129,000.00
SY	SEEDING	WATER QUALITY TREATMENT BMP	5600	\$ 2.00	\$ 11,200.00
EACH	SPECIAL - BACKFLOW PREVENTER	IN LINE CHECK VALVE	1	\$ 8,500.00	\$ 8,500.00
LS	STORM WATER POLLUTION PREVENTION PLAN		1	\$ 20,000.00	\$ 20,000.00
EACH	EROSION CONTROL		15000	\$ 1.00	\$ 15,000.00
				Total	\$ 381,435.87

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LOCATION MAP

LATITUDE: 41°30'17" N LONGITUDE: 81°42'06" W



PORTION TO BE IMPROVED	
INTERSTATE HIGHWAY	
FEDERAL ROUTES	
STATE ROUTES	
COUNTY & TOWNSHIP ROADS	
OTHER ROADS	

DESIGN DESIGNATION

CURRENT ADT (2019)	SEASONAL
DESIGN YEAR ADT (2039)	SEASONAL
DESIGN HOURLY VOLUME (2039)	N/A
DIRECTIONAL DISTRIBUTION	N/A
TRUCKS (24 HOUR B&C)	N/A
DESIGN SPEED	<25 MPH
LEGAL SPEED	<25 MPH
DESIGN FUNCTIONAL CLASSIFICATION:	
LOCAL - PRIVATE	
NHS PROJECT	NO

DESIGN EXCEPTIONS

UNDERGROUND UTILITIES
Contact Two Working Days
Before You Dig


OHIO811.org
Before You Dig

OHIO811, 8-1-1, or 1-800-362-2764
(Non-members must be called directly)

PLAN PREPARED BY:
JMT
959 W. ST. CLAIR AVE., CLEVELAND, OHIO 44113
P:(216) 400 6230 F:(216) 400 6238 www.jmt.com

ENGINEERS SEAL:



SIGNED: 
DATE: 4/19/21

STANDARD CONSTRUCTION DRAWINGS					SUPPLEMENTAL SPECIFICATIONS	SPECIAL PROVISIONS
CB-1.1	7/19/19	CITY OF CLEVELAND			800	1/15/21
CB-1.2	1/15/16	STD-H02	STD-T02		832	10/19/18
CB-1.3	1/15/16	STD-H03	STD-T03		839	1/17/20
MH-1.1	1/15/16	STD-H04			902	7/19/19
MH-1.2	1/15/16	STD-H05			939	1/17/20
DM-1.1	7/17/20	STD-H06				
DM-4.3	1/15/16	STD-H08				
DM-4.4	1/15/16	STD-H09				
BP-1.1	7/28/00	STD-H12				
BP-2.1	7/17/15	STD-H13				
BP-2.2	1/15/21	STD-001				
BP-3.1	1/17/20	STD-005				
F-1.1	7/19/13	STD-006				
F-3.2	7/18/14	STD-008				
RM-4.2	4/17/20	STD-011				
RM-6.1	7/18/14	STD-T01				

PROJECT DESCRIPTION

REHABILITATION & RAISING OF THE SURFACE ON DOCK 24 AND 26W WITH NEW CONCRETE CAP ON BULKHEAD. 1098' OF BULKHEAD ON DOCK 26W SHALL BE REPLACED WITH NEW SHEET PILE OUTSIDE OF THE EXISTING FOOTPRINT FOR AN ANTICIPATED LIFESPAN OF 50 YEARS. DRAINAGE IMPROVEMENTS ASSOCIATED WITH THIS PROJECT INCLUDE REROUTING/CONSOLIDATION OF OUTFALLS AND WATER QUALITY TREATMENT AND STORAGE. NEW BOLLARDS, FENDERS, AND BOLLARD FOUNDATION REHABILITATION ARE ALSO INCLUDED IN THIS PROJECT.

PROJECT EARTH DISTURBED AREA:	10.11 ACRES
ESTIMATED CONTRACTOR EARTH DISTURBED AREA:	0.25 ACRES
NOTICE OF INTENT EARTH DISTURBED AREA:	10.36 ACRES

2019 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING CHANGES AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.



APPROVED 
DATE 4-27-21 PRESIDENT/CEO, CLEVELAND-CUYAHOGA COUNTY PORT AUTHORITY

PIDP GRANT NO. 693JF71910010

PID NO. 113698

CONSTRUCTION PROJECT NO. OPS-20-A

RAILROAD INVOLVEMENT NONE

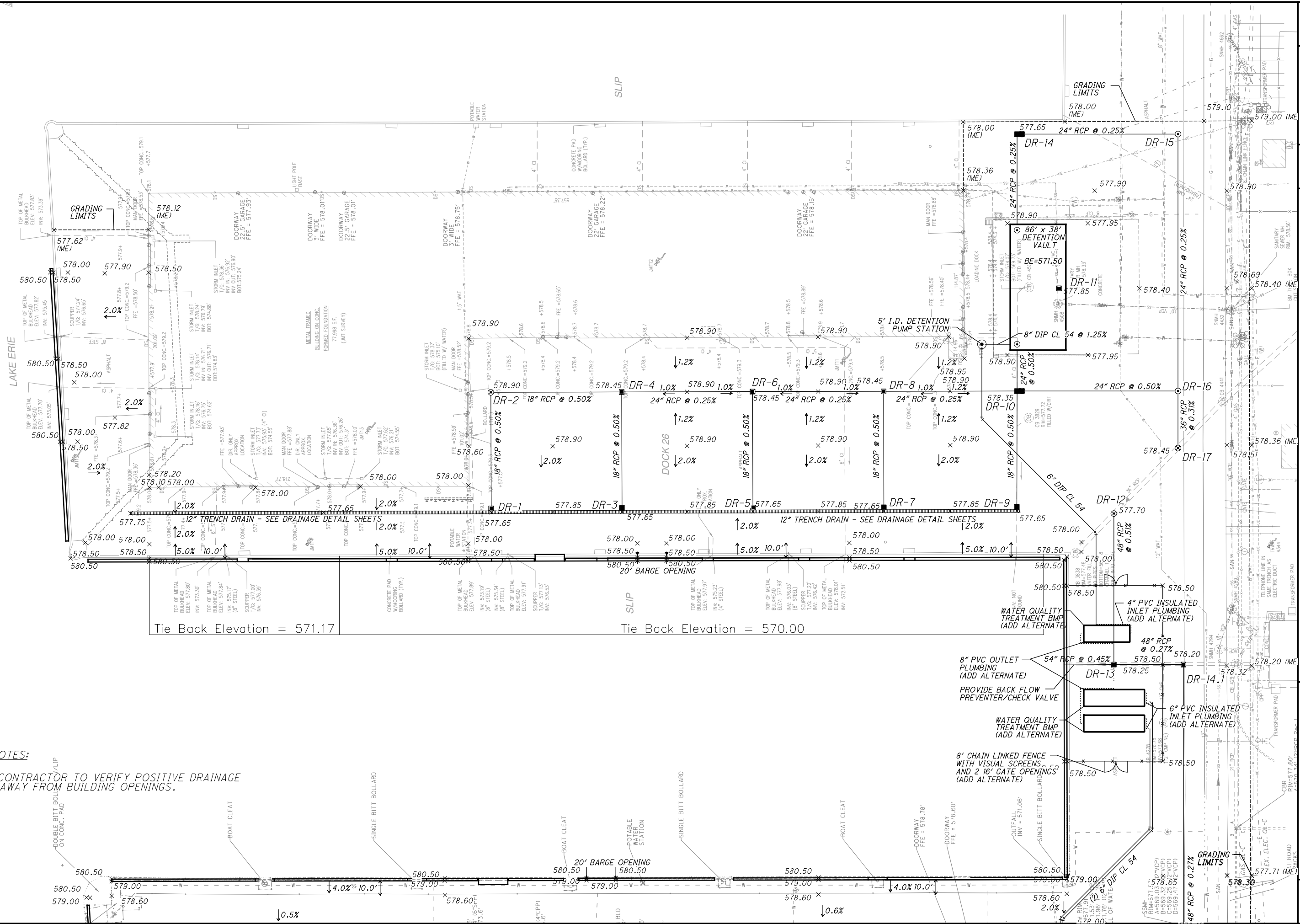
DOCK 24 & 26W

1/106

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NOTES:

1. CONTRACTOR TO VERIFY POSITIVE DRAINAGE AWAY FROM BUILDING OPENINGS.



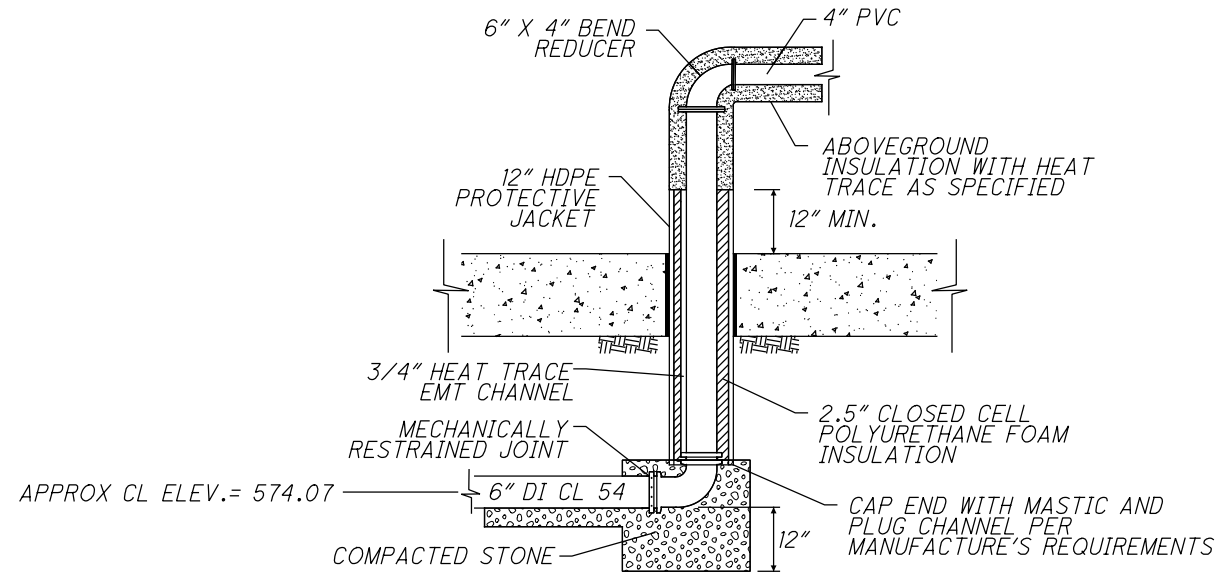
GRADING PLAN SHEET
DOCK 24 & 26W

DOCK 24 & 26W

24
106

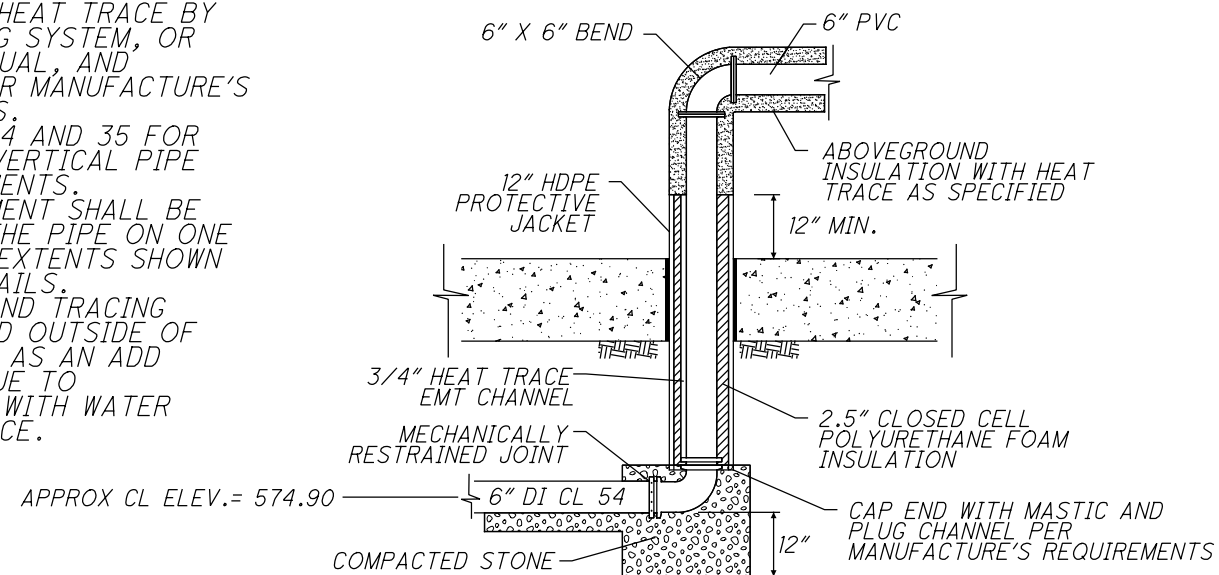
CALCULATED
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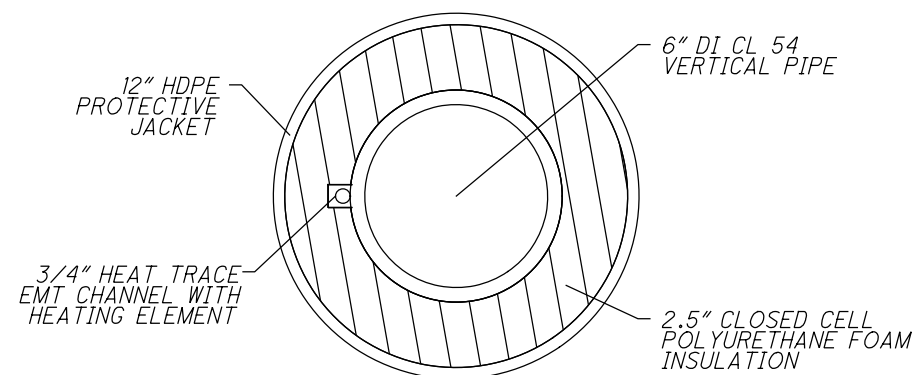


DOCK 26W VERTICAL PIPE HEATING ELEMENT CROSS SECTION DETAIL
N.T.S.

- NOTES:
1. BELOW GROUND INSULATION JACKET WITH HEAT TRACE BY TRICON PIPING SYSTEM, OR APPROVED EQUAL, AND INSTALLED PER MANUFACTURE'S REQUIREMENTS.
 2. SEE SHEETS 34 AND 35 FOR EXTENTS OF VERTICAL PIPE HEATING ELEMENTS.
 3. HEATING ELEMENT SHALL BE AFFIXED TO THE PIPE ON ONE SIDE TO THE EXTENTS SHOWN IN THESE DETAILS.
 4. INSULATION AND TRACING SHALL BE PAID OUTSIDE OF THE BASE BID AS AN ADD ALTERNATE DUE TO ASSOCIATION WITH WATER QUALITY DEVICE.

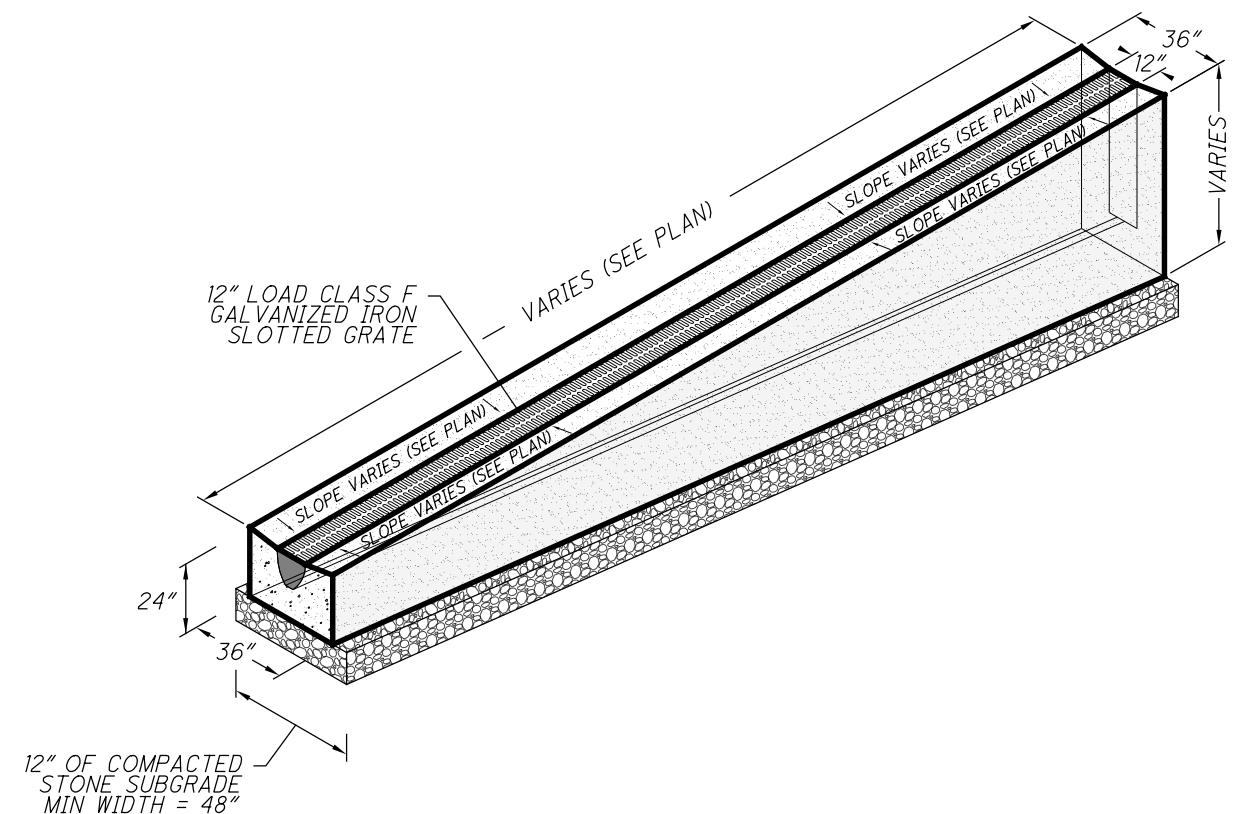
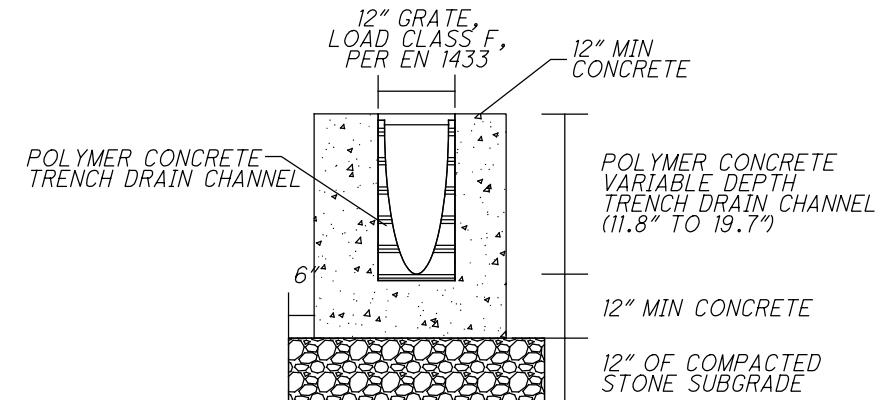


DOCK 24 VERTICAL PIPE HEATING ELEMENT CROSS SECTION DETAIL
N.T.S.



VERTICAL PIPE HEATING ELEMENT PLAN DETAIL
INTAKE PVC AND SUBSURFACE DI REMOVED FOR CLARITY
N.T.S.

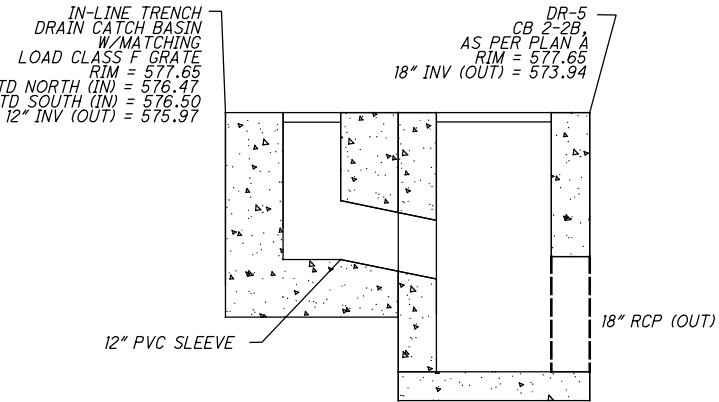
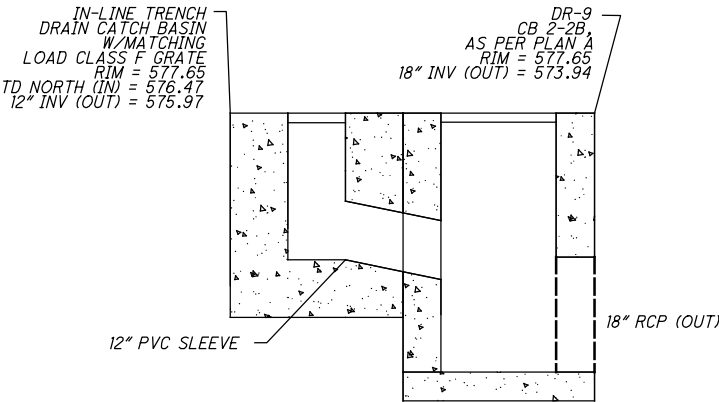
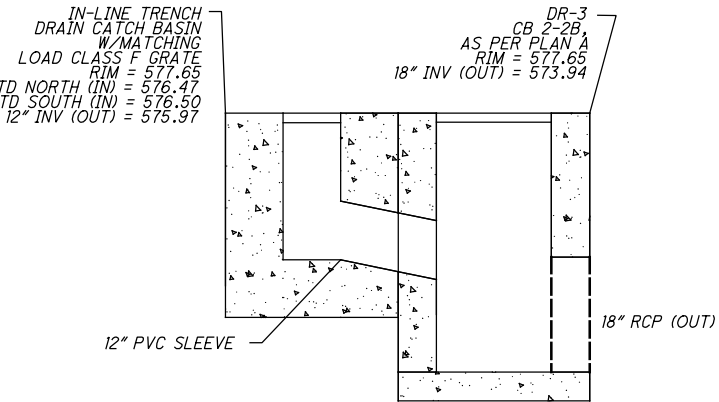
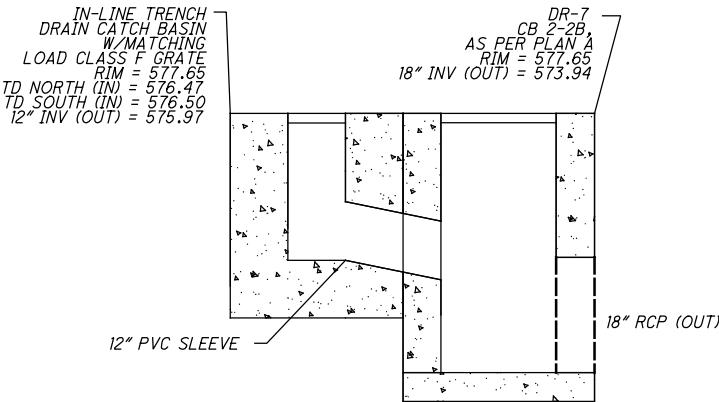
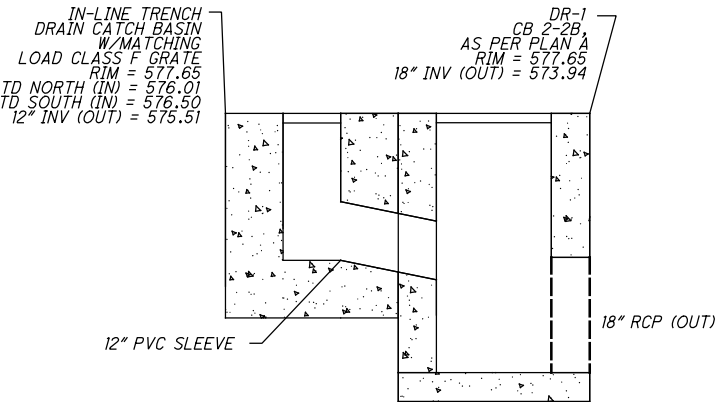
TRENCH DRAIN WITH STANDARD GRATE DETAIL
TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS
SEE SUPPLEMENTAL SPECIFICATIONS 839 AND 939



ISOMETRIC TRENCH DRAIN DETAIL
TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS
SEE SUPPLEMENTAL SPECIFICATIONS 839 AND 939

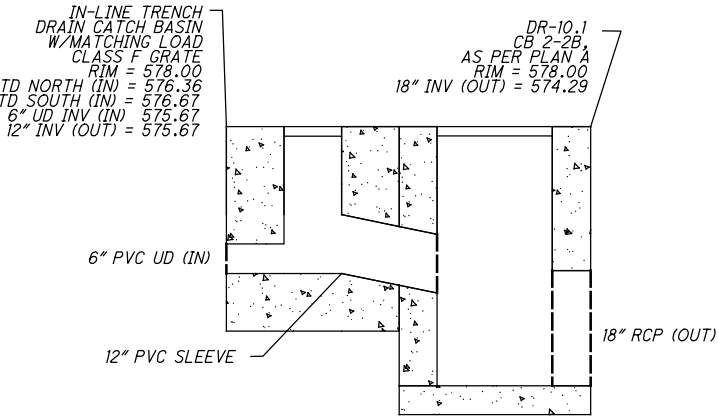
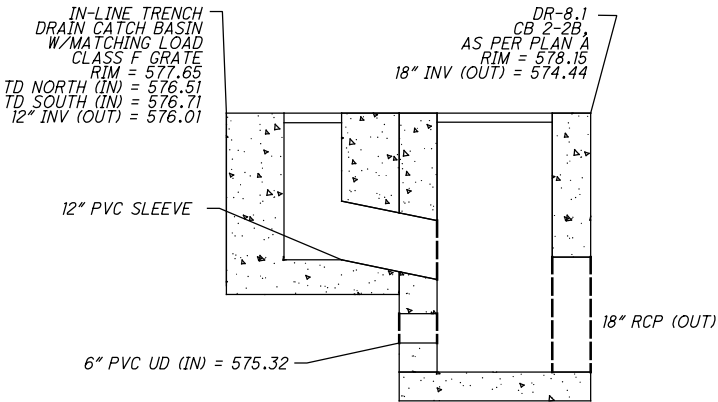
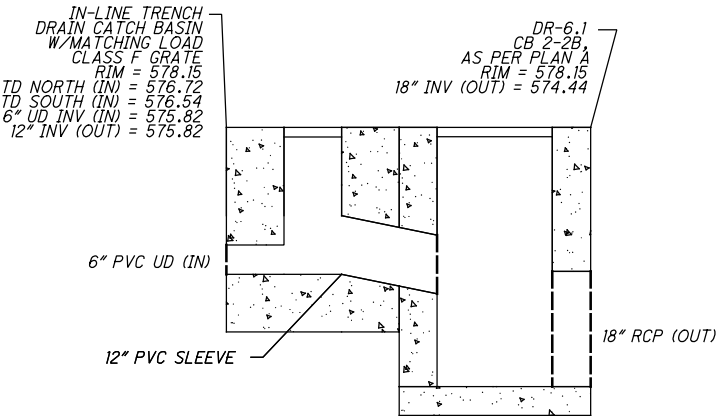
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DOCK 26W TRENCH DRAIN
CONNECTION DETAILS



NOTES:
1. LOAD CLASS F GRATE PER EN 1433.
2. PIPE OPENINGS SHALL BE GASKETED OR SEALED.

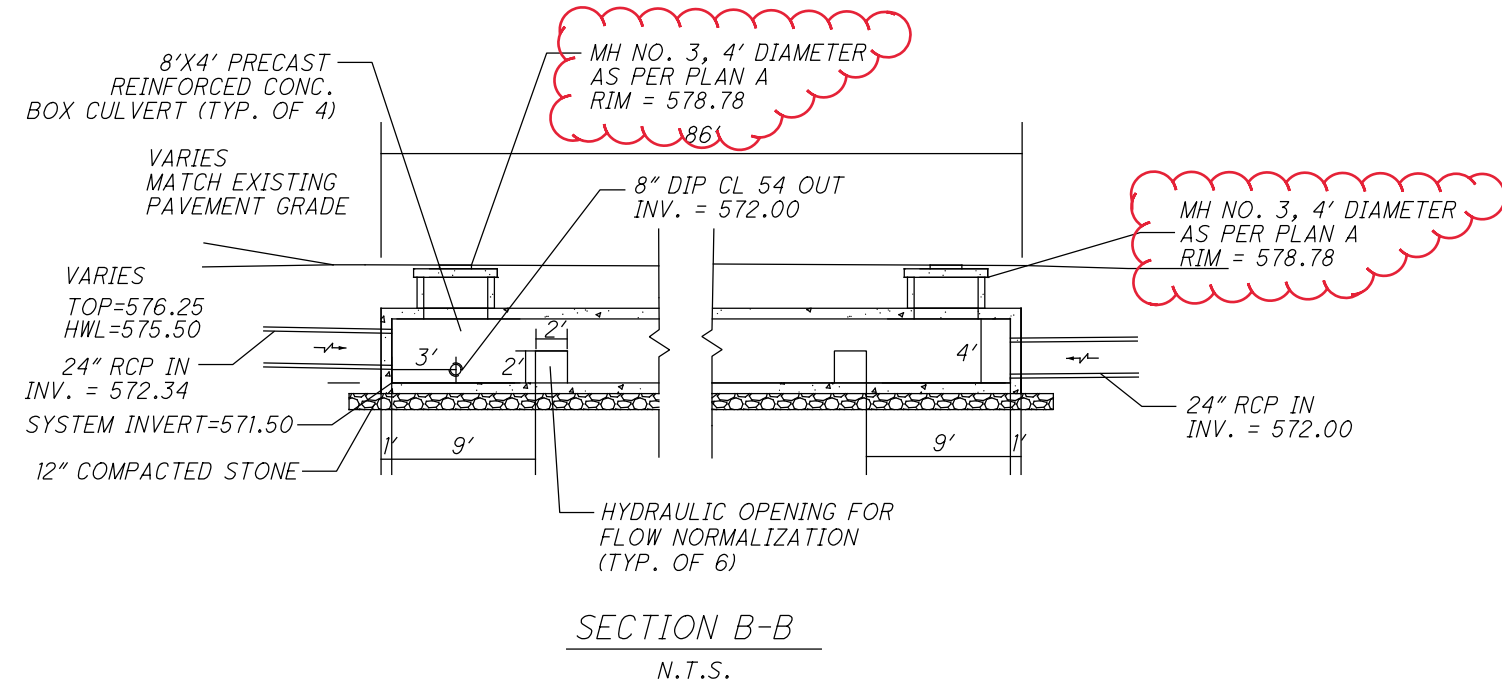
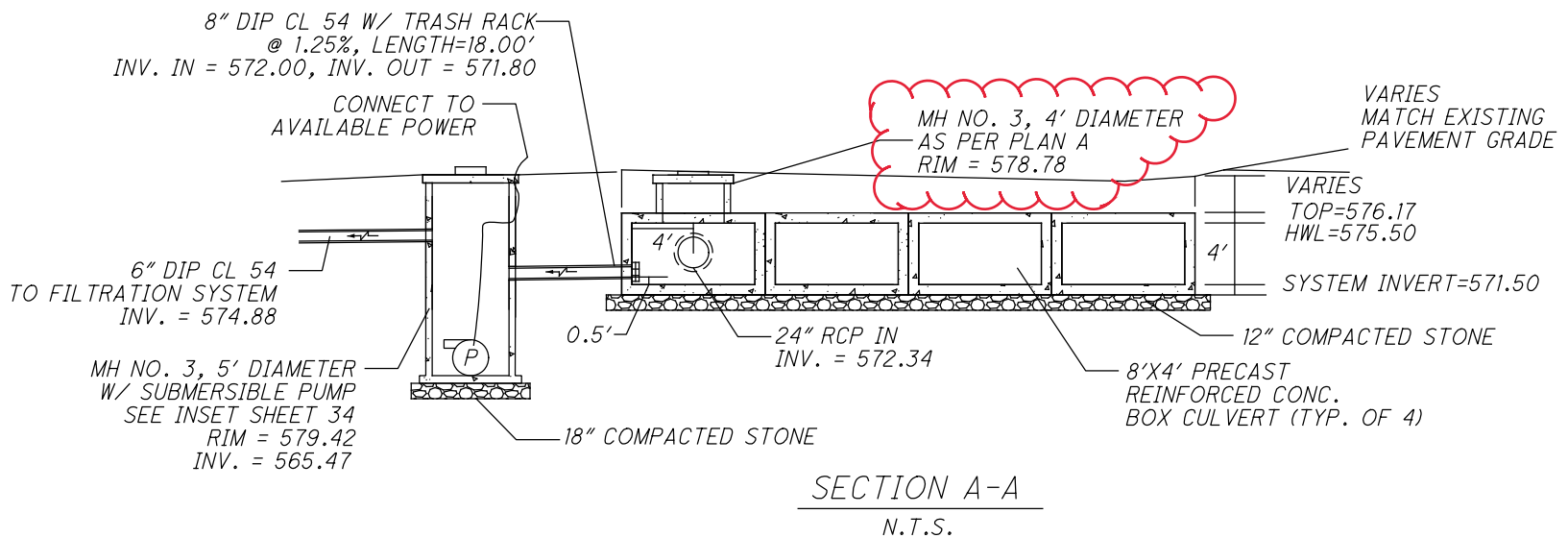
DOCK 24 TRENCH DRAIN/UNDERDRAIN OUTFALL
CONNECTION DETAILS



NOTES:
1. LOAD CLASS F GRATE PER EN 1433.
2. PIPE OPENINGS SHALL BE GASKETED OR SEALED.

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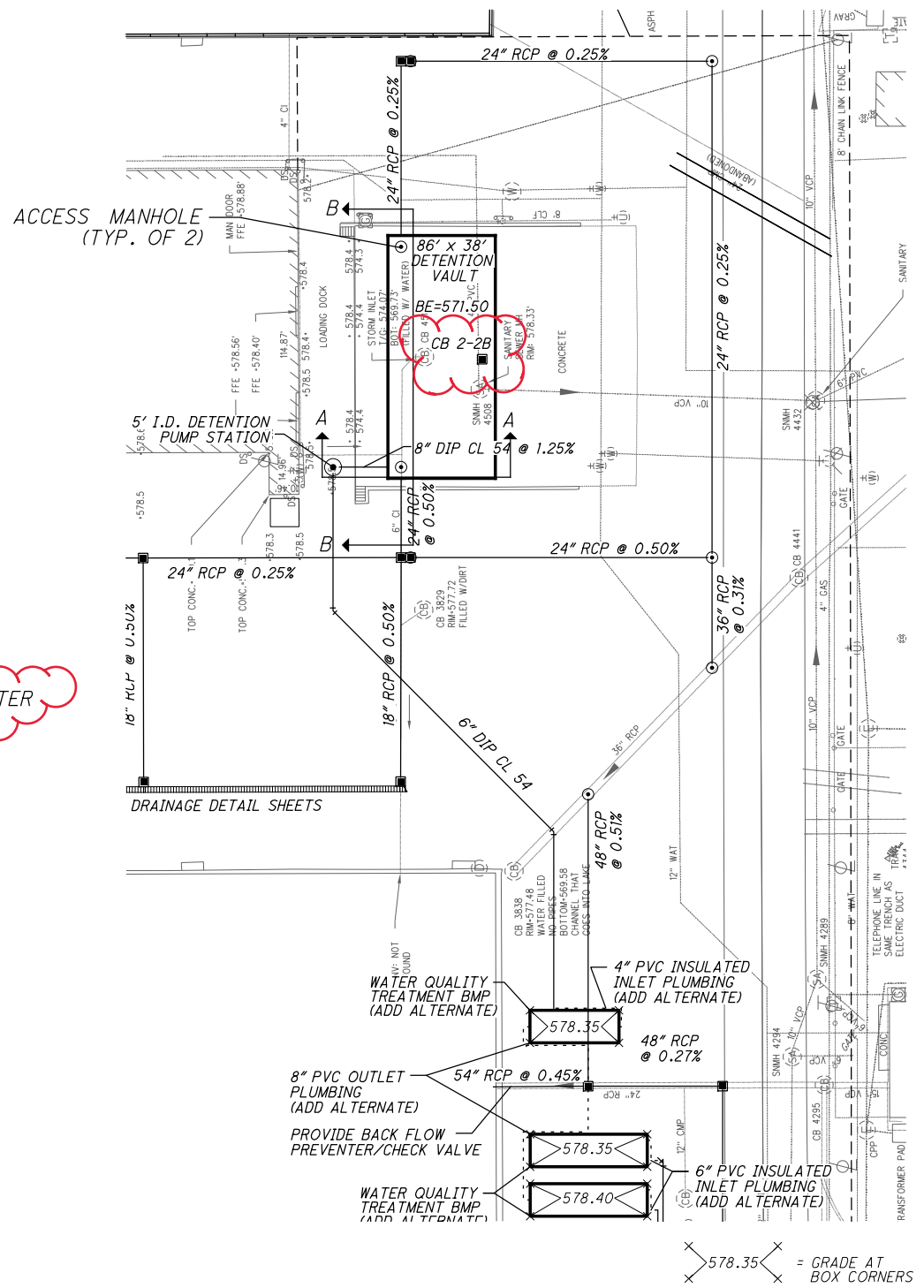
UNDERGROUND CONCRETE DETENTION VAULT DETAILS



- NOTES:
1. UNDERGROUND DETENTION STRUCTURE SHALL BE WATERTIGHT. SEAL ALL JOINTS BETWEEN CULVERT SECTION OR PROVIDE GASKETS.
 2. OUTSIDE WALLS SHALL BE SEALED WITH TYPE 2 WATERPROOFING MEMBRANE FOR 2' ON EACH SIDE OF JOINTS.
 3. TOP OF CULVERT SHALL BE SEALED WITH TYPE 3 WATERPROOFING MEMBRANE FOR 2' ON EACH SIDE OF JOINTS.
 4. ALL CONNECTIONS AND JOINTS SHALL BE LEAK RESISTANT.
 5. UPSTREAM PIPES SHALL BE GASKETED AND JOINTS GROUTED.

- NOTES (CONT.):
6. END BOX SECTIONS SHALL HAVE END WALLS.
 7. PRECAST REINFORCED CONCRETE BOX CULVERT SHALL BE DESIGNED TO SUPPORT A VEHICLE LOAD AT THE SURFACE OF 144K PER AXLE WITH 2 AXLES DISTRIBUTED THROUGH THE PAVEMENT AND EARTH TO THE CULVERT.

TREATMENT SYSTEM INSET DOCK 26W



1. UNDERGROUND DETENTION STRUCTURE SHALL BE WATERTIGHT. SEAL ALL JOINTS BETWEEN CULVERT SECTION OR PROVIDE GASKETS.
2. OUTSIDE WALLS SHALL BE SEALED WITH TYPE 2 WATERPROOFING MEMBRANE FOR 2' ON EACH SIDE OF JOINTS.
3. TOP OF CULVERT SHALL BE SEALED WITH TYPE 3 WATERPROOFING MEMBRANE FOR 2' ON EACH SIDE OF JOINTS.
4. ALL CONNECTIONS AND JOINTS SHALL BE LEAK RESISTANT.
5. UPSTREAM PIPES SHALL BE GASKETED AND JOINTS GROUTED.

6. END BOX SECTIONS SHALL HAVE END WALLS.

7. PRECAST REINFORCED CONCRETE BOX CULVERT SHALL BE DESIGNED TO SUPPORT A VEHICLE LOAD AT THE SURFACE OF 144K PER AXLE WITH 2 AXLES DISTRIBUTED THROUGH THE PAVEMENT AND EARTH TO THE CULVERT.

VARIES
MATCH EXISTING
PAVEMENT GRADE

MH NO. 3, 4' DIAMETER
AS PER PLAN A
RIM = 578.50

MH NO. 3, 4' DIAMETER
AS PER PLAN A
RIM = 578.43

VARIES
TOP=575.75
HWL=575.00

SYSTEM INVERT=571.00

12" DIP CL 54 OUT
INV. = 571.50

24" RCP IN
INV. = 571.96

— 8'X4' PRECAST
REINFORCED CONC.
BOX CULVERT (TYP. OF 6)

12" COMPACTED STONE

N.T.S.

8'X4' PRECAST
REINFORCED CONC.
BOX CULVERT (TYP. OF 6)

VARIES
MATCH EXISTING
PAVEMENT GRADE

TOP=575.75
HWL=575.00

SYSTEM INVERT=571.00

12" COMPACTED STONE

186'

MH NO. 3, 4' DIAMETER
AS PER PLAN A
RIM = 578.43

— CONNECT TO
AVAILABLE POWER

MH NO. 3, 6' DIAMETER
W/ SUBMERSIBLE PUMP
SEE INSET SHEET 35
RIM = 579.00
INV. = 564.15

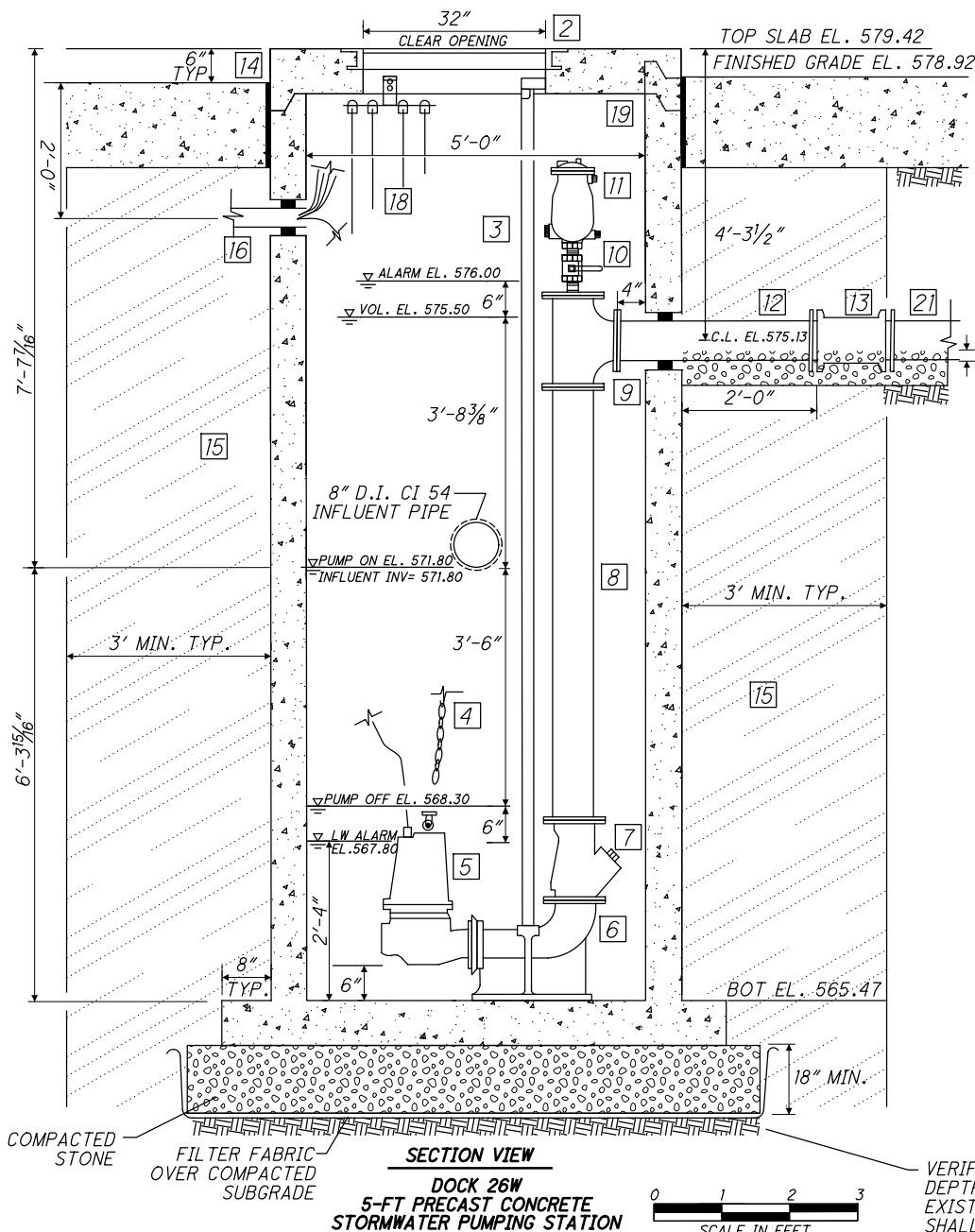
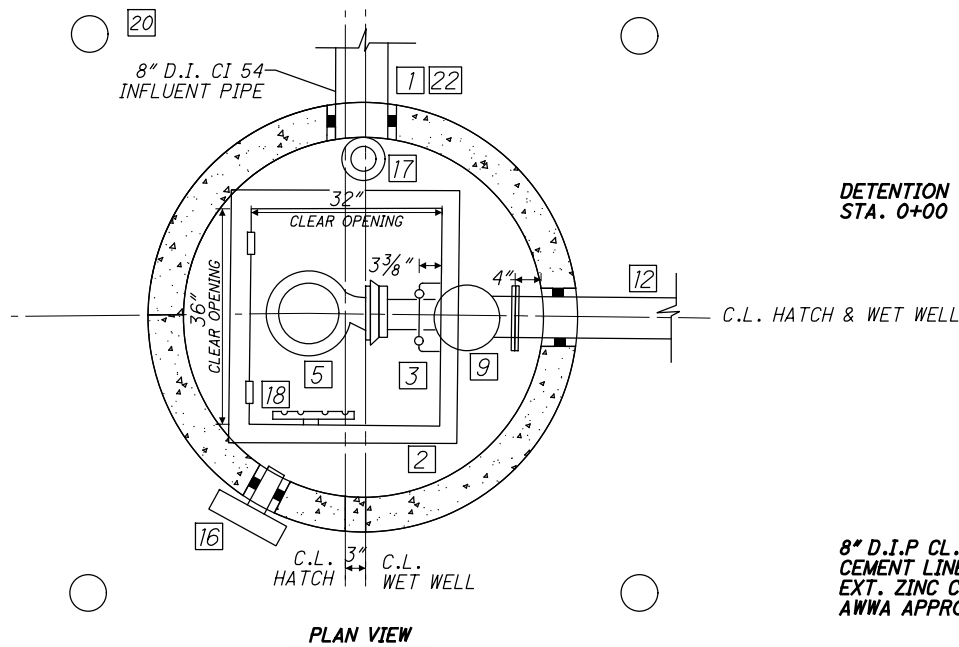
— (2) 6" DIP CL 54
TO FILTRATION SYSTEM
INV. = 574.34

12" DIP CL 54 W/ TRASH RACK
@ 2.00%, LENGTH=5.00'
INV. IN=571.50, INV. OUT=571.40

N.T.S.

[illegible]
$$\begin{array}{c} \times \\ \times \end{array} \rangle 578.35 \langle \begin{array}{c} \times \\ \times \end{array} = \text{GRADE AT BOX CORNERS}$$

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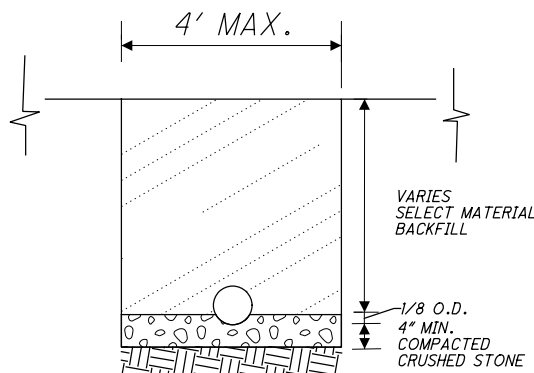


DETENTION VAULT
STA. 0+00

8" D.I.P. CL. 54
CEMENT LINED W/
EXT. ZINC COATING
AWWA APPROVED

PLACE BEDDING 1/8 O.D.

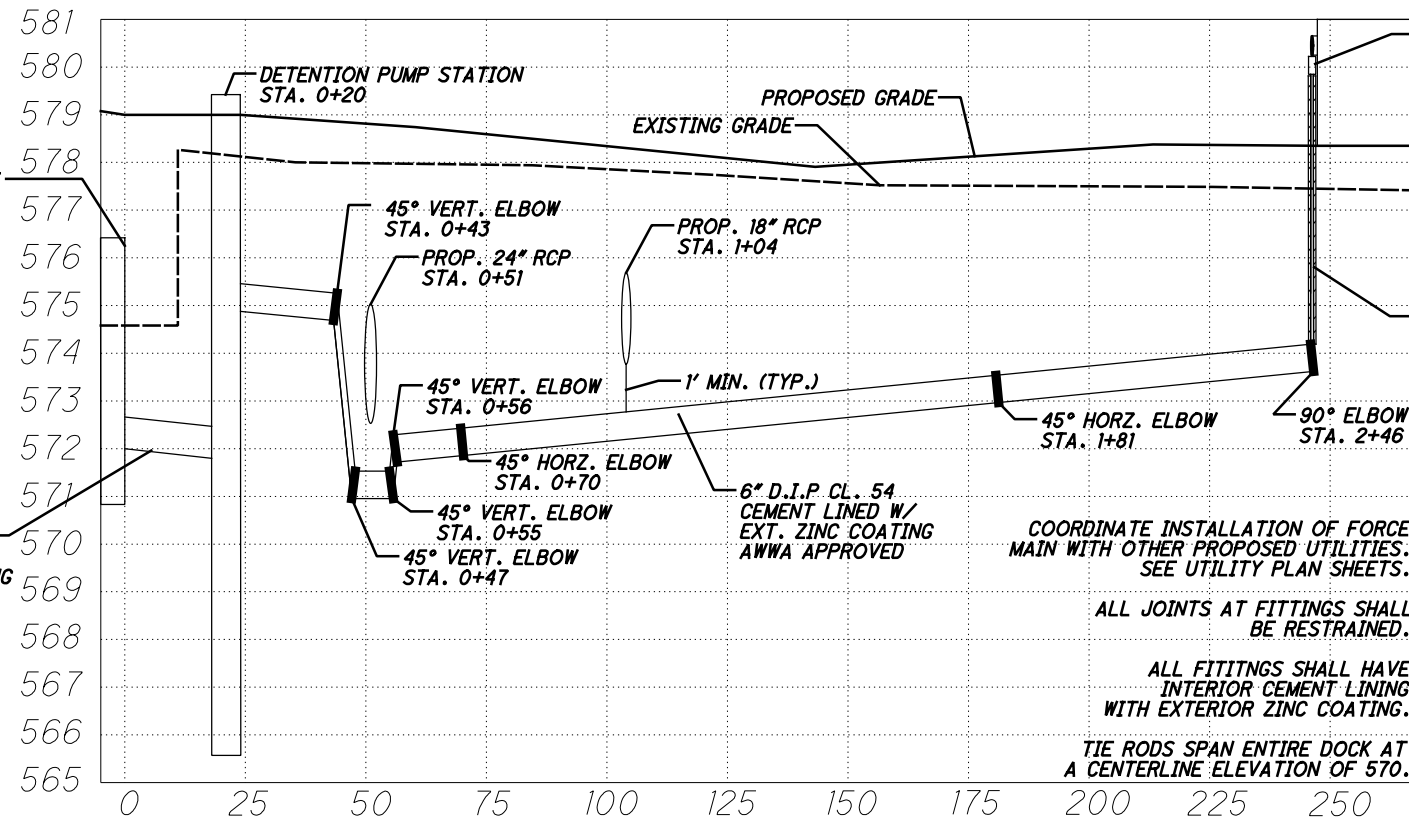
4" MIN. DEPTH
COMPACTED
CRUSHED STONE
BEDDING



- NOTES:
1. PLACE SELECT MATERIAL AT 8" LOOSE LIFTS AND COMPACT TO 95% PROCTOR DENSITY MIN.
 2. IF POOR SOILS ARE ENCOUNTERED, UNDERCUT AND BACKFILL WITH CRUSHED STONE AT 6" MAX. COMPACT LIFTS.
 3. FORCE MAIN SHALL BE LEAKAGE AND PRESSURE TESTED CONCURRENTLY IN ACCORDANCE WITH AWWA C600. TESTING PRESSURE = 20 PSI.

**DOCK 26W
FORCE MAIN TRENCH DETAIL
N.T.S**

VERIFY EXISTING SOILS AND REQUIRED STONE BEDDING DEPTH PRIOR TO PLACEMENT OF PRECAST WET WELL. EXISTING SOILS EVALUATION AND RECOMMENDATION SHALL BE PERFORMED BY A LICENSED SOILS ENGINEER.



CONNECT TO ABOVEGROUND FILTRATION SYSTEM PIPING PER MANUFACTURER RECOMMENDATION W/ HEAT TRACED INSULATION ON EXPOSED PLUMBING. SUPPORT ABOVE GROUND PIPING AS REQUIRED. (ADD ALTERNATE)

VERTICAL PIPE HEATING ELEMENT SEE SHEET 30 (ADD ALTERNATE)

COORDINATE INSTALLATION OF FORCE MAIN WITH OTHER PROPOSED UTILITIES. SEE UTILITY PLAN SHEETS.

ALL JOINTS AT FITTINGS SHALL BE RESTRAINED.

ALL FITTINGS SHALL HAVE INTERIOR CEMENT LINING WITH EXTERIOR ZINC COATING.

TIE RODS SPAN ENTIRE DOCK AT A CENTERLINE ELEVATION OF 570.

CONSTRUCTION SCHEDULE

- 1 WALL PENETRATION WITH LINK SEAL. NON-SHRINK GROUT ANNULAR SPACE INSIDE AND OUTSIDE, TYPICAL.
- 2 32" X 36" ANGLE FRAME ALUMINUM ACCESS COVER WITH AUTO LOCK 316 S.S. HOLD OPEN ARM, S.S. LIFT ASSIST, RECESSED LIFTING HANDLE, AND 316 S.S. SLAM LOCK WITH REMOVABLE KEY AND FALL PROTECTION. ALL HINGES AND HARDWARE SHALL BE 316 S.S.; HALLIDAY SIR3236 OR APPROVED EQUAL. COORDINATE HINGE LOCATION AND SLAM LOCK / PADLOCK PREFERENCE WITH OWNER PRIOR TO ORDER.
- 3 (2) 2" DIAMETER S.S. GUIDE RAILS WITH S.S. UPPER GUIDE RAIL BRACKET.
- 4 3/16" 304 S.S. LIFTING CHAIN WITH 304 S.S. SHACKLE AND ALLOY STEEL GRAB HOOK.
- 5 3 HP, 3 PHASE, 4" NON-CLOGGING SOLIDS HANDLING PUMP GOULDS WS30D4 SERIES, OR APPROVED EQUAL. VERIFY WITH STORMWATER TREATMENT SYSTEM MANUFACTURER PRIOR TO ORDER.
 - a. OPERATING POINT: 400 GPM @ 23 FT TDH.
 - b. SHUT OFF HEAD: 46 FT.
 - c. SECONDARY POINT: 480 GPM @ 16.5 FT TDH.
- 6 BASE WITH INTEGRAL CAST ELBOW. 6" 150# ANSI DISCHARGE FLANGE, EPOXY COATED.
- 7 6" DUCTILE IRON EPOXY COATED BALL CHECK VALVE. AWWA APPROVED.
- 8 6" FLANGE CEMENT LINED DUCTILE IRON EPOXY COATED PIPE. AWWA APPROVED.
- 9 6" X 6" D.I. FLANGE TEE, EPOXY COATED CEMENT LINED. AWWA APPROVED.
- 10 2" TAPPED BLIND FLANGE WITH (2) 2" BRASS NIPPLE, 2" FULL PORT BRONZE BALL VALVE WITH S.S. HANDLE.
- 11 2" WASTEWATER AUTOMATIC AIR RELEASE VALVE, EPOXY COATED CAST IRON OR COMPOSITE TYPE.
- 12 6" DUCTILE IRON SPOOL, CL 54 FLANGE X PE EPOXY COATED CEMENT LINED. AWWA APPROVED.
- 13 6" DUCTILE IRON SLEEVE, M.J. RESTRAINED JOINTS.
- 14 1/2" EXPANSION JOINT IN ACCORDANCE WITH PCA RULES AND PRACTICE. TYP.
- 15 APPROVED SELECT MATERIAL, PLACED AT 8" LOOSE LIFTS AND COMPACTED TO 95% THEORETICAL OPTIMAL DENSITY.
- 16 ELECTRICAL CONDUIT WITH LINK SEAL. COORDINATE SIZE AND LOCATION PRIOR TO CORE DRILL. PROVIDE ABOVE GROUND JUNCTION BOX. COORDINATE LOCATION WITH OWNER.
- 17 3" STEEL POWDER COATED MUSHROOM AIR VENT WITH LINK SEAL AND NON-SHRINK GROUT ANNULAR SPACE.
- 18 304 S.S. FLOAT BRACKET WITH (4) CORD GRIPS.
- 19 JOINT SEALANT PER ASTM C900, ASTM C443. FILL ANNULAR SPACE WITH NON-SHRINK GROUT, TYPICAL.
- 20 CONCRETE BOLLARD, TYPICAL.
- 21 6" DUCTILE IRON CL 54 CEMENT LINED ZINC COATED FORCE MAIN. AWWA APPROVED.
- 22 8" DUCTILE IRON SLEEVE, M.J. RESTRAINED JOINTS.

FIELD QUALITY CONTROL

MANUFACTURER'S FIELD SERVICE:

1. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, TEST, AND ADJUST COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS. REPORT RESULTS IN WRITING.

PERFORM TESTS, INSPECTIONS AND PREPARE TEST REPORTS:

1. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING.

TESTS AND INSPECTIONS:

1. AFTER INSTALLING PACKAGED STORMWATER PUMPING STATIONS AND AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST FOR COMPLIANCE WITH REQUIREMENTS. FURNISH WATER REQUIRED FOR PUMP TESTS.
2. LEAK TEST: AFTER INSTALLATION, CHARGE SYSTEMS AND TEST FOR LEAKS. REPAIR LEAKS AND RETEST UNTIL NO LEAKS EXIST. HYDROSTATICALLY TEST SYSTEM PIPING FOR LEAKS AT 20 PSIG.
3. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION.
4. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.

REMOVE AND REPLACE PACKAGED STORMWATER PUMPING STATIONS THAT DO NOT PASS TESTS AND INSPECTIONS AND RETEST AS SPECIFIED ABOVE.

STARTUP SERVICE

ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO PERFORM STARTUP SERVICE:

1. COMPLETE INSTALLATION AND STARTUP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
2. ADJUST PUMP, ACCESSORY, AND CONTROL SETTINGS, AND SAFETY AND ALARM DEVICES.
3. TEST EACH UNIT ON CLEAR WATER THROUGH MINIMUM OF FOUR COMPLETE CYCLES UNDER SUPERVISION OF MANUFACTURER'S REPRESENTATIVE AND IN PRESENCE OF ARCHITECT/ENGINEER. DEMONSTRATE THAT SYSTEM PERFORMANCE, CONTROL FUNCTIONS, AND ALARMS MEET SPECIFIED REQUIREMENTS.

EQUIPMENT ACCEPTANCE:

1. ADJUST, REPAIR, MODIFY, OR REPLACE COMPONENTS FAILING TO PERFORM AS SPECIFIED AND RERUN TESTS.
2. MAKE FINAL ADJUSTMENTS TO EQUIPMENT UNDER DIRECTION OF MANUFACTURER'S REPRESENTATIVE.

FURNISH INSTALLATION CERTIFICATE FROM EQUIPMENT MANUFACTURER'S REPRESENTATIVE ATTESTING THAT EQUIPMENT HAS BEEN PROPERLY INSTALLED AND IS READY FOR STARTUP AND TESTING.

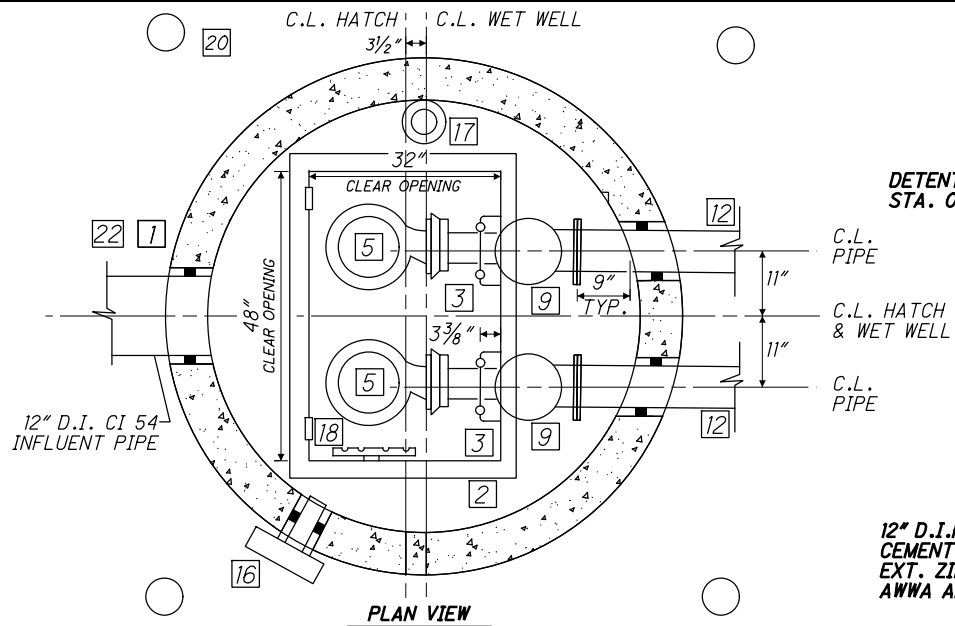
DEMONSTRATION

ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TRAIN OWNER'S MAINTENANCE PERSONNEL, MINIMUM OF ONE (1) DAY, TO ADJUST, OPERATE, AND MAINTAIN PACKAGED SEWAGE PUMPING STATIONS.

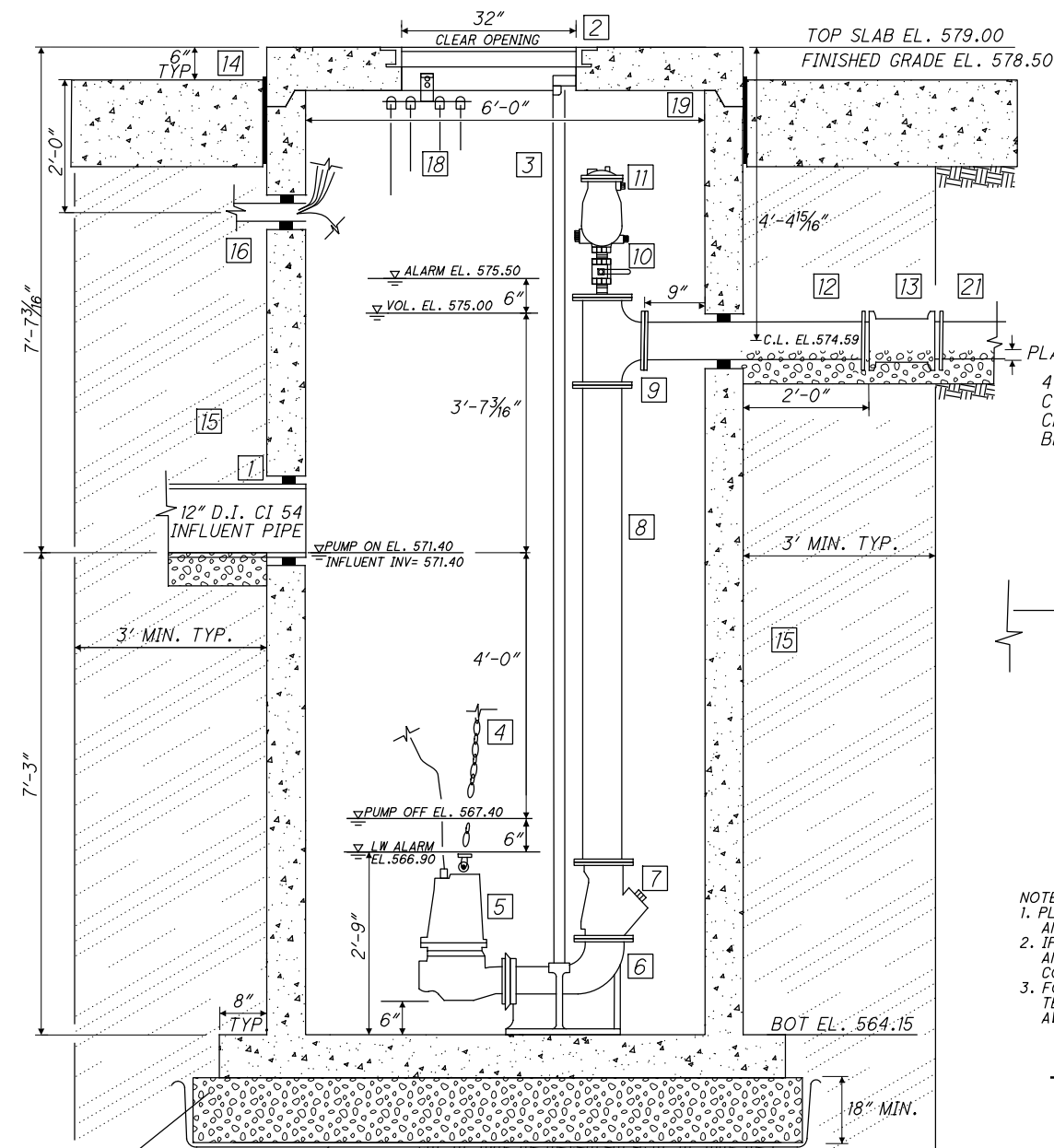
ADD ALTERNATE

INTERNAL COMPONENTS OF THE STORMWATER PUMP STATION SHALL BE INSTALLED AT THE OWNERS DISCRETION AS DETERMINED BY THE BASE BID.

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PLAN VIEW



SECTION VIEW

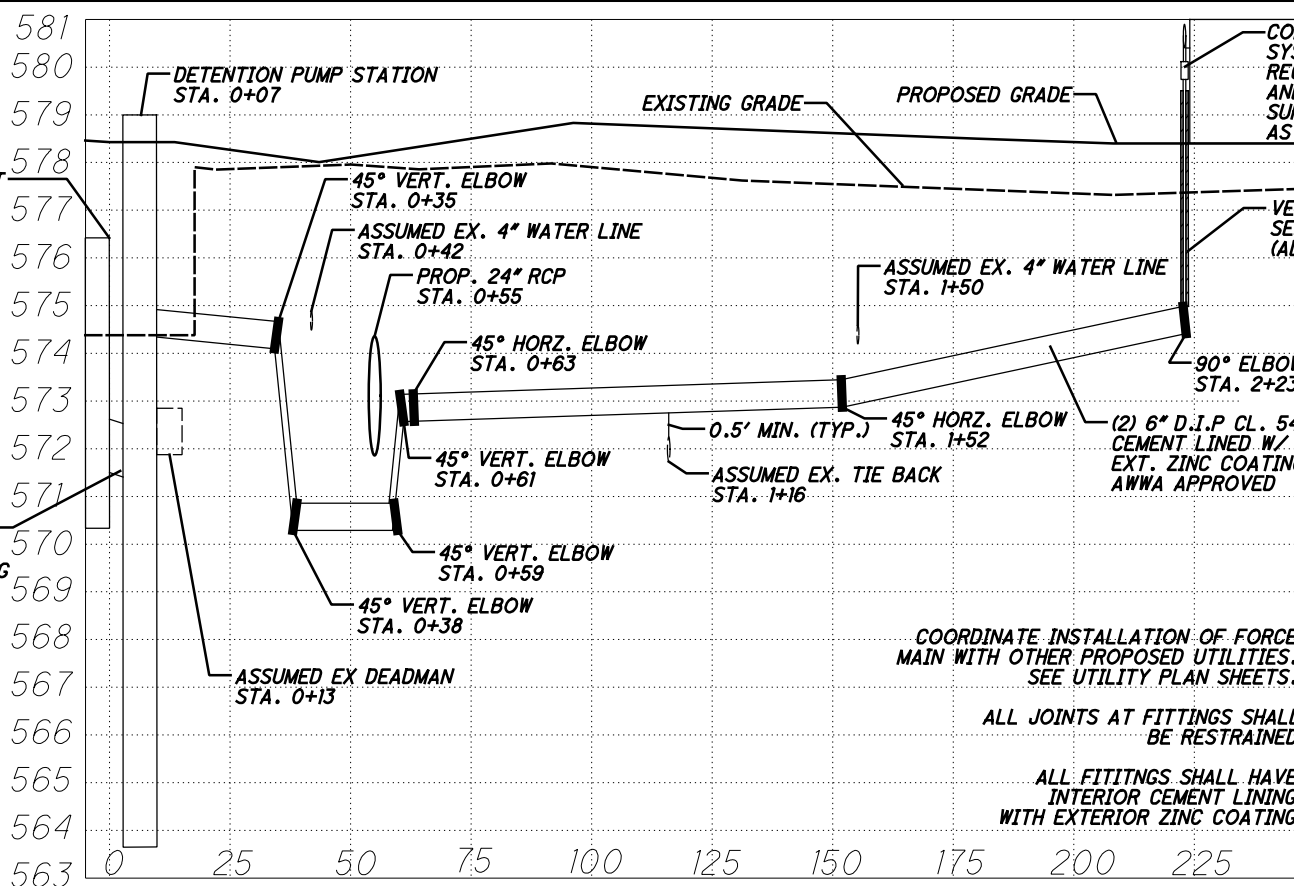
DOCK 24
6-FT PRECAST CONCRETE
STORMWATER PUMPING STATION



VERIFY EXISTING SOILS AND REQUIRED STONE BEDDING DEPTH PRIOR TO PLACEMENT OF PRECAST WET WELL. EXISTING SOILS EVALUATION AND RECOMMENDATION SHALL BE PERFORMED BY A LICENSED SOILS ENGINEER.

- NOTES:
1. PLACE SELECT MATERIAL AT 8" LOOSE LIFTS AND COMPACT TO 95% PROCTOR DENSITY MIN.
 2. IF POOR SOILS ARE ENCOUNTERED, UNDERCUT AND BACKFILL WITH CRUSHED STONE AT 6" MAX. COMPACT LIFTS.
 3. FORCE MAIN SHALL BE LEAKAGE AND PRESSURE TESTED CONCURRENTLY IN ACCORDANCE WITH AWWA C600. TEST PRESSURE= 20 PSI.

DOCK 24
FORCE MAIN TRENCH DETAIL
N.T.S.



CONSTRUCTION SCHEDULE

- 1 WALL PENETRATION WITH LINK SEAL. NON-SHRINK GROUT ANNULAR SPACE INSIDE AND OUTSIDE, TYPICAL.
- 2 32" X 48" ANGLE FRAME ALUMINUM ACCESS COVER WITH AUTO LOCK 316 S.S. HOLD OPEN ARM, S.S. LIFT ASSIST, RECESSED LIFTING HANDLE, AND 316 S.S. SLAM LOCK WITH REMOVABLE KEY AND FALL PROTECTION. ALL HINGES AND HARDWARE SHALL BE 316 S.S.; HALLIDAY SIR3248 OR APPROVED EQUAL. COORDINATE HINGE LOCATION AND SLAM LOCK / PADLOCK PREFERENCE WITH OWNER PRIOR TO ORDER.
- 3 (2) 2" DIAMETER S.S. GUIDE RAILS WITH S.S. UPPER GUIDE RAIL BRACKET.
- 4 3/16" 304 S.S. LIFTING CHAIN WITH 304 S.S. SHACKLE AND ALLOY STEEL GRAB HOOK.
- 5 5 HP, 3 PHASE, 4" NON-CLOGGING SOLIDS HANDLING PUMP; GOULDS WSS04 SERIES, OR APPROVED EQUAL. VERIFY WITH STORMWATER TREATMENT SYSTEM MANUFACTURER PRIOR TO ORDER.
 - a. OPERATING POINT: 445 GPM @ 25 FT TDH.
 - b. SHUT OFF HEAD: 51.5 FT.
 - c. SECONDARY POINT: 530 GPM @ 19.7 FT TDH.
- 6 BASE WITH INTEGRAL CAST ELBOW. 6" 150# ANSI DISCHARGE FLANGE, EPOXY COATED.
- 7 6" DUCTILE IRON EPOXY COATED BALL CHECK VALVE. AWWA APPROVED.
- 8 6" FLANGE CEMENT LINED DUCTILE IRON EPOXY COATED PIPE. AWWA APPROVED.
- 9 6" X 6" D.I. FLANGE TEE, EPOXY COATED CEMENT LINED. AWWA APPROVED.
- 10 2" TAPPED BLIND FLANGE WITH (2) 2" BRASS NIPPLE, 2" FULL PORT BRONZE BALL VALVE WITH S.S. HANDLE.
- 11 2" WASTEWATER AUTOMATIC AIR RELEASE VALVE, EPOXY COATED CAST IRON OR COMPOSITE TYPE.
- 12 6" DUCTILE IRON SPOOL, CL 54 FLANGE X PE EPOXY COATED CEMENT LINED. AWWA APPROVED.
- 13 6" DUCTILE IRON SLEEVE, M.J. RESTRAINED JOINTS.
- 14 1/2" EXPANSION JOINT IN ACCORDANCE WITH PCA RULES AND PRACTICE. TYP.
- 15 APPROVED SELECT MATERIAL, PLACED AT 8" LOOSE LIFTS AND COMPACTED TO 95% THEORETICAL OPTIMAL DENSITY.
- 16 ELECTRICAL CONDUIT WITH LINK SEAL. COORDINATE SIZE AND LOCATION PRIOR TO CORE DRILL. PROVIDE ABOVE GROUND JUNCTION BOX. COORDINATE LOCATION WITH OWNER.
- 17 3" STEEL POWDER COATED MUSHROOM AIR VENT WITH LINK SEAL AND NON-SHRINK GROUT ANNULAR SPACE.
- 18 304 S.S. FLOAT BRACKET WITH (4) CORD GRIPS.
- 19 JOINT SEALANT PER ASTM C900, ASTM C443. FILL ANNULAR SPACE WITH NON-SHRINK GROUT, TYPICAL.
- 20 CONCRETE BOLLARD, TYPICAL.
- 21 6" DUCTILE IRON CL 54 CEMENT LINED ZINC COATED FORCE MAIN. AWWA APPROVED.
- 22 12" DUCTILE IRON SLEEVE, M.J. RESTRAINED JOINTS.

FIELD QUALITY CONTROL

- MANUFACTURER'S FIELD SERVICE:
1. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, TEST, AND ADJUST COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS. REPORT RESULTS IN WRITING.
- PERFORM TESTS, INSPECTIONS AND PREPARE TEST REPORTS:
1. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING.
- TESTS AND INSPECTIONS:
1. AFTER INSTALLING PACKAGED STORMWATER PUMPING STATIONS AND AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST FOR COMPLIANCE WITH REQUIREMENTS. FURNISH WATER REQUIRED FOR PUMP TESTS.
 2. LEAK TEST: AFTER INSTALLATION, CHARGE SYSTEMS AND TEST FOR LEAKS. REPAIR LEAKS AND RETEST UNTIL NO LEAKS EXIST. HYDROSTATICALLY TEST SYSTEM PIPING FOR LEAKS AT 20 PSIG.
 3. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION.
 4. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.

REMOVE AND REPLACE PACKAGED STORMWATER PUMPING STATIONS THAT DO NOT PASS TESTS AND INSPECTIONS AND RETEST AS SPECIFIED ABOVE.

STARTUP SERVICE

- ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO PERFORM STARTUP SERVICE:
1. COMPLETE INSTALLATION AND STARTUP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
 2. ADJUST PUMP, ACCESSORY, AND CONTROL SETTINGS, AND SAFETY AND ARM DEVICES.
 3. TEST EACH UNIT ON CLEAR WATER THROUGH MINIMUM OF FOUR COMPLETE CYCLES UNDER SUPERVISION OF MANUFACTURER'S REPRESENTATIVE AND IN PRESENCE OF ARCHITECT/ENGINEER. DEMONSTRATE THAT SYSTEM PERFORMANCE, CONTROL FUNCTIONS, AND ALARMS MEET SPECIFIED REQUIREMENTS.

EQUIPMENT ACCEPTANCE:

1. ADJUST, REPAIR, MODIFY, OR REPLACE COMPONENTS FAILING TO PERFORM AS SPECIFIED AND RERUN TESTS.
2. MAKE FINAL ADJUSTMENTS TO EQUIPMENT UNDER DIRECTION OF MANUFACTURER'S REPRESENTATIVE.

FURNISH INSTALLATION CERTIFICATE FROM EQUIPMENT MANUFACTURER'S REPRESENTATIVE ATTESTING THAT EQUIPMENT HAS BEEN PROPERLY INSTALLED AND IS READY FOR STARTUP AND TESTING.

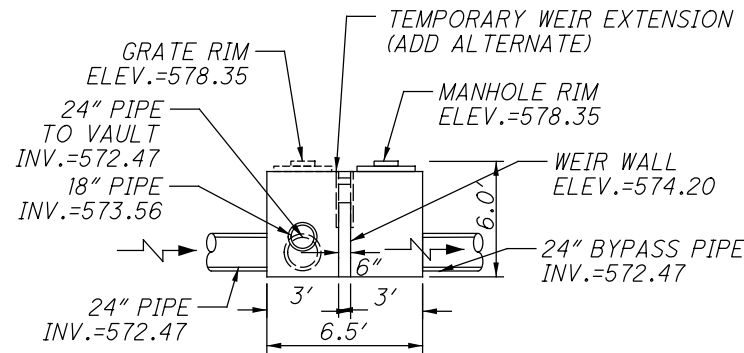
DEMONSTRATION

ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TRAIN OWNER'S MAINTENANCE PERSONNEL, MINIMUM OF ONE (1) DAY, TO ADJUST, OPERATE, AND MAINTAIN PACKAGED SEWAGE PUMPING STATIONS.

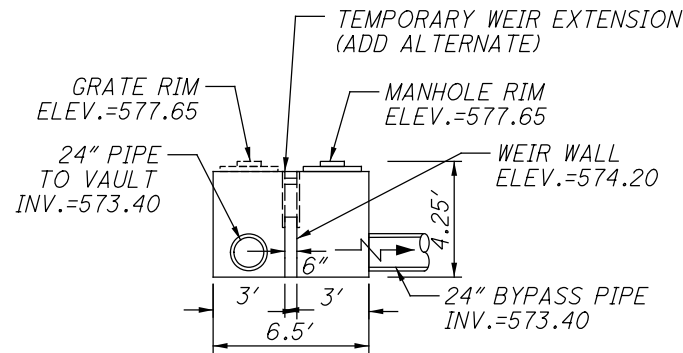
ADD ALTERNATE

INTERNAL COMPONENTS OF THE STORMWATER PUMP STATION SHALL BE INSTALLED AT THE OWNER'S DISCRETION AS DETERMINED BY THE BASE BID.

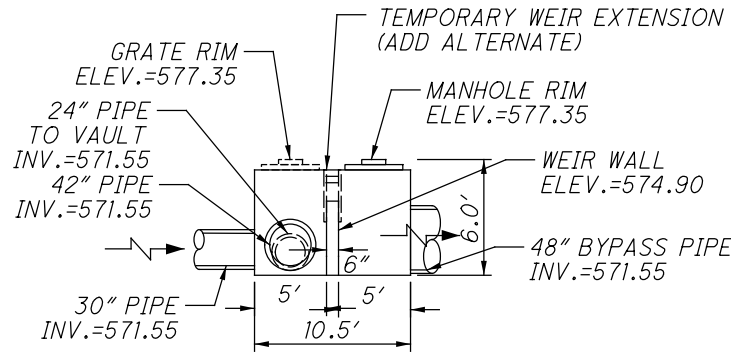
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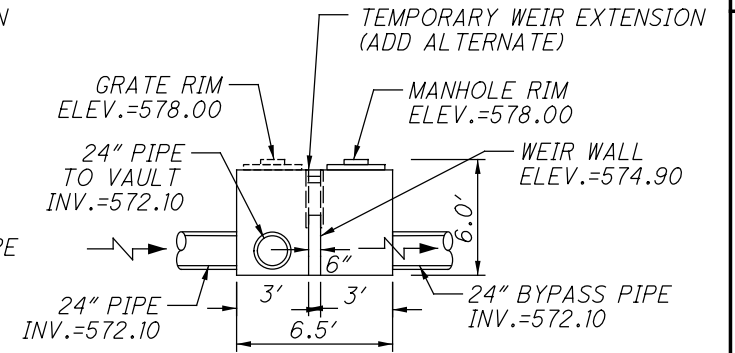
UNDERGROUND ELEVATION DR-10
DUAL CB 2-3, AS PER PLAN A
N.T.S.



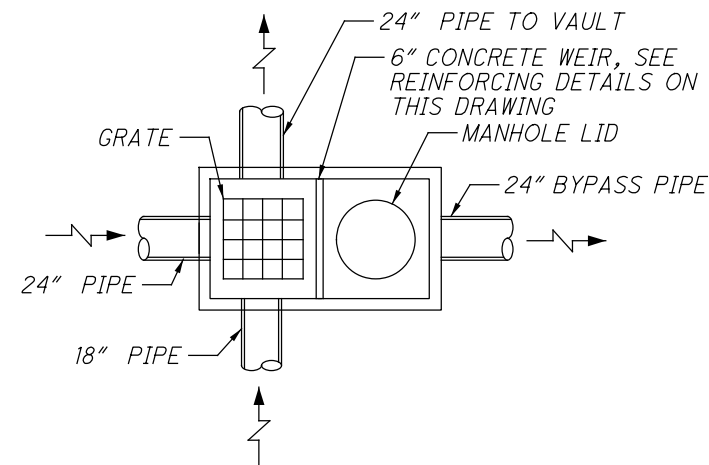
UNDERGROUND ELEVATION DR-14
DUAL CB 2-3, AS PER PLAN A
N.T.S.



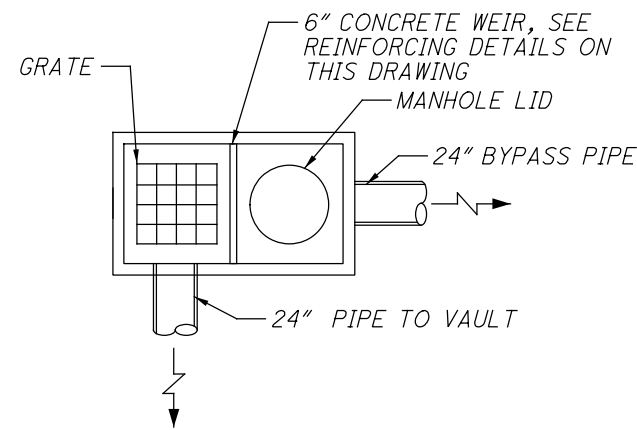
UNDERGROUND ELEVATION DR-9.1
DUAL CB 2-5, AS PER PLAN A
N.T.S.



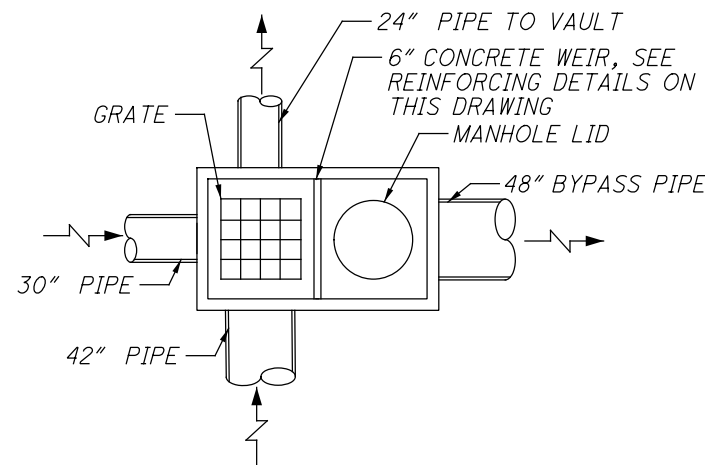
UNDERGROUND ELEVATION DR-4.1
DUAL CB 2-3, AS PER PLAN A
N.T.S.



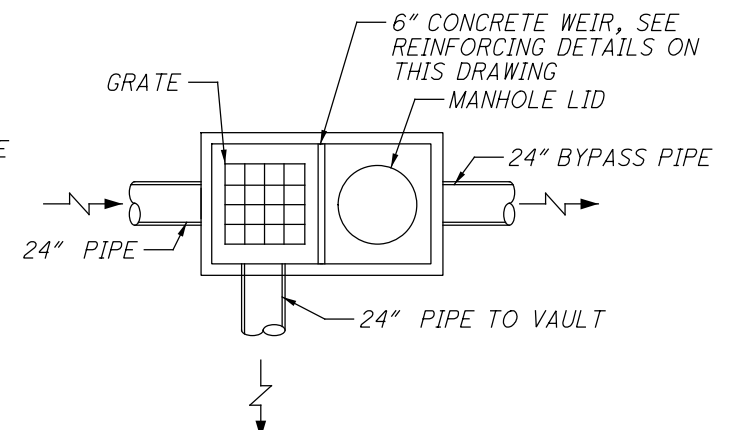
DR-10 PLAN
N.T.S.



DR-14 PLAN
N.T.S.



DR-9.1 PLAN
N.T.S.

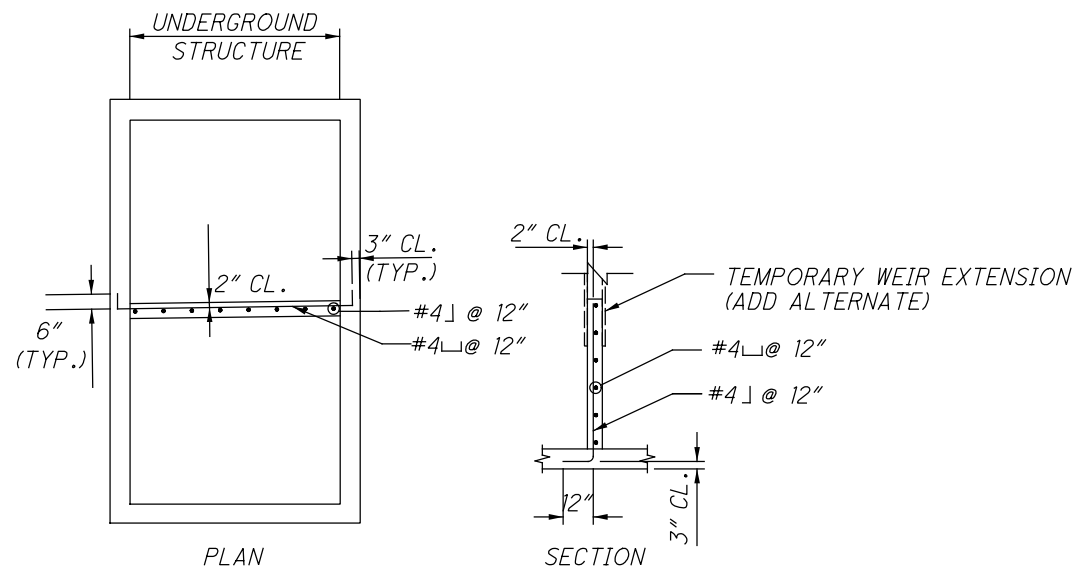


DR-4.1 PLAN
N.T.S.

- NOTES:
1. PIPE AND HYDRAULIC OPENINGS SHALL BE GASKETED OR SEALED.
 2. UPSTREAM PIPES SHALL BE GASKETED AND JOINTS GROUTED.

ADD ALTERNATE TEMPORARY DRAINAGE NOTES:

1. THE CONCRETE WEIR SHALL BE EXTENDED TO THE TOP OF THE STRUCTURE TO DIRECT ALL RUNOFF INTO THE BYPASS PIPE. THIS WORK IS OUTSIDE OF THE BASE BID AND WILL BE PAID AS AN ADD ALTERNATE DUE TO THE ASSOCIATION WITH THE WATER QUALITY TREATMENT DEVICES.
 - 1a. EXTENTION IS ANTICIPATED TO BE METALLIC AND MECHANICALLY AFFIXED TO THE CONCRETE WEIR. SEE DETAILS THIS SHEET FOR INTENT.
2. EXTENSION IS TO BE MADE WATERTIGHT.
3. EXTENSION IS TEMPORARY AND IS TO BE REMOVED DURING INSTALLATION OF THE WATER QUALITY DEVICES.

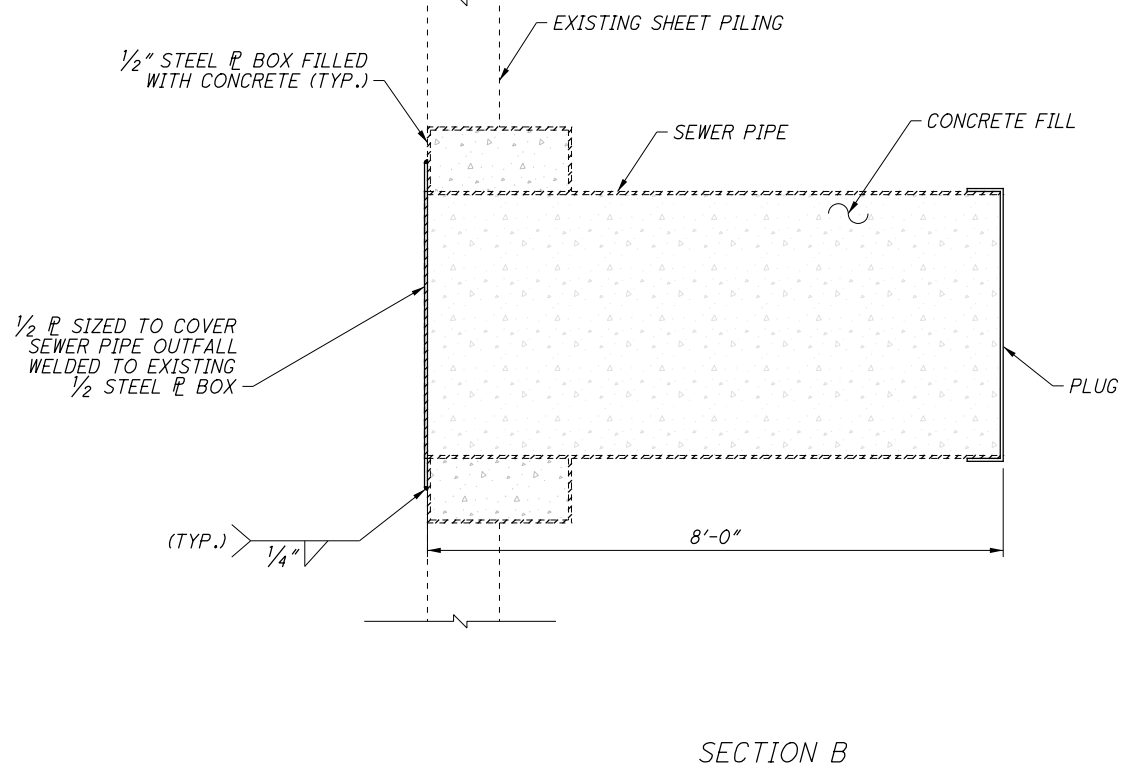
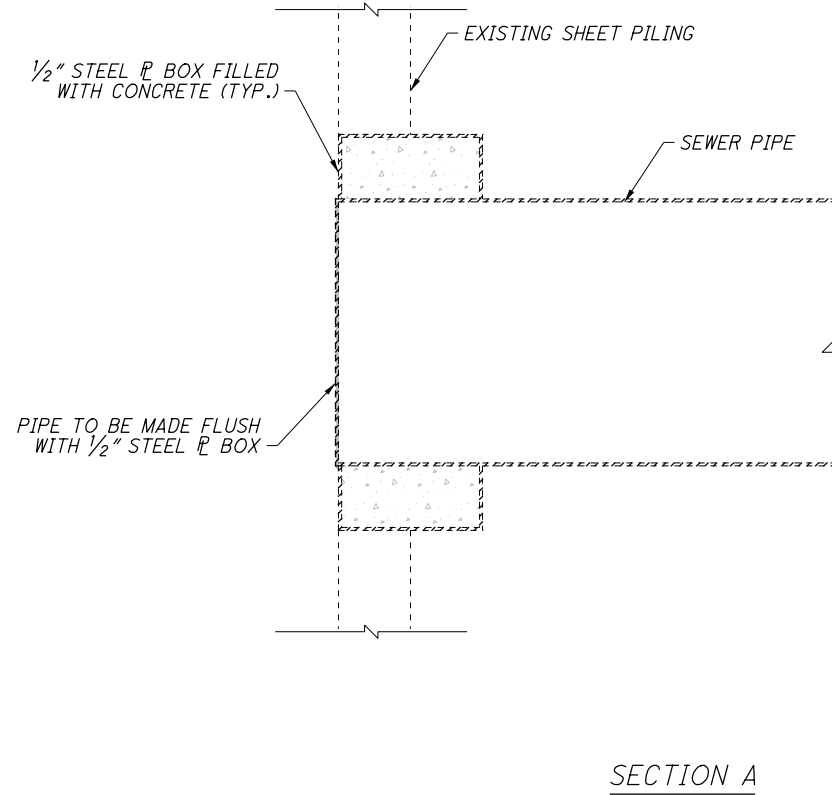
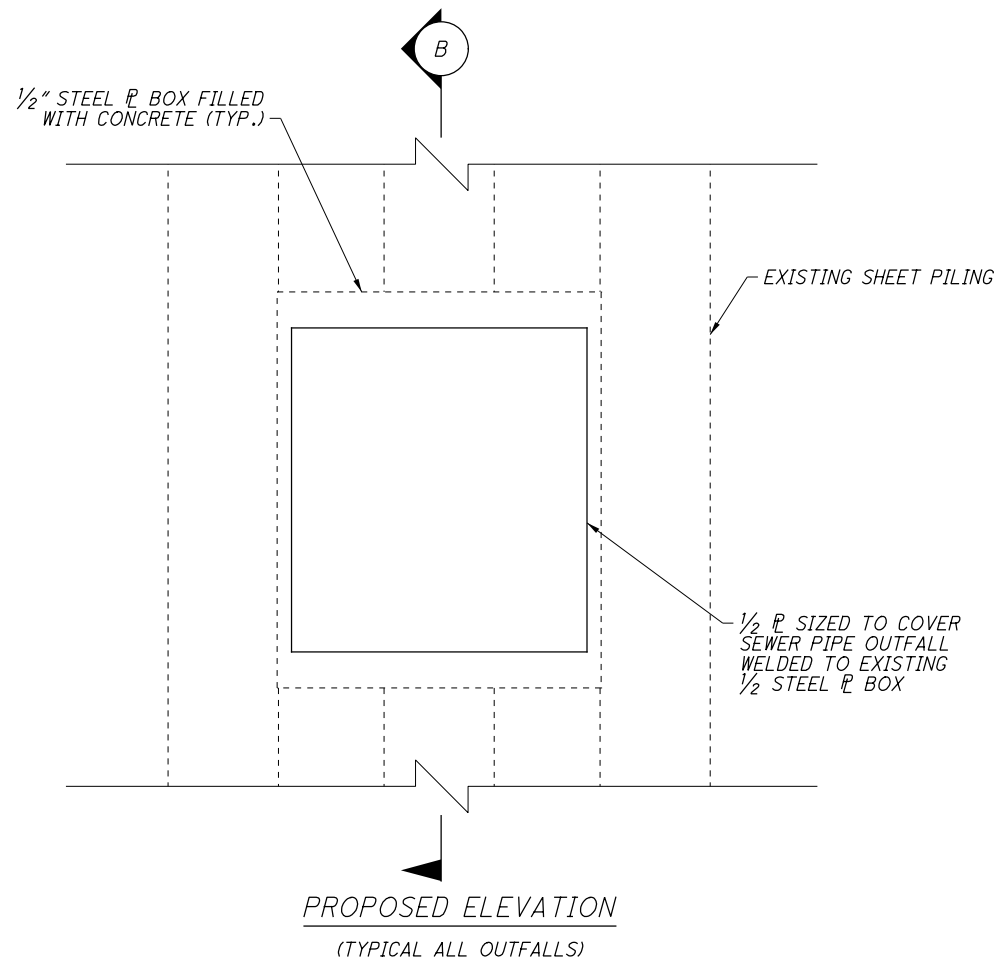
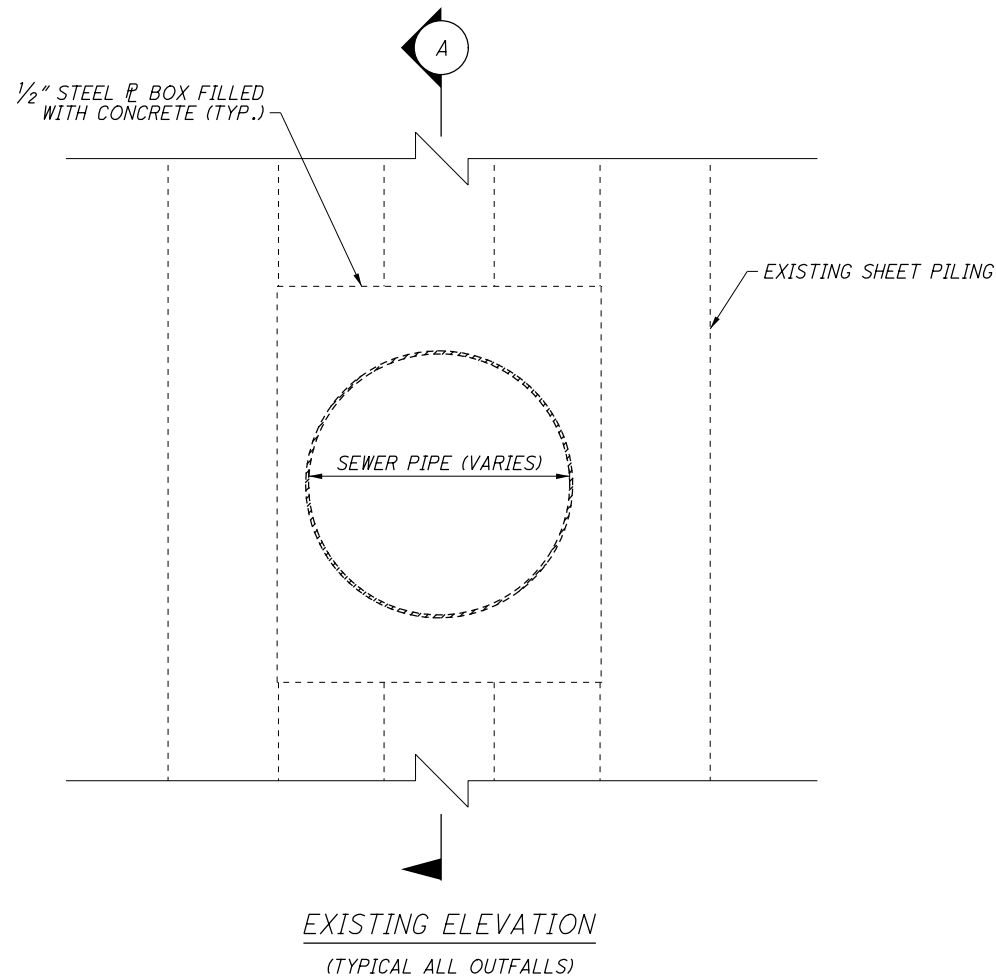


PLAN

SECTION

WEIR WALL REINFORCING DETAILS
N.T.S.

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NOTES:
1. DETAIL SHOWN IS TYPICAL OF MOST WALL PENETRATIONS. HOWEVER, SMALLER PENETRATIONS MAY GO DIRECTLY THROUGH THE SHEET PILE. IN THESE CASES, A 1/2" PLATE THAT EXTENDS AT LEAST 1" PAST THE OPENING SHALL BE WELDED TO THE SHEET PILE.
2. SOME OUTFALL PIPES HAVE BEEN REPAIRED IN THE PAST AND MAY INCLUDE VARYING AMOUNTS OF GROUT, MORTAR, CONCRETE COLLARS OR OTHER FORMS OF SEALS. THIS MATERIAL SHALL BE REMOVED AS NEEDED TO FACILITATE SEALING THE OPENING.
3. AS AN ALTERNATIVE TO PLUGGING AND FILLING THE LAST SECTION OF PIPE, THE ENTIRE PIPE MAY BE REMOVED WITHOUT DAMAGING THE EXISTING STEEL PLATE BOX OR SHEET PILE