

APPENDIX 1  
DRAWING LIST

## LIST OF DRAWINGS

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C-3	DROP SHAFT 213 CONSOLIDATION CONDUIT PLAN AND PROFILE III: STA 4+00 - 8+00
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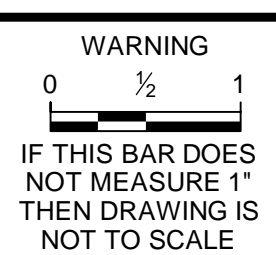
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BY: JAIME PAYNE

DWG FILE: J:\6412 NBC CSO Consolidation Conduits\Drawing Files\Civil\Sheet Set\PAWT\_III\4\_III\5\_LIST\_OF\_DRAWINGS.dwg PLOT DATE: Thursday, July 23, 2021 8:48:20 AM

1	5/13/20	JP	STANTEC COMMENTS
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DESIGNED	C. CRONIN
DRAWN	J. PAYNE
CHECKED	J. D'ALESSIO

FINAL DESIGN - JULY 2021



NBC CONTRACT NO 308.04C  
GENERAL

DROP SHAFT 213 CONSOLIDATION CONDUIT  
LIST OF DRAWINGS

SHEET  
G-1  
195130227

APPENDIX 2  
SPECIFICATION LIST

**NARRAGANSETT BAY COMMISSION  
CSO PHASE IIIA-4  
OF-210/213/214 FACILITIES  
CONTRACT NO. 308.04C**

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**Appendix A – Geotechnical Data Report**

**Appendix B – Environmental Technical Memo**

**Appendix C – RIPDES Stormwater Permit**

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**Appendix E - Soil Erosion And Sediment Control Plan**

APPENDIX 3  
GEOTECHNICAL DATA REPORT  
(SEPARATE COVER)



## APPENDIX 4

### **NEW DESIGN ICM RESULTS AND CDF MODEL RESULTS**

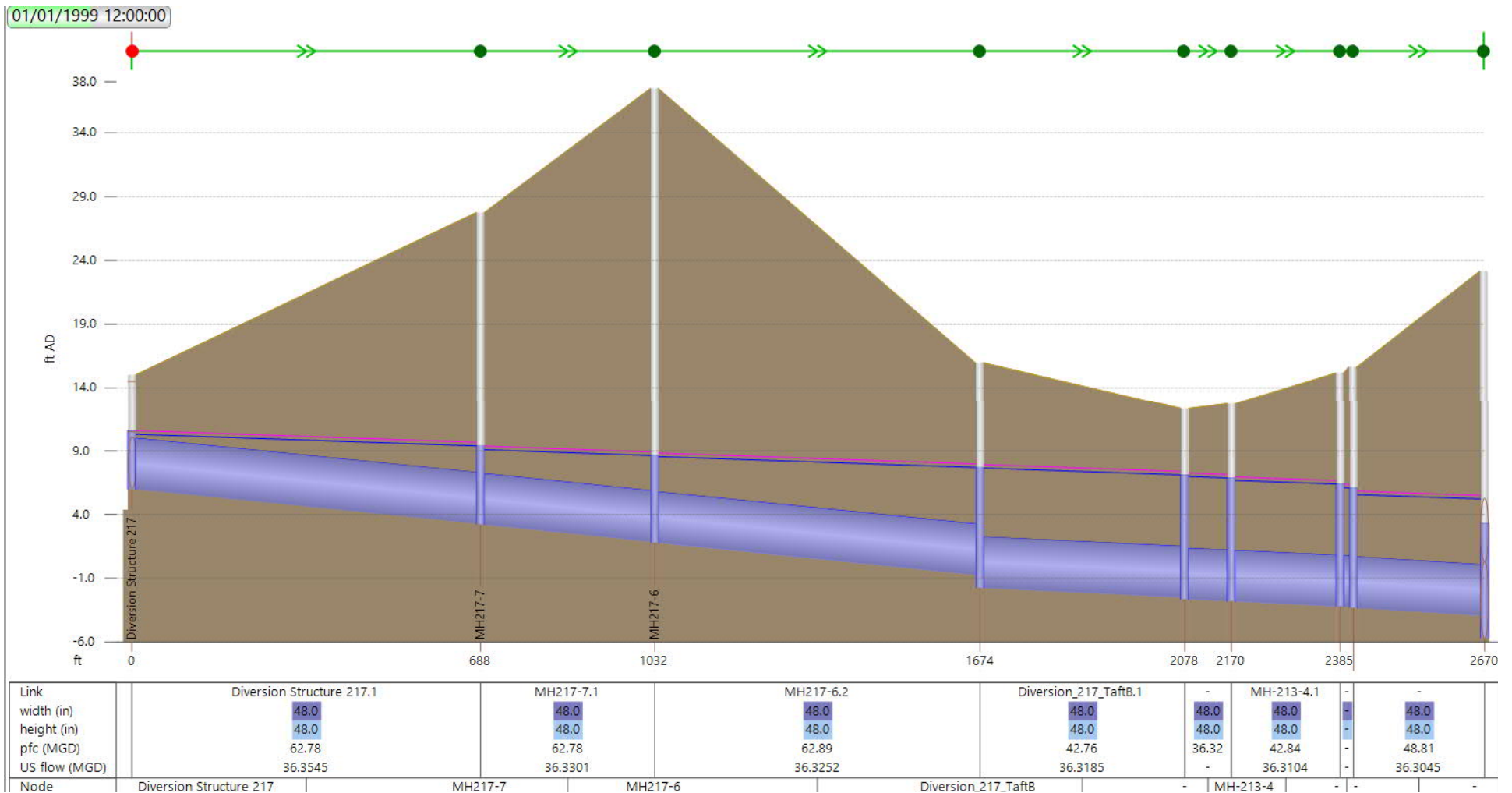
# NBC 213 New Design Results

11/10/2020

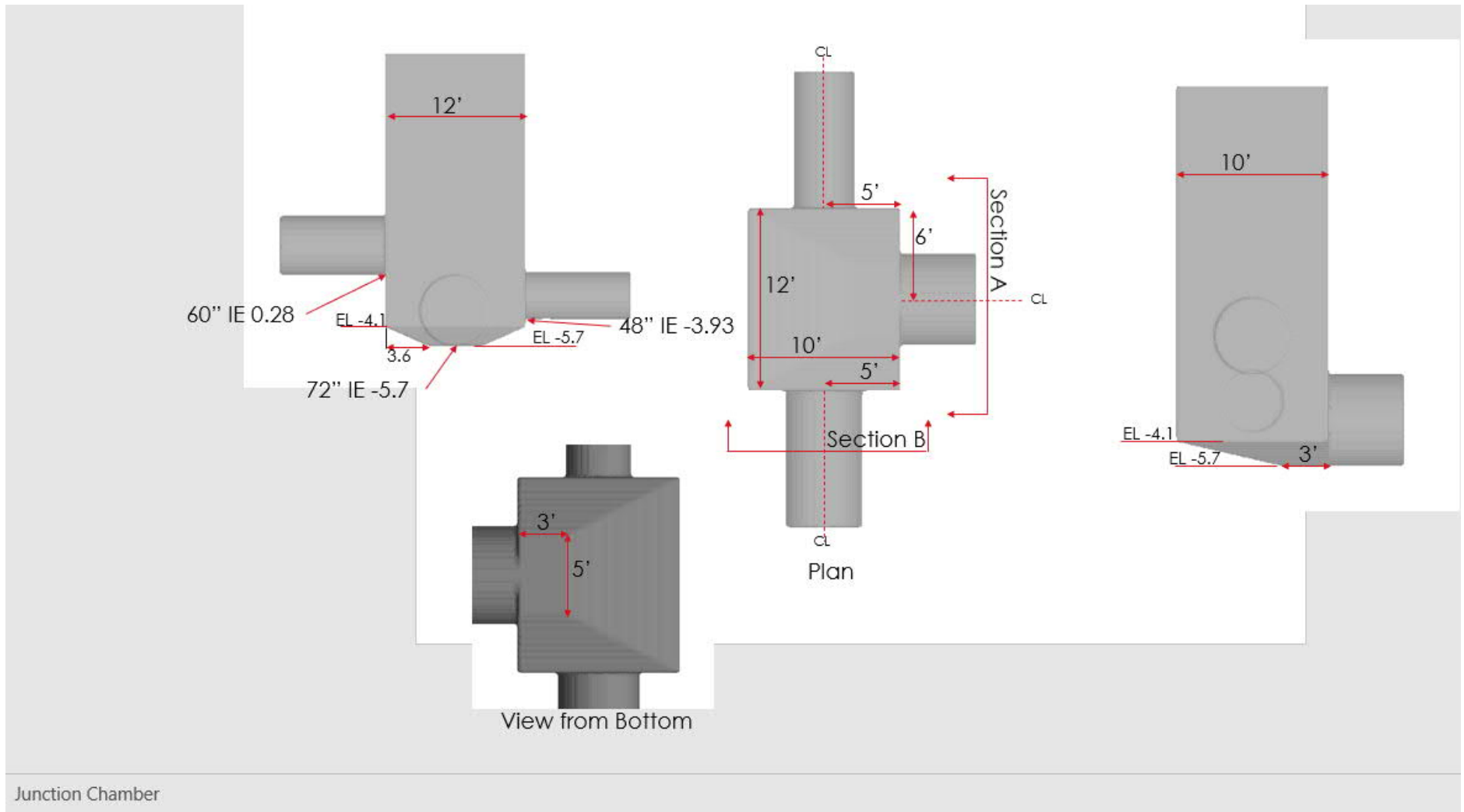
# CSO Risk

- 4 or less spills during the typical year at all CSOs
- No spills during the 3 month storm.

# 217 OF to Junction Chamber prior to Gate Closure

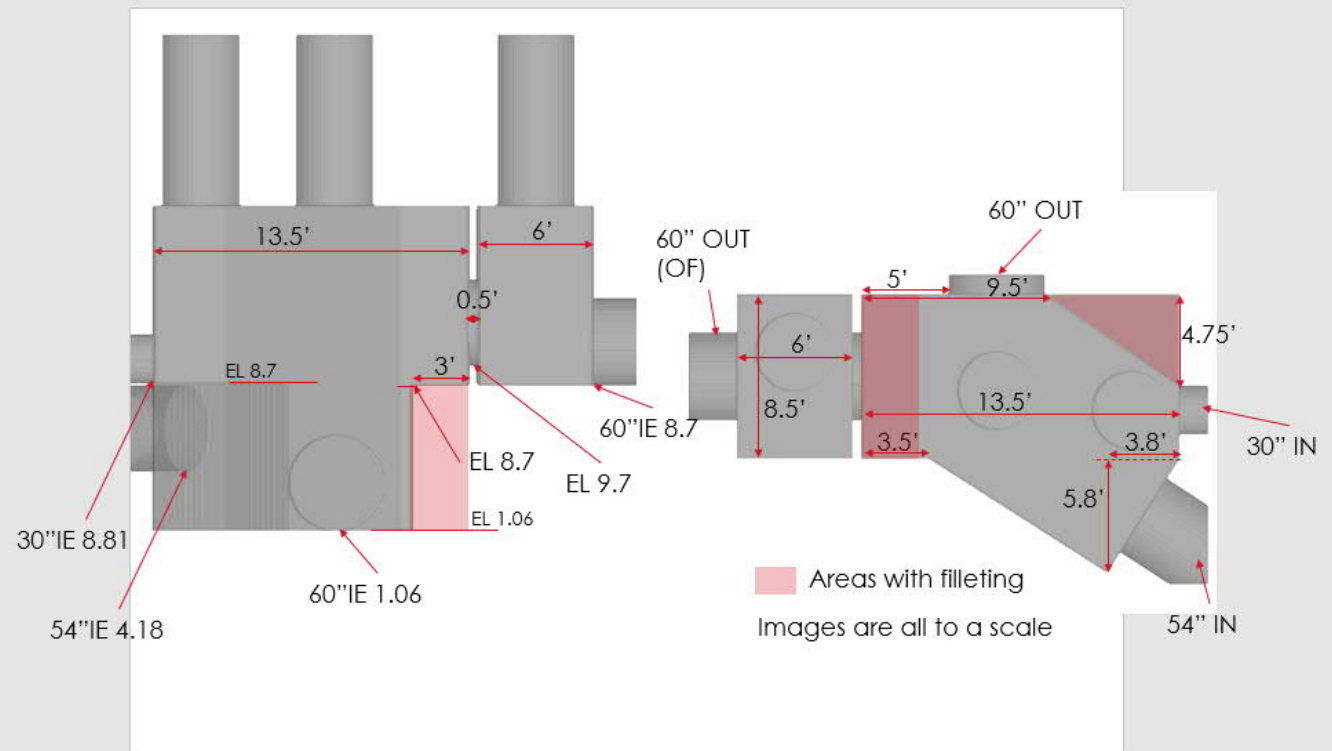






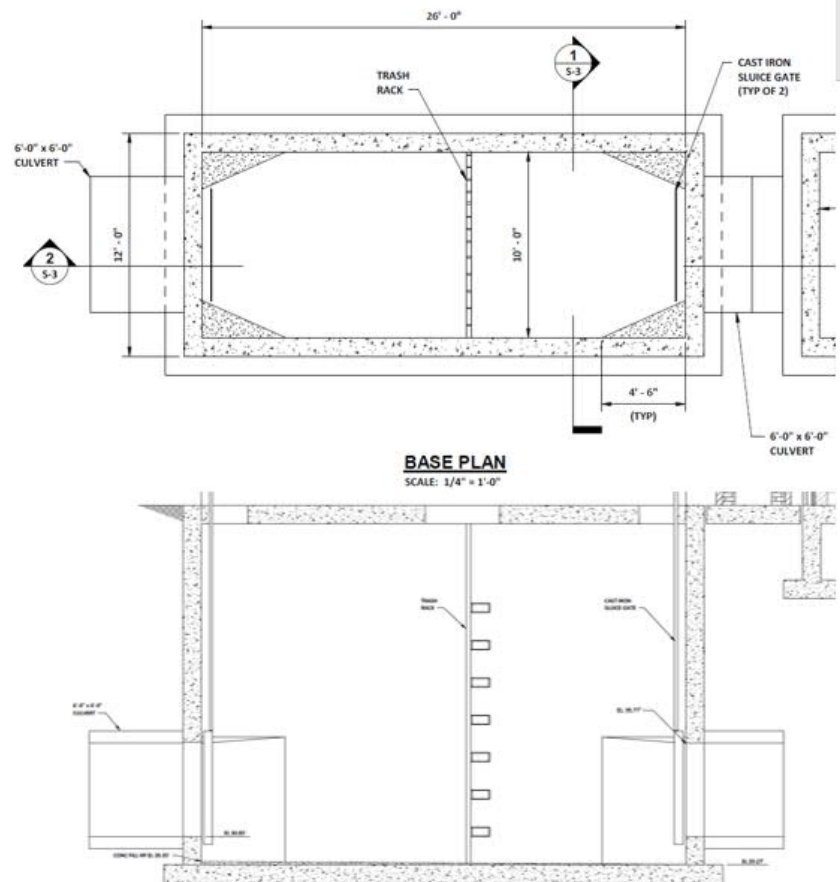
Junction Chamber

CFD Model Results: Junction Chamber



OF-214 Diversion

CFD Model Results: OF-214 Diversion Structure



213 GS – This design will be identical to the 205 and UBVI sites.

CFD Model Results: GSS



APPENDIX 5  
CALCULATIONS

Consolidation Conduit Capacity  
 Contract IIIA-4 and IIIA-5  
 NBC - Pawtucket RI

Purpose:  
 Purpose of computation is to determine minimum slope and confirm pipe sizes for Consolidation Conduit

Source: " Phase III CSO Program: Conceptual Design for Consolidation Conduits and Regulator Modifications - Technical Memorandum January 25, 2019  
 Table ES-5, Pager 21 of 32 and RFI #10 **RFI 10 Superseded by CFD and ICM Model dated 11-12-2020**

**Design Criteria:**

Maximum Velocity: < 10 ft/sec  
 >8 ft/sec requires evaluation to determine if special design considerations are required  
 Capacity: Manage 2 year peak hourly flow without surcharging

**Design Flow IIIA-4** Of 210, 211, 213, 214 179.78 cfs Revised / Superseded **140.79 CFS**  
 2-year Peak Hourly Flow 116.20 MGD CFD Model & ICM Model Results **91 MGD**

Determine minimum Slope and Pipe Size for OF-210 and 211 Consolidation Conduit  
 Q=63.2 MGD (RFI 10) Revised / Superseded CFD Model & ICM Model Results 11/12/2020 **52.3 MGD**

<b>OF-210,211</b>												
Manning Eq'n (solve for "v"): $v=(1.49/n)*(rH^{2/3})(s)^{1/2}$												
	Pipe Size	Area (ft <sup>2</sup> )	n	rH	rH <sup>(2/3)</sup>	s	s <sup>(1/2)</sup>	v (ft/sec)	q (cfs)	q (gpm)	q (MGD)	
Minimum Slope (Q>63.2 MGD)	48	12.56	0.013	1	1	<b>0.0225</b>	0.15	17.19	215.94	96,912	139.55	
Maximum Slope	48	12.56	0.013	1	1	<b>0.0162</b>	0.1272792	14.59	183.23	82,232	118.41	
Maximum Slope	48	12.56	0.013	1	1	<b>0.0075</b>	0.0866025	9.93	124.67	55,952	80.57	

Determine minimum Slope and Pipe Size for Down Stream of OF-213 Consolidation Conduit  
 Q=83.2 MGD (RFI 10) Revised / Superseded CFD Model & ICM Model Results 11/12/2020 **64 MGD**

<b>OF-210,211, 213</b>												
Manning Eq'n (solve for "v"): $v=(1.49/n)*(rH^{2/3})(s)^{1/2}$												
	Pipe Size	Area (ft <sup>2</sup> )	n	rH	rH <sup>(2/3)</sup>	s	s <sup>(1/2)</sup>	v (ft/sec)	q (cfs)	q (gpm)	q (MGD)	
Minimum Slope (Q>83.2 MGD)	54	15.90	0.013	1.125	1.0816872	<b>0.0043</b>	0.0655744	8.13	129.23	58,000	83.52	
Maximum Slope (V<8 ft/sec)												
Maximum Slope (V<10 ft/sec)	54	15.90	0.013	1.125	1.0816872	<b>0.0065</b>	0.0806226	10.00	158.89	71,310	102.69	

Determine minimum Slope and Pipe Size for Down Stream of OF-214 Consolidation Conduit

Q=116 (MGD) RFI 10 - Superseded CFD Model & ICM Model Results 11/12/2020 **91 MGD**

<b>OF-210,211, 213, 214</b>												
Manning Eq'n (solve for "v"): $v=(1.49/n)*(rH^{2/3})(s)^{1/2}$												
	Pipe Size	Area (ft <sup>2</sup> )	n	rH	rH <sup>(2/3)</sup>	s	s <sup>(1/2)</sup>	v (ft/sec)	q (cfs)	q (gpm)	q (MGD)	
Minimum Slope (Q>116 MGD)	60	19.63	0.013	1.25	1.1603972	<b>0.0048</b>	0.069282	9.21	180.83	81,158	116.87	

Determine minimum Slope and Pipe Size for Down Stream of OF-217 Consolidation Conduit  
 Q=39 (MGD) CFD Model & ICM Model Results 11/12/2020 **36.3 MGD**

<b>OF-217</b>												
Manning Eq'n (solve for "v"): $v=(1.49/n)*(rH^{2/3})(s)^{1/2}$												
	Pipe Size	Area (ft <sup>2</sup> )	n	rH	rH <sup>(2/3)</sup>	s	s <sup>(1/2)</sup>	v (ft/sec)	q (cfs)	q (gpm)	q (MGD)	
Minimum Slope (Q>39 MGD)	48	12.56	0.013	1	1	<b>0.0018</b>	0.0424264	4.86	61.08	27,411	39.47	
Maximum Slope (V<8 ft/sec)	48	12.56	0.013	1	1	<b>0.0048</b>	0.069282	7.94	99.74	44,762	64.46	
Maximum Slope (V<10 ft/sec)	48	12.56	0.013	1	1	<b>0.0075</b>	0.0866025	9.93	124.67	55,952	80.57	

Determine minimum Slope and Pipe Size for Down Stream of Junction Chamber

Q=155.2 (MGD) CFD Model & ICM Model Results 11/12/2020 91+36.3 **127.3 MGD**

<b>OF-210,211, 213, 214,217</b>												
Manning Eq'n (solve for "v"): $v=(1.49/n)*(rH^{2/3})(s)^{1/2}$												
	Pipe Size	Area (ft <sup>2</sup> )	n	rH	rH <sup>(2/3)</sup>	s	s <sup>(1/2)</sup>	v (ft/sec)	q (cfs)	q (gpm)	q (MGD)	
Minimum Slope (Q>155.2 MGD)	72	28.26	0.013	1.5	1.3103707	<b>0.0025</b>	0.05	7.51	212.22	95,243	137.15	
Maximum Slope (V<10 ft/sec)	72	28.26	0.013	1.5	1.3103707	<b>0.0044</b>	0.0663325	9.96	281.54	126,354	181.95	

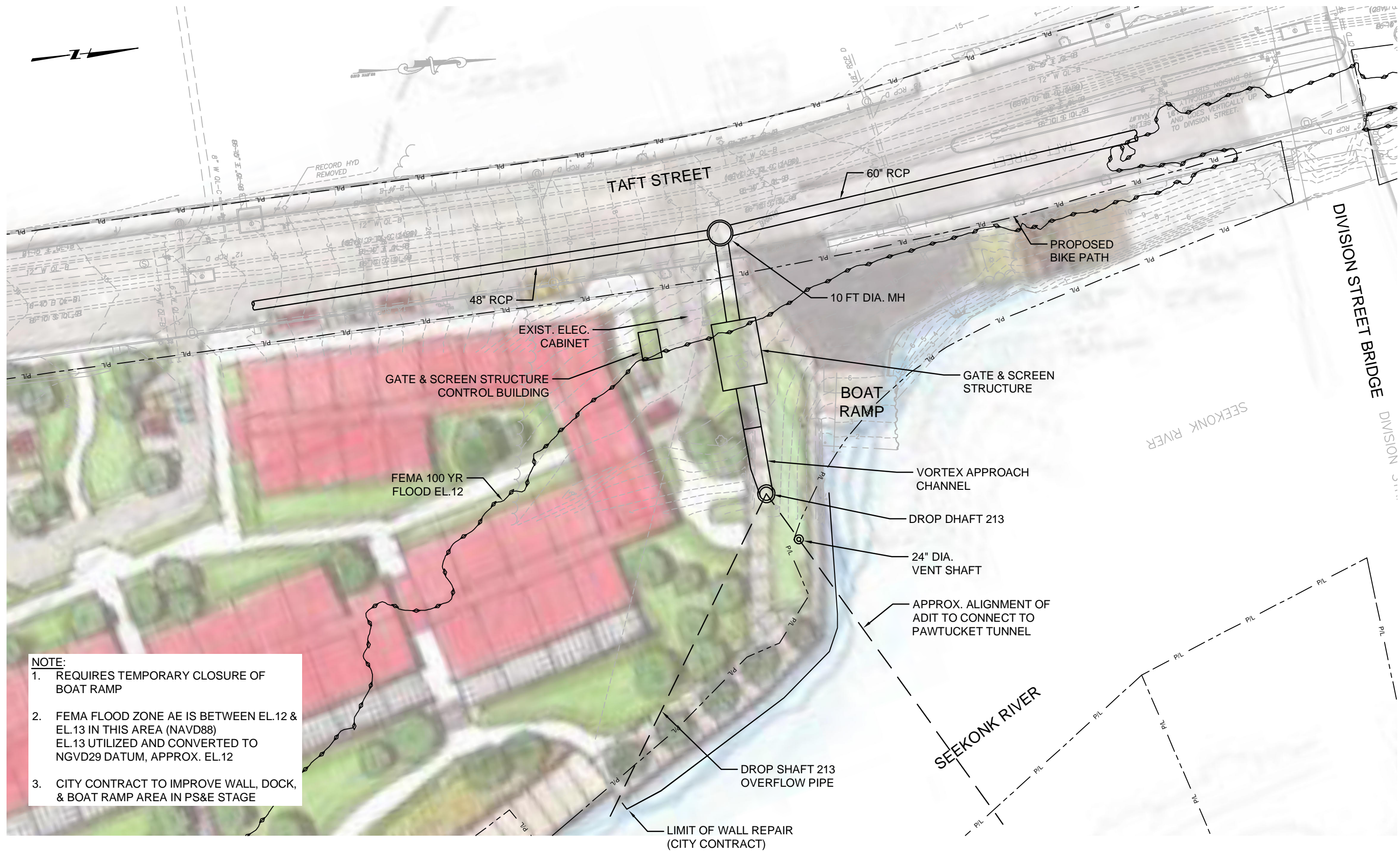
Determine minimum Slope and Pipe Size for Approach Channel

Q=155.2 (MGD) CFD Model & ICM Model Results 11/12/2020 91+36.3 **127.3 MGD**

<b>OF-210,211, 213, 214,217</b>												
Manning Eq'n (solve for "v"): $v=(1.49/n)*(rH^{2/3})(s)^{1/2}$												
	Pipe Size	Area (ft <sup>2</sup> )	n	rH	rH <sup>(2/3)</sup>	s	s <sup>(1/2)</sup>	v (ft/sec)	q (cfs)	q (gpm)	q (MGD)	
Minimum Slope (Q>155.2 MGD)	6	6	0.013	1.5	1.3103707	<b>0.0014</b>	0.0374166	5.62	202.30	90,794	130.74	
Maximum Slope (V<10 ft/sec)	6	6	0.013	1.5	1.3103707	<b>0.0044</b>	0.0663325	9.96	358.65	160,960	231.78	

APPENDIX 6  
Drop Shaft 213 –  
ALTERNATIVE SITING LOCATIONS  
AND LAYOUT FIGURES

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 BY: BRANDON MARINI



**NOTE:**

- REQUIRES TEMPORARY CLOSURE OF BOAT RAMP
- FEMA FLOOD ZONE AE IS BETWEEN EL. 12 & EL. 13 IN THIS AREA (NAVD88) EL. 13 UTILIZED AND CONVERTED TO NGVD29 DATUM, APPROX. EL. 12
- CITY CONTRACT TO IMPROVE WALL, DOCK, & BOAT RAMP AREA IN PS&E STAGE

REV	DATE	BY	DESCRIPTION

SCALE  
1"=20'

WARNING  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

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 DRAWN B. MARINI  
 CHECKED C. CRONIN

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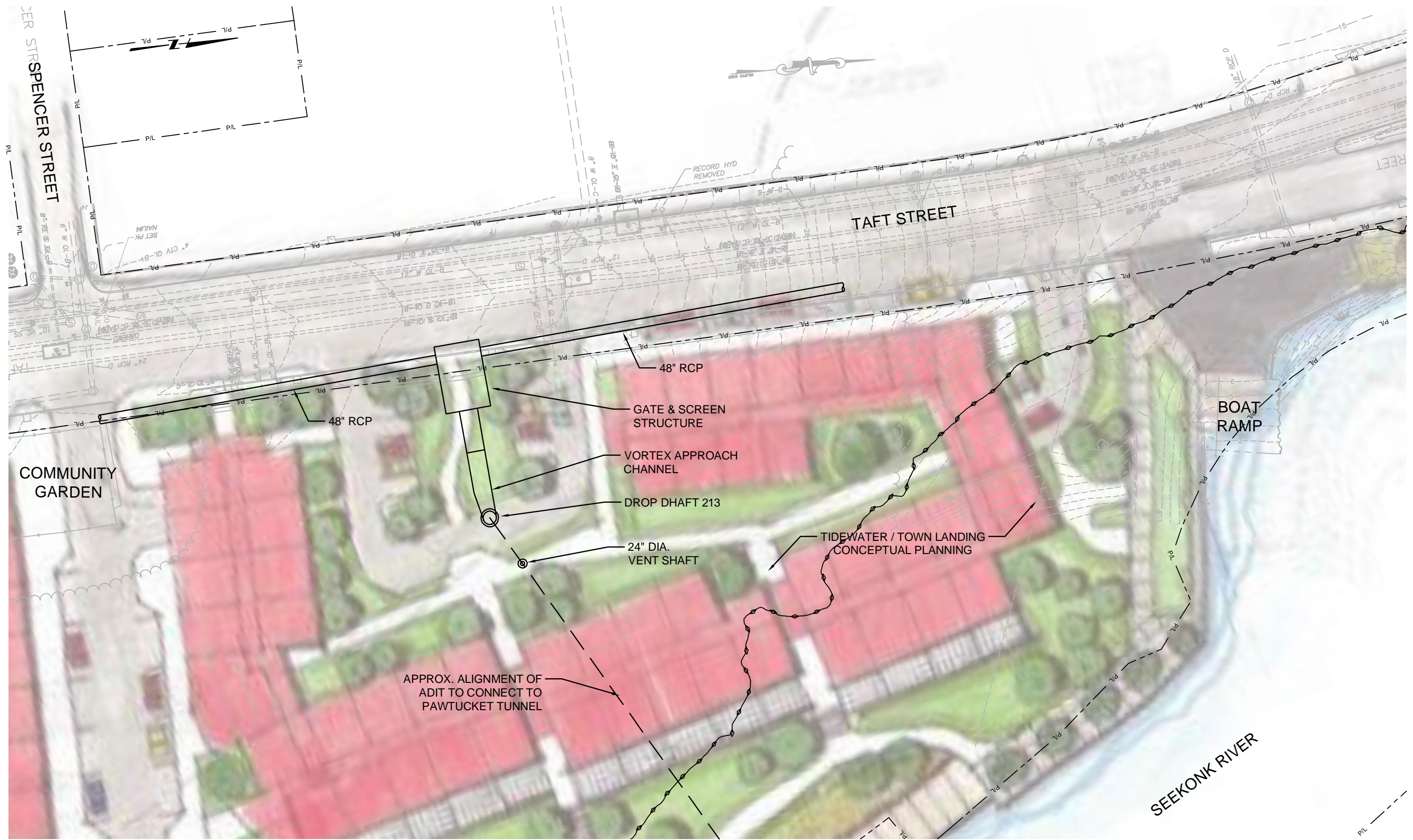
NARRAGANSETT BAY COMMISSION  
 PHASE III COMBINED SEWER  
 OVERFLOW PROGRAM

Stantec

NBC CONTRACT NO 308.XXC  
 CIVIL

DROP SHAFT 213 CONSOLIDATION CONDUIT OPTION A-1  
 TOWN LANDING

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 DRAWN B. MARINI  
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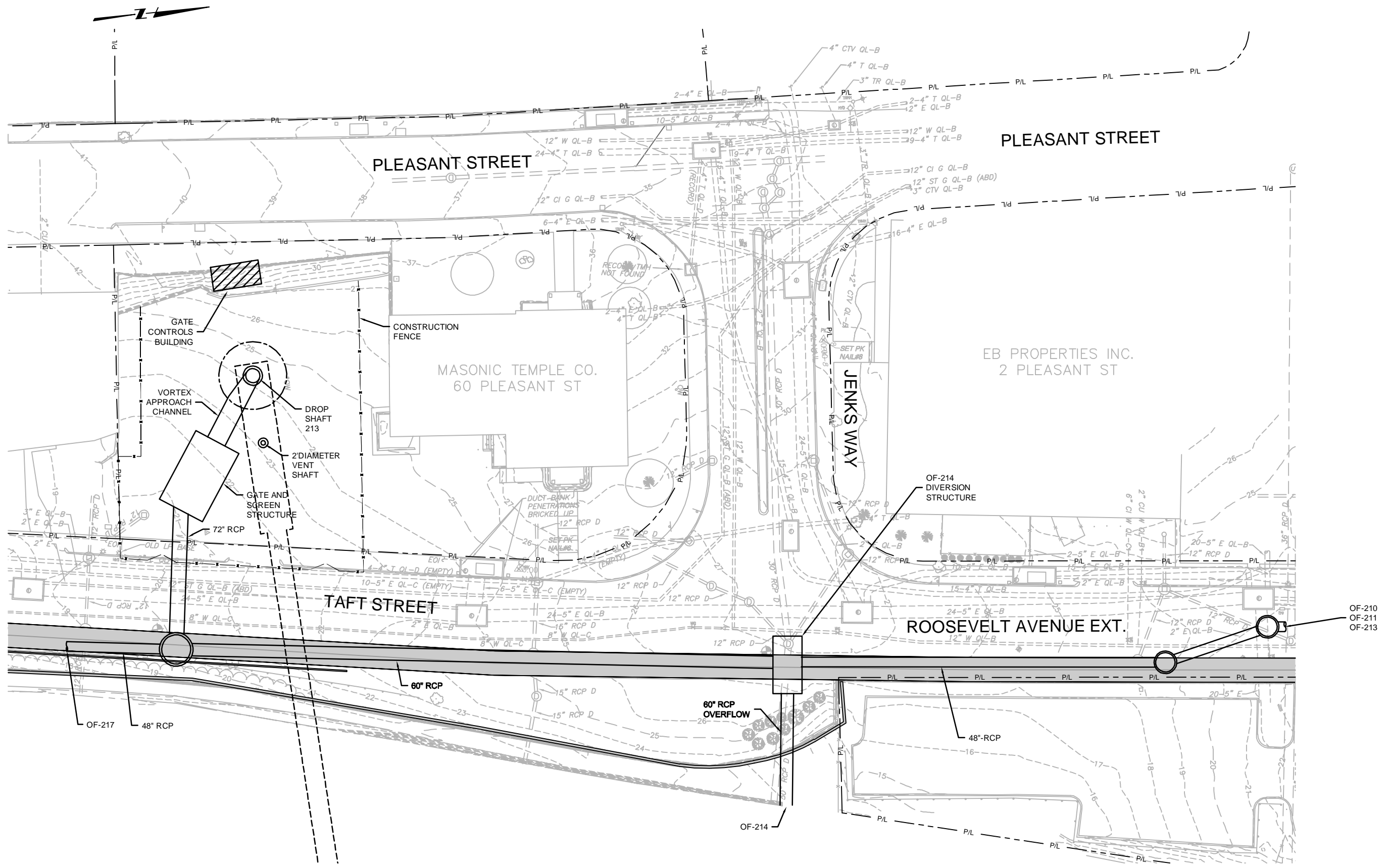
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 PHASE III COMBINED SEWER  
 OVERFLOW PROGRAM

NBC CONTRACT NO 308.XXC  
 CIVIL

DROP SHAFT 213 CONSOLIDATION CONDUIT OPTION A-2  
 TOWN LANDING

SHEET  
**FIG. A-2**  
 195130165

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 DRAWN P. NATOWICH  
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 PHASE III COMBINED SEWER  
 OVERFLOW PROGRAM

NBC CONTRACT NO 308.XXC  
 CIVIL

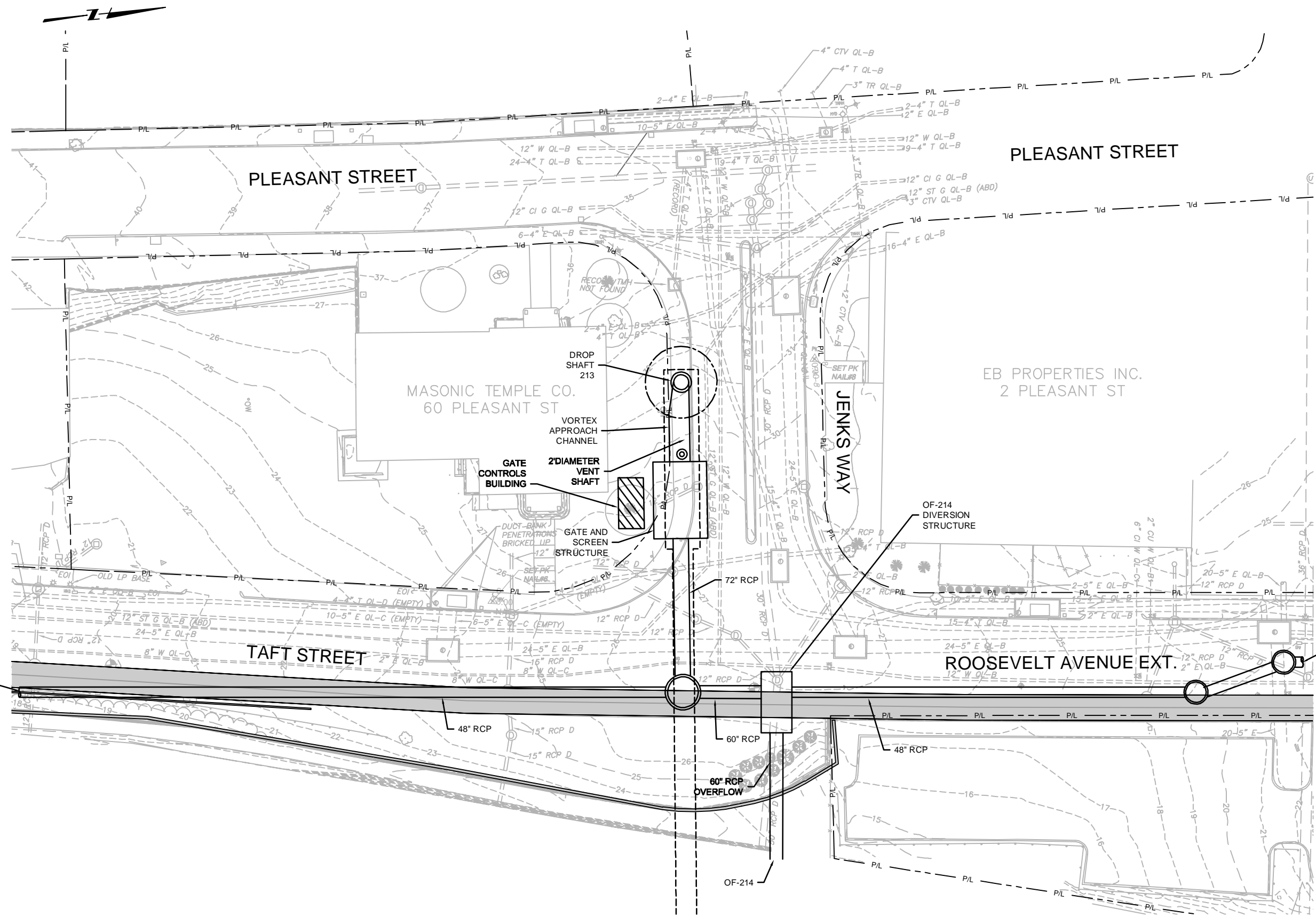
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 MAONIC TEMPLE

SHEET  
 FIG. B-1  
 195130165

BY: BRANDON MARINI

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DRAWN P. NATOWICH  
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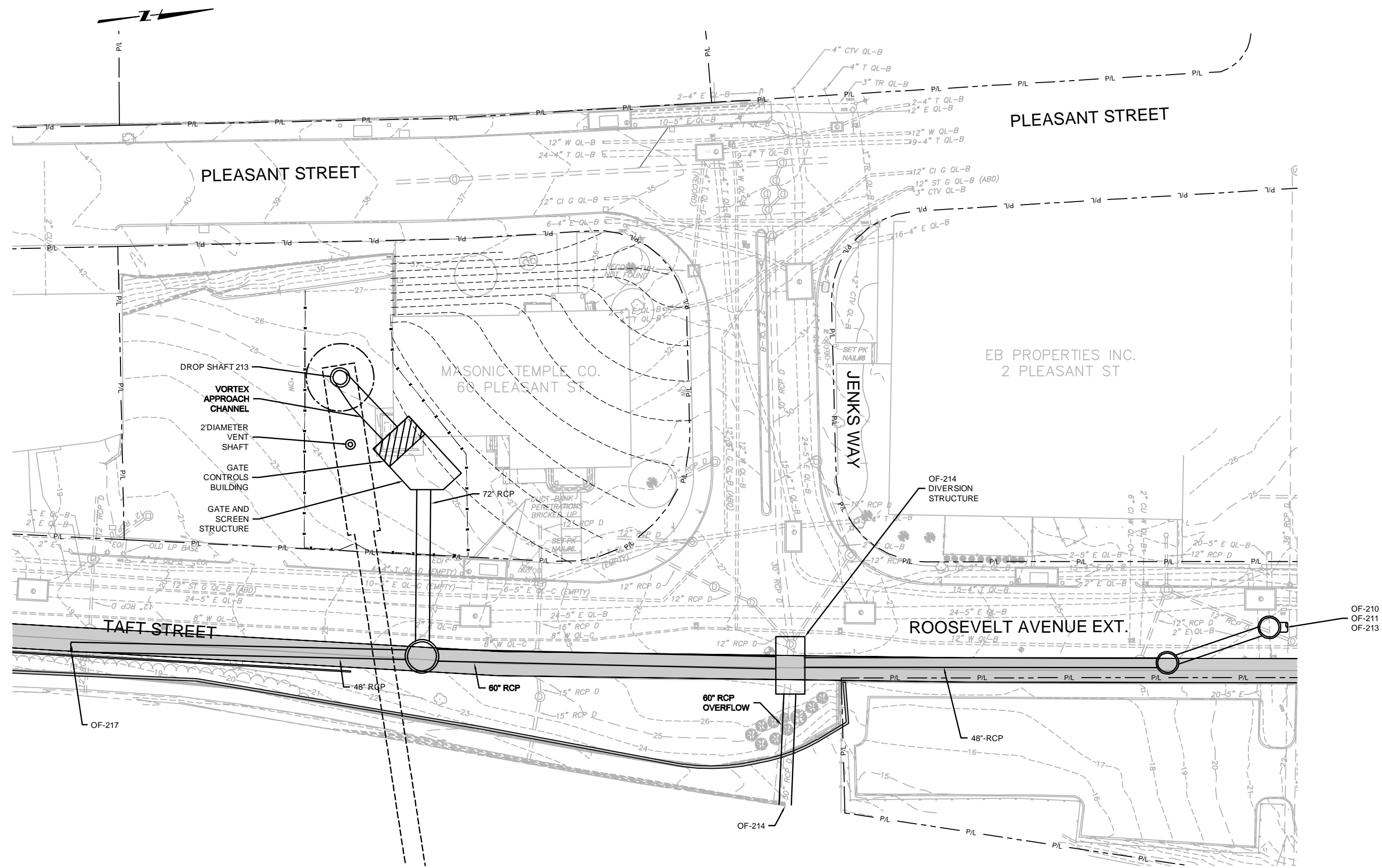
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PHASE III COMBINED SEWER OVERFLOW PROGRAM

NBC CONTRACT NO 308.XXC  
CIVIL

DROP SHAFT 213 CONSOLIDATION CONDUIT OPTION B-2  
MASONIC TEMPLE

SHEET  
FIG. B-2  
195130165

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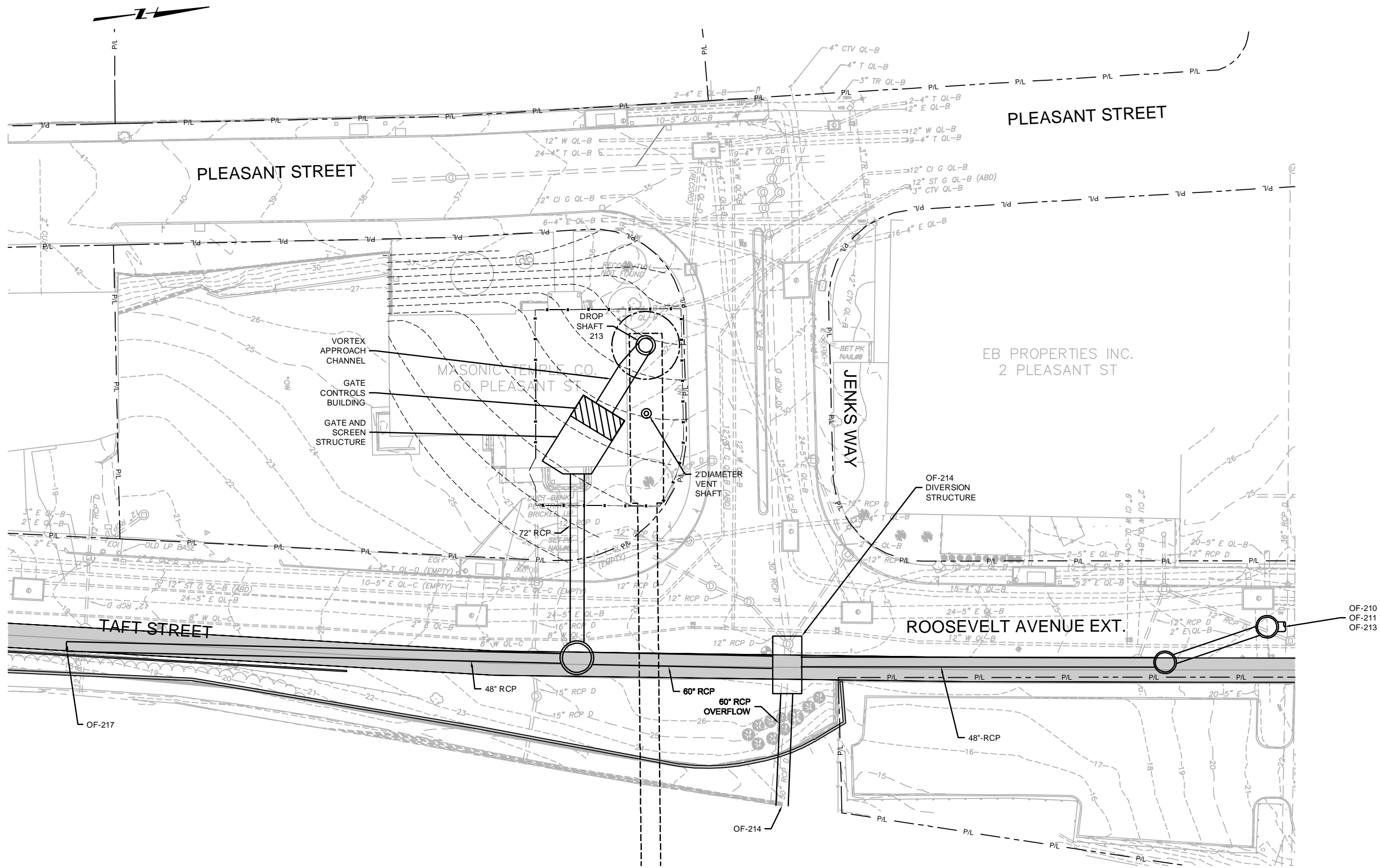
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 PHASE III COMBINED SEWER OVERFLOW PROGRAM  
 Stantec

NBC CONTRACT NO 308.XXC  
 CIVIL  
 DROP SHAFT 213 CONSOLIDATION CONDUIT OPTION B-3  
 MASONIC TEMPLE

SHEET  
**FIG. B-3**  
 195130165



DWG FILE: C:\work\kdr\40520963\PAWT\_FIG\_DS-213\_OPTION B\_MASONIC TEMPLE.dwg  
 PLOT DATE: Tuesday, May 1, 2018 11:18:00 AM  
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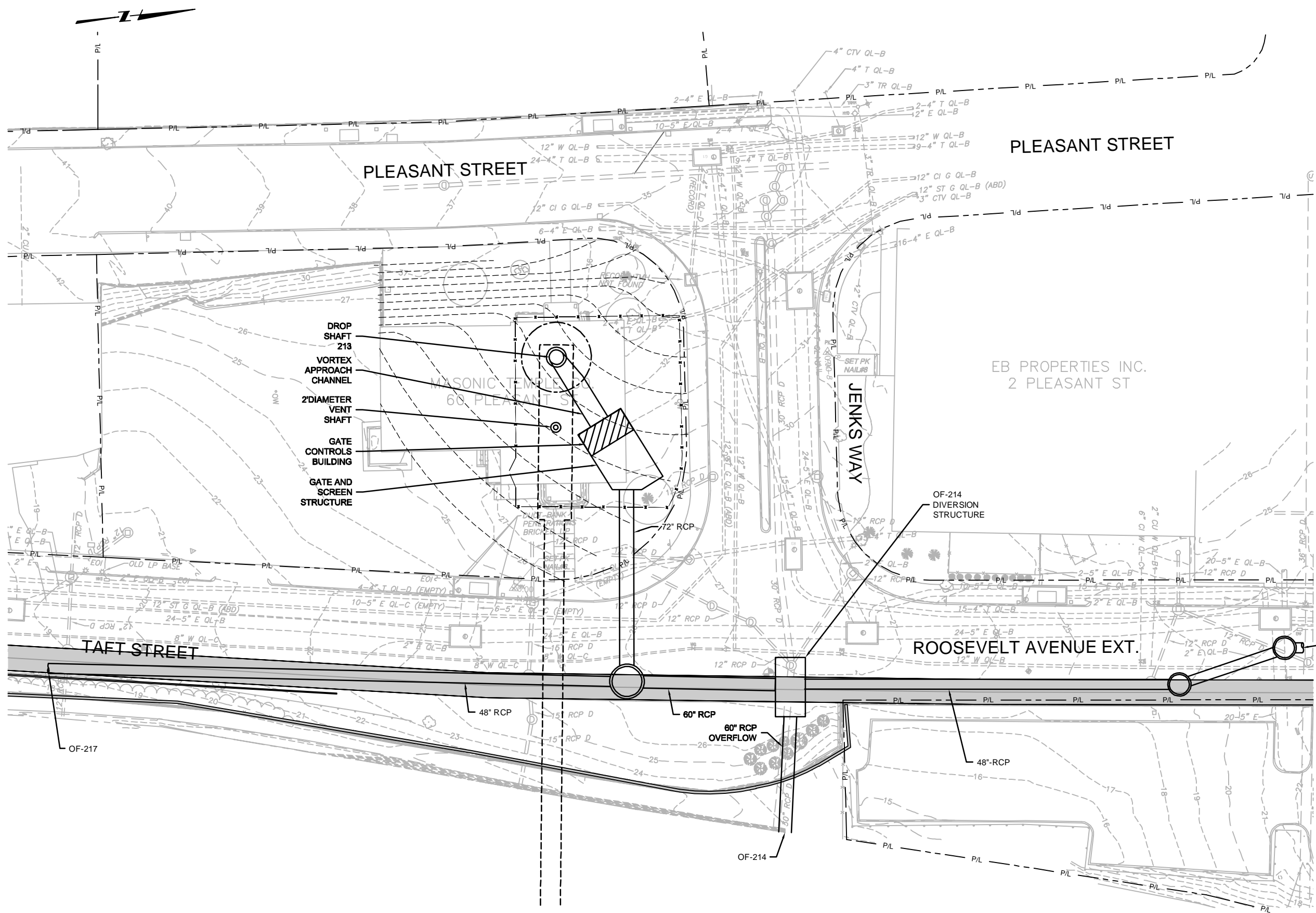
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NBC CONTRACT NO 308.XXC  
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DROP SHAFT 213 CONSOLIDATION CONDUIT OPTION B-4  
MASONIC TEMPLE

SHEET  
FIG. B-4  
195130165

BY: BRANDON MARINI

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DWG FILE: C:\pwworkdir\40520963\PAWT\_FIG\_DS-213\_OPTION B\_MASONIC TEMPLE.dwg



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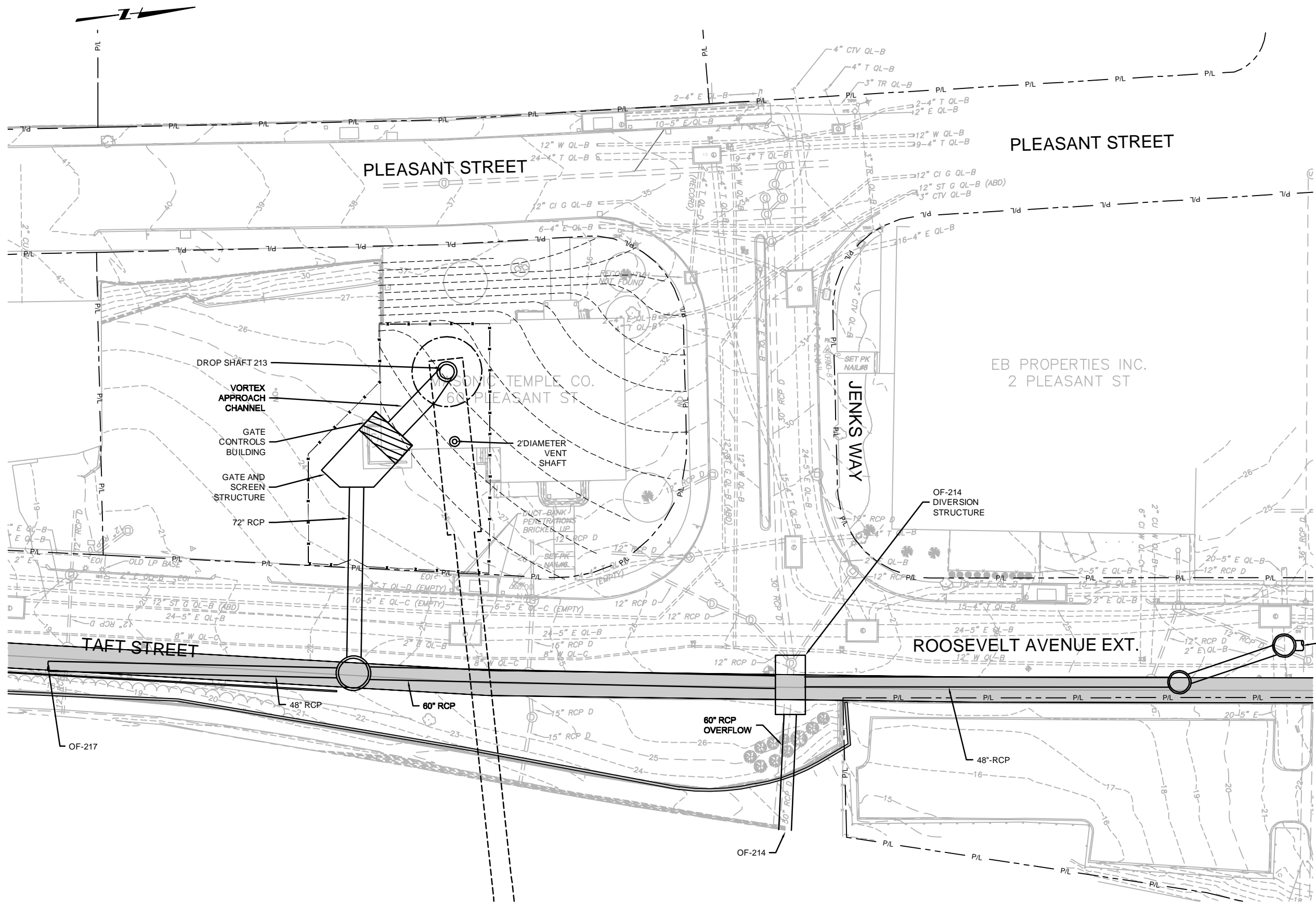
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NBC CONTRACT NO 308.XXC  
CIVIL  
DROP SHAFT 213 CONSOLIDATION CONDUIT OPTION B-5  
MASONIC TEMPLE

SHEET  
FIG. B-5  
195130165

BY: BRANDON MARINI

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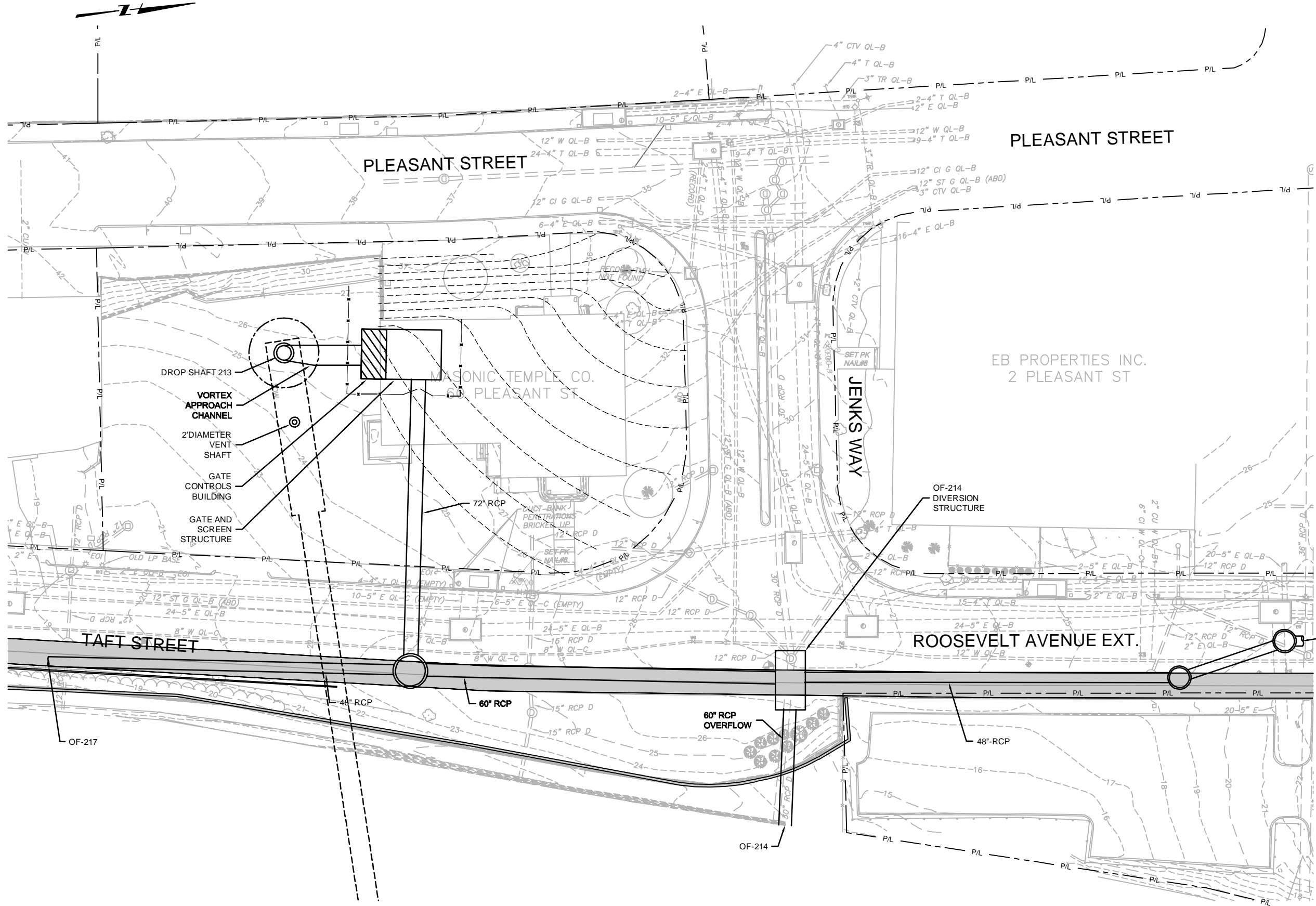
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 MASONIC TEMPLE

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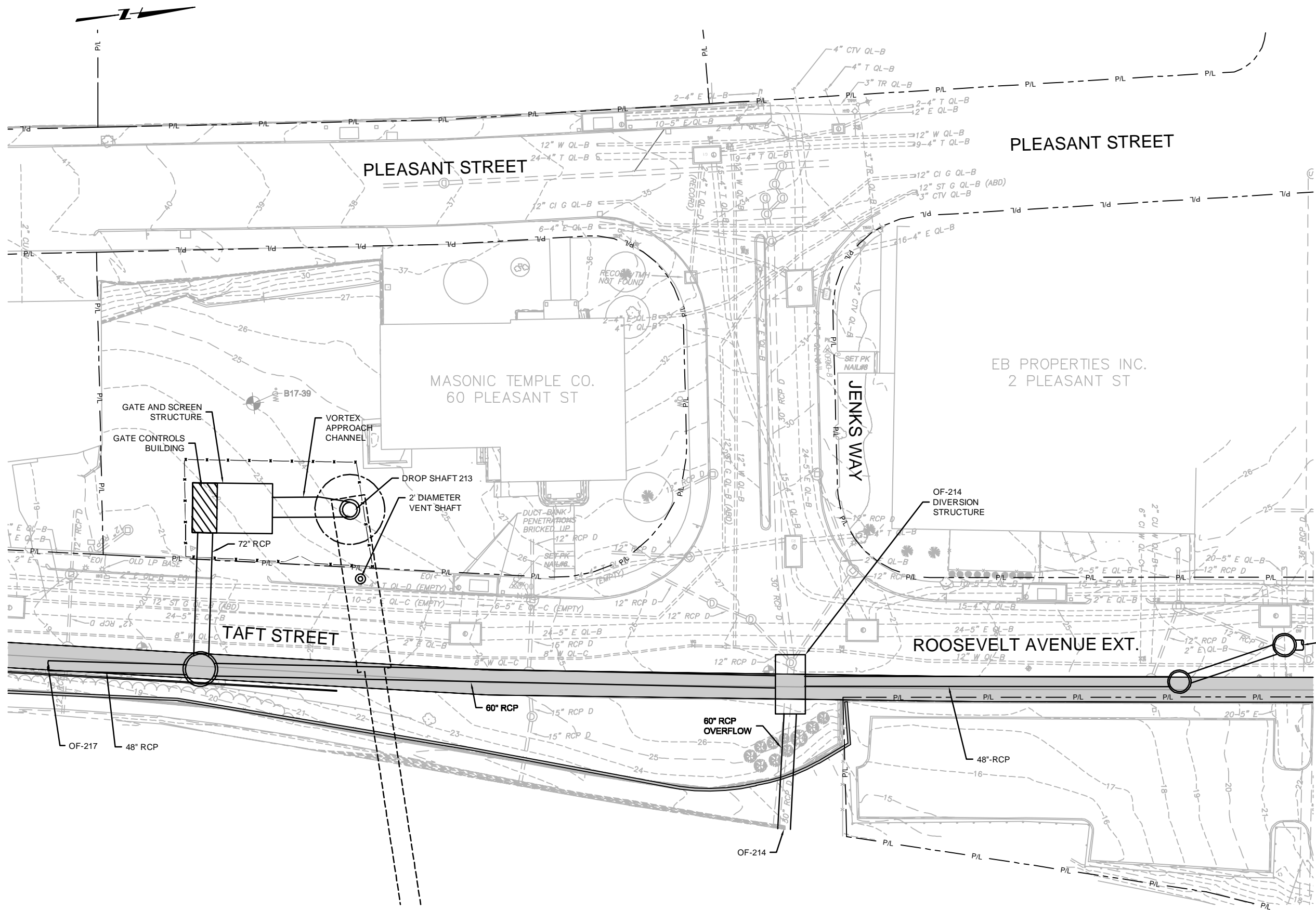
NBC CONTRACT NO 308.XXC  
CIVIL  
DROP SHAFT 213 CONSOLIDATION CONDUIT OPTION B-7  
MASONIC TEMPLE

SHEET  
FIG. B-7  
195130165

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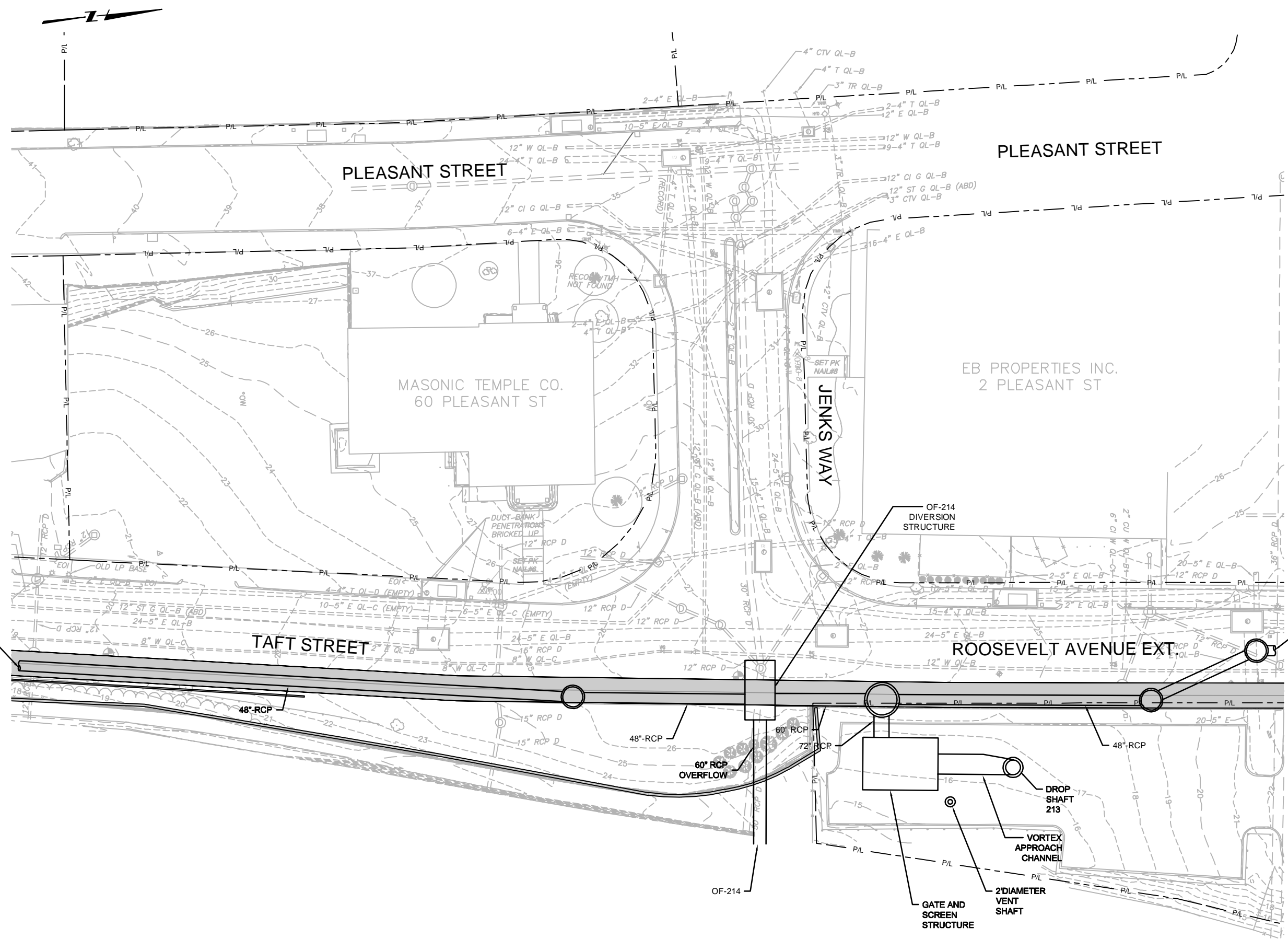
NBC CONTRACT NO 308.XXC  
CIVIL  
DROP SHAFT 213 CONSOLIDATION CONDUIT OPTION B-8  
MASONIC TEMPLE

SHEET  
FIG. B-8  
195130165

BY: BRANDON MARINI

PLOT DATE: Tuesday, May 1, 2018 11:18:00 AM

DWG FILE: C:\pwworkdir\40520963\PAWT\_FIG\_DS-213\_OPTION C\_PARCEL 53-584\_PARKING LOT.dwg



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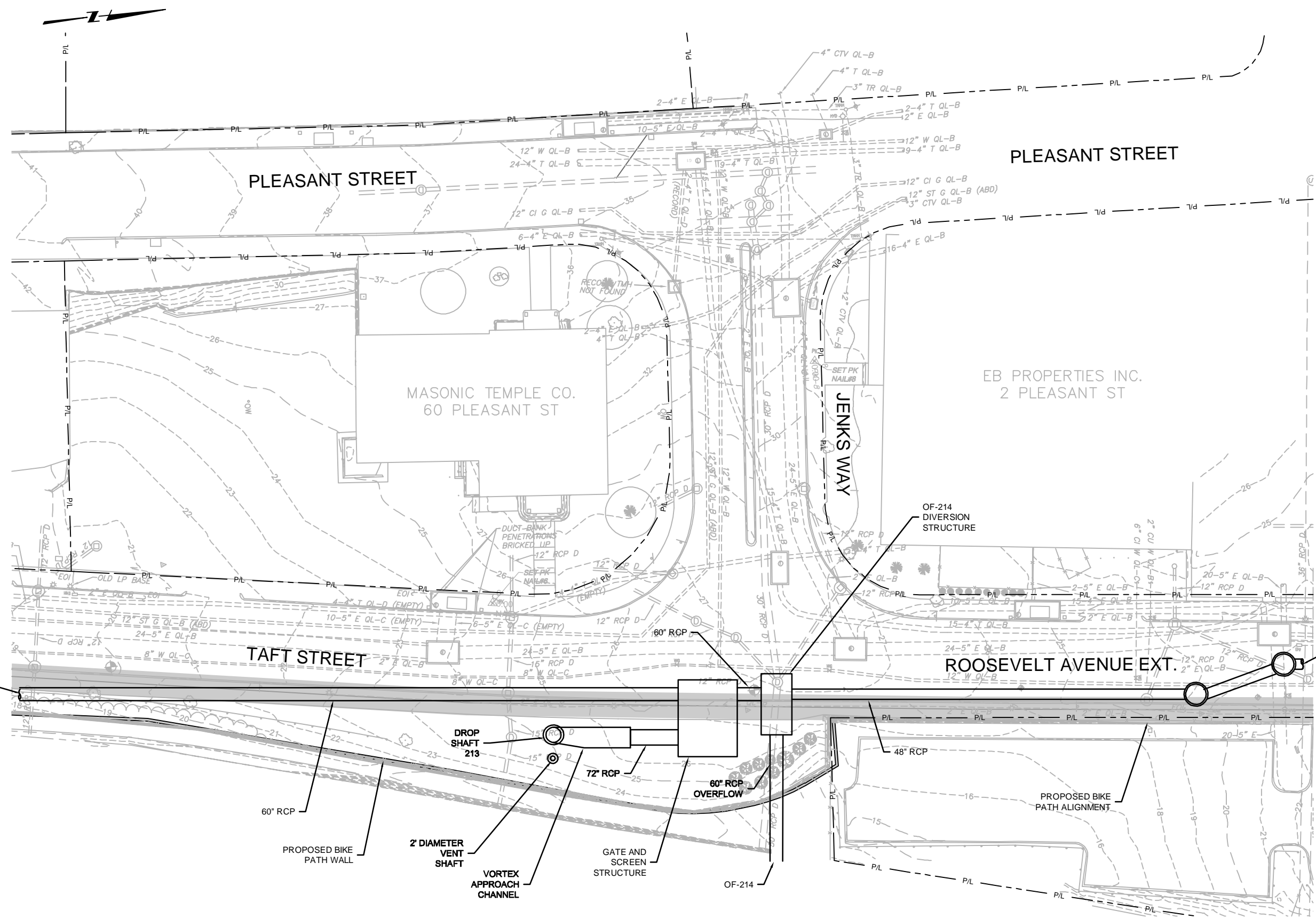
NBC CONTRACT NO 308.XXC  
CIVIL  
DROP SHAFT 213 CONSOLIDATION CONDUIT OPTION C  
PARCEL 53-584 PARKING LOT

SHEET  
FIG. C-1  
195130165

BY: BRANDON MARINI

PLOT DATE: Tuesday, May 1, 2018 11:18:00 AM

DWG FILE: C:\pwworkdir\40520963\PAWT\_FIG\_DS\213\_OPTION D\_GrASS AREA OVER OF-214.dwg



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NBC CONTRACT NO 308.XXC  
CIVIL  
DROP SHAFT 213 CONSOLIDATION CONDUIT OPTION D  
JENKS WAY

SHEET  
FIG. D-1  
195130165

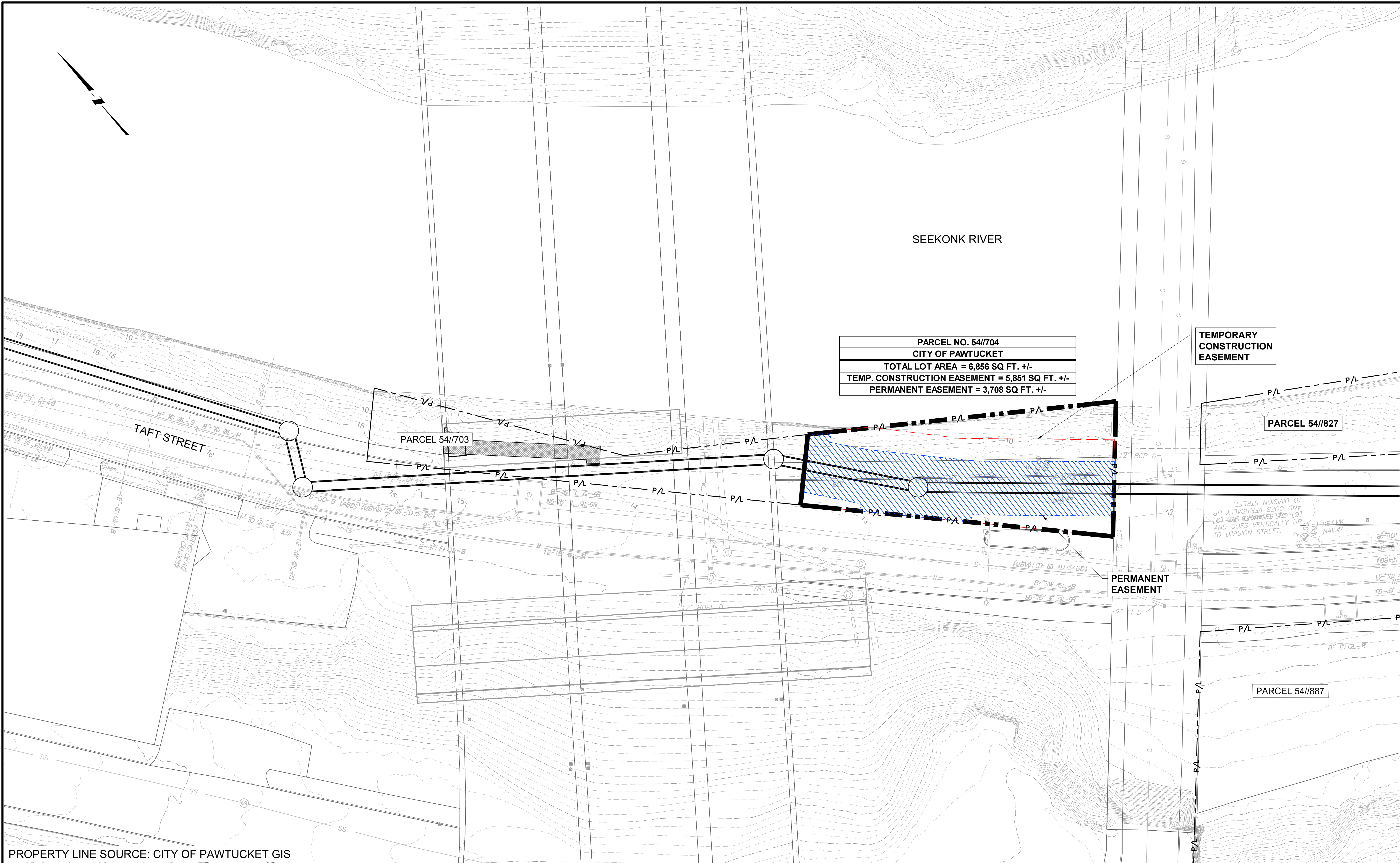
APPENDIX 7  
EASEMENT DRAWINGS



BY: JAMIE PAYNE

PLOT DATE: Tuesday, May 12, 2020 5:00:17 PM

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PROPERTY LINE SOURCE: CITY OF PAWTUCKET GIS

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NBC CONTRACT NO 308.04C  
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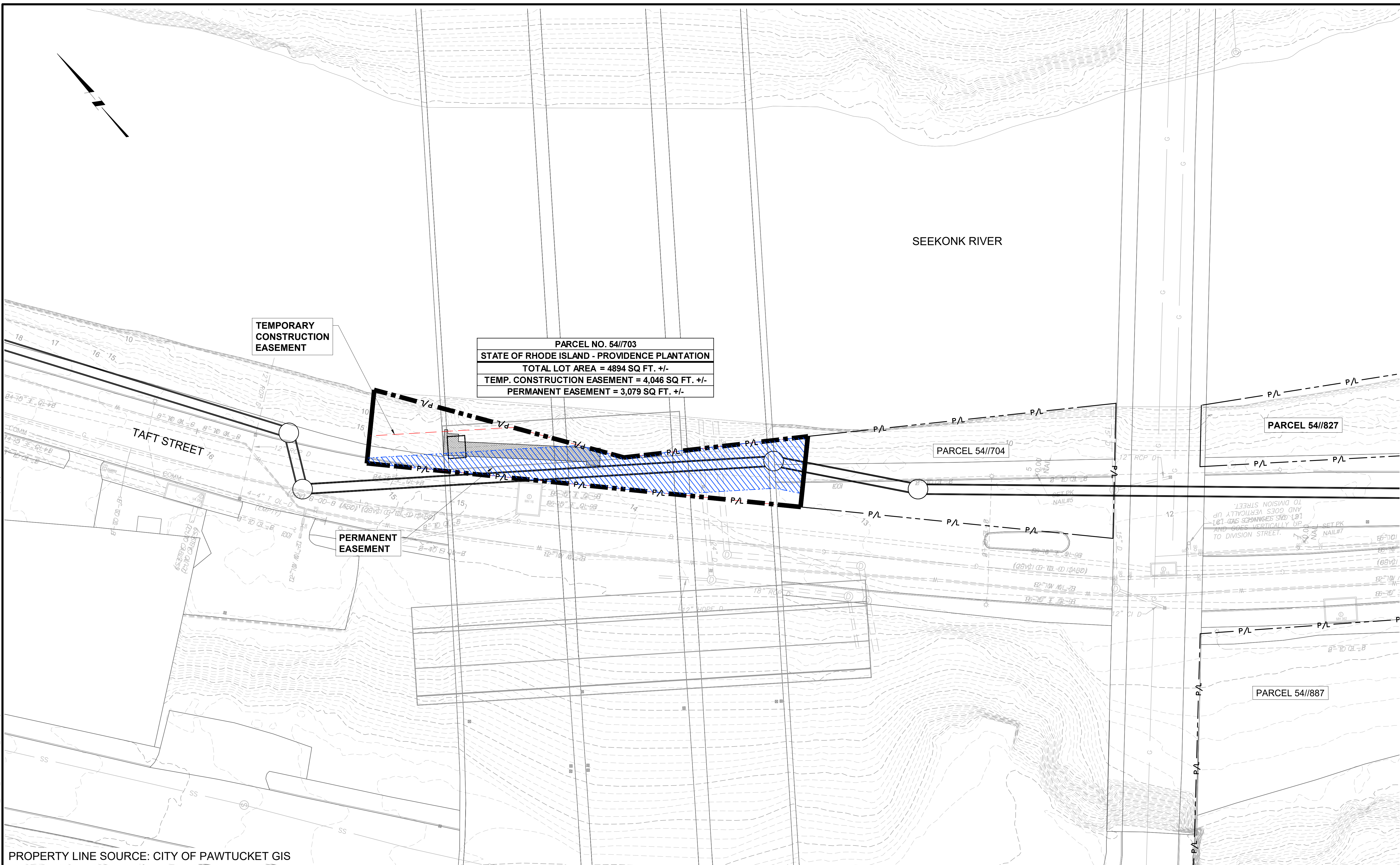
OF 210/213/214 FACILITIES  
EASEMENT DRAWING - PARCEL NO. 54//704

SHEET  
C-1  
195130227

BY: JAMIE PAYNE

PLOT DATE: Tuesday, May 12, 2020 5:01:03 PM

DWG FILE: C:\pwworkdir\6250964\PAWT\_SITE\_EASEMENTS\_III-A-4.dwg



PROPERTY LINE SOURCE: CITY OF PAWTUCKET GIS

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CIVIL

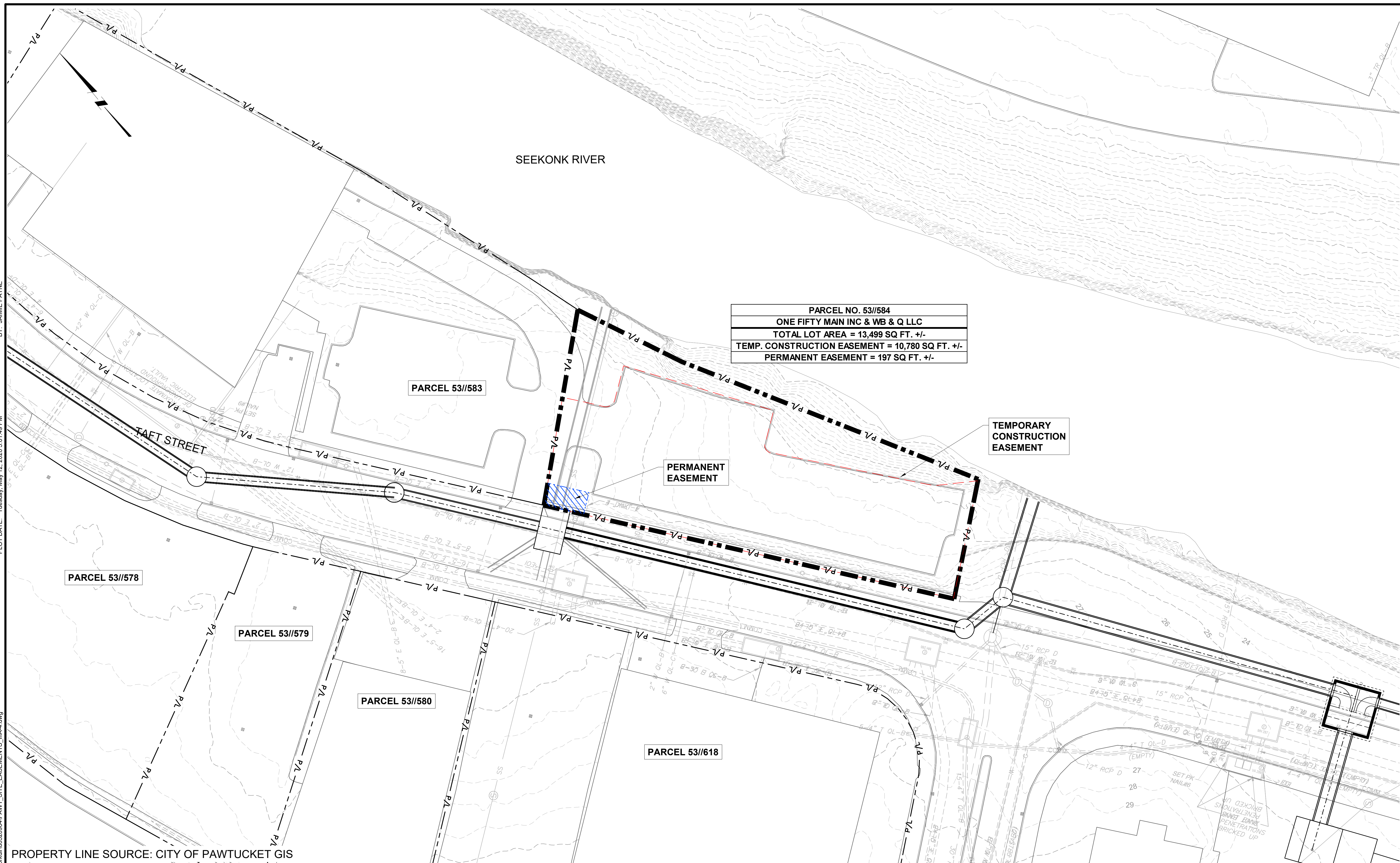
OF 210/213/214 FACILITIES  
EASEMENT DRAWING - PARCEL NO. 54/703

SHEET  
C-2  
195130227

BY: JAMIE PAYNE

PLOT DATE: Tuesday, May 12, 2020 5:01:49 PM

DWG FILE: C:\pwworkdir\0620964\PAWT\_SITE\_EASEMENTS\_ILIA-4.dwg



PARCEL NO. 53//584
ONE FIFTY MAIN INC & WB & Q LLC
TOTAL LOT AREA = 13,499 SQ FT. +/-
TEMP. CONSTRUCTION EASEMENT = 10,780 SQ FT. +/-
PERMANENT EASEMENT = 197 SQ FT. +/-

PERMANENT EASEMENT

TEMPORARY CONSTRUCTION EASEMENT

PROPERTY LINE SOURCE: CITY OF PAWTUCKET GIS

REV	DATE	BY	DESCRIPTION

SCALE
1" = 40'

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DRAWN: J. PAYNE
CHECKED: C. CRONIN

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 OVERFLOW PROGRAM

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NBC CONTRACT NO 308.04C  
 CIVIL

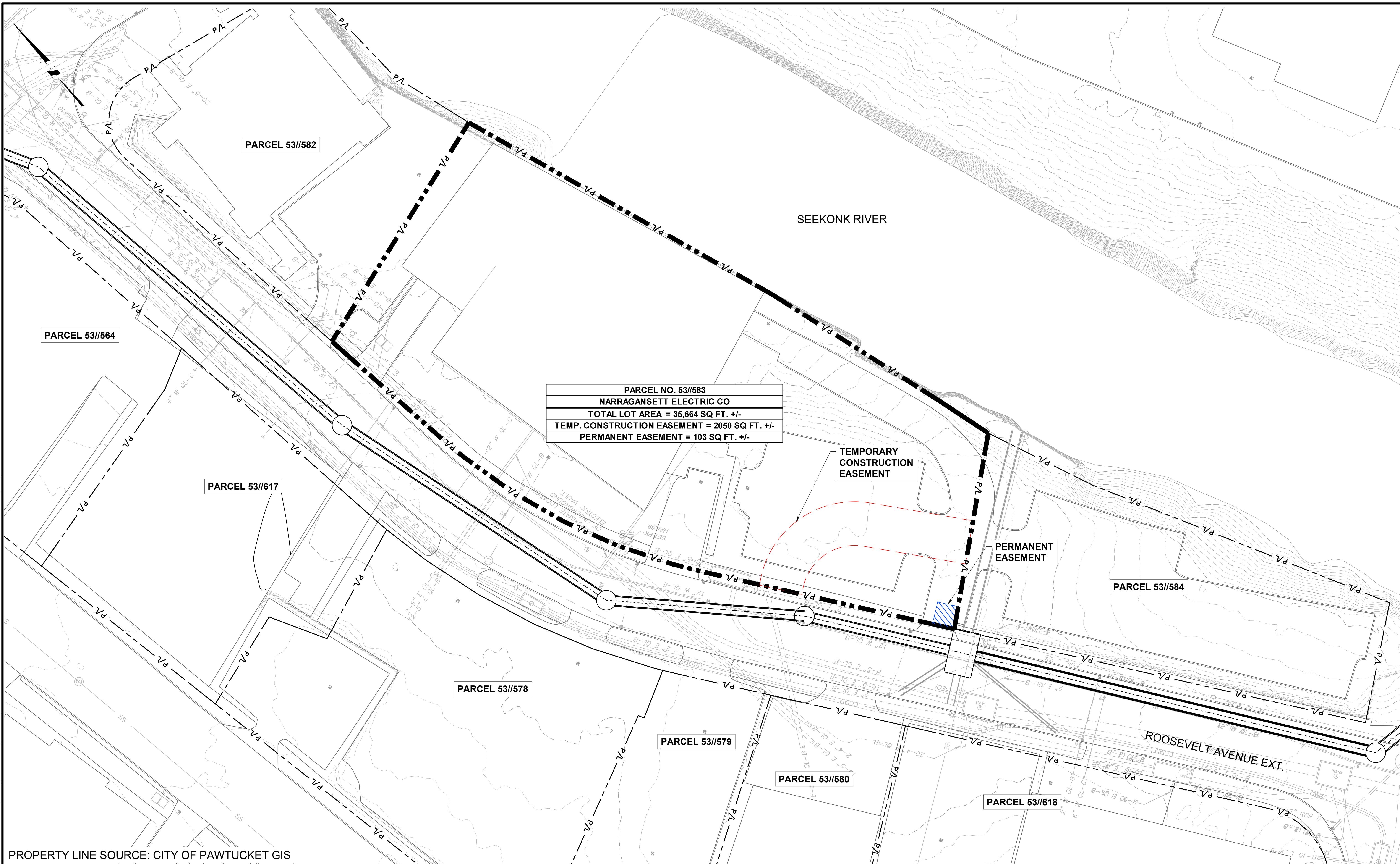
OF 210/213/214 FACILITIES  
 EASEMENT DRAWING - PARCEL NO. 53//584

SHEET  
 C-3  
 195130227

BY: JAMIE PAYNE

PLOT DATE: Tuesday, May 12, 2020 5:02:35 PM

DWG FILE: C:\pwworkdir\0620964\PAWT\_SITE\_EASEMENTS\_III-A-4.dwg



PARCEL NO. 53//583
NARRAGANSETT ELECTRIC CO
TOTAL LOT AREA = 35,664 SQ FT. +/-
TEMP. CONSTRUCTION EASEMENT = 2050 SQ FT. +/-
PERMANENT EASEMENT = 103 SQ FT. +/-

TEMPORARY CONSTRUCTION EASEMENT

PERMANENT EASEMENT

PROPERTY LINE SOURCE: CITY OF PAWTUCKET GIS

REV	DATE	BY	DESCRIPTION

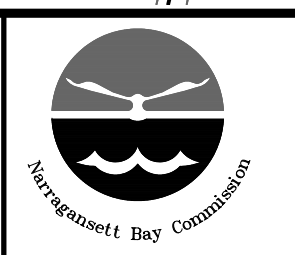
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CIVIL

OF 210/213/214 FACILITIES  
EASEMENT DRAWING - PARCEL NO. 53//583

SHEET  
C-4  
195130227

APPENDIX 8  
ENVIRONMENTAL TECHNICAL MEMORANDUM  
(SEPARATE COVER)

APPENDIX 9  
RISK REGISTER



2LA	Complications in acquiring utility easements (municipal acquisition)	Unlikely - 10%	Medium 500K - 1.0M	Very High >90	2	50	100	100	200	Mitigate	NBC and PM/CM to coordinate with municipal parties early in the design process to identify intent to take easements.	Identified	NBC	Rare - 1%	Medium 500K - 1.0M	Medium 30-60	1	50	50	50	50
3LA	Complications in acquiring utility easements (private acquisition)	Possible - 30%	Very Low <100K	Medium 30-60	3	1	50	3	150	Avoid	Redesign OF-213 Diversion Structure to avoid need for permanent easement.	Identified	NBC	Rare - 1%	Very Low <100K	Medium 30-60	1	1	50	1	50
<b>Operations &amp; Maintenance</b>																					
10M	Slide Gates in GSS fail to actuate	Possible - 30%	High 1.0M-2.5M	Very Low <15	3	80	1	240	3	Mitigate	Design shall incorporate access directly above slide gates for possible removal. NBC shall incorporate inspection and exercising of the gates on a regular basis as part of the facility O&M.	Identified	NBC	Rare - 1%	High 1.0M-2.5M	Very Low <15	1	80	1	80	1
20M	Floatables from Diversion Structures cannot be removed	Likely - 50%	Low 100K - 500K	Very Low <15	4	10	1	40	4	Mitigate	Design shall incorporate access directly above floatables screen at diversion structure to allow NBC O&M personnel to vacuum floatables from structure.	Identified	NBC	Rare - 1%	Low 100K - 500K	Very Low <15	1	10	1	10	1
30M	River water level higher than diversion structure weir, enters consolidation conduit	Probable - 70%	High 1.0M-2.5M	Very Low <15	5	80	1	400	5	Mitigate	Add tide gate structure on outfall pipe, at or downstream of diversion structure weir, when weir elevation is below 100-year flood plain elevation	Identified	NBC	Rare - 1%	High 1.0M-2.5M	Very Low <15	1	80	1	80	1
40M	Floatables from GSS cannot be removed	Likely - 50%	High 1.0M-2.5M	Very Low <15	4	80	1	320	4	Mitigate	Design shall incorporate access directly above GSS bar screen to allow NBC O&M personnel to vacuum floatables from structure. Due to structure depth, NBC to develop protocol which may include closing gates and flooding screening compartment.	Identified	NBC	Rare - 1%	High 1.0M-2.5M	Very Low <15	1	80	1	80	1
50M	Slide gates non-functional due to power outage	Probable - 70%	High 1.0M-2.5M	Very Low <15	5	80	1	400	5	Mitigate	Slide gate actuators only critical infrastructure requiring power. In event of power failure, hydraulic actuators shall be provided with mechanism for storing power to close the gates on loss of power.	Identified	NBC	Rare - 1%	High 1.0M-2.5M	Very Low <15	1	80	1	80	1

*Risk Likelihood Rating*

Likelihood	Probability	Score
Probable - 70%	70%	5
Likely - 50%	50%	4
Possible - 30%	30%	3
Unlikely - 10%	10%	2
Rare - 1%	1%	1

*Cost Consequence Rating*

Severity	Consequence	
	Cost (\$)	Score
Very High > 2.5M	>2.5M	100
High 1.0M-2.5M	1.0M-2.5M	80
Medium 500K - 1.0M	500K-1.0M	50
Low 100K - 500K	100K-500K	10
Very Low <100K	<100K	1

*Schedule Consequence Rating*

Severity	Consequence	
	Cal. Day Delay	Score
Very High >90	>90	100
High 60-90	60-90	80
Medium 30-60	30-60	50
Low 15-30	15-30	10
Very Low <15	<15	1

*Risk Matrix*

Likelihood (Score)	Very Low (1)	Low (10)	Medium (50)	High (80)	Very High (100)
Probable (5)	5	50	250	400	500
Likely (4)	4	40	200	320	400
Possible (3)	3	30	150	240	300
Unlikely (2)	2	20	100	160	200
Rare (1)	1	10	50	80	100

*Risk Owner*

PM/CM
Designer
Contractor
NBC

*Risk Strategy*

Strategy	Description
Transfer	Assign risk to others or insure risk
Avoid	Do not perform activity
Mitigate	Specify measures to reduce likelihood and/or consequence
Accept	Willing to accept consequences

*Risk Management Strategy*

Status	Description
Active	Risk has occurred and strategy being implemented
Identified	Identified but not yet implemented or occurred
Expired	Risk did not occur, has expired and implementation not needed
Closed	Risk occurred and strategy is complete



NBC Phase III CSO Program Contract IIIA-4 - Basis of Risk Register Updated: 7/30/2021									
Risk ID	Risk Title	Basis of Likelihood Impact	Basis of Cost Impact	Basis of Schedule Impact	Strategy	Basis of Approach	Basis of Residual Likelihood Impact	Basis of Residual Cost Impact	Basis of Residual Schedule Impact
<b>Safety</b>									
1S	Contractor non-compliance with H&S Plan	Given non-traditional restrictions associated with working on Tidewater site, it is likely that a non-compliance event from workers will occur.	OSHA fine and contractor shutdown for period of time until compliance achieved.	If OSHA fine only, no schedule impact. If contractor shut down for non-compliance, contractor self-incentivized to achieve compliance.	Transfer	Contractor solely responsible for Health & Safety of his employees.	Risk Transferred - No current reduction in risk profile	Risk Transferred - No current reduction in risk profile	Risk Transferred - No current reduction in risk profile
2S	Worker Fatality	On-the-job worker fatality is a rare occurrence in the modern construction industry.	Significant OSHA fine, work shutdown, legal fees associated with wrongful death lawsuit, possible settlement costs, etc.	OSHA project shutdown during investigation	Transfer	Contractor solely responsible for Health & Safety of his employees.	Risk Transferred - No current reduction in risk profile	Risk Transferred - No current reduction in risk profile	Risk Transferred - No current reduction in risk profile
3S	Worker Lost Time	Worker accidents are possible in the modern construction industry.	Medical bills, workman compensation claims, lost productivity	Limited time lost	Transfer	Contractor solely responsible for Health & Safety of his employees.	Risk Transferred - No current reduction in risk profile	Risk Transferred - No current reduction in risk profile	Risk Transferred - No current reduction in risk profile
4S	Pedestrian accident due to construction activities	Proximity of construction activities to pedestrian ways; ability of pedestrians to travel through work zone	Repair costs (equipment), medical costs, legal costs, public relation response costs	Lost productivity; management of public relations situation	Mitigate	Contractor responsible for managing work zone. Alignment and work limits located off Taft Street right-of-way. Require screening and security measures (fencing, gates for privacy, noise, etc.) between work zone and Taft Street right-of-way. Pedestrian management plans to be included in Contract Documents to designate proposed pedestrian travel ways in areas where normal pedestrian access is impacted by construction activities.	Risk Transferred - No current reduction in risk profile	No change from pre-strategy assumptions	No change from pre-strategy assumptions
5S	Vehicular damage due to use parking lot on Parcel 584 (Roosevelt Ave. Ext.) during construction.	Construction activities in close proximity to retaining wall above parking lot.	Vehicle damage due to potential wall damage; pedestrian injury	Limited schedule impact.	Mitigate	Eliminate private access to lot by securing temporary construction easement.	Limited breach of site security.	No change from pre-strategy assumptions	No change from pre-strategy assumptions
<b>Planning &amp; Permitting</b>									
1PP	CRMC approvals delayed	Profile / scale of CSO Phase III program; agency permitting history	Limited to additional permitting rework time and effort	Critical path schedule. Bidding and procurement will be delayed if permit approvals delayed.	Mitigate	Early coordination with CRMC to present design and permit intent should allow for agency requirement incorporation into permitting and contract documents.	No change from pre-strategy assumptions	No change from pre-strategy assumptions	No change from pre-strategy assumptions
2PP	RIDEM approvals delayed	Profile / scale of CSO Phase III program; agency permitting history	Limited to additional permitting rework time and effort	Critical path schedule. Bidding and procurement will be delayed if permit approvals delayed.	Mitigate	Early coordination with RIDEM to present design and permit intent should allow for agency requirement incorporation into permitting and contract documents.	No change from pre-strategy assumptions	No change from pre-strategy assumptions	No change from pre-strategy assumptions
3PP	RIHPHC approval delayed	Profile / scale of CSO Phase III program; agency permitting history	Limited to additional permitting rework time and effort	Critical path schedule. Bidding and procurement will be delayed if permit approvals delayed.	Mitigate	Early coordination with RIHPHC to present design and permit intent should allow for agency requirement incorporation into permitting and contract documents.	No historic sites of concern identified. Permitting process should be relatively straightforward.	No change from pre-strategy assumptions	Risk of schedule impact reduced based on confirmation of no historic sites of concern.
<b>Procurement</b>									
1P	Contract execution delayed due to contractor bonding	Apparent low bid contractor to be disqualified due to inability to secure required bonds.	Cost assumes apparent low bid contractor cannot secure bonding and another contractor must be selected.	Schedule impact associated with abandoning contracting process with initial contractor and initiating contracting process to another contractor.	Accept	None	No change from pre-strategy assumptions	No change from pre-strategy assumptions	No change from pre-strategy assumptions
2P	Bids exceed project cost estimate	Competitive marketplace	Cost associated with bid prices above estimates.	Tied to cost - On low end of cost, schedule impacts are minimal if within contingencies. On high end of cost, schedule impacts associated with readvertisement of project.	Mitigate	Conduct OPCC at all project design stages.	Risk decreased due to monitoring of anticipated project costs.	Residual cost impacts associated with specialty construction costs.	No change from pre-strategy assumptions
3P	Lack of contractor interest	Similar construction contracts competing for the same specialty contractors advertised at approximately the same time.	Cost impacts associated with elevated bid prices due to decreased competition.	Schedule impact assumes all bids rejected and project re-advertised.	Mitigate	Pre-advertise project in trade periodicals for specialty subcontractors to generate interest prior to bidding.	Advance advertisement and tactical program scheduling will generate interest and help ensure competitive bidding for each project.	No change from pre-strategy assumptions	No change from pre-strategy assumptions
<b>Design</b>									
1D	Mapping provided by PM/CM is insufficient for design	PM/CM stated that mapping provided would likely not be sufficient for design purposes.	Cost associated with additional survey information to be obtained.	Schedule impacts associated with obtaining proposal and procurement of additional survey and additional survey information.	Mitigate	Review mapping when available to determine if product is sufficient for design purposes. Supplement with additional survey information as needed.	Assumes sufficient survey information will be obtained by the Designer (with additional costs covered via Change Order).	No change from pre-strategy assumptions. Pre-strategy assumptions include costs to mitigate.	No change from pre-strategy assumptions. Pre-strategy assumptions include schedule impacts associated with mitigation.
2D	Existing utility information is inaccurate	Large number of utilities in the area; NGrid has stated that the utility locations presented on the Tidewater Site are schematic.	Cost associated with damaged utilities due to inaccurate information, cost associated with additional investigation (potholing)	Schedule impacts associated with additional investigation and downtime associated with utility strikes resulting from inaccurate information.	Mitigate	Conduct SUE investigation (vacuum excavation). Additional coordination with utilities.	Assumes utility strikes based on inaccurate information may still occur, despite best efforts to properly identify all utilities	Cost associated with damaged utilities due to inaccurate information.	Schedule impacts associated with implementing additional investigation and downtime associated with potential utility strikes resulting from inaccurate information.
3D	Presence of bedrock identified	Existing borings identify bedrock.	Increased cost associated with management / removal of rock in lieu of soil	Production differential of microtunneling in rock vs. soil	Accept	Conduct additional borings to better identify bedrock profile for Contractor's information.	No change from pre-strategy assumptions	No change from pre-strategy assumptions	No change from pre-strategy assumptions
4D	Stakeholder-requested scope changes	The NBC has requested scope changes.	Cost associated with additional design and investigation efforts. Costs associated with re-design will increase as design progresses.	Schedule impacts associated re-design efforts and obtaining supplemental information through remobilization of subconsultants.	Accept	Coordinate with NBC and PM/CM on a routine basis to ensure expectations are clear and identify and incorporate any changes early in the design process, where possible.	No change from pre-strategy assumptions	No change from pre-strategy assumptions	No change from pre-strategy assumptions
<b>Construction</b>									
1C	Insufficient Support-of-Excavation (SOE) at structures	SOE required at all structures based on depth of excavation.	Cost associated with contractor's labor and equipment downtime, SOE re-design costs, SOE repairs	Schedule impacts associated with SOE failure	Transfer	Contractor responsible for SOE design and construction.	No change from pre-strategy assumptions	Contractor bears cost of SOE failure and cure. Cost risk transferred.	No change from pre-strategy assumptions

NBC Phase III CSO Program									
Contract IIIA-4 - Basis of Risk Register									
Updated: 7/30/2021									
Risk ID	Risk Title	Basis of Likelihood Impact	Basis of Cost Impact	Basis of Schedule Impact	Strategy	Basis of Approach	Basis of Residual Likelihood Impact	Basis of Residual Cost Impact	Basis of Residual Schedule Impact
2C	Insufficient dewatering at structures	Dewatering and/or groundwater cutoff / management required at all structures based on groundwater data obtained and provided.	Cost associated with contractor's labor and equipment downtime, implementation of additional dewatering measures (wells, pumps, etc.), additional groundwater treatment measures	Schedule impacts associated with curing dewatering system failure (drilling additional wells, mobilizing additional equipment)	Transfer	Contractor responsible for dewatering design and implementation.	No change from pre-strategy assumptions	Contractor bears cost to cure dewatering operations. Cost risk transferred.	No change from pre-strategy assumptions
3C	Insufficient dewatering for utility trenching operation	Dewatering and/or groundwater cutoff / management required at most utility trenching locations based on groundwater data obtained and provided.	Cost associated with contractor's labor and equipment downtime, implementation of additional dewatering measures (wells, pumps, etc.), additional groundwater treatment measures	Schedule impacts associated with curing dewatering system failure (drilling additional wells, mobilizing additional equipment)	Transfer	Contractor responsible for dewatering design and implementation.	No change from pre-strategy assumptions	Contractor bears cost to cure dewatering operations. Cost risk transferred.	No change from pre-strategy assumptions
4C	Insufficient groundwater management for utility tunnel between GSS and Junction Chamber	Dewatering and/or groundwater cutoff / management expected to be extensive in this area based on groundwater data obtained and provided.	Cost associated with additional groundwater management methods.	Schedule impacts associated with implementation of additional groundwater management methods	Transfer	Contractor responsible for dewatering design and implementation.	No change from pre-strategy assumptions	Contractor bears cost to cure dewatering operations. Cost risk transferred.	No change from pre-strategy assumptions
5C	Existing electrical infrastructure near hydroelectric facility damaged during construction.	Damage to electric facilities in this location is likely with conventional construction techniques given number and close proximity of ductbanks.	Cost association with emergency repair efforts	Schedule impacts associated with electric infrastructure repair (temporary and permanent)	Avoid	Select a construction technique that does not require electric facilities to be supported.	Limited residual risk with selected trenchless technique with respect to utility damage.	No change from pre-strategy assumptions	No change from pre-strategy assumptions
6C	OF-214 - Stone Retaining Wall impacted by structure construction	Based on SOE limits, impacts to the stone retaining wall are anticipated	Cost associated with repairs to wall	Schedule impact associated with wall reconstruction	Accept	Incorporate retaining wall removal and repair design into construction documents	No change from pre-strategy assumptions	No change from pre-strategy assumptions	No change from pre-strategy assumptions
7C	Improper management of Existing Outfalls / Flow during construction	Existing outfall flow must be managed during construction. Some existing infrastructure will be out of service during the construction process.	Fines and penalties associated with mismanagement of existing outfall flow.	Limited schedule impact associated with implementing cure measures.	Transfer	Contract Documents to require Contractor submit an existing flow management plan	No change from pre-strategy assumptions	Contractor bears cost to cure mismanaged outfall operations and associated penalties. Cost risk transferred.	No change from pre-strategy assumptions
8C	Electrical vault beneath I-95 bridge damaged	The vault is located beneath the bridge in the center of the roadway. Proposed alignment is between the electrical vault and the abandoned bridge footing. The vault will probably be damaged due to the narrow alignment corridor.	Cost associated with repair efforts and installation of temporary electric infrastructure.	Schedule impact associated with installing temporary electric infrastructure and repairing electric vault after construction.	Avoid	Select a construction technique that does not require electric facilities to be supported.	Even with pipe jacking, vertical separation between consolidation conduit and bottom of vault is low (about 2'). Damage to structure is still likely given its existing condition.	No change from pre-strategy assumptions	No change from pre-strategy assumptions
9C	Unknown obstruction in vicinity of OF-213 impacts diversion structure construction	Known obstruction from initial geotechnical investigation. Unknown source/nature.	Relocate / reconfigure diversion structure, retaining wall modifications, additional investigation to locate consolidation conduit, private property impacts.	Schedule impacts associated with redesign/reconfig of diversion structure and consolidation conduit near OF-213	Mitigate	Investigate unknown obstruction to define source and nature. (7/30/21) Conducted test pit as part of SUE investigation. Identified abandoned electrical duct bank. Ductbank verified abandoned by National Grid on site. Ductbank identified for removal/disposal on Contract Documents.	Risk expired through mitigation measures taken.	No change from pre-strategy assumptions	No change from pre-strategy assumptions
10C	Existing retaining wall along river is damaged as a result of construction activities.	Proximity to heavy construction activities. Unknown construction. Evidence of surface defects (cracking)	Reconstruction of some/all of the retaining wall abutting the work zone.	Reconstruction of some/all of the retaining wall abutting the work zone.	Mitigate	Conducted test pits behind wall to evaluate batter construction. Identified lateral load restrictions within range of retaining wall. Specify surface repairs (crack repair, repointing) prior to utility construction. Pre-construction survey required. Geotechnical monitoring. Transfer remaining risk to Contractor.	Risk potential mitigated through the implementation of lateral loading restrictions. Small potential remains for limited reconstruction even with monitor / protection requirements.	Limited reconstruction of retaining wall section(s)	Limited reconstruction of retaining wall section(s)
11C	Contractor delayed due to inability to access Masonic Temple site (occupied by Tunnel D-B contractor)	Tunnel D-B contractor scheduled to be working on site when NBC contractor scheduled to commence work.	Contractor downtime and reorganization to mobilize to different site activity.	Contractor downtime and reorganization to mobilize to different site activity. Potential material lead time issues.	Mitigate	Coordinate with NBC and PM/CM as bid date approaches to coordinate schedule with Tunnel D-B team and institute project milestones / restrictions to avoid site conflicts.	Possibility of Tunnel D-B contractor being delayed from vacating the site prior to NBC construction commencement, even with project milestones / restrictions	Limited delays	Limited delays
<b>Environmental</b>									
1E	Contamination encountered within the project area.	Project site located in an urban fill area, where encountering low level contamination is a possibility.	Costs include special handling / disposal of soil, possible groundwater treatment	Minimal project delays associated with disposal facility administration.	Mitigate	Conduct soil borings and analyze samples taken outside the Tidewater site for presence of contaminants	Soil samples will not reduce the likelihood of encountering contamination, but will identify if risk is elevated (if contamination is encountered in sampling program.)	No change from pre-strategy assumptions	No change from pre-strategy assumptions
<b>Stakeholder Engagement</b>									
15E	Construction occurs while RIPTA Bus Station in construction.	RIPTA existing bus terminal is located at Main St. / Roosevelt Ave. intersection. RIPTA constructing a new terminal outside project limits. If construction completed before IIIA-4 construction commences, traffic / pedestrian management at intersection will be significantly reduced.	Additional traffic management and coordination with RIPTA for bus routing, protection of pedestrians.	Limited schedule impacts. Potential decrease in production associated with additional traffic management	Accept	RIPTA's new bus terminal scheduled to be completed by Spring 2022, which is before IIIA-4 construction commences. Risk of construction overlap is low.	No change from pre-strategy assumptions	No change from pre-strategy assumptions	No change from pre-strategy assumptions
25E	Resident / business claims of property damage due to construction vibrations	Property damage caused by construction operations are possible.	Costs associated with damage assessment, repairs, relocation of stakeholders (if necessary)	Minimal schedule impact. Assumes mitigation / restoration measures performed during active construction.	Transfer	Contractor to conduct pre-construction site survey and maintain builder's risk insurance	No change from pre-strategy assumptions	Contractor (or Contractor's insurance carrier) bears costs associated with assessment / repair of property damage. Cost risk transferred.	No change from pre-strategy assumptions
35E	Vehicular access to private property / access to private parking lots	Utility construction within travelled right-of-ways generally impact access to abutting properties at some point during construction.	Limited cost implications associated with public outreach. Potential costs associated with temporary access provisions.	Limited schedule impact associated with potential temporary access provisions.	Avoid	Proposed alignment sites a portion of the work zone outside the travelled right-of-way. Alignment within right-of-way proposed to be installed by trenchless construction techniques, limiting surface disturbance to access locations.	See "Basis of Approach"	Limited cost implications associated with public outreach, if necessary.	No change from pre-strategy assumptions
<b>Financial</b>									

NBC Phase III CSO Program									
Contract IIIA-4 - Basis of Risk Register									
Updated: 7/30/2021									
Risk ID	Risk Title	Basis of Likelihood Impact	Basis of Cost Impact	Basis of Schedule Impact	Strategy	Basis of Approach	Basis of Residual Likelihood Impact	Basis of Residual Cost Impact	Basis of Residual Schedule Impact
1F	OPCC exceeds project budget	Estimated project costs may exceed project budget with larger contingencies at earlier design stages. Risk likelihood may be reduced as design progresses.	Cost associated with value engineering design to work within project budget.	Schedule impact associated with value engineering activities.	Mitigate	Prepare OPCC at various project design milestones and course-correct / value-engineer solutions as needed.	Some elements may not be able to be value engineered out for a successful project. Discuss accepting minor exceedences at later design stages, if necessary.	Review of OPCC at regular design intervals will reduce cost impact risk.	Review of OPCC at regular design intervals will reduce schedule impact risk.
2F	Reduction in SRF funding availability	Project identified on CWSRF CY2020 Project Priority List	Cost associated with applying for and securing funding from alternative source; Potential for inferior borrowing terms	Procurement impacts associated with securing project funding from alternative source	Accept	None	No change from pre-strategy assumptions	No change from pre-strategy assumptions	No change from pre-strategy assumptions
<b>Land Acquisition / Easements</b>									
1LA	Complications in acquiring Masonic Temple site	Initial response receptive from property owners; NBC always has option to take portion of property by eminent domain	Cost associated with identifying an alternate site for the GSS and Drop Shaft DS-213. Additional design costs associated with system reconfiguration.	Schedule impacts associated with identifying, securing, re-design and vetting activities (geotechnical, environmental, etc.) associated with a new GSS site.	Mitigate	NBC and PM/CM coordinating with Masonic Temple property owners. Current plan is to purchase entire property, set for closing on June 30, 2020.	Property purchased by NBC	No change from pre-strategy assumptions	No change from pre-strategy assumptions
2LA	Complications in acquiring utility easements (municipal acquisition)	Major permanent easements to be acquired from State and City of Pawtucket. Defined process for acquiring.	Significant effort to redesign if easements cannot be secured	Significant effort to redesign if easements cannot be secured.	Mitigate	NBC and PM/CM to coordinate with municipal parties early in the design process to identify intent to take easements.	City / State aware of the project. NBC & PM/CM continue to coordinate with City / State.	No change from pre-strategy assumptions	Mitigation measures may help decrease schedule impact if complications encountered.
3LA	Complications in acquiring utility easements (private acquisition)	Two minor permanent easements associated with OF-213 Diversion Structure.	Cost associated with redesign efforts at OF-213 and potential utility relocation associated with redesign.	Redesign efforts and additional utility coordination for potential relocation.	Avoid	If complications in acquiring utility easements of private property, redesign OF-213 Diversion Structure to eliminate need for permanent easement.	Risk averted by avoidance plan.	No change from pre-strategy assumptions	No change from pre-strategy assumptions
<b>Operations &amp; Maintenance</b>									
1OM	Slide Gates in GSS fail to actuate.	Slide gates have moving parts that can bind/fail to actual, especially in a wet / submerged environment.	Fines and penalties associated with overflows caused by inability to pass flow through GSS.	No identifiable schedule impact.	Mitigate	Design shall incorporate access directly above slide gates for possible removal. NBC shall incorporate exercising of the gates on a regular basis as part of the facility O&M.	Ability to remove gates from structure provided in design. Regular inspection and maintenance will mitigate risk occurrence.	No change from pre-strategy assumptions	No change from pre-strategy assumptions
2OM	Floatables from Diversion Structure cannot be removed	Floatables will accumulate in diversion structure, eventually requiring increased maintenance at GSS or overtopping screen and discharging to outfall.	Increased maintenance recurrence at GSS and fines/penalties associated with floatables discharging to river.	No identifiable schedule impact.	Mitigate	Design shall incorporate access directly above floatables screen at diversion structure to allow NBC O&M personnel to vacuum floatables from structure.	With proper access to floatables screen, likelihood of floatables discharging over screen will be rare.	No change from pre-strategy assumptions	No change from pre-strategy assumptions
3OM	River water level higher than diversion structure weir, enters consolidation conduit	Flood stage elevation of river near OF-217 is higher than proposed weir elevation at diversion structure, allowing river water into consolidation conduit during flood events.	Fines and penalties associated with overflows caused partly by Seekonk River taking capacity within the consolidation conduit.	No identifiable schedule impact.	Mitigate	Provide measure to keep river water out of consolidation conduit.	Only situation where river water can enter the consolidation conduit is due to a malfunction of the tide gate during a flood event.	No change from pre-strategy assumptions	No change from pre-strategy assumptions
4OM	Floatables from GSS cannot be removed	Floatables will blind bar rack inhibiting flow.	Fines and penalties associated with overflows caused by inability to pass flow through GSS.	No identifiable schedule impact.	Mitigate	Provide access above bar rack to allow NBC to remove floatables from GSS structure. Consider emergency flow bypass.	With proper access to floatables screen, likelihood of floatables blinding screen will be rare.	No change from pre-strategy assumptions	No change from pre-strategy assumptions
5OM	Slide gates non-functional due to power outage.	Gate actuators require power to actuate.	Fines and penalties associated with overflows caused by inability to pass flow through GSS.	No identifiable schedule impact.	Mitigate	Slide gate actuators only critical infrastructure requiring power. In event of power failure, hydraulic actuators shall be provided with mechanism for storing power to close the gates on loss of power.	Emergency gate actuation (stored power) provided in design.	No change from pre-strategy assumptions	No change from pre-strategy assumptions

APPENDIX 10  
OPINION OF PROBABLE  
CONSTRUCTION COST



**BETA GROUP INC.**  
**PHASE III COMBINED SEWER  
OVERFLOW PROGRAM (IIIA-4)  
OF-210/213/214 FACILITIES  
CONTRACT NO. 308.04C  
OPCC (Class 3)  
60% COST ESTIMATE**

**SUMMARY**

City Point Partners has performed a cost estimate analysis of the Phase III Combined Sewer Overflow Program – Drop Shaft 210/213/214 Consolidation Conduit (IIIA-4), Contract No. 308.04C, based on plans and specifications dated July 2020 as well communications with team members from BETA and McMillen Jacobs. The pricing was based on current labor rates, material pricing from database from Sage estimating software, and other reference databases like RIDOT Weighted Average Unit Prices.

Contract IIIA-4 Drop Shaft 210/213/214 Consolidation Conduit includes construction of cast-in-place gate & screening structure, junction chamber, 12’ diameter manhole, approach channel, precast manhole structures and cast-in-place diversion structures. It also includes the installation of 203 linear feet of 54” RCP in open trench, 299 linear feet of 48” RCP in open trench and 247 linear feet of 48” RCP via pipe jacking on Roosevelt Ave. On Taft Street there is installation of 151 linear feet of 60” RCP in open trench, 541 linear feet of 48” RCP in open trench and 233 linear feet of 48” RCP via pipe jacking. From the gate & screening structure to the junction box there is 6 linear feet of 72” RCP in open trench and 39 linear feet of 72” RCP via pipe jacking. It also includes 1290 linear feet of water main bypass and approximately 1100 linear feet of new water main. Traffic management, paving & curbing are also included in the scope.

The total assessment of the Contract IIIA-4 has been calculated for an estimated value of **\$19,996,608.50**.

**Assumptions:**

**Contract IIIA-4:**

Support of Excavation (SOE): Secant Piles will be used as SOE for Gate & Screening Structure, Approach Channel, 12’ diameter Manhole and Junction Chamber. Soldier Pile and Lagging will be used for the rest of the structures and open trenches for piping.

Dewatering: Assumed 5 wells monitored and capped @ 100GPM for open trenching and 2 wells each for pipe jacking pits. Well point system is assumed at this stage of design.

Trenchless Construction: IIIA-4 includes approximately 400 LF of pipe jacking. Cost for pipe jacking is calculated at \$26 per inch per linear feet @ 30 lf/day productivity. It also includes 50 LF of 72” RCP utility tunneling which includes installation of 10’ dia. Utility Tunneling, installation of 72” RCP and annulus grouting.

Open Trenching: Assumed 12” of bedding, 36” cover for all piping and soldier pile & lagging for all the excavation. The trenches are backfilled with existing material.

Includes approximately 10301 SY of paving and 1200 LF of remove and reset of existing curb and 1200 LF of sidewalk.

Temporary Services, Trailers, Erosion Control, Final Cleaning, Site Security etc. included in General Requirements.

Total duration of 18 months is assumed for calculation of escalation. The construction start date is assumed to be May 25, 2022 (End of Phase IIIA-5). Based on these assumptions, the escalation is calculated at **10.75%**.

**Markups:**

Overhead & Profit	12%
Contingency	20%

Escalation to Mid-Point

4% Annually

**Additional References:**

The following sources were used in preparation of this estimate in addition to plans and specifications issued by Beta:

Stantec

- "Phase III CSO Program, Conceptual Design for Consolidation Conduits and Regulator Modifications - Technical Memorandum, January 25, 2019" for the Narragansett Bay Commission, prepared by Stantec

RIDOT

- "RI Department of Transportation, Plans, Profiles and Sections of Proposed Bridge Replacement, Pawtucket Bridge No. 550, I-95 Over the Seekonk River, Volume 3 Bridge Plans, RI Contract No. 2010-CB-004, FA Project Nos. BRO-0550(003), IM-0550(004), IMG-0550(005), Length =0.9 miles, Commonwealth Engineers and Consultants, Inc. Providence RI, April 2010"
- "RI Department of Public Works, Division of Roads and Bridges, Plan, Profile and Sections of Proposed State Highway, Division St. Project, Contract Three, RIFA Project NO. I-01(11) Length 0723 Miles, Contract Number 5753, April 1957"
- "Construction Stage Soil Management Plan for the Pawtucket River Bridge #550 Replacement and Improvements, For Commonwealth Engineers and Consultants, Inc., DEM Case #2009-13, August 2009" by Wright Pierce
- Site investigation Report of the Phase II and III ESA Work Associated with Pawtucket Bridge #550 Replacement and Improvements for Commonwealth Engineers and Consultants, Inc., DEM Case #2009-13, Volume 1 and Volume 2, August 2009" by Wright Pierce
- Remedial Action Work Plan for the Pawtucket Bridge #550 Replacement and Improvements for Commonwealth Engineers and Consultants, Inc., DEM Case #2009-13, October 2009, Revised December 2009" by Wright Pierce

City of Pawtucket

City of Pawtucket, Seekonk/Blackstone River Wall Repair Project, June 10, 2011, Prepared for: City of Pawtucket, Prepared by: Fuss and O'Neill Inc.

Estimate submitted by

Annalisa Motti – Project Controls Specialist

Apoorva Paruchuri – Lead Project Controls Specialist

Jim Stetson – VP Project Controls

Location	Description	Takeoff Quantity	UOM	Total Cost/Unit	UOM	Total Amount	Grand Total Amount
<b>12' Dia. MH</b>							
	<b>Backfill &amp; Compaction</b>						
	Backfill, trench, air tamped compaction, 12' Dia. MH	1,242.35	ecy	\$ 19.01	/ecy	\$ 23,614.00	\$ 31,171.00
	<b>Backfill &amp; Compaction</b>	<b>1,242.35</b>	<b>cy</b>	<b>\$ 19.01</b>	<b>/cy</b>	<b>\$ 23,614.00</b>	<b>\$ 31,171.00</b>
	<b>Excavation</b>						
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket 12" Dia MH	131.67	cy	\$ 22.26	/cy	\$ 2,931.00	\$ 3,869.00
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket	1,294.22	cy	\$ 22.26	/cy	\$ 28,809.00	\$ 38,028.00
	Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	51.87	lcy	\$ 11.50	/lcy	\$ 597.00	\$ 788.00
	<b>Excavation</b>	<b>1,294.22</b>	<b>cy</b>	<b>\$ 24.99</b>	<b>/cy</b>	<b>\$ 32,337.00</b>	<b>\$ 42,684.00</b>
	<b>Excavation - Rock</b>						
	Excavate pit, Rock - 12' Dia MH	36.00	cy	\$ 75.00	/cy	\$ 2,700.00	\$ 3,564.00
	<b>Excavation - Rock</b>	<b>36.00</b>	<b>cy</b>	<b>\$ 75.00</b>	<b>/cy</b>	<b>\$ 2,700.00</b>	<b>\$ 3,564.00</b>
	<b>Frames and Covers</b>						
	Utility area drains, catch basins manhls catch basins manhls frames and covers, cast iron, heavy traffic, excludes footing, excavtn, and backfill 12" Dia MH	1.00	ea	\$ 2,520.48	/ea	\$ 2,520.00	\$ 3,327.00
	Utility area drains, catch basins manhls catch basins manhls frames and covers, cast iron, heavy traffic, 36" dm	1.00	ea	\$ 1,527.42	/ea	\$ 1,527.00	\$ 2,016.00
	Storm Drainage Manholes, Frames, and Covers, standard sizes, galvanized steel	1.00	ea	\$ 41.45	/ea	\$ 41.00	\$ 55.00
	<b>Frames and Covers</b>	<b>1.00</b>	<b>ea</b>	<b>\$ 4,089.35</b>	<b>/ea</b>	<b>\$ 4,089.00</b>	<b>\$ 5,398.00</b>
	<b>Precast Concrete</b>						
	Storm Drainage Manholes, Frames, and Covers, concrete, precast, 12' I.D., excludes base, excavation, backfill, frame and cover 12' Dia MH	36.00	vlf	\$ 860.78	/vlf	\$ 30,988.00	\$ 40,904.00
	<b>Precast Concrete</b>	<b>36.00</b>	<b>ea</b>	<b>\$ 860.78</b>	<b>/ea</b>	<b>\$ 30,988.00</b>	<b>\$ 40,904.00</b>
	<b>Cast-In-Place Concrete</b>						
	Base slab; form, resteel and concrete to 8" thick, avg cost per cy 12' Dia MH	3.97	cy	\$ 445.01	/cy	\$ 1,767.00	\$ 2,333.00
	Slab; form, resteel and concrete to 8" thick, avg cost per cy 12' Dia MH	3.55	cy	\$ 445.01	/cy	\$ 1,581.00	\$ 2,087.00
	<b>Cast-In-Place Concrete</b>	<b>3.55</b>	<b>cy</b>	<b>\$ 943.05</b>	<b>/cy</b>	<b>\$ 3,348.00</b>	<b>\$ 4,419.00</b>
	<b>Precast Concrete</b>						
	Storm Drainage Manholes, Frames, and Covers, concrete, precast, 12' inside diameter, 8' deep	1.00	ea	\$ 6,399.79	/ea	\$ 6,400.00	\$ 8,448.00
	Storm Drainage Manholes, Frames, and Covers, concrete, precast, 12' I.D.,	23.00	vlf	\$ 720.16	/vlf	\$ 16,564.00	\$ 21,864.00
	<b>Precast Concrete</b>	<b>12.00</b>	<b>ea</b>	<b>\$ 1,913.62</b>	<b>/ea</b>	<b>\$ 22,963.00</b>	<b>\$ 30,312.00</b>
	<b>12' Dia. MH</b>					<b>\$ 120,040.00</b>	<b>\$ 158,452.00</b>
<b>APPROACH CHANNEL</b>							
	<b>Backfill</b>						
	Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	554.07	ecy	\$ 3.85	/ecy	\$ 2,134.00	\$ 2,817.00
	Fill by borrow and utility bedding, for pipe and conduit, sand, dead or bank, excludes compaction	16.29	lcy	\$ 32.50	/lcy	\$ 529.00	\$ 699.00
	Fill by borrow and utility bedding, for pipe and conduit, compacting bedding in trench	16.29	ecy	\$ 7.07	/ecy	\$ 115.00	\$ 152.00
	<b>Backfill</b>	<b>554.07</b>	<b>cy</b>	<b>\$ 5.01</b>	<b>/cy</b>	<b>\$ 2,779.00</b>	<b>\$ 3,668.00</b>
	<b>Excavation</b>						
	Excavating, trench or continuous footing, common earth, 1 1/2 C.Y. excavator, 14' to 20' deep, excludes sheeting or dewatering	570.37	bcy	\$ 4.64	/bcy	\$ 2,647.00	\$ 3,494.00
	Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	16.30	lcy	\$ 11.50	/lcy	\$ 187.00	\$ 247.00
	<b>Excavation</b>	<b>586.00</b>	<b>cy</b>	<b>\$ 4.84</b>	<b>/cy</b>	<b>\$ 2,834.00</b>	<b>\$ 3,741.00</b>
	<b>Excavation - Rock</b>						
	Excavation, Rock	40.00	bcy	\$ 75.00	/bcy	\$ 3,000.00	\$ 3,960.00
	<b>Excavation - Rock</b>	<b>40.00</b>	<b>cy</b>	<b>\$ 75.00</b>	<b>/cy</b>	<b>\$ 3,000.00</b>	<b>\$ 3,960.00</b>
	<b>Cast-In-Place Concrete</b>						
	Forms in place, wall, steel framed plywood, to 16' high, 3 use/month	1,680.00	sfca	\$ 13.41	/sfca	\$ 22,537.00	\$ 29,748.00
	Form oil, coverage varies greatly, maximum, includes material only	4.48	gal	\$ 21.50	/gal	\$ 96.00	\$ 127.00
	Reinforcing steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	2.52	ton	\$ 2,106.01	/ton	\$ 5,307.00	\$ 7,005.00
	Reinforcing in place, unloading & sorting, add - walls, cols, beams	2.52	ton	\$ 54.78	/ton	\$ 138.00	\$ 182.00
	Reinforcing, crane cost for handling, add to above, walls, cols, beams	2.52	ton	\$ 59.55	/ton	\$ 150.00	\$ 198.00
	Concrete, ready mix, regular weight, walls/cols/beams, 4000 psi	16.33	cy	\$ 128.00	/cy	\$ 2,091.00	\$ 2,760.00
	Structural concrete, placing, walls, pumped, 15" thick, includes vibrating, excludes material	16.33	cy	\$ 48.93	/cy	\$ 799.00	\$ 1,055.00
	<b>Cast-In-Place Concrete</b>	<b>16.33</b>	<b>cy</b>	<b>\$ 1,905.57</b>	<b>/cy</b>	<b>\$ 31,118.00</b>	<b>\$ 41,076.00</b>
	<b>APPROACH CHANNEL</b>					<b>\$ 39,731.00</b>	<b>\$ 52,445.00</b>
<b>CONTROL BUILDING</b>							
	<b>Backfill &amp; Compaction</b>						
	Aggregate, sand, washed, for concrete, loaded at the pit, includes material only	1.56	cy	\$ 29.50	/cy	\$ 46.00	\$ 61.00
	Aggregate, sand, washed, for concrete, loaded at the pit, includes material only	1.56	cy	\$ 29.50	/cy	\$ 46.00	\$ 61.00
	Aggregate, stone, 3/4" to 1-1/2", includes material only	3.11	cy	\$ 33.50	/cy	\$ 104.00	\$ 138.00
	Aggregate, stone, 3/4" to 1-1/2", includes material only	3.11	cy	\$ 33.50	/cy	\$ 104.00	\$ 138.00
	Fine grading, fine grade for slab on grade, machine	28.00	sy	\$ 1.87	/sy	\$ 52.00	\$ 69.00
	Fine grading, fine grade for slab on grade, machine	28.00	sy	\$ 1.87	/sy	\$ 52.00	\$ 69.00
	<b>Backfill &amp; Compaction</b>	<b>4.67</b>	<b>cy</b>	<b>\$ 86.72</b>	<b>/cy</b>	<b>\$ 405.00</b>	<b>\$ 535.00</b>



Location	Description	Takeoff Quantity	UOM	Total Cost/Unit	UOM	Total Amount	Grand Total Amount
<b>Cast-In-Place Concrete</b>							
	Underslab vapor barrier, visqueen membrane to 6 mil	252.00	sf	\$ 0.23	/sf	\$ 59.00	\$ 77.00
	C.I.P. concrete forms, slab on grade, edge, wood, to 6" high, 4 use, includes erecting, bracing, stripping and cleaning	64.00	lf	\$ 4.87	/lf	\$ 311.00	\$ 411.00
	Reinforcing steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.16	ton	\$ 2,387.80	/ton	\$ 377.00	\$ 498.00
	Reinforcing in place, unloading & sorting, add to above - slabs	0.16	ton	\$ 54.75	/ton	\$ 9.00	\$ 11.00
	Reinforcing in place, crane cost for handling, add to above, slabs	0.16	ton	\$ 59.50	/ton	\$ 9.00	\$ 12.00
	Concrete, ready mix, regular weight, slabs/mats, 4000 psi	4.90	cy	\$ 128.00	/cy	\$ 627.00	\$ 828.00
	Structural concrete, placing, slab on grade, direct chute, over 6" thick, includes vibrating, excludes material	4.90	cy	\$ 22.35	/cy	\$ 110.00	\$ 145.00
	Concrete finishing, floors, monolithic, machine trowel finish	252.00	sf	\$ 1.06	/sf	\$ 267.00	\$ 352.00
	Concrete finishing, floor, dustproofing, solvent-based, 1 coat	252.00	sf	\$ 0.47	/sf	\$ 118.00	\$ 156.00
	Curing, sprayed membrane curing compound	2.52	csf	\$ 24.83	/csf	\$ 63.00	\$ 83.00
	<b>Cast-In-Place Concrete</b>	<b>9.80</b>	<b>cy</b>	<b>\$ 198.95</b>	<b>/cy</b>	<b>\$ 1,950.00</b>	<b>\$ 2,574.00</b>
<b>Electrical</b>							
	Reglet, zinc and copper alloy, 20 ounce	56.00	lf	\$ 9.67	/lf	\$ 542.00	\$ 715.00
	Reglet, counter flashing for zinc and copper alloy, 20 ounce, 12" wide	56.00	lf	\$ 11.30	/lf	\$ 633.00	\$ 836.00
	<b>Electrical</b>	<b>56.00</b>	<b>lf</b>	<b>\$ 20.98</b>	<b>/lf</b>	<b>\$ 1,175.00</b>	<b>\$ 1,551.00</b>
<b>Precast Concrete</b>							
	Head House - Precast - Allowance	1.00	ls	\$ 150,000.00	/ls	\$ 150,000.00	\$ 198,000.00
	<b>Precast Concrete</b>	<b>1.00</b>	<b>ea</b>	<b>\$ 150,000.00</b>	<b>/ea</b>	<b>\$ 150,000.00</b>	<b>\$ 198,000.00</b>
<b>Fans</b>							
	Exhaust Fan, EF1	1.00	ea	\$ 5,557.89	/ea	\$ 5,558.00	\$ 7,336.00
	Exhaust Air Louver, 26" x 26"	1.00	ea	\$ 600.03	/ea	\$ 600.00	\$ 792.00
	Intake Louver, 36" x 48"	1.00	ea	\$ 1,399.97	/ea	\$ 1,400.00	\$ 1,848.00
	<b>Fans</b>	<b>1.00</b>	<b>ea</b>	<b>\$ 7,557.89</b>	<b>/ea</b>	<b>\$ 7,558.00</b>	<b>\$ 9,976.00</b>
<b>Fire Detection</b>							
	Detection systems, fire alarm control panel, alarm device	1.00	ea	\$ 324.48	/ea	\$ 324.00	\$ 428.00
	<b>Fire Detection</b>	<b>1.00</b>	<b>ea</b>	<b>\$ 324.48</b>	<b>/ea</b>	<b>\$ 324.00</b>	<b>\$ 428.00</b>
<b>Electrical</b>							
	Lighting controls allowance, relay panels, core & shell	192.00	sf	\$ 0.25	/sf	\$ 48.00	\$ 63.00
	<b>Electrical</b>	<b>192.00</b>	<b>lf</b>	<b>\$ 0.25</b>	<b>/lf</b>	<b>\$ 48.00</b>	<b>\$ 63.00</b>
<b>Enclosures</b>							
	Intrusion Detection Panel, 12" H x 12" W x 5" D - Enclosure	1.00	ea	\$ 587.40	/ea	\$ 587.00	\$ 775.00
	Lighting Control Panel, 30" H x 20" W x 10" D - Enclosure	1.00	ea	\$ 698.88	/ea	\$ 699.00	\$ 923.00
	Gate Control Panel, 30" H x 30" W x 10" D - Enclosure	2.00	ea	\$ 921.84	/ea	\$ 1,844.00	\$ 2,434.00
	SCADA Control Panel 36" H x 30" W x 10" D - Enclosure	1.00	ea	\$ 1,060.93	/ea	\$ 1,061.00	\$ 1,400.00
	<b>Enclosures</b>	<b>4.00</b>	<b>ea</b>	<b>\$ 1,047.72</b>	<b>/ea</b>	<b>\$ 4,191.00</b>	<b>\$ 5,532.00</b>
<b>Grounding</b>							
	Building grounding system, average cost per sf	950.00	lf	\$ 2.50	/lf	\$ 2,375.00	\$ 3,135.00
	<b>Grounding</b>				<b>/lf</b>	<b>\$ 2,375.00</b>	<b>\$ 3,135.00</b>
<b>Lighting</b>							
	Lighting Fixture, F2	5.00	ea	\$ 213.80	/ea	\$ 1,069.00	\$ 1,411.00
	Lighting Fixture, F1	2.00	ea	\$ 230.17	/ea	\$ 460.00	\$ 608.00
	Lighting Fixture, W1	1.00	ea	\$ 148.98	/ea	\$ 149.00	\$ 197.00
	Sealed Weatherproof Remote Lighting	1.00	ea	\$ 284.48	/ea	\$ 284.00	\$ 376.00
	Lighting controls allowance, avg. \$/sf, fitout	192.00	sf	\$ 4.50	/sf	\$ 864.00	\$ 1,140.00
	Exit lighting	1.00	ea	\$ 151.87	/ea	\$ 152.00	\$ 200.00
	Emergency lights, battery operated, self-contained fluor lamp pack	1.00	ea	\$ 258.58	/ea	\$ 259.00	\$ 341.00
	<b>Lighting</b>	<b>11.00</b>	<b>ea</b>	<b>\$ 294.29</b>	<b>/ea</b>	<b>\$ 3,237.00</b>	<b>\$ 4,273.00</b>
<b>Panelboards</b>							
	Intrusion Detection Panelboard, 120/208 V, 100 amp	1.00	ea	\$ 2,900.14	/ea	\$ 2,900.00	\$ 3,828.00
	Lighting Panelboard, 120/208 V, 100 amp	1.00	ea	\$ 2,900.15	/ea	\$ 2,900.00	\$ 3,828.00
	Gate Control Panels, 120/208 V	2.00	ea	\$ 10,879.20	/ea	\$ 21,758.00	\$ 28,721.00
	<b>Panelboards</b>	<b>2.00</b>	<b>ea</b>	<b>\$ 13,779.35</b>	<b>/ea</b>	<b>\$ 27,559.00</b>	<b>\$ 36,377.00</b>
<b>CONTROL BUILDING</b>						<b>\$ 198,822.00</b>	<b>\$ 262,445.00</b>
<b>DRAINAGE REPLACEMENT</b>							
<b>Catchbasins</b>							
	4' Drainage Manholes	14.00	ea	\$ 4,500.00	/ea	\$ 63,000.00	\$ 83,160.00
	<b>Catchbasins</b>	<b>14.00</b>	<b>ea</b>	<b>\$ 4,500.00</b>	<b>/ea</b>	<b>\$ 63,000.00</b>	<b>\$ 83,160.00</b>
<b>Replace 12" Drain</b>							
	Replace 12" Drain	300.00	lf	\$ 110.00	/lf	\$ 33,000.00	\$ 43,560.00
	<b>Replace 12" Drain</b>	<b>300.00</b>	<b>lf</b>	<b>\$ 110.00</b>	<b>/lf</b>	<b>\$ 33,000.00</b>	<b>\$ 43,560.00</b>
<b>Replace 24" Drain</b>							
	Replace 24" Drain	113.00	lf	\$ 135.00	/lf	\$ 15,255.00	\$ 20,137.00
	<b>Replace 24" Drain</b>	<b>113.00</b>	<b>lf</b>	<b>\$ 135.00</b>	<b>/lf</b>	<b>\$ 15,255.00</b>	<b>\$ 20,137.00</b>
<b>DRAINAGE REPLACEMENT</b>						<b>\$ 111,255.00</b>	<b>\$ 146,857.00</b>
<b>GATE &amp; SCREENING STRUCTURE</b>							
<b>Dewatering</b>							
	Dewatering	1.00	ls	\$ 90,000.00	/ls	\$ 90,000.00	\$ 118,800.00
	<b>Dewatering</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 90,000.00</b>	<b>/ls</b>	<b>\$ 90,000.00</b>	<b>\$ 118,800.00</b>
<b>Electric Handholes</b>							
	Electric Handholes	5.00	ea	\$ 4,835.26	/ea	\$ 24,176.00	\$ 31,913.00
	<b>Electric Handholes</b>	<b>5.00</b>	<b>ea</b>	<b>\$ 4,835.26</b>	<b>/ea</b>	<b>\$ 24,176.00</b>	<b>\$ 31,913.00</b>
<b>Excavation - Rock</b>							
	Excavation, Rock	700.00	bcy	\$ 75.00	/bcy	\$ 52,500.00	\$ 69,300.00
	Excavation, Rock (Approach Channel)	115.00	bcy	\$ 75.00	/bcy	\$ 8,625.00	\$ 11,385.00

Location	Description	Takeoff Quantity	UOM	Total Cost/Unit	UOM	Total Amount	Grand Total Amount
	<b>Excavation - Rock</b>	<b>815.00</b>	<b>cy</b>	<b>\$ 75.00</b>	<b>/cy</b>	<b>\$ 61,125.00</b>	<b>\$ 80,685.00</b>
	<b>Secant Pile SOE</b>						
	Mobilization	1.00	ls	\$ 50,000.00	/ls	\$ 50,000.00	\$ 66,000.00
	Secant Pile, Construction	4,800.00	vlf	\$ 300.00	/vlf	\$ 1,440,000.00	\$ 1,900,800.00
	<b>Secant Pile SOE</b>	<b>4,800.00</b>	<b>lf</b>	<b>\$ 310.42</b>	<b>/lf</b>	<b>\$ 1,490,000.00</b>	<b>\$ 1,966,800.00</b>
	<b>Cast-In-Place Concrete</b>						
	C.I.P. concrete forms, slab on grade, edge, wood, 7" to 12" high, 4 use, includes erecting, bracing, stripping and cleaning	86.00	sfca	\$ 7.00	/sfca	\$ 602.00	\$ 795.00
	C.I.P. concrete forms, slab on grade, slab blockouts, wood, to 12" high, 1 use, includes erecting, bracing, stripping and cleaning	40.00	lf	\$ 14.55	/lf	\$ 582.00	\$ 768.00
	C.I.P. concrete forms, wall, box out for opening, to 16" thick, over 10 S.F. (use perimeter), includes erecting, bracing, stripping and cleaning	132.00	lf	\$ 17.28	/lf	\$ 2,281.00	\$ 3,011.00
	C.I.P. concrete forms, wall, job built, plywood, exterior, over 16' high, 3 use, includes erecting, bracing, stripping and cleaning	5,040.00	sfca	\$ 14.41	/sfca	\$ 72,647.00	\$ 95,894.00
	Form oil, coverage varies greatly, maximum, includes material only	13.44	gal	\$ 21.50	/gal	\$ 289.00	\$ 381.00
	Reinforcing steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.24	ton	\$ 2,387.75	/ton	\$ 583.00	\$ 769.00
	Reinforcing steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.21	ton	\$ 2,387.76	/ton	\$ 501.00	\$ 662.00
	Reinforcing steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	7.56	ton	\$ 2,106.01	/ton	\$ 15,921.00	\$ 21,016.00
	Reinforcing in place, unloading & sorting, add to above - slabs	0.24	ton	\$ 54.80	/ton	\$ 13.00	\$ 18.00
	Reinforcing in place, unloading & sorting, add to above - slabs	0.21	ton	\$ 54.76	/ton	\$ 12.00	\$ 15.00
	Reinforcing in place, unloading & sorting, add - walls, cols, beams	7.56	ton	\$ 54.78	/ton	\$ 414.00	\$ 547.00
	Reinforcing in place, crane cost for handling, add to above, slabs	0.24	ton	\$ 59.55	/ton	\$ 15.00	\$ 19.00
	Reinforcing in place, crane cost for handling, add to above, slabs	0.21	ton	\$ 59.57	/ton	\$ 13.00	\$ 17.00
	Reinforcing, crane cost for handling, add to above, walls, cols, beams	7.56	ton	\$ 59.55	/ton	\$ 450.00	\$ 594.00
	Concrete, ready mix, regular weight, walls/cols/beams, 4000 psi	93.88	cy	\$ 128.00	/cy	\$ 12,016.00	\$ 15,862.00
	Concrete, ready mix, regular weight, slabs/mats, 5000 psi	15.21	cy	\$ 134.00	/cy	\$ 2,038.00	\$ 2,690.00
	Concrete, ready mix, regular weight, slabs/mats, 5000 psi	13.07	cy	\$ 134.00	/cy	\$ 1,751.00	\$ 2,311.00
	Structural concrete, placing, slab on grade, direct chute, over 6" thick, includes vibrating, excludes material	15.21	cy	\$ 22.35	/cy	\$ 340.00	\$ 449.00
	Structural concrete, placing, slab on grade, direct chute, over 6" thick, includes vibrating, excludes material	13.07	cy	\$ 22.35	/cy	\$ 292.00	\$ 386.00
	Structural concrete, placing, walls, pumped, 15" thick, includes vibrating, excludes material - 93.88	93.88	cy	\$ 48.93	/cy	\$ 4,594.00	\$ 6,064.00
	Concrete finishing, floors, monolithic, machine trowel finish	336.00	sf	\$ 1.06	/sf	\$ 356.00	\$ 470.00
	Concrete finishing, floor, dustproofing, solvent-based, 1 coat	391.00	sf	\$ 0.47	/sf	\$ 183.00	\$ 242.00
	Concrete finishing, floor, dustproofing, solvent-based, 1 coat	336.00	sf	\$ 0.47	/sf	\$ 157.00	\$ 208.00
	Curing, sprayed membrane curing compound	3.91	csf	\$ 24.83	/csf	\$ 97.00	\$ 128.00
	Curing, sprayed membrane curing compound	3.36	csf	\$ 24.84	/csf	\$ 83.00	\$ 110.00
	Fine grading, fine grade for slab on grade, machine - Roof	37.33	sy	\$ 1.87	/sy	\$ 70.00	\$ 92.00
	<b>Cast-In-Place Concrete</b>	<b>122.15</b>	<b>cy</b>	<b>\$ 952.11</b>	<b>/cy</b>	<b>\$ 116,300.00</b>	<b>\$ 153,516.00</b>
	<b>Ladder</b>						
	Ladder, shop fabricated, steel, 20" W, bolted to concrete, excl cage	64.00	vlf	\$ 73.23	/vlf	\$ 4,686.00	\$ 6,186.00
	<b>Ladder</b>	<b>64.00</b>	<b>lf</b>	<b>\$ 73.23</b>	<b>/lf</b>	<b>\$ 4,686.00</b>	<b>\$ 6,186.00</b>
	<b>Misc. Metals</b>						
	Fiberglass reinforced polymer, #4 bar (Assumed 6" Spacing) - 16' x 32' Bar Rack	1,024.00	lf	\$ 30.00	/lf	\$ 30,720.00	\$ 40,550.00
	<b>Misc. Metals</b>	<b>1,024.00</b>	<b>lf</b>	<b>\$ 30.00</b>	<b>/lf</b>	<b>\$ 30,720.00</b>	<b>\$ 40,550.00</b>
	<b>Gate &amp; Actuator</b>						
	Hydraulic Sliding Gate & Actuator	2.00	ea	\$ 160,334.20	/ea	\$ 320,668.00	\$ 423,282.00
	<b>Gate &amp; Actuator</b>	<b>2.00</b>	<b>ea</b>	<b>\$ 160,334.20</b>	<b>/ea</b>	<b>\$ 320,668.00</b>	<b>\$ 423,282.00</b>
	<b>Vent</b>						
	Bird screens, galvanized, 13" x 13" flue	1.00	ea	\$ 127.53	/ea	\$ 128.00	\$ 168.00
	Vent, prefabricated metal, gas, double wall, galvanized steel, 36" diameter	23.00	vlf	\$ 241.00	/vlf	\$ 5,543.00	\$ 7,317.00
	<b>Vent</b>	<b>23.00</b>	<b>lf</b>	<b>\$ 246.55</b>	<b>/lf</b>	<b>\$ 5,671.00</b>	<b>\$ 7,485.00</b>
	<b>Conduit/Wiring</b>						
	3/4" EMT w/ conductors, avg. \$/lf, fitout - Headhouse and GSS	950.00	lf	\$ 5.37	/lf	\$ 5,105.00	\$ 6,738.00
	<b>Conduit/Wiring</b>	<b>950.00</b>	<b>lf</b>	<b>\$ 5.37</b>	<b>/lf</b>	<b>\$ 5,105.00</b>	<b>\$ 6,738.00</b>
	<b>Electrical</b>						
	Duct accessories, multi-blade dampers, opposed blade, 36" x 36"	1.00	ea	\$ 603.20	/ea	\$ 603.00	\$ 796.00
	<b>Electrical</b>	<b>1.00</b>	<b>lf</b>	<b>\$ 603.20</b>	<b>/lf</b>	<b>\$ 603.00</b>	<b>\$ 796.00</b>
	<b>Site Wire/Conduit</b>						
	Wire, copper, stranded, 600 volt, #3, type THW, in raceway	50.00	clf	\$ 240.17	/clf	\$ 12,008.00	\$ 15,851.00
	Concrete Encased Conduits, PVC, 4 @ 4" diameter, includes excavation, backfill and cast in place concrete	1,085.00	lf	\$ 99.31	/lf	\$ 107,750.00	\$ 142,230.00
	<b>Site Wire/Conduit</b>	<b>1,085.00</b>	<b>lf</b>	<b>\$ 110.38</b>	<b>/lf</b>	<b>\$ 119,758.00</b>	<b>\$ 158,081.00</b>
	<b>Utility Meter</b>						
	Smart metering, In panel, three phase, 277/480 volt, 400 amp	1.00	ea	\$ 1,024.10	/ea	\$ 1,024.00	\$ 1,352.00
	<b>Utility Meter</b>	<b>1.00</b>	<b>ea</b>	<b>\$ 1,024.10</b>	<b>/ea</b>	<b>\$ 1,024.00</b>	<b>\$ 1,352.00</b>
	<b>GATE &amp; SCREENING STRUCTURE</b>					<b>\$ 2,269,837.00</b>	<b>\$ 2,996,185.00</b>
<b>GENERAL REQUIREMENTS</b>							
	<b>Bonds, Insurance &amp; Permits</b>						
	Bonds, Insurance & Permits	1.00	ls	\$ 100,000.00	/ls	\$ 100,000.00	\$ 132,000.00
	<b>Bonds, Insurance &amp; P</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 100,000.00</b>	<b>/ls</b>	<b>\$ 100,000.00</b>	<b>\$ 132,000.00</b>

Location	Description	Takeoff Quantity	UOM	Total Cost/Unit	UOM	Total Amount	Grand Total Amount
	<b>Erosion Control</b>						
	Erosion Control	1.00	ls	\$ 100,000.00	/ls	\$ 100,000.00	\$ 132,000.00
	<b>Erosion Control</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 100,000.00</b>	<b>/ls</b>	<b>\$ 100,000.00</b>	<b>\$ 132,000.00</b>
	<b>Final Cleaning</b>						
	Final Cleaning	1.00	ls	\$ 50,000.00	/ls	\$ 50,000.00	\$ 66,000.00
	<b>Final Cleaning</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 50,000.00</b>	<b>/ls</b>	<b>\$ 50,000.00</b>	<b>\$ 66,000.00</b>
	<b>Mobilization</b>						
	Mobilization	1.00	ls	\$ 180,000.00	/ls	\$ 180,000.00	\$ 237,600.00
	<b>Mobilization</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 180,000.00</b>	<b>/ls</b>	<b>\$ 180,000.00</b>	<b>\$ 237,600.00</b>
	<b>Site Security</b>						
	Watchman, security service, uniformed person, monthly basis	9,720.00	hr	\$ 45.50	/hr	\$ 442,260.00	\$ 583,783.00
	<b>Site Security</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 442,260.00</b>	<b>/ls</b>	<b>\$ 442,260.00</b>	<b>\$ 583,783.00</b>
	<b>Supervision/GC Staff</b>						
	Field Personnel, clerk, average - 50% of Project Duration	36.00	week	\$ 485.00	/week	\$ 17,460.00	\$ 23,047.00
	Field engineer, average - 50% of Project Duration	36.00	week	\$ 1,500.00	/week	\$ 54,000.00	\$ 71,280.00
	Field Personnel, general purpose laborer, average	72.00	week	\$ 1,600.00	/week	\$ 115,200.00	\$ 152,064.00
	Field Personnel, project manager, average - 30% of Project Duration	21.60	week	\$ 2,450.00	/week	\$ 52,920.00	\$ 69,854.00
	Field Personnel, superintendent, average - 70% of Project Duration	50.40	week	\$ 2,275.00	/week	\$ 114,660.00	\$ 151,351.00
	Scheduling, computer-update	20.00	ea	\$ 1,450.00	/ea	\$ 29,000.00	\$ 38,280.00
	<b>Supervision/GC Staff</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 383,240.00</b>	<b>/ls</b>	<b>\$ 383,240.00</b>	<b>\$ 505,877.00</b>
	<b>Temp. Facilities/Utilities</b>						
	Temporary Heat, per week, 12 hours per day, incl. fuel and operation	2,600.00	c fl	\$ 13.64	/c fl	\$ 35,472.00	\$ 46,823.00
	Office Trailer, furnished, buy, 50' x 10', excl. hookups	2.00	ea	\$ 31,573.87	/ea	\$ 63,148.00	\$ 83,355.00
	Office Trailer, delivery, add per mile	150.00	mile	\$ 12.00	/mile	\$ 1,800.00	\$ 2,376.00
	Storage Boxes, rent per month, 20' x 8'	12.00	ea	\$ 84.50	/ea	\$ 1,014.00	\$ 1,338.00
	Field Office Expense, office equipment rental, average	18.00	mo	\$ 205.00	/mo	\$ 3,690.00	\$ 4,871.00
	Field Office Expense, office supplies, average	18.00	mo	\$ 82.00	/mo	\$ 1,476.00	\$ 1,948.00
	Field Office Expense, telephone bill; avg. bill/month, incl. long dist.	18.00	mo	\$ 86.00	/mo	\$ 1,548.00	\$ 2,043.00
	Field Office Expense, field office lights & HVAC	18.00	mo	\$ 161.00	/mo	\$ 2,898.00	\$ 3,825.00
	Rent toilet portable chemical	540.00	day	\$ 14.25	/day	\$ 7,695.00	\$ 10,157.00
	Barricades, traffic cones, PVC, 28" high	500.00	ea	\$ 17.75	/ea	\$ 8,875.00	\$ 11,715.00
	Temporary Fencing, chain link, rented up to 12 months, 6' high, 11 ga, over 1000'	3,000.00	lf	\$ 7.22	/lf	\$ 21,667.00	\$ 28,600.00
	Project Signs, sign, high intensity reflectorized, buy, excl. posts	100.00	ea	\$ 25.00	/ea	\$ 2,500.00	\$ 3,300.00
	Rubbish handling, dumpster, 20 C.Y., 8 ton capacity, weekly rental, includes one dump per week, cost to be added to demolition cost.	72.00	week	\$ 565.00	/week	\$ 40,680.00	\$ 53,698.00
	<b>Temp. Facilities/Utilities</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 192,462.89</b>	<b>/ls</b>	<b>\$ 192,463.00</b>	<b>\$ 254,051.00</b>
	<b>Testing/Inspection</b>						
	Testing and Inspection	1.00	ls	\$ 50,000.00	/ls	\$ 50,000.00	\$ 66,000.00
	<b>Testing/Inspection</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 50,000.00</b>	<b>/ls</b>	<b>\$ 50,000.00</b>	<b>\$ 66,000.00</b>
	<b>Traffic Management</b>						
	Traffic Management	1.00	ls	\$ 100,000.00	/ls	\$ 100,000.00	\$ 132,000.00
	<b>Traffic Management</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 100,000.00</b>	<b>/ls</b>	<b>\$ 100,000.00</b>	<b>\$ 132,000.00</b>
	<b>GENERAL REQUIREMENTS</b>					<b>\$ 1,597,963.00</b>	<b>\$ 2,109,311.00</b>

**JUNCTION CHAMBER**

	<b>Backfill &amp; Compaction</b>						
	Backfill, trench, air tamped compaction	75.00	ecy	\$ 19.01	/ecy	\$ 1,426.00	\$ 1,882.00
	<b>Backfill &amp; Compaction</b>	<b>75.00</b>	<b>cy</b>	<b>\$ 19.01</b>	<b>/cy</b>	<b>\$ 1,426.00</b>	<b>\$ 1,882.00</b>
	<b>Dewatering</b>						
	Dewatering	1.00	ls	\$ 50,000.00	/ls	\$ 50,000.00	\$ 66,000.00
	<b>Dewatering</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 50,000.00</b>	<b>/ls</b>	<b>\$ 50,000.00</b>	<b>\$ 66,000.00</b>
	<b>Excavation</b>						
	Excavate pit, Rock	65.00	cy	\$ 75.00	/cy	\$ 4,875.00	\$ 6,435.00
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket	400.00	cy	\$ 22.26	/cy	\$ 8,904.00	\$ 11,753.00
	<b>Excavation</b>	<b>465.00</b>	<b>cy</b>	<b>\$ 29.63</b>	<b>/cy</b>	<b>\$ 13,779.00</b>	<b>\$ 18,188.00</b>
	<b>Secant Pile SOE</b>						
	Mobilization	1.00	ls	\$ 49,999.96	/ls	\$ 50,000.00	\$ 66,000.00
	Secant Pile, Construction	1,400.00	vlf	\$ 300.00	/vlf	\$ 420,000.00	\$ 554,400.00
	<b>Secant Pile SOE</b>	<b>1,400.00</b>	<b>lf</b>	<b>\$ 335.71</b>	<b>/lf</b>	<b>\$ 470,000.00</b>	<b>\$ 620,400.00</b>
	<b>Cast-In-Place Concrete</b>						
	C.I.P. concrete forms, elevated slab, flat plate, plywood, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	181.00	sf	\$ 8.76	/sf	\$ 1,586.00	\$ 2,093.00
	C.I.P. concrete forms, elevated slab, flat slab with drop panels, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	182.00	sf	\$ 9.17	/sf	\$ 1,669.00	\$ 2,203.00
	C.I.P. concrete forms, wall, box out for opening, to 16" thick, over 10 S.F. (use perimeter), includes erecting, bracing, stripping and cleaning	48.00	lf	\$ 17.28	/lf	\$ 829.00	\$ 1,095.00
	Forms in place, wall, steel framed plywood, >16' high, 3 use/month	3,240.00	sfca	\$ 14.68	/sfca	\$ 47,566.00	\$ 62,787.00
	Form oil, coverage varies greatly, maximum, includes material only	8.64	gal	\$ 21.50	/gal	\$ 186.00	\$ 245.00
	Reinforcing steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.41	ton	\$ 1,917.56	/ton	\$ 786.00	\$ 1,038.00
	Reinforcing steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.41	ton	\$ 1,917.57	/ton	\$ 780.00	\$ 1,030.00
	Reinforcing steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	4.86	ton	\$ 1,885.65	/ton	\$ 9,164.00	\$ 12,097.00
	Reinforcing in place, unloading & sorting, add - walls, cols, beams	4.86	ton	\$ 54.78	/ton	\$ 266.00	\$ 351.00
	Reinforcing in place, unloading & sorting, add to above - decks	0.41	ton	\$ 54.78	/ton	\$ 22.00	\$ 30.00
	Reinforcing in place, unloading & sorting, add to above - decks	0.41	ton	\$ 54.77	/ton	\$ 22.00	\$ 29.00
	Reinforcing steel, crane cost for handling, maximum, add	0.41	ton	\$ 156.54	/ton	\$ 64.00	\$ 85.00
	Reinforcing steel, crane cost for handling, maximum, add	0.41	ton	\$ 156.54	/ton	\$ 64.00	\$ 84.00

Location	Description	Takeoff Quantity	UOM	Total Cost/Unit	UOM	Total Amount	Grand Total Amount
	Reinforcing, crane cost for handling, add to above, walls, cols, beams	4.86	ton	\$ 59.55	/ton	\$ 289.00	\$ 382.00
	Concrete, ready mix, regular weight, walls/cols/beams, 4000 psi	75.79	cy	\$ 128.00	/cy	\$ 9,700.00	\$ 12,805.00
	Concrete, ready mix, regular weight, elevated decks, 4000 psi	7.42	cy	\$ 128.00	/cy	\$ 949.00	\$ 1,253.00
	Concrete, ready mix, regular weight, elevated decks, 4000 psi	7.37	cy	\$ 128.00	/cy	\$ 944.00	\$ 1,246.00
	Structural concrete, placing, elevated slab, pumped, over 10" thick, includes vibrating, excludes material	7.37	cy	\$ 32.62	/cy	\$ 241.00	\$ 318.00
	Structural concrete, placing, elevated slab, pumped, over 10" thick, includes vibrating, excludes material	7.42	cy	\$ 32.62	/cy	\$ 242.00	\$ 320.00
	Structural concrete, placing, walls, pumped, 15" thick, includes vibrating, excludes material	75.79	cy	\$ 48.93	/cy	\$ 3,708.00	\$ 4,895.00
	Finishing elev slab, manual screed, bull float, machine float & trowel	182.00	sf	\$ 1.06	/sf	\$ 193.00	\$ 255.00
	Finishing: break ties & patch voids (walls, cols or beams)	45.00	sf	\$ 1.12	/sf	\$ 51.00	\$ 67.00
	Curing, sprayed membrane curing compound, elevated decks	1.81	csf	\$ 24.83	/csf	\$ 45.00	\$ 59.00
	Curing, sprayed membrane curing compound, elevated decks	7.42	csf	\$ 24.83	/csf	\$ 184.00	\$ 243.00
	Utility area drains,catch basins manholes frames and covers,cast iron,heavy traffic,24"diameter,400lb, excludes footing,excavation,and backfill	1.00	ea	\$ 539.00	/ea	\$ 539.00	\$ 711.00
	Storm Drainage Manholes, Frames, and Covers, concrete, cast in place	1.00	ea	\$ 3,493.89	/ea	\$ 3,494.00	\$ 4,612.00
	<b>Cast-In-Place Concrete</b>	<b>90.57</b>	<b>cy</b>	<b>\$ 922.88</b>	<b>/cy</b>	<b>\$ 83,585.00</b>	<b>\$ 110,333.00</b>
<b>Masonry</b>	Brick Invert	100.00	sf	\$ 40.00	/sf	\$ 4,000.00	\$ 5,280.00
	<b>Masonry</b>	<b>100.00</b>	<b>sf</b>	<b>\$ 40.00</b>	<b>/sf</b>	<b>\$ 4,000.00</b>	<b>\$ 5,280.00</b>
	<b>JUNCTION CHAMBER</b>					<b>\$ 622,790.00</b>	<b>\$ 822,083.00</b>
<b>MANAGEMENT OF CONTAMINATED SOILS</b>							
	<b>Disposal of Soil</b>						
	Hauling and Loading - 26 Mile Roundtrip	5,318.00	ton	\$ 3.01	/ton	\$ 16,026.00	\$ 21,154.00
	RIRRC: Alternate Cover (assumed 90% of Excess Soil)	4,785.75	ton	\$ 30.00	/ton	\$ 143,573.00	\$ 189,516.00
	RIRRC: Solid Waste Soil (assumed 10% of Excess Soil)	531.75	ton	\$ 50.00	/ton	\$ 26,588.00	\$ 35,096.00
	<b>Disposal of Soil</b>	<b>5,318.00</b>	<b>tons</b>	<b>\$ 35.01</b>	<b>/tons</b>	<b>\$ 186,186.00</b>	<b>\$ 245,765.00</b>
	<b>MANAGEMENT OF CONTAMINATED SOILS</b>					<b>\$ 186,186.00</b>	<b>\$ 245,765.00</b>
<b>MANHOLE STRUCTURES</b>							
	<b>Backfill &amp; Compaction</b>						
	Backfill, trench, air tamped compaction, add MH 210	36.00	ecy	\$ 19.01	/ecy	\$ 684.00	\$ 903.00
	<b>Backfill &amp; Compaction</b>	<b>36.00</b>	<b>cy</b>	<b>\$ 19.01</b>	<b>/cy</b>	<b>\$ 684.00</b>	<b>\$ 903.00</b>
	<b>Cast-In-Place Concrete</b>						
	Base slab; form, resteel and concrete to 6" thick, avg cost per cy MH 210	4.50	cy	\$ 445.01	/cy	\$ 2,003.00	\$ 2,643.00
	<b>Cast-In-Place Concrete</b>	<b>4.50</b>	<b>cy</b>	<b>\$ 445.01</b>	<b>/cy</b>	<b>\$ 2,003.00</b>	<b>\$ 2,643.00</b>
	<b>Excavation</b>						
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket MH 210	266.00	cy	\$ 22.26	/cy	\$ 5,921.00	\$ 7,816.00
	Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading MH 210	230.00	lcy	\$ 11.50	/lcy	\$ 2,646.00	\$ 3,492.00
	<b>Excavation</b>	<b>266.00</b>	<b>cy</b>	<b>\$ 32.21</b>	<b>/cy</b>	<b>\$ 8,567.00</b>	<b>\$ 11,308.00</b>
	<b>Frames and Covers</b>						
	Utility area drains,catch basins manhls catch basins manhls frames and covers,cast iron,heavy traffic, MH 210	1.00	ea	\$ 1,527.42	/ea	\$ 1,527.00	\$ 2,016.00
	<b>Frames and Covers</b>	<b>1.00</b>	<b>ea</b>	<b>\$ 1,527.42</b>	<b>/ea</b>	<b>\$ 1,527.00</b>	<b>\$ 2,016.00</b>
	<b>Precast Concrete</b>						
	Storm Drainage Manholes, Frames, and Covers, concrete, precast, 8' inside diameter - MH 210	1.00	ea	\$ 6,399.79	/ea	\$ 6,400.00	\$ 8,448.00
	Storm Drainage Manholes, Frames, and Covers, precast concrete, 8' diameter manhole, MH 210	1.00	ea	\$ 1,127.65	/ea	\$ 1,128.00	\$ 1,489.00
	<b>Precast Concrete</b>	<b>1.00</b>	<b>ea</b>	<b>\$ 7,527.44</b>	<b>/ea</b>	<b>\$ 7,527.00</b>	<b>\$ 9,936.00</b>
	<b>Backfill &amp; Compaction</b>						
	Backfill, trench, air tamped compaction, add MH 213-3 and 213-4	21.42	ecy	\$ 19.01	/ecy	\$ 407.00	\$ 537.00
	Backfill, trench, air tamped compaction, add MH 217-2, 3 & 3A	36.11	ecy	\$ 19.01	/ecy	\$ 686.00	\$ 906.00
	Backfill, trench, air tamped compaction, add MH 217-1	17.35	ecy	\$ 19.01	/ecy	\$ 330.00	\$ 435.00
	Backfill, trench, air tamped compaction, add MH 217-4	9.38	ecy	\$ 19.01	/ecy	\$ 178.00	\$ 235.00
	Backfill, trench, air tamped compaction, add - MH 213-1 and 213-2	17.44	ecy	\$ 19.01	/ecy	\$ 331.00	\$ 438.00
	<b>Backfill &amp; Compaction</b>	<b>101.70</b>	<b>cy</b>	<b>\$ 19.01</b>	<b>/cy</b>	<b>\$ 1,933.00</b>	<b>\$ 2,552.00</b>
	<b>Excavation</b>						
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket - MH 217-2, 3 & 3A	133.33	cy	\$ 22.26	/cy	\$ 2,968.00	\$ 3,918.00
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket - MH 217-1	62.22	cy	\$ 22.26	/cy	\$ 1,385.00	\$ 1,828.00
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket - MH 217-4	35.56	cy	\$ 22.26	/cy	\$ 791.00	\$ 1,045.00
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket - MH 213-1 and 213-2	36.67	cy	\$ 22.26	/cy	\$ 816.00	\$ 1,077.00
	<b>Excavation</b>	<b>267.78</b>	<b>cy</b>	<b>\$ 22.26</b>	<b>/cy</b>	<b>\$ 5,961.00</b>	<b>\$ 7,868.00</b>
	<b>Excavation - Rock</b>						
	Excavate pit, Rock - MH 213-1 and 213-2	30.00	cy	\$ 75.00	/cy	\$ 2,250.00	\$ 2,970.00
	<b>Excavation - Rock</b>	<b>30.00</b>	<b>cy</b>	<b>\$ 75.00</b>	<b>/cy</b>	<b>\$ 2,250.00</b>	<b>\$ 2,970.00</b>
	<b>Frames and Covers</b>						
	Utility area drains,catch basins manhls catch basins manhls frames and covers,cast iron,heavy traffic,36"dm,1150lb, excluds footing,excavtn,and backfill - MH 213-1 and 213-2	2.00	ea	\$ 1,592.60	/ea	\$ 3,185.00	\$ 4,204.00
	Utility area drains,catch basins manhls catch basins manhls frames and covers,cast iron,heavy traffic,36"dm,1150lb, excluds footing,excavtn,and backfill MH 213-3 and 213-4	2.00	ea	\$ 1,592.60	/ea	\$ 3,185.00	\$ 4,204.00

Location	Description	Takeoff Quantity	UOM	Total Cost/Unit	UOM	Total Amount	Grand Total Amount
	Utility area drains,catch basins manhls catch basins manhls frames and covers,cast iron,heavy traffic,36"dm,1150lb, excludes footing,excavtn,and backfill MH 217-2, 3 & 3A	3.00	ea	\$ 1,592.60	/ea	\$ 4,778.00	\$ 6,307.00
	Utility area drains,catch basins manhls catch basins manhls frames and covers,cast iron,heavy traffic,36"dm,1150lb, excludes footing,excavtn,and backfill MH 217-1	1.00	ea	\$ 1,592.59	/ea	\$ 1,593.00	\$ 2,102.00
	Utility area drains,catch basins manhls catch basins manhls frames and covers,cast iron,heavy traffic,36"dm,1150lb, excludes footing,excavtn,and backfill MH 217-4	1.00	ea	\$ 1,592.59	/ea	\$ 1,593.00	\$ 2,102.00
	<b>Frames and Covers</b>	<b>10.00</b>	<b>ea</b>	<b>\$ 1,433.34</b>	<b>/ea</b>	<b>\$ 14,333.00</b>	<b>\$ 18,920.00</b>
	<b>Soldier Pile SOE</b>						
	Soldier Pile & Lagging - TEMP. SOE - MH 213-3 and 213-4	1,260.00	sf	\$ 45.00	/sf	\$ 56,700.00	\$ 74,844.00
	Soldier Pile & Lagging - TEMP. SOE - MH 217-1	980.00	sf	\$ 45.00	/sf	\$ 44,100.00	\$ 58,212.00
	Soldier Pile & Lagging - TEMP. SOE - MH 217-2, 3 & 3A	2,100.00	sf	\$ 45.00	/sf	\$ 94,500.00	\$ 124,740.00
	Soldier Pile & Lagging - TEMP. SOE - MH 217-4	560.00	sf	\$ 45.00	/sf	\$ 25,200.00	\$ 33,264.00
	Soldier Pile & Lagging - TEMP. SOE - MH 213-1 and 213-2	1,050.00	sf	\$ 45.00	/sf	\$ 47,250.00	\$ 62,370.00
	Soldier Pile & Lagging - TEMP. SOE - MH 210	900.00	sf	\$ 45.00	/sf	\$ 40,500.00	\$ 53,460.00
	<b>Soldier Pile SOE</b>	<b>5,950.00</b>	<b>sf</b>	<b>\$ 51.81</b>	<b>/sf</b>	<b>\$ 308,250.00</b>	<b>\$ 406,890.00</b>
	<b>Cast-In-Place Concrete</b>						
	Base slab; form, resteel and concrete to 8" thick, avg cost per cy MH 213-1 and 213-2	2.47	cy	\$ 461.17	/cy	\$ 1,138.00	\$ 1,502.00
	Base slab; form, resteel and concrete to 8" thick, avg cost per cy MH 213-3 and 213-4	2.47	cy	\$ 461.17	/cy	\$ 1,138.00	\$ 1,502.00
	Base slab; form, resteel and concrete to 8" thick, avg cost per cy MH 217-2, 3 & 3A	3.70	cy	\$ 461.18	/cy	\$ 1,706.00	\$ 2,252.00
	Base slab; form, resteel and concrete to 8" thick, avg cost per cy MH 217-1	1.23	cy	\$ 461.18	/cy	\$ 569.00	\$ 751.00
	Base slab; form, resteel and concrete to 8" thick, avg cost per cy MH 217-4	1.23	cy	\$ 461.18	/cy	\$ 569.00	\$ 751.00
	<b>Cast-In-Place Concrete</b>	<b>11.10</b>	<b>cy</b>	<b>\$ 461.17</b>	<b>/cy</b>	<b>\$ 5,119.00</b>	<b>\$ 6,757.00</b>
	<b>Precast Concrete</b>						
	Storm Drainage Manholes, Frames, and Covers, concrete, precast, 8' I.D., excludes base, excavation, backfill, frame and cover MH 213-1 and 213-2	30.00	vlf	\$ 860.78	/vlf	\$ 25,823.00	\$ 34,087.00
	Storm Drainage Manholes, Frames, and Covers, concrete, precast, 8' I.D., excludes base, excavation, backfill, frame and cover MH 213-3 and 213-4	36.00	vlf	\$ 860.78	/vlf	\$ 30,988.00	\$ 40,904.00
	Storm Drainage Manholes, Frames, and Covers, concrete, precast, 8' I.D., excludes base, excavation, backfill, frame and cover - MH 217-2, 3 & 3A	60.00	vlf	\$ 860.78	/vlf	\$ 51,647.00	\$ 68,174.00
	Storm Drainage Manholes, Frames, and Covers, concrete, precast, 8' I.D., excludes base, excavation, backfill, frame and cover MH 217-1	28.00	vlf	\$ 860.78	/vlf	\$ 24,102.00	\$ 31,815.00
	Storm Drainage Manholes, Frames, and Covers, concrete, precast, 8' I.D., excludes base, excavation, backfill, frame and cover MH 217-4	16.00	vlf	\$ 860.78	/vlf	\$ 13,773.00	\$ 18,180.00
	<b>Precast Concrete</b>	<b>170.00</b>	<b>ea</b>	<b>\$ 860.78</b>	<b>/ea</b>	<b>\$ 146,333.00</b>	<b>\$ 193,159.00</b>
	<b>MANHOLE STRUCTURES</b>					<b>\$ 504,488.00</b>	<b>\$ 665,924.00</b>
	<b>OF - 210 DIVERSION STRUCTURE</b>						
	<b>Backfill &amp; Compaction</b>						
	Backfill, trench, air tamped compaction,	44.44	ecy	\$ 19.01	/ecy	\$ 845.00	\$ 1,115.00
	<b>Backfill &amp; Compaction</b>	<b>44.44</b>	<b>cy</b>	<b>\$ 19.01</b>	<b>/cy</b>	<b>\$ 845.00</b>	<b>\$ 1,115.00</b>
	<b>Cast-In-Place Concrete</b>						
	Base slab; form, resteel and concrete to 6" thick, avg cost per cy	5.00	cy	\$ 445.01	/cy	\$ 2,225.00	\$ 2,937.00
	<b>Cast-In-Place Concrete</b>	<b>5.00</b>	<b>cy</b>	<b>\$ 445.01</b>	<b>/cy</b>	<b>\$ 2,225.00</b>	<b>\$ 2,937.00</b>
	<b>Excavate</b>						
	Hauling, excavated or borrow material, loose cubic yards, 3 mile round trip, 2.1 loads/hour, 6 C.Y. dump truck, highway haulers, excludes loading	974.00	lcy	\$ 11.50	/lcy	\$ 11,203.00	\$ 14,789.00
	<b>Excavate</b>	<b>974.00</b>	<b>cy</b>	<b>\$ 11.50</b>	<b>/cy</b>	<b>\$ 11,203.00</b>	<b>\$ 14,789.00</b>
	<b>Excavation</b>						
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket	1,020.00	cy	\$ 22.26	/cy	\$ 22,705.00	\$ 29,971.00
	<b>Excavation</b>	<b>1,020.00</b>	<b>cy</b>	<b>\$ 22.26</b>	<b>/cy</b>	<b>\$ 22,705.00</b>	<b>\$ 29,971.00</b>
	<b>Frames and Covers</b>						
	Utility area drains,catch basins manhls catch basins manhls frames and covers,cast iron,heavy traffic,	1.00	ea	\$ 1,527.42	/ea	\$ 1,527.00	\$ 2,016.00
	<b>Frames and Covers</b>	<b>1.00</b>	<b>ea</b>	<b>\$ 1,527.42</b>	<b>/ea</b>	<b>\$ 1,527.00</b>	<b>\$ 2,016.00</b>
	<b>Precast Concrete</b>						
	Storm Drainage Manholes, Frames, and Covers, concrete, precast, 10' I.D., excludes base, excavation, backfill, frame and cover	1.00	ea	\$ 4,422.74	/ea	\$ 4,423.00	\$ 5,838.00
	Storm Drainage Manholes, Frames, and Covers, concrete, precast, 10' I.D., excludes base, excavation, backfill, add for depths over 8'	17.00	vlf	\$ 510.96	/vlf	\$ 8,686.00	\$ 11,466.00
	Storm Drainage Manholes, Frames, and Covers, precast concrete, 10' diameter manhole, 6" thick top	1.00	ea	\$ 814.25	/ea	\$ 814.00	\$ 1,075.00
	<b>Precast Concrete</b>	<b>1.00</b>	<b>ea</b>	<b>\$ 13,923.27</b>	<b>/ea</b>	<b>\$ 13,923.00</b>	<b>\$ 18,379.00</b>
	<b>Soldier Pile SOE</b>						
	Soldier Pile & Lagging	1,122.00	sf	\$ 45.00	/sf	\$ 50,490.00	\$ 66,647.00
	<b>Soldier Pile SOE</b>	<b>1,122.00</b>	<b>sf</b>	<b>\$ 45.00</b>	<b>/sf</b>	<b>\$ 50,490.00</b>	<b>\$ 66,647.00</b>
	<b>OF - 210 DIVERSION STRUCTURE</b>					<b>\$ 102,919.00</b>	<b>\$ 135,853.00</b>
	<b>OF - 211 DIVERSION STRUCTURE MODIFICATION</b>						
	<b>Cast-In-Place Concrete</b>						
	Forms in place, wall, steel framed plywood, to 16' high, 3 use/month	70.00	sfca	\$ 92.91	/sfca	\$ 6,503.00	\$ 8,584.00

Location	Description	Takeoff Quantity	UOM	Total Cost/Unit	UOM	Total Amount	Grand Total Amount
	Reinforcing steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.02	ton	\$ 5,299.33	/ton	\$ 79.00	\$ 105.00
	Reinforcing in place, unloading & sorting, add - walls, cols, beams	0.02	ton	\$ 878.70	/ton	\$ 13.00	\$ 17.00
	Reinforcing, crane cost for handling, add to above, walls, cols, beams	0.02	ton	\$ 879.00	/ton	\$ 13.00	\$ 17.00
	Concrete, ready mix, regular weight, walls/cols/beams, 4000 psi	0.95	cy	\$ 128.00	/cy	\$ 122.00	\$ 161.00
	Structural concrete, placing, walls, pumped, 15" thick, includes vibrating, excludes material	0.95	cy	\$ 393.64	/cy	\$ 374.00	\$ 494.00
	Additional Cost (To account for Tripod, PPE, Confined Space etc.)	1.00	ls	\$ 5,000.00	/ls	\$ 5,000.00	\$ 6,600.00
	<b>Cast-In-Place Concrete</b>	<b>0.95</b>	<b>cy</b>	<b>\$ 12,742.41</b>	<b>/cy</b>	<b>\$ 12,105.00</b>	<b>\$ 15,979.00</b>
<b>OF - 211 DIVERSION STRUCTURE MODIFICATION</b>							
<b>OF - 213 DIVERSION STRUCTURE</b>							
	<b>Backfill &amp; Compaction</b>						
	Backfill, trench, air tamped compaction	60.00	ecy	\$ 19.01	/ecy	\$ 1,140.00	\$ 1,505.00
	<b>Backfill &amp; Compaction</b>	<b>60.00</b>	<b>cy</b>	<b>\$ 19.01</b>	<b>/cy</b>	<b>\$ 1,140.00</b>	<b>\$ 1,505.00</b>
	<b>Dewatering</b>						
	Dewatering	1.00	ls	\$ 10,000.00	/ls	\$ 10,000.00	\$ 13,200.00
	<b>Dewatering</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 10,000.00</b>	<b>/ls</b>	<b>\$ 10,000.00</b>	<b>\$ 13,200.00</b>
	<b>Epoxy Liner</b>						
	Monolithic Structural Epoxy Coating	1,032.00	sf	\$ 4.82	/sf	\$ 4,973.00	\$ 6,564.00
	<b>Epoxy Liner</b>	<b>1,032.00</b>	<b>sf</b>	<b>\$ 4.82</b>	<b>/sf</b>	<b>\$ 4,973.00</b>	<b>\$ 6,564.00</b>
	<b>Excavation</b>						
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket	130.00	cy	\$ 22.26	/cy	\$ 2,894.00	\$ 3,820.00
	<b>Excavation</b>	<b>130.00</b>	<b>cy</b>	<b>\$ 22.26</b>	<b>/cy</b>	<b>\$ 2,894.00</b>	<b>\$ 3,820.00</b>
	<b>Flap Gate</b>						
	Flap Gate	1.00	ls	\$ 10,000.00	/ls	\$ 10,000.00	\$ 13,200.00
	<b>Flap Gate</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 10,000.00</b>	<b>/ls</b>	<b>\$ 10,000.00</b>	<b>\$ 13,200.00</b>
	<b>Soldier Pile SOE</b>						
	Soldier Pile & Lagging	690.00	sf	\$ 45.00	/sf	\$ 31,050.00	\$ 40,986.00
	<b>Soldier Pile SOE</b>	<b>690.00</b>	<b>sf</b>	<b>\$ 45.00</b>	<b>/sf</b>	<b>\$ 31,050.00</b>	<b>\$ 40,986.00</b>
	<b>Cast-In-Place Concrete</b>						
	C.I.P. concrete forms, elevated slab, flat slab with drop panels, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	316.00	sf	\$ 9.17	/sf	\$ 2,898.00	\$ 3,826.00
	C.I.P. concrete forms, elevated slab, flat slab with drop panels, to 15' high, 4 use, includes shoring, erecting, bracing, stripping and cleaning	210.00	sf	\$ 9.17	/sf	\$ 1,926.00	\$ 2,542.00
	Cip concrete forms, elevated slab, box-out for shallow slab openings, over 10 sf (use perimeter), includes shoring, erecting, bracing, stripping and cleaning	175.00	lf	\$ 8.55	/lf	\$ 1,496.00	\$ 1,975.00
	Forms in place, wall, steel framed plywood, to 16' high, 3 use/month	1,440.00	sfca	\$ 13.40	/sfca	\$ 19,297.00	\$ 25,472.00
	Forms in place, wall, steel framed plywood, to 16' high, 3 use/month	112.00	sfca	\$ 13.40	/sfca	\$ 1,501.00	\$ 1,981.00
	Form oil, coverage varies greatly, maximum, includes material only	3.84	gal	\$ 21.50	/gal	\$ 83.00	\$ 109.00
	Form oil, coverage varies greatly, maximum, includes material only	0.30	gal	\$ 21.50	/gal	\$ 6.00	\$ 8.00
	Reinforcing steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.71	ton	\$ 1,917.57	/ton	\$ 1,363.00	\$ 1,800.00
	Reinforcing steel, in place, elevated slabs, #4 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.42	ton	\$ 1,917.57	/ton	\$ 805.00	\$ 1,063.00
	Reinforcing steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.40	ton	\$ 1,885.65	/ton	\$ 754.00	\$ 996.00
	Reinforcing steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.02	ton	\$ 1,886.00	/ton	\$ 45.00	\$ 60.00
	Reinforcing in place, unloading & sorting, add - walls, cols, beams	0.40	ton	\$ 54.78	/ton	\$ 22.00	\$ 29.00
	Reinforcing in place, unloading & sorting, add - walls, cols, beams	0.02	ton	\$ 54.60	/ton	\$ 1.00	\$ 2.00
	Reinforcing in place, unloading & sorting, add to above - decks	0.71	ton	\$ 54.78	/ton	\$ 39.00	\$ 51.00
	Reinforcing in place, unloading & sorting, add to above - decks	0.42	ton	\$ 54.79	/ton	\$ 23.00	\$ 30.00
	Reinforcing steel, crane cost for handling, maximum, add	0.71	ton	\$ 156.53	/ton	\$ 111.00	\$ 147.00
	Reinforcing steel, crane cost for handling, maximum, add	0.42	ton	\$ 156.52	/ton	\$ 66.00	\$ 87.00
	Reinforcing, crane cost for handling, add to above, walls, cols, beams	0.40	ton	\$ 59.55	/ton	\$ 24.00	\$ 31.00
	Reinforcing, crane cost for handling, add to above, walls, cols, beams	0.02	ton	\$ 59.60	/ton	\$ 1.00	\$ 2.00
	Concrete, ready mix, regular weight, walls/cols/beams, 4000 psi	29.33	cy	\$ 128.00	/cy	\$ 3,755.00	\$ 4,956.00
	Concrete, ready mix, regular weight, walls/cols/beams, 4000 psi	1.52	cy	\$ 128.00	/cy	\$ 195.00	\$ 257.00
	Concrete, ready mix, regular weight, elevated decks, 4000 psi	12.87	cy	\$ 128.00	/cy	\$ 1,648.00	\$ 2,175.00
	Concrete, ready mix, regular weight, elevated decks, 4000 psi	11.41	cy	\$ 128.00	/cy	\$ 1,460.00	\$ 1,927.00
	Concrete, ready mix, regular weight, 4000 psi	10.00	cy	\$ 120.00	/cy	\$ 1,200.00	\$ 1,584.00
	Structural concrete, placing, elevated slab, pumped, over 10" thick, includes vibrating, excludes material	12.87	cy	\$ 32.62	/cy	\$ 420.00	\$ 554.00
	Structural concrete, placing, elevated slab, pumped, over 10" thick, includes vibrating, excludes material	11.41	cy	\$ 32.62	/cy	\$ 372.00	\$ 491.00
	Structural concrete, placing, walls, pumped, 15" thick, includes vibrating, excludes material	29.33	cy	\$ 48.93	/cy	\$ 1,435.00	\$ 1,895.00
	Structural concrete, placing, walls, pumped, 15" thick, includes vibrating, excludes material	1.52	cy	\$ 48.93	/cy	\$ 74.00	\$ 98.00
	Curing, sprayed membrane curing compound, elevated decks	1.52	csf	\$ 24.84	/csf	\$ 38.00	\$ 50.00
	Utility area drains, catch basins manholes frames and covers, cast iron, heavy traffic, 24" diameter, 400lb, excludes footing, excavation, and backfill	2.00	ea	\$ 539.00	/ea	\$ 1,078.00	\$ 1,423.00
	Storm Drainage Manholes, Frames, and Covers, concrete, cast in place	2.00	ea	\$ 3,493.89	/ea	\$ 6,988.00	\$ 9,224.00
	<b>Cast-In-Place Concrete</b>	<b>65.14</b>	<b>cy</b>	<b>\$ 754.15</b>	<b>/cy</b>	<b>\$ 49,126.00</b>	<b>\$ 64,846.00</b>
	<b>Masonry</b>						
	Brick Invert	90.00	sf	\$ 40.00	/sf	\$ 3,600.00	\$ 4,752.00
	<b>Masonry</b>	<b>90.00</b>	<b>sf</b>	<b>\$ 40.00</b>	<b>/sf</b>	<b>\$ 3,600.00</b>	<b>\$ 4,752.00</b>
	<b>Misc. Metals</b>						

Location	Description	Takeoff Quantity	UOM	Total Cost/Unit	UOM	Total Amount	Grand Total Amount
	Fiberglass reinforced polymer, #4 bar (Assumed 6" Spacing) - Bar Rack	36.00	lf	\$ 15.00	/lf	\$ 540.00	\$ 713.00
	<b>Misc. Metals</b>	<b>36.00</b>	<b>lf</b>	<b>\$ 15.00</b>	<b>/lf</b>	<b>\$ 540.00</b>	<b>\$ 713.00</b>
	<b>OF - 213 DIVERSION STRUCTURE</b>					<b>\$ 113,323.00</b>	<b>\$ 149,586.00</b>
	<b>OF - 214 DIVERSION STRUCTURE</b>						
	<b>Cast-In-Place Concrete</b>						
	C.I.P. concrete forms, slab on grade, slab blockouts, wood, to 12" high, 1 use, includes erecting, bracing, stripping and cleaning	16.00	lf	\$ 14.55	/lf	\$ 233.00	\$ 307.00
	C.I.P. concrete forms, wall, box out for opening, to 16" thick, over 10 S.F. (use perimeter), includes erecting, bracing, stripping and cleaning	80.00	lf	\$ 17.28	/lf	\$ 1,382.00	\$ 1,825.00
	C.I.P. concrete forms, wall, job built, plywood, below grade, to 8' high, 2 use, includes erecting, bracing, stripping and cleaning	234.00	sfca	\$ 11.41	/sfca	\$ 2,669.00	\$ 3,523.00
	Form oil, coverage varies greatly, maximum, includes material only	6.61	gal	\$ 21.50	/gal	\$ 142.00	\$ 188.00
	Reinforcing steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.15	ton	\$ 2,387.74	/ton	\$ 349.00	\$ 460.00
	Reinforcing steel, in place, slab on grade, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	0.15	ton	\$ 2,387.74	/ton	\$ 349.00	\$ 460.00
	Reinforcing steel, in place, walls, #3 to #7, A615, grade 60, incl labor for accessories, excl material for accessories	3.72	ton	\$ 2,106.01	/ton	\$ 7,834.00	\$ 10,341.00
	Reinforcing in place, A615 Gr 60, walls, #8 to #18	14,080.00	lb	\$ 0.83	/lb	\$ 11,646.00	\$ 15,373.00
	Reinforcing in place, unloading & sorting, add to above - slabs	7.19	ton	\$ 54.78	/ton	\$ 394.00	\$ 520.00
	Reinforcing in place, unloading & sorting, add to above - slabs	0.15	ton	\$ 54.80	/ton	\$ 8.00	\$ 11.00
	Reinforcing in place, unloading & sorting, add - walls, cols, beams	3.72	ton	\$ 54.78	/ton	\$ 204.00	\$ 269.00
	Reinforcing in place, crane cost for handling, add to above, slabs	7.19	ton	\$ 59.55	/ton	\$ 428.00	\$ 565.00
	Reinforcing in place, crane cost for handling, add to above, slabs	0.15	ton	\$ 59.60	/ton	\$ 9.00	\$ 11.00
	Reinforcing, crane cost for handling, add to above, walls, cols, beams	3.72	ton	\$ 59.55	/ton	\$ 222.00	\$ 292.00
	Concrete, ready mix, regular weight, slabs/mats, 4000 psi	86.66	cy	\$ 128.00	/cy	\$ 11,092.00	\$ 14,642.00
	Concrete, ready mix, regular weight, slabs/mats, 4000 psi	9.10	cy	\$ 128.00	/cy	\$ 1,165.00	\$ 1,538.00
	Concrete, ready mix, regular weight, walls/cols/beams, 4000 psi	58.80	cy	\$ 128.00	/cy	\$ 7,526.00	\$ 9,935.00
	Structural concrete, placing, slab on grade, direct chute, over 6" thick, includes vibrating, excludes material	13.65	cy	\$ 22.35	/cy	\$ 305.00	\$ 403.00
	Structural concrete, placing, slab on grade, direct chute, over 6" thick, includes vibrating, excludes material	9.10	cy	\$ 22.35	/cy	\$ 203.00	\$ 268.00
	Structural concrete, placing, walls, direct chute, 8" thick, includes vibrating, excludes material	73.01	cy	\$ 40.98	/cy	\$ 2,992.00	\$ 3,949.00
	Structural concrete, placing, walls, pumped, 15" thick, includes vibrating, excludes material	58.80	cy	\$ 48.93	/cy	\$ 2,877.00	\$ 3,798.00
	Concrete finishing, floors, monolithic, machine trowel finish	234.00	sf	\$ 1.06	/sf	\$ 248.00	\$ 327.00
	Concrete finishing, floors, monolithic, machine trowel finish	234.00	sf	\$ 1.06	/sf	\$ 248.00	\$ 327.00
	Concrete finishing, floor, dustproofing, solvent-based, 1 coat	234.00	sf	\$ 0.47	/sf	\$ 110.00	\$ 145.00
	Concrete finishing, floor, dustproofing, solvent-based, 1 coat	234.00	sf	\$ 0.47	/sf	\$ 110.00	\$ 145.00
	Finishing: break ties & patch voids (walls, cols or beams)	1,134.00	sf	\$ 1.12	/sf	\$ 1,275.00	\$ 1,683.00
	Curing, sprayed membrane curing compound	2.34	csf	\$ 24.83	/csf	\$ 58.00	\$ 77.00
	Curing, sprayed membrane curing compound	2.34	csf	\$ 24.83	/csf	\$ 58.00	\$ 77.00
	Fine grading, fine grade for slab on grade, machine	26.00	sy	\$ 1.87	/sy	\$ 49.00	\$ 64.00
	Fine grading, fine grade for slab on grade, machine	26.00	sy	\$ 1.87	/sy	\$ 49.00	\$ 64.00
	Strt excvtn for minor strtrs,bank measur,for spread and mat footngs,elevatr pits,and small buildng fndtns,3/4 cy bucket,machine excavtn,hydrlic backhoe	266.67	bcy	\$ 22.26	/bcy	\$ 5,936.00	\$ 7,835.00
	Hauling, excavated or borrow material, loose cubic yards, 1 mile round trip, 2.2 loads/hour, 12 C.Y. truck, highway haulers, excludes loading	266.67	lcy	\$ 6.25	/lcy	\$ 1,666.00	\$ 2,199.00
	<b>Cast-In-Place Concrete</b>	<b>154.56</b>	<b>cy</b>	<b>\$ 400.06</b>	<b>/cy</b>	<b>\$ 61,833.00</b>	<b>\$ 81,620.00</b>
	<b>Demolition</b>						
	Selective demolition, water & sewer piping & fittings, concrete pipe, 30"-36", diameter, excludes excavation	33.00	lf	\$ 56.61	/lf	\$ 1,868.00	\$ 2,466.00
	Hauling, 12 cy truck, cycle 8 miles, 30 MPH ave, 15 min. wait/Ld./Uld.	80.00	lcy	\$ 6.25	/lcy	\$ 500.00	\$ 660.00
	<b>Demolition</b>	<b>80.00</b>	<b>cy</b>	<b>\$ 29.60</b>	<b>/cy</b>	<b>\$ 2,368.00</b>	<b>\$ 3,126.00</b>
	<b>Manhole</b>						
	Concrete, ready mix, regular weight, slabs/mats, 4000 psi	6.00	cy	\$ 128.00	/cy	\$ 768.00	\$ 1,014.00
	Utility area drains, catch basins manholes frames and covers, cast iron, watertight, 30" diameter	1.00	ea	\$ 1,210.28	/ea	\$ 1,210.00	\$ 1,598.00
	Storm Drainage Manholes, Frames, and Covers, concrete, cast in place 6' deep, excludes base, excavation, backfill, frame and cover	1.00	ea	\$ 3,493.89	/ea	\$ 3,494.00	\$ 4,612.00
	<b>Manhole</b>	<b>1.00</b>	<b>ea</b>	<b>\$ 5,472.17</b>	<b>/ea</b>	<b>\$ 5,472.00</b>	<b>\$ 7,223.00</b>
	<b>60" RCP</b>						
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket	184.00	cy	\$ 22.26	/cy	\$ 4,096.00	\$ 5,406.00
	Backfill, trench, air tamped compaction, add	184.00	ecy	\$ 19.01	/ecy	\$ 3,497.00	\$ 4,617.00
	Fill by borrow and utility bedding, for pipe and conduit, crushed or screened bank run gravel, excludes compaction	12.50	lcy	\$ 32.02	/lcy	\$ 400.00	\$ 528.00
	Fill by borrow and utility bedding, for pipe and conduit, compacting bedding in trench	12.50	ecy	\$ 7.34	/ecy	\$ 92.00	\$ 121.00
	Soldier Pile & Lagging - TEMP. SOE	2,564.00	sf	\$ 45.00	/sf	\$ 115,380.00	\$ 152,302.00
	Public Storm Utility Drainage Piping, reinforced concrete pipe (RCP), 60" diameter, 8' lengths, class 3, excludes excavation or backfill, gaskets	38.00	lf	\$ 317.08	/lf	\$ 12,049.00	\$ 15,905.00
	<b>60" RCP</b>	<b>38.00</b>	<b>lf</b>	<b>\$ 3,566.16</b>	<b>/lf</b>	<b>\$ 135,514.00</b>	<b>\$ 178,879.00</b>
	<b>Backfill &amp; Compaction</b>						
	Backfill, trench, air tamped compaction	150.00	ecy	\$ 19.01	/ecy	\$ 2,851.00	\$ 3,764.00
	<b>Backfill &amp; Compaction</b>	<b>150.00</b>	<b>cy</b>	<b>\$ 19.01</b>	<b>/cy</b>	<b>\$ 2,851.00</b>	<b>\$ 3,764.00</b>
	<b>Dewatering</b>						
	Dewatering	1.00	ls	\$ 15,000.00	/ls	\$ 15,000.00	\$ 19,800.00
	<b>Dewatering</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 15,000.00</b>	<b>/ls</b>	<b>\$ 15,000.00</b>	<b>\$ 19,800.00</b>
	<b>Excavation</b>						

Location	Description	Takeoff Quantity	UOM	Total Cost/Unit	UOM	Total Amount	Grand Total Amount
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket	1,079.00	cy	\$ 22.26	/cy	\$ 24,018.00	\$ 31,704.00
	<b>Excavation</b>	<b>1,079.00</b>	<b>cy</b>	<b>\$ 22.26</b>	<b>/cy</b>	<b>\$ 24,018.00</b>	<b>\$ 31,704.00</b>
<b>Flap Gate</b>	Flap Gate	1.00	ls	\$ 10,000.00	/ls	\$ 10,000.00	\$ 13,200.00
	<b>Flap Gate</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 10,000.00</b>	<b>/ls</b>	<b>\$ 10,000.00</b>	<b>\$ 13,200.00</b>
<b>Soldier Pile SOE</b>	Soldier Pile & Lagging	870.00	sf	\$ 45.00	/sf	\$ 39,150.00	\$ 51,678.00
	<b>Soldier Pile SOE</b>	<b>870.00</b>	<b>sf</b>	<b>\$ 45.00</b>	<b>/sf</b>	<b>\$ 39,150.00</b>	<b>\$ 51,678.00</b>
<b>Precast Concrete</b>	OF - 214 Precast Concrete Structure - Allowance	1.00	ls	\$ 54,000.00	/ls	\$ 54,000.00	\$ 71,280.00
	<b>Precast Concrete</b>	<b>1.00</b>	<b>ea</b>	<b>\$ 54,000.00</b>	<b>/ea</b>	<b>\$ 54,000.00</b>	<b>\$ 71,280.00</b>
<b>Masonry</b>	Brick Invert	100.00	sf	\$ 40.00	/sf	\$ 4,000.00	\$ 5,280.00
	<b>Masonry</b>	<b>100.00</b>	<b>sf</b>	<b>\$ 40.00</b>	<b>/sf</b>	<b>\$ 4,000.00</b>	<b>\$ 5,280.00</b>
<b>Misc. Metals</b>	Fiberglass reinforced polymer, #4 bar (Assumed 6" Spacing) - Bar Rack	72.00	lf	\$ 15.00	/lf	\$ 1,080.00	\$ 1,426.00
	<b>Misc. Metals</b>	<b>72.00</b>	<b>lf</b>	<b>\$ 15.00</b>	<b>/lf</b>	<b>\$ 1,080.00</b>	<b>\$ 1,426.00</b>
	<b>OF - 214 DIVERSION STRUCTURE</b>					<b>\$ 355,287.00</b>	<b>\$ 468,979.00</b>
<b>REMOVE &amp; REBUILD RETAINING WALL</b>							
<b>Demolition</b>	Hauling, 12 cy truck, cycle 8 miles, 30 MPH ave, 15 min. wait/Ld./Uld.	800.00	lcy	\$ 6.25	/lcy	\$ 4,997.00	\$ 6,596.00
	<b>Demolition</b>	<b>800.00</b>	<b>cy</b>	<b>\$ 6.25</b>	<b>/cy</b>	<b>\$ 4,997.00</b>	<b>\$ 6,596.00</b>
<b>Masonry</b>	Field stone, wall, under 18" thick, dry laid	666.00	cf	\$ 35.79	/cf	\$ 23,834.00	\$ 31,461.00
	<b>Masonry</b>	<b>666.00</b>	<b>sf</b>	<b>\$ 35.79</b>	<b>/sf</b>	<b>\$ 23,834.00</b>	<b>\$ 31,461.00</b>
<b>Demo Retain. Wall</b>	Demolition, concrete, walls, bar reinforced, 6-12 C.F	1,530.00	cf	\$ 10.00	/cf	\$ 15,300.00	\$ 20,196.00
	Rubbish handling, dumpster, 40 C.Y., 13 ton capacity, weekly rental, includes one dump per week	1.00	week	\$ 775.00	/week	\$ 775.00	\$ 1,023.00
	Rubbish handling, 100' haul, load, haul to chute and dumping into chute	60.00	cy	\$ 73.32	/cy	\$ 4,399.00	\$ 5,807.00
	Rubbish handling, loading & trucking, chute loaded	60.00	cy	\$ 65.90	/cy	\$ 3,954.00	\$ 5,220.00
	<b>Demo Retain. Wall</b>	<b>815.00</b>	<b>cy</b>	<b>\$ 29.97</b>	<b>/cy</b>	<b>\$ 24,428.00</b>	<b>\$ 32,245.00</b>
<b>CIP Retaining Wall</b>	Cast-in place retaining walls, reinforced concrete	40.00	lf	\$ 2,487.00	/lf	\$ 99,480.00	\$ 131,314.00
	<b>CIP Retaining Wall</b>	<b>40.00</b>	<b>lf</b>	<b>\$ 2,487.00</b>	<b>/lf</b>	<b>\$ 99,480.00</b>	<b>\$ 131,314.00</b>
	<b>REMOVE &amp; REBUILD RETAINING WALL</b>					<b>\$ 152,739.00</b>	<b>\$ 201,616.00</b>
<b>RETAINING WALL PROTECTION</b>							
<b>Protect Ret. Wall</b>	Retaining Wall Protection - Instrumentation Plan	435.00	lf	\$ 500.00	/lf	\$ 217,500.00	\$ 287,100.00
	<b>Protect Ret. Wall</b>	<b>435.00</b>	<b>lf</b>	<b>\$ 500.00</b>	<b>/lf</b>	<b>\$ 217,500.00</b>	<b>\$ 287,100.00</b>
	<b>RETAINING WALL PROTECTION</b>					<b>\$ 217,500.00</b>	<b>\$ 287,100.00</b>
<b>ROOSEVELT AVE CONSOLIDATION CONDUIT</b>							
<b>48" RCP</b>	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket	1,328.00	cy	\$ 22.26	/cy	\$ 29,561.00	\$ 39,021.00
	Backfill, trench, air tamped compaction, add	889.00	ecy	\$ 19.01	/ecy	\$ 16,898.00	\$ 22,305.00
	Fill by borrow and utility bedding, for pipe and conduit, crushed or screened bank run gravel, excludes compaction	55.00	lcy	\$ 32.02	/lcy	\$ 1,761.00	\$ 2,325.00
	Fill by borrow and utility bedding, for pipe and conduit, compacting bedding in trench	55.00	ecy	\$ 7.34	/ecy	\$ 404.00	\$ 533.00
	Soldier Pile & Lagging - TEMP. SOE	7,475.00	sf	\$ 45.00	/sf	\$ 336,375.00	\$ 444,015.00
	Public Storm Utility Drainage Piping, reinforced concrete pipe (RCP), 48" diameter, 8' lengths, class 3, excludes excavation or backfill, gaskets	299.00	lf	\$ 317.08	/lf	\$ 94,807.00	\$ 125,145.00
	<b>48" RCP</b>	<b>299.00</b>	<b>lf</b>	<b>\$ 1,604.70</b>	<b>/lf</b>	<b>\$ 479,805.00</b>	<b>\$ 633,343.00</b>
<b>54" RCP</b>	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket	925.00	cy	\$ 22.26	/cy	\$ 20,590.00	\$ 27,179.00
	Backfill, trench, air tamped compaction, add	800.00	ecy	\$ 19.01	/ecy	\$ 15,206.00	\$ 20,072.00
	Fill by borrow and utility bedding, for pipe and conduit, crushed or screened bank run gravel, excludes compaction	37.00	lcy	\$ 32.02	/lcy	\$ 1,185.00	\$ 1,564.00
	Fill by borrow and utility bedding, for pipe and conduit, compacting bedding in trench	37.00	ecy	\$ 7.34	/ecy	\$ 272.00	\$ 359.00
	Soldier Pile & Lagging - TEMP. SOE	8,753.00	sf	\$ 45.00	/sf	\$ 393,885.00	\$ 519,928.00
	Public Storm Utility Drainage Piping, reinforced concrete pipe (RCP), 54" diameter, 8' lengths, class 3, excludes excavation or backfill, gaskets	203.00	lf	\$ 317.08	/lf	\$ 64,367.00	\$ 84,964.00
	<b>54" RCP</b>	<b>203.00</b>	<b>lf</b>	<b>\$ 2,440.91</b>	<b>/lf</b>	<b>\$ 495,505.00</b>	<b>\$ 654,066.00</b>
<b>Open Trench Dewater</b>	Rent 8" diam wellpoint discharge pipe	150.00	day	\$ 0.40	/day	\$ 60.00	\$ 79.00
	Rent wellpoint header pipe, 4" diameter, flow to 100 GPM	2,000.00	day	\$ 0.40	/day	\$ 800.00	\$ 1,056.00
	Rent wellpoint 25" long w/fittings & riser pipe 1-1/2" or 2" suction	725.00	day	\$ 3.20	/day	\$ 2,320.00	\$ 3,062.00
	Rent wellpoint pump, diesel, 20 HP, 4" suction	725.00	day	\$ 178.35	/day	\$ 129,304.00	\$ 170,681.00
	Wells, for dewatering, with steel casing, 10' to 20' deep, 2' diameter, average	100.00	vlf	\$ 64.97	/vlf	\$ 6,497.00	\$ 8,576.00
	Wellpoints, single stage system, 0.75 labor hours per L.F., installation and removal, minimum	2,000.00	hdr	\$ 56.53	/hdr	\$ 113,061.00	\$ 149,241.00
	Wellpoints, pump operation, 4 @ 6 hour shifts, per 24 hour day	72.50	day	\$ 1,986.27	/day	\$ 144,004.00	\$ 190,086.00



Location	Description	Takeoff Quantity	UOM	Total Cost/Unit	UOM	Total Amount	Grand Total Amount
	<b>Open Trench Dewater</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 396,046.05</b>	<b>/ls</b>	<b>\$ 396,046.00</b>	<b>\$ 522,781.00</b>
	<b>Pipe Jack Pits Dewat</b>						
	Rent 8" diam wellpoint discharge pipe - 48"	150.00	day	\$ 0.40	/day	\$ 60.00	\$ 79.00
	Rent wellpoint header pipe, 4" diameter, flow to 100 GPM -48"	1,000.00	day	\$ 0.40	/day	\$ 400.00	\$ 528.00
	Rent wellpoint header pipe, 6" diam, quick couplg, alum & plastic add - 48"	1,000.00	day	\$ 1.55	/day	\$ 1,550.00	\$ 2,046.00
	Rent wellpoint 25" long w/fittings & riser pipe 1-1/2" or 2" suction - 48"	90.00	day	\$ 3.20	/day	\$ 288.00	\$ 380.00
	Rent wellpoint pump, diesel, 20 HP, 4" suction - 48"	75.00	day	\$ 178.35	/day	\$ 13,376.00	\$ 17,657.00
	Wells, for dewatering, with steel casing, 10' to 20' deep, 2' diameter, average - 48"	120.00	vlf	\$ 64.97	/vlf	\$ 7,796.00	\$ 10,291.00
	Wellpoints, single stage system, 0.75 labor hours per L.F., installation and removal, minimum - 48"	1,000.00	hdr	\$ 56.53	/hdr	\$ 56,531.00	\$ 74,620.00
	Wellpoints, pump operation, 4 @ 6 hour shifts, per 24 hour day - 48"	7.50	day	\$ 1,986.27	/day	\$ 14,897.00	\$ 19,664.00
	<b>Pipe Jack Pits Dewat</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 94,897.91</b>	<b>/ls</b>	<b>\$ 94,898.00</b>	<b>\$ 125,265.00</b>
	<b>Pipe Jacking</b>						
	Pipe Jacking, 48" Dia - 48"	247.00	lf	\$ 1,250.00	/lf	\$ 308,750.00	\$ 407,550.00
	Reinforced concrete pipe (RCP) with gaskets, 48" diameter - PIPE JACKING - 48"	247.00	lf	\$ 150.00	/lf	\$ 37,050.00	\$ 48,906.00
	<b>Pipe Jacking</b>	<b>247.00</b>	<b>lf</b>	<b>\$ 1,400.00</b>	<b>/lf</b>	<b>\$ 345,800.00</b>	<b>\$ 456,456.00</b>
	<b>Pipe Jacking Pits</b>						
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket - PIPE JACKING PITS - 48"	555.00	cy	\$ 22.26	/cy	\$ 12,354.00	\$ 16,308.00
	Backfill, trench, air tamped compaction, add - PIPE JACKING PITS - 48"	555.00	ecy	\$ 19.01	/ecy	\$ 10,549.00	\$ 13,925.00
	Soldier Pile & Lagging - TEMP. SOE - 48"	4,200.00	sf	\$ 45.00	/sf	\$ 189,000.00	\$ 249,480.00
	<b>Pipe Jacking Pits</b>	<b>2.00</b>	<b>ls</b>	<b>\$ 105,951.71</b>	<b>/ls</b>	<b>\$ 211,903.00</b>	<b>\$ 279,713.00</b>
	<b>ROOSEVELT AVE CONSOLIDATION CONDUIT</b>					<b>\$ 2,023,958.00</b>	<b>\$ 2,671,624.00</b>
<b>SITE</b>							
	<b>Clear &amp; Grub</b>						
	Clearing & grubbing	0.22	acre	\$ 7,679.73	/acre	\$ 1,690.00	\$ 2,230.00
	<b>Clear &amp; Grub</b>	<b>0.22</b>	<b>acr</b>	<b>\$ 7,679.73</b>	<b>/acr</b>	<b>\$ 1,690.00</b>	<b>\$ 2,230.00</b>
	<b>Curbing</b>						
	Remove and Reset Curb	1,200.00	lf	\$ 25.00	/lf	\$ 30,000.00	\$ 39,600.00
	<b>Curbing</b>	<b>1,200.00</b>	<b>lf</b>	<b>\$ 25.00</b>	<b>/lf</b>	<b>\$ 30,000.00</b>	<b>\$ 39,600.00</b>
	<b>Detour Signs</b>						
	Signs, stock signs, reflectorized, ( Average - 24" x 24")	25.00	ea	\$ 102.24	/ea	\$ 2,556.00	\$ 3,374.00
	Signs, 10'-0", excludes posts, add to above for steel posts, galvanized, upright, bolted	68.00	ea	\$ 47.81	/ea	\$ 3,251.00	\$ 4,291.00
	<b>Detour Signs</b>	<b>93.00</b>	<b>ea</b>	<b>\$ 62.44</b>	<b>/ea</b>	<b>\$ 5,807.00</b>	<b>\$ 7,665.00</b>
	<b>Paving</b>						
	Selective demolition, saw cutting, asphalt, up to 3" deep	800.00	lf	\$ 1.75	/lf	\$ 1,397.00	\$ 1,844.00
	Selective demolition, saw cutting, asphalt, up to 3" deep	388.00	lf	\$ 1.75	/lf	\$ 678.00	\$ 895.00
	Selective demolition, saw cutting, asphalt, up to 3" deep	2,884.00	lf	\$ 1.75	/lf	\$ 5,037.00	\$ 6,649.00
	Selective demolition, saw cutting, asphalt, up to 3" deep	1,180.00	lf	\$ 1.75	/lf	\$ 2,061.00	\$ 2,720.00
	Selective demolition, saw cutting, asphalt, up to 3" deep	840.00	lf	\$ 1.75	/lf	\$ 1,467.00	\$ 1,937.00
	Selective demolition, saw cutting, asphalt, up to 3" deep	120.00	lf	\$ 1.75	/lf	\$ 210.00	\$ 277.00
	Selective demolition, saw cutting, asphalt, up to 3" deep	800.00	lf	\$ 1.75	/lf	\$ 1,397.00	\$ 1,844.00
	Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	1,357.00	sy	\$ 0.97	/sy	\$ 1,320.00	\$ 1,743.00
	Cold milling asphalt paving, 1" to 3"	13,658.00	sy	\$ 1.83	/sy	\$ 25,014.00	\$ 33,018.00
	In-place hot reused asphalt paving, 4" deep, remove, rejuvenate and spread	267.00	sy	\$ 10.99	/sy	\$ 2,935.00	\$ 3,875.00
	In-place hot reused asphalt paving, 4" deep, remove, rejuvenate and spread	140.00	sy	\$ 10.99	/sy	\$ 1,539.00	\$ 2,032.00
	In-place hot reused asphalt paving, 4" deep, remove, rejuvenate and spread	320.00	sy	\$ 10.99	/sy	\$ 3,518.00	\$ 4,644.00
	In-place hot reused asphalt paving, 4" deep, remove, rejuvenate and spread	131.00	sy	\$ 10.99	/sy	\$ 1,440.00	\$ 1,901.00
	In-place hot reused asphalt paving, 4" deep, remove, rejuvenate and spread	93.00	sy	\$ 10.99	/sy	\$ 1,022.00	\$ 1,350.00
	In-place hot reused asphalt paving, 4" deep, remove, rejuvenate and spread	13.00	sy	\$ 10.99	/sy	\$ 143.00	\$ 189.00
	In-place hot reused asphalt paving, 4" deep, remove, rejuvenate and spread	267.00	sy	\$ 10.99	/sy	\$ 2,935.00	\$ 3,875.00
	Base course drainage layers, aggregate base course for roadways and large paved areas, crushed stone base, compacted, crushed 1-1/2" stone base, 6" deep	1,357.00	sy	\$ 10.00	/sy	\$ 13,570.00	\$ 17,912.00
	Base course drainage layers, 12" Deep	850.00	sy	\$ 20.07	/sy	\$ 17,062.00	\$ 22,522.00
	Base course drainage layers, prepare and roll sub-base, large areas over 2500 S.Y.	1,357.00	sy	\$ 0.94	/sy	\$ 1,281.00	\$ 1,691.00
	Bituminous-stabilized Base courses, for roadways and large paved areas, liquid application to gravel base, asphalt emulsion	1,674.02	gal	\$ 4.85	/gal	\$ 8,115.00	\$ 10,711.00
	Plant-mix asphalt paving, binder course, 3" thick	267.00	sy	\$ 12.57	/sy	\$ 3,355.00	\$ 4,429.00
	Plant-mix asphalt paving, binder course, 3" thick	140.00	sy	\$ 12.57	/sy	\$ 1,759.00	\$ 2,322.00
	Plant-mix asphalt paving, binder course, 3" thick	320.00	sy	\$ 12.57	/sy	\$ 4,021.00	\$ 5,308.00
	Plant-mix asphalt paving, binder course, 3" thick	131.00	sy	\$ 12.57	/sy	\$ 1,646.00	\$ 2,173.00
	Plant-mix asphalt paving, binder course, 3" thick	93.00	sy	\$ 12.57	/sy	\$ 1,169.00	\$ 1,543.00
	Plant-mix asphalt paving, binder course, 3" thick	13.00	sy	\$ 12.57	/sy	\$ 163.00	\$ 216.00
	Plant-mix asphalt paving, binder course, 3" thick	267.00	sy	\$ 12.57	/sy	\$ 3,355.00	\$ 4,429.00
	Plant-mix asphalt paving, wearing course, 1-1/2" thick	13,658.00	sy	\$ 9.57	/sy	\$ 130,667.00	\$ 172,480.00
	Painted pavement markings, thermoplastic, white or yellow, 6" wide	1,400.00	lf	\$ 0.83	/lf	\$ 1,169.00	\$ 1,543.00
	Painted pavement markings, thermoplastic, white or yellow, arrows	500.00	sf	\$ 7.03	/sf	\$ 3,517.00	\$ 4,642.00
	Painted pavement markings, thermoplastic, white or yellow, letters	500.00	sf	\$ 7.03	/sf	\$ 3,517.00	\$ 4,642.00
	<b>Paving</b>	<b>13,658.00</b>	<b>SY</b>	<b>\$ 18.05</b>	<b>/SY</b>	<b>\$ 246,482.00</b>	<b>\$ 325,356.00</b>
	<b>Sidewalks</b>						
	Sidewalks	1,200.00	lf	\$ 22.00	/lf	\$ 26,400.00	\$ 34,848.00
	<b>Sidewalks</b>	<b>1,200.00</b>	<b>lf</b>	<b>\$ 22.00</b>	<b>/lf</b>	<b>\$ 26,400.00</b>	<b>\$ 34,848.00</b>
	<b>SITE</b>					<b>\$ 310,379.00</b>	<b>\$ 409,700.00</b>
<b>SITE ELECTRICAL</b>							
	<b>Electrical Controls</b>						

Location	Description	Takeoff Quantity	UOM	Total Cost/Unit	UOM	Total Amount	Grand Total Amount
	Control stations, heavy duty, stop/start, pilot light, NEMA 1	3.00	ea	\$ 308.01	/ea	\$ 924.00	\$ 1,220.00
	<b>Electrical Controls</b>	<b>3.00</b>	<b>ea</b>	<b>\$ 308.01</b>	<b>/ea</b>	<b>\$ 924.00</b>	<b>\$ 1,220.00</b>
<b>Electrical Ducts</b>	Electrcl undrgrnd ducts and manholes,hand holes,precast concrete,with concrete cover,3'x3'x3'deep,excludes excavation,backfill and cast place concrete	3.00	ea	\$ 1,641.49	/ea	\$ 4,924.00	\$ 6,500.00
	<b>Electrical Ducts</b>	<b>3.00</b>	<b>ea</b>	<b>\$ 1,641.49</b>	<b>/ea</b>	<b>\$ 4,924.00</b>	<b>\$ 6,500.00</b>
<b>Light Poles</b>	Light poles w/ anchor base, aluminum, to 40' high	5.00	ea	\$ 3,386.13	/ea	\$ 16,931.00	\$ 22,348.00
	<b>Light Poles</b>	<b>5.00</b>	<b>ea</b>	<b>\$ 3,386.13</b>	<b>/ea</b>	<b>\$ 16,931.00</b>	<b>\$ 22,348.00</b>
<b>Wiring &amp; Raceway</b>	Wire, copper, stranded, 600 volt, 2/0, type THW, in raceway	15.74	clf	\$ 438.05	/clf	\$ 6,893.00	\$ 9,099.00
	Wire, copper, stranded, 600 volt, 3/0, type THW, in raceway	15.74	clf	\$ 505.34	/clf	\$ 7,952.00	\$ 10,497.00
	Ground wire, copper wire, bare stranded, #8	31.47	clf	\$ 104.44	/clf	\$ 3,287.00	\$ 4,339.00
	Electrcl undrgrn ducts and manhols,undrgrn duct banks ready for concrete fill,pvc,type eb,2 @ 3'dm,excludes excavation,backfill and cast place concrete	1,558.00	lf	\$ 10.47	/lf	\$ 16,314.00	\$ 21,535.00
	<b>Wiring &amp; Raceway</b>	<b>1,558.00</b>	<b>lf</b>	<b>\$ 22.11</b>	<b>/lf</b>	<b>\$ 34,446.00</b>	<b>\$ 45,469.00</b>
	<b>SITE ELECTRICAL</b>					<b>\$ 57,226.00</b>	<b>\$ 75,538.00</b>
<b>TAFT ST. CONSOLIDATION CONDUIT</b>							
<b>48" RCP</b>	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket	2,009.00	cy	\$ 22.26	/cy	\$ 44,720.00	\$ 59,030.00
	Backfill, trench, air tamped compaction, add	1,676.00	ecy	\$ 19.01	/ecy	\$ 31,857.00	\$ 42,051.00
	Fill by borrow and utility bedding, for pipe and conduit, crushed or screened bank run gravel, excludes compaction	80.00	lcy	\$ 32.02	/lcy	\$ 2,562.00	\$ 3,381.00
	Fill by borrow and utility bedding, for pipe and conduit, compacting bedding in trench	80.00	ecy	\$ 7.34	/ecy	\$ 587.00	\$ 775.00
	Soldier Pile & Lagging - TEMP. SOE	21,687.00	sf	\$ 45.00	/sf	\$ 975,915.00	\$ 1,288,208.00
	Public Storm Utility Drainage Piping, reinforced concrete pipe (RCP), 48" diameter, 8' lengths, class 3, excludes excavation or backfill, gaskets	541.00	lf	\$ 317.08	/lf	\$ 171,540.00	\$ 226,432.00
	<b>48" RCP</b>	<b>541.00</b>	<b>lf</b>	<b>\$ 2,268.36</b>	<b>/lf</b>	<b>\$ 1,227,180.00</b>	<b>\$ 1,619,878.00</b>
<b>60" RCP</b>	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket	972.00	cy	\$ 22.26	/cy	\$ 21,637.00	\$ 28,560.00
	Backfill, trench, air tamped compaction, add	808.00	ecy	\$ 19.01	/ecy	\$ 15,358.00	\$ 20,273.00
	Fill by borrow and utility bedding, for pipe and conduit, crushed or screened bank run gravel, excludes compaction	39.00	lcy	\$ 32.02	/lcy	\$ 1,249.00	\$ 1,648.00
	Fill by borrow and utility bedding, for pipe and conduit, compacting bedding in trench	39.00	ecy	\$ 7.34	/ecy	\$ 286.00	\$ 378.00
	Soldier Pile & Lagging - TEMP. SOE	8,753.00	sf	\$ 45.00	/sf	\$ 393,885.00	\$ 519,928.00
	Public Storm Utility Drainage Piping, reinforced concrete pipe (RCP), 60" diameter, 8' lengths, class 3, excludes excavation or backfill, gaskets	151.00	lf	\$ 317.08	/lf	\$ 47,879.00	\$ 63,200.00
	<b>60" RCP</b>	<b>151.00</b>	<b>lf</b>	<b>\$ 3,180.75</b>	<b>/lf</b>	<b>\$ 480,294.00</b>	<b>\$ 633,988.00</b>
<b>Pipe Jack Pits Dewat</b>	Rent 8" diam wellpoint discharge pipe - 48"	150.00	day	\$ 0.40	/day	\$ 60.00	\$ 79.00
	Rent wellpoint header pipe, 4" diameter, 100 GPM - 48"	1,000.00	day	\$ 0.40	/day	\$ 400.00	\$ 528.00
	Rent wellpoint pump, diesel, 20 HP, 4" suction - 48"	75.00	day	\$ 178.35	/day	\$ 13,376.00	\$ 17,657.00
	Wells, for dewatering, with steel casing, 10' to 20' deep, 2' diameter, average - 48"	40.00	vlf	\$ 64.97	/vlf	\$ 2,599.00	\$ 3,430.00
	Wellpoints, single stage system, 0.75 labor hours per L.F., installation and removal, minimum - 48"	1,000.00	hdr	\$ 56.53	/hdr	\$ 56,531.00	\$ 74,620.00
	Wellpoints, pump operation, 4 @ 6 hour shifts, per 24 hour day -48"	7.50	day	\$ 1,986.27	/day	\$ 14,897.00	\$ 19,664.00
	<b>Pipe Jack Pits Dewat</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 87,862.53</b>	<b>/ls</b>	<b>\$ 87,863.00</b>	<b>\$ 115,979.00</b>
<b>Pipe Jacking</b>	Pipe Jacking, 48" Dia - 48"	233.00	lf	\$ 1,250.00	/lf	\$ 291,250.00	\$ 384,450.00
	Reinforced concrete pipe (RCP) with gaskets, 48" diameter - PIPE JACKING -48"	233.00	lf	\$ 150.00	/lf	\$ 34,950.00	\$ 46,134.00
	<b>Pipe Jacking</b>	<b>233.00</b>	<b>lf</b>	<b>\$ 1,400.00</b>	<b>/lf</b>	<b>\$ 326,200.00</b>	<b>\$ 430,584.00</b>
<b>Pipe Jacking Pits</b>	Rock Removal - PIPE JACKING PITS	75.00	cy	\$ 75.00	/cy	\$ 5,625.00	\$ 7,425.00
	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket - PIPE JACKING PITS - 48"	111.00	cy	\$ 22.26	/cy	\$ 2,471.00	\$ 3,262.00
	Backfill, trench, air tamped compaction, add - PIPE JACKING PITS - 48"	186.00	ecy	\$ 19.01	/ecy	\$ 3,535.00	\$ 4,667.00
	Soldier Pile & Lagging - TEMP. SOE - 48"	1,400.00	sf	\$ 45.00	/sf	\$ 63,000.00	\$ 83,160.00
	<b>Pipe Jacking Pits</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 74,631.22</b>	<b>/ls</b>	<b>\$ 74,631.00</b>	<b>\$ 98,513.00</b>
<b>Rock Removal</b>	Rock Removal - PIPE JACKING - 48"	25.00	cy	\$ 75.00	/cy	\$ 1,875.00	\$ 2,475.00
	<b>Rock Removal</b>	<b>25.00</b>	<b>cy</b>	<b>\$ 75.00</b>	<b>/cy</b>	<b>\$ 1,875.00</b>	<b>\$ 2,475.00</b>
						<b>\$ 2,198,043.00</b>	<b>\$ 2,901,417.00</b>
<b>UTILITY TUNNELING FROM GSS TO JUNCTION CHAMBER</b>							
<b>72" RCP</b>	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket - 72"	525.00	cy	\$ 22.26	/cy	\$ 11,686.00	\$ 15,426.00
	Backfill, trench, air tamped compaction, add - 72"	525.00	ecy	\$ 19.01	/ecy	\$ 9,979.00	\$ 13,172.00
	Fill by borrow and utility bedding, for pipe and conduit, crushed or screened bank run gravel, excludes compaction - 72"	1.50	lcy	\$ 32.02	/lcy	\$ 48.00	\$ 63.00
	Fill by borrow and utility bedding, for pipe and conduit, compacting bedding in trench - 72"	46.00	ecy	\$ 7.34	/ecy	\$ 338.00	\$ 446.00
	Soldier Pile & Lagging - TEMP. SOE - 72"	525.00	sf	\$ 45.00	/sf	\$ 23,625.00	\$ 31,185.00
	Public Storm Utility Drainage Piping, reinforced concrete pipe (RCP), 72" diameter, 8' lengths, class 3, excludes excavation or backfill, gaskets - 72"	6.00	lf	\$ 317.08	/lf	\$ 1,902.00	\$ 2,511.00
	<b>72" RCP</b>	<b>6.00</b>	<b>lf</b>	<b>\$ 7,929.78</b>	<b>/lf</b>	<b>\$ 47,579.00</b>	<b>\$ 62,804.00</b>
<b>Pipe Jack Pits Dewatering</b>							

Location	Description	Takeoff Quantity	UOM	Total Cost/Unit	UOM	Total Amount	Grand Total Amount
	Rent 8" diam wellpoint discharge pipe -72"	150.00	day	\$ 0.40	/day	\$ 60.00	\$ 79.00
	Rent wellpoint header pipe, 4" diameter, flow to 100 GPM - 72"	1,000.00	day	\$ 0.40	/day	\$ 400.00	\$ 528.00
	Rent wellpoint header pipe, 6" diam, quick couplg, alum & plastic add - 72"	1,000.00	day	\$ 1.55	/day	\$ 1,550.00	\$ 2,046.00
	Rent wellpoint 25" long w/fittings & riser pipe 1-1/2" or 2" suction - 72"	90.00	day	\$ 3.20	/day	\$ 288.00	\$ 380.00
	Rent wellpoint pump, diesel, 20 HP, 4" suction - 72"	75.00	day	\$ 178.35	/day	\$ 13,376.00	\$ 17,657.00
	Wells, for dewatering, with steel casing, 10' to 20' deep, 2' diameter, average - 72"	53.00	vlf	\$ 64.97	/vlf	\$ 3,443.00	\$ 4,545.00
	Wellpoints, single stage system, 0.75 labor hours per L.F., installation and removal, minimum - 72"	1,000.00	hdr	\$ 56.53	/hdr	\$ 56,531.00	\$ 74,620.00
	Wellpoints, pump operation, 4 @ 6 hour shifts, per 24 hour day - 72"	7.50	day	\$ 1,986.27	/day	\$ 14,897.00	\$ 19,664.00
	<b>Pipe Jack Pits Dewat</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 90,545.10</b>	<b>/ls</b>	<b>\$ 90,545.00</b>	<b>\$ 119,520.00</b>
<b>Pipe Jacking</b>	Pipe Jacking, 72" Dia - 72"	39.00	lf	\$ 1,250.00	/lf	\$ 48,750.00	\$ 64,350.00
	Reinforced concrete pipe (RCP) with gaskets, 72" diameter - PIPE JACKING - 72"	39.00	lf	\$ 150.00	/lf	\$ 5,850.00	\$ 7,722.00
	<b>Pipe Jacking</b>	<b>39.00</b>	<b>lf</b>	<b>\$ 1,400.00</b>	<b>/lf</b>	<b>\$ 54,600.00</b>	<b>\$ 72,072.00</b>
<b>Pipe Jacking Pits</b>	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket - PIPE JACKING PITS - 72"	500.00	cy	\$ 22.26	/cy	\$ 11,130.00	\$ 14,691.00
	Backfill, trench, air tamped compaction, add - PIPE JACKING PITS - 72"	500.00	ecy	\$ 19.01	/ecy	\$ 9,504.00	\$ 12,545.00
	Structural concrete, placing, walls, pumped, 15" thick, includes vibrating, excludes material	1,700.00	sf	\$ 45.00	/sf	\$ 76,500.00	\$ 100,980.00
	<b>Pipe Jacking Pits</b>	<b>1.00</b>	<b>ls</b>	<b>\$ 97,133.71</b>	<b>/ls</b>	<b>\$ 97,134.00</b>	<b>\$ 128,216.00</b>
<b>Ribs and Lagging</b>	Utility Tunneling, roadwork, 120"	50.00	lf	\$ 26,415.00	/lf	\$ 1,320,750.00	\$ 1,743,390.00
	<b>Ribs and Lagging</b>	<b>50.00</b>	<b>lf</b>	<b>\$ 26,415.00</b>	<b>/lf</b>	<b>\$ 1,320,750.00</b>	<b>\$ 1,743,390.00</b>
<b>Rock Removal</b>	Rock Removal	150.00	cy	\$ 75.00	/cy	\$ 11,250.00	\$ 14,850.00
	<b>Rock Removal</b>	<b>150.00</b>	<b>cy</b>	<b>\$ 75.00</b>	<b>/cy</b>	<b>\$ 11,250.00</b>	<b>\$ 14,850.00</b>
<b>Ground Improvement</b>	Ground Improvement (Cementious Grouting with Bentonite admixture)	1.00	ls	\$525,000	/ls	\$ 525,000.00	\$ 525,000.00
	<b>Ground Improvement</b>	<b>1.00</b>	<b>ls</b>	<b>\$525,000</b>	<b>/ls</b>	<b>\$ 525,000.00</b>	<b>\$ 525,000.00</b>
	<b>UTILITY TUNNELING FROM GSS TO JUNCTION CHAMBER</b>					<b>\$ 2,146,857.00</b>	<b>\$ 2,665,852.00</b>
<b>WATER MAIN REPLACEMENT</b>							
<b>BYPASS</b>	Excavating, trench or continuous footing, common earth, 3/8 C.Y. excavator, 1' to 4' deep	25.35	bcy	\$ 10.77	/bcy	\$ 273.00	\$ 360.00
	Backfill, trench, air tamped compaction, add	14.73	ecy	\$ 19.01	/ecy	\$ 280.00	\$ 370.00
	Bedding, crushed stone 3/4" to 1/2"	1.24	lcy	\$ 42.35	/lcy	\$ 52.00	\$ 69.00
	Filter fabric, polypropylene, laid in trench	286.67	sy	\$ 1.78	/sy	\$ 510.00	\$ 673.00
	Public Water Utility Distribution Piping, butterfly valves cast iron, with extension box, 6" diameter	1.00	ea	\$ 938.71	/ea	\$ 939.00	\$ 1,239.00
	Water meter, commercial, bronze flanged, 6" dia, 1000 GPM	5.00	ea	\$ 7,203.20	/ea	\$ 36,016.00	\$ 47,541.00
	Water supply distribution piping, thrust block, 90 elbow, 6 inch diameter, excludes excavation or backfill	4.00	ea	\$ 62.80	/ea	\$ 251.00	\$ 332.00
	Water utility distribution valve, check valves, rubber disc, with rubber gaskets, 6" diameter, excludes excavation and backfill	6.00	ea	\$ 1,383.80	/ea	\$ 8,303.00	\$ 10,960.00
	Fire Hydrants	4.00	ea	\$ 3,277.09	/ea	\$ 13,108.00	\$ 17,303.00
	HDPE, pipe, 6" diameter	1,290.00	lf	\$ 25.00	/lf	\$ 32,248.00	\$ 42,567.00
	2" Service	65.00	lf	\$ 7.97	/lf	\$ 518.00	\$ 684.00
	4" Service	15.00	lf	\$ 16.05	/lf	\$ 241.00	\$ 318.00
	6" Service	72.00	lf	\$ 19.99	/lf	\$ 1,440.00	\$ 1,900.00
	<b>BYPASS</b>	<b>1,290.00</b>	<b>lf</b>	<b>\$ 73.01</b>	<b>/lf</b>	<b>\$ 94,179.00</b>	<b>\$ 124,316.00</b>
<b>Excavation</b>	Excavate pit, common earth, hyd backhoe, 3/4 cy bucket - MH 213-3 and 213-4	80.00	cy	\$ 22.26	/cy	\$ 1,781.00	\$ 2,351.00
	<b>Excavation</b>	<b>80.00</b>	<b>cy</b>	<b>\$ 22.26</b>	<b>/cy</b>	<b>\$ 1,781.00</b>	<b>\$ 2,351.00</b>
<b>MAIN ST. WATER</b>	Excavating, trench or continuous footing, common earth, 1 C.Y. excavator, 6' to 10' deep, excludes sheeting or dewatering	88.89	bcy	\$ 5.19	/bcy	\$ 461.00	\$ 609.00
	Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	77.78	ecy	\$ 3.85	/ecy	\$ 300.00	\$ 395.00
	Fill by borrow and utility bedding, for pipe and conduit, sand, dead or bank, excludes compaction	6.26	lcy	\$ 32.50	/lcy	\$ 204.00	\$ 269.00
	Fill by borrow and utility bedding, for pipe and conduit, compacting bedding in trench	6.26	ecy	\$ 7.07	/ecy	\$ 44.00	\$ 58.00
	Utility Line Signs, Markers, and Flags, vinyl, aluminum foil core, detectable, 2", excludes excavation and backfill	1.00	clf	\$ 13.03	/clf	\$ 13.00	\$ 17.00
	Public water utility distribution piping, ductile iron pipe, cement lined, mechanical joint, fittings, 18'igs, 20" diam, class 50, excludes excavation backfill	60.00	lf	\$ 204.07	/lf	\$ 12,244.00	\$ 16,162.00
	Public Water Utility Distribution Piping, butterfly valves cast iron, with extension box, 20" diameter	2.00	ea	\$ 6,500.01	/ea	\$ 13,000.00	\$ 17,160.00
	Line Stop, 20" diameter	1.00	ea	\$ 10,000.01	/ea	\$ 10,000.00	\$ 13,200.00
	<b>MAIN ST. WATER</b>	<b>60.00</b>	<b>lf</b>	<b>\$ 604.43</b>	<b>/lf</b>	<b>\$ 36,266.00</b>	<b>\$ 47,871.00</b>
<b>ROOSEVELT AVE WATER</b>	Excavating, trench or continuous footing, common earth, 1 C.Y. excavator, 6' to 10' deep, excludes sheeting or dewatering	874.07	bcy	\$ 5.19	/bcy	\$ 4,536.00	\$ 5,988.00
	Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	764.82	ecy	\$ 3.85	/ecy	\$ 2,946.00	\$ 3,888.00
	Fill by borrow and utility bedding, for pipe and conduit, sand, dead or bank, excludes compaction	92.10	lcy	\$ 32.50	/lcy	\$ 2,993.00	\$ 3,951.00

Location	Description	Takeoff Quantity	UOM	Total Cost/Unit	UOM	Total Amount	Grand Total Amount
	Fill by borrow and utility bedding, for pipe and conduit, compacting bedding in trench	92.10	ecy	\$ 7.07	/ecy	\$ 652.00	\$ 860.00
	Utility Line Signs, Markers, and Flags, vinyl, aluminum foil core, detectable, 2", excludes excavation and backfill	6.00	clf	\$ 13.03	/clf	\$ 78.00	\$ 103.00
	Public water utility distribution piping, ductile iron pipe, cement lined, mechanical joint, fittings, 18'lgs, 12" diam, class 50, excludes excavation backfill	590.00	lf	\$ 124.91	/lf	\$ 73,694.00	\$ 97,277.00
	Public water utility distribution piping, fitting, 90 degree bend elbow, mechanical joint, ductile iron, cement lined, 12" diameter, class 50 water piping	7.00	ea	\$ 1,243.92	/ea	\$ 8,707.00	\$ 11,494.00
	Public Water Utility Distribution Piping, fitting, wye or tee, ductile iron, cement lined, mechanical joint, 12" diameter, class 50 water piping	5.00	ea	\$ 2,495.88	/ea	\$ 12,479.00	\$ 16,473.00
	Water meter, commercial, bronze flanged, 8" dia, 1800 GPM	5.00	ea	\$ 10,729.00	/ea	\$ 53,645.00	\$ 70,811.00
	Water supply distribution piping, thrust block, 90 elbow, 6 inch diameter, excludes excavation or backfill	2.00	ea	\$ 62.80	/ea	\$ 126.00	\$ 166.00
	Water utility distribution valve, check valves, rubber disc, with rubber gaskets, 6" diameter, excludes excavation and backfill	8.00	ea	\$ 1,383.80	/ea	\$ 11,070.00	\$ 14,613.00
	Water Utility Distribution Fire Hydrants, two way, 7'-0" depth, 4-1/2" valve, includes mechanical joints, excludes excavation and backfill	2.00	ea	\$ 3,277.09	/ea	\$ 6,554.00	\$ 8,652.00
	<b>ROOSEVELT AVE WATER</b>	<b>590.00</b>	<b>lf</b>	<b>\$ 300.82</b>	<b>/lf</b>	<b>\$ 177,481.00</b>	<b>\$ 234,275.00</b>
<b>TAFT WATER MAIN REP.</b>							
	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 4' to 6' deep, excavator, excludes sheeting or dewatering	388.89	bcy	\$ 6.68	/bcy	\$ 2,597.00	\$ 3,428.00
	Backfill, trench, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	311.11	ecy	\$ 3.85	/ecy	\$ 1,198.00	\$ 1,582.00
	Fill by borrow and utility bedding, for pipe and conduit, sand, dead or bank, excludes compaction	65.56	lcy	\$ 32.50	/lcy	\$ 2,131.00	\$ 2,813.00
	Fill by borrow and utility bedding, for pipe and conduit, compacting bedding in trench	65.56	ecy	\$ 7.07	/ecy	\$ 464.00	\$ 612.00
	Utility Line Signs, Markers, and Flags, vinyl, aluminum foil core, detectable, 2", excludes excavation and backfill	4.00	clf	\$ 13.03	/clf	\$ 52.00	\$ 69.00
	Public water utility distribution piping, ductile iron pipe, cement lined, mechanical joint, fittings, 18'lgs, 12" diam, class 50, excludes excavation backfill	420.00	lf	\$ 124.91	/lf	\$ 52,460.00	\$ 69,248.00
	Public water utility distribution piping, fitting, 90 degree bend elbow, mechanical joint, ductile iron, cement lined, 12" diameter, class 50 water piping	10.00	ea	\$ 1,243.92	/ea	\$ 12,439.00	\$ 16,420.00
	Public Water Utility Distribution Piping, fitting, wye or tee, ductile iron, cement lined, mechanical joint, 12" diameter, class 50 water piping	5.00	ea	\$ 2,495.88	/ea	\$ 12,479.00	\$ 16,473.00
	Public Water Utility Distribution Piping, butterfly valves cast iron, with extension box, 12" diameter	1.00	ea	\$ 2,179.17	/ea	\$ 2,179.00	\$ 2,877.00
	Water meter, commercial, bronze flanged, 8" dia, 1800 GPM	5.00	ea	\$ 10,729.00	/ea	\$ 53,645.00	\$ 70,811.00
	Water supply distribution piping, thrust block, 90 elbow, 6 inch diameter, excludes excavation or backfill	2.00	ea	\$ 62.80	/ea	\$ 126.00	\$ 166.00
	Water utility distribution valve, check valves, rubber disc, with rubber gaskets, 6" diameter, excludes excavation and backfill	6.00	ea	\$ 1,383.80	/ea	\$ 8,303.00	\$ 10,960.00
	Water Utility Distribution Fire Hydrants, two way, 7'-0" depth, 4-1/2" valve, includes mechanical joints, excludes excavation and backfill	2.00	ea	\$ 3,277.09	/ea	\$ 6,554.00	\$ 8,652.00
	<b>TAFT WATER MAIN REP.</b>	<b>420.00</b>	<b>lf</b>	<b>\$ 368.16</b>	<b>/lf</b>	<b>\$ 154,628.00</b>	<b>\$ 204,108.00</b>
	<b>WATER MAIN REPLACEMENT</b>					<b>\$ 464,334.00</b>	<b>\$ 612,921.00</b>
	<b>SUBTOTAL</b>					<b>\$13,805,780.00</b>	<b>\$ 18,055,629.00</b>
	<b>Escalation (10.75%)</b>						<b>\$ 1,940,979.50</b>
	<b>TOTAL</b>						<b>\$ 19,996,608.50</b>

APPENDIX 11  
OPINION OF PROBABLE  
CONSTRUCTION SCHEDULE

Schedule 60% CTD Submittal  
Phase III Combined Sewer Overflow Program  
IIIA-4 Drop Shaft 213 Consolidation Conduit  
Data Date: December 16, 2022 (Advertise Date)

Prepared for



Prepared by



July 29, 2020

## Table of Contents

- I. CTD Summary
- II. Purpose
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- XII. Traffic Control
- XIII. Attachments
  - a. 60% CTD Full Detailed Schedule report
  - b. Critical Path Schedule report
  - c. Electronic XER File (Primavera file)

## I. CTD SUMMARY

The work under this project consists of installation of consolidation conduit along Taft Street and Roosevelt Avenue including installation of drainage structures and water main replacement in Pawtucket, RI.

The 60% CTD schedule begins with an Advertisement Date of December 16, 2022, as the initial data date, and projects an NTP date of March 16, 2023. The Substantial Completion of contract IIIA-4 is calculated at 1213 calendar days to May 11, 2026, with a total of 1274 calendar days from NTP to Contractor Field Completion on July 11, 2026.

The CTD schedule was developed using Primavera P6 Version 20.

The following milestones are included in the CTD schedule:

Milestones No.	Phase III Combined Sewer Overflow Program, Pawtucket, RI - IIIA-4 CTD Activity Name	Current Submission 60% CTD	
		Dates	Durations from NTP
ADV	Advertise Date	16-Dec-22	N/A
BDO	Bid Opening	14-Jan-23	N/A
NTP	Issue Contractor NTP	16-Mar-23	N/A
Milestones			
SC IIIA-4	Substantial Completion Contract IIIA-4	11-May-26	1213
CFC	Contractor Field Completion	11-Jul-26	1274

## II. PURPOSE

The schedule and the narrative are developed for the sole use of Narragansett Bay Commission (NBC) and should not be shared with the contractor. The CTD is prepared using Critical Path Method (CPM) scheduling techniques to estimate the duration for the construction portion of the project and is generated to demonstrate that there is at least one reasonable/buildable plan to finish the project within the time frame specified. This CTD considers most critical constructability aspects as part of this planning effort, however, not all constructability aspects have been drafted/commented upon as part of this CTD. This CTD schedule is based on the 60% design and is intended to provide a baseline comparison of what is a reasonable and achievable duration for the construction of the project.

## III. PROJECT DESCRIPTION

Contract IIIA-4, the drop shaft 210/213/213 consolidation conduit includes construction of a cast-in-place gate & screening structure, junction chamber, 12' diameter manhole, approach channel, precast manhole structures and cast-in-place diversion structures. It also includes installation of approximately 400 linear feet of 48" RCP, 194 linear feet of 54" RCP and 162 linear feet of 60" RCP in open trench, and 163 linear feet of 48" RCP pipe jacking at the Roosevelt Avenue consolidation conduit. The Taft Street consolidation conduit includes installation of approximately 720 linear feet of 48" RCP in open trench, and approximately 250 linear feet 48" RCP installed by pipe jacking. It also includes 50 linear feet of utility tunneling of 72" RCP between the gate screening structure and the junction chamber. It also includes installation of 1290 linear feet of water main bypass and approximately 1100 linear feet of new



water main at Main Street, Roosevelt Avenue and Taft Street. There is 475 linear feet of retaining wall to be demolished and rebuilt. Traffic management, paving & curbing are also included in the scope of work.

#### IV. REFERENCES

The 60% CTD was developed using information contained in the following documents:

- 60% Plans - PHASE III COMBINED SEWER OVERFLOW PROGRAM OF-210/213/214 FACILITIES, CONTRACT NO.308.04C, 60% DESIGN, JULY 2021
- 60% Cost Estimate – 07-29-2021 (Developed by City Point Partners as part of this submission)

#### V. METHODOLOGY

Beta Group, Inc. has engaged City Point Partners LLC to develop a 60% contract time determination (CTD) schedule for this project. After reviewing the reference information for the project and the Narragansett Bay Commission requirements, the scope of work was identified and analyzed. The 60% cost estimate was used as the starting point for the schedule to maintain traceability between the two documents. The project scope was further broken down into a work breakdown structure (WBS) of work categories and elements, and further detailed into a discrete set of items of work (activities). The duration of each activity was calculated based on the quantity take offs, estimated hours and productivity, previous historical data, as well as equipment efficiencies and crew compositions. After defining the activities which represent the scope of the project, logical relationships between the activities were created to reflect the sequencing in which the work will be performed. The schedule was then calculated based on the activity durations, and the sequence of the activities. The application of the resources over time was evaluated based on the number of activities worked during the construction of each phase, and restrictions based on assumptions of availability of labor and equipment.

Two standard calendars have been used in the development of the schedule:

1. Cal01-7d/8hr/NoHol(ms) - Those activities which are milestones, administrative or long-range tracking such as submittals, are using a 7-day, 8-hour work calendar with no holidays.
2. Cal02-5d/8hr/10hol - The primary calendar is a 5-day, 8-hour work calendar with 10 federal holidays for all work activities
3. Cal02-5d/8hr/10hol Winter Shutdown - The primary calendar is a 5-day, 8-hour work calendar with 10 federal holidays and winter shutdown period from December 15 to March 15 for weather sensitive concrete and paving activities.

#### VI. CRITICAL PATH

For this CTD, a project's critical path is the longest continuous path of activities through the project. The critical path determines the completion date of the project. A delay of any of the activities on the critical path will delay the completion date of the project.

To provide an understanding of the critical path, a written description is below. The full schedule and critical path reports are attached with the narrative.

The project's critical path begins with the preconstruction activities including the advertising date followed by the Bid Opening, Issue Notice of Award, Notice to Proceed followed by the submittals.

Next on critical path is initial sitework activities followed by the Utility Tunneling from Gate and Screening Structure to Junction Chamber. This is followed by the construction of Gate and Screening Structure- Approach Channel and Junction Chamber construction.

Phase 1 critical path along Taft Street include activities for pipe jacking from MH 217-1 to MH 217-2 followed by pipe jacking from MH 217-2 to MH 217-3, drainage replacement, open trench pipe installation from MH 217-3 to MH 217-4. This is followed by the sidewalk and pavement construction along Taft Street.

Phase 2 critical path along Roosevelt Avenue includes temporary water bypass, open trench pipe installation from Junction Chamber to Diversion Structure 214 followed by pipe jacking from Station 5+50 to MH 213-3, drainage replacement at MH 213-3, open trench from MH 213-3 to MH 213-2, open trench from MH 213-2 to MH 213-1. This is followed by final sidewalk and pavement installation.

Critical path continues to Phase 3 along Main Street which includes pipe jacking from MH 213-1 to Diversion Structure 210 on Main Street followed by the construction of Diversion Structure 210 and open trench pipe installation from DS 210 to MH 210-1. Sidewalk and pavement installation along Roosevelt Avenue and Main Street is next on critical path leading to Substantial Completion of Contract IIIA-4.

The milestone Substantial Completion is next followed by the NBC/RIDOT punchlist inspection, punchlist, project documentation and closeout and contractor demobilization leading to the Contractor Field Completion milestone.

## VII. ASSUMPTIONS

### Schedule Sequencing Assumptions

The project is divided into the following work breakdown structure:

- Milestones and Bid Phase
- Preconstruction for Permits Submittals and Long Lead Items
- Construction of IIIA-4
- Closeout Activities

### Work under IIIA-4:

The work begins with mobilization of the contractor followed by clearing and grubbing, installation temporary traffic controls and safety signing, erosion control, test pits and utility protection.

Work under this contract is subdivided into three phases based on the traffic management plans.

Prior to the start of phase 1, utility tunneling from Gate Screening Structure to Junction Chamber is done followed by the construction of these two structures and approach channel.

Phase 1 – Taft Street:

- Open trench construction from junction chamber to MH 217-1.
- Water Main Replacement along Taft Street.
- Pipe jacking from MH 217-1 to MH 217-2 followed by the installation of MH 217-1.
- Pipe jacking operation from MH 217-2 to MH 217-3 followed by the installation of MH 217-2.
- Drainage Replacement along Taft Street.

- Open trench construction from MH 217-3 to MH 217-4 followed by the installation of precast manhole MH 217-3 and connecting to existing MH 217-4.
- Pavement & sidewalk construction and removal of temporary traffic controls.

Phase 2- Roosevelt Avenue:

- Installation of Road Signage and Barriers followed by temporary water bypass.
- Drainage replacement at Diversion Structure 214.
- Open Trench construction from Junction Chamber to Diversion Structure followed by 214 MH 213-4 followed by the construction of diversion structure 214, and precast Diversion Structure 2 installation.
- Pipe Jacking from Station 5+50 to MH 213-3 followed by installation of Diversion Structure 213.
- Drainage replacement at MH 213-3.
- Open trench construction from MH 213-3 to MH 213-2 followed by the installation of precast manhole MH 213-3.
- Open trench construction from MH 213-2 to MH 213-1 followed by the installation of MH 213-2.
- Concurrent to the installation of consolidation conduit, new water main installation and removal and replacement of retaining wall will occur in phase 2.

Phase 3- Main Street:

- Installation of Road Signage and Barriers.
- Pipe jacking from MH 213-1 as driving pit and Diversion Structure 210 as receiving pit followed by the installation of precast manhole MH 213-1
- Open trench construction from Diversion Structure 210 to MH 210-1 and construction of diversion structure 210 and MH 210-1.
- Concurrent to the installation of consolidation conduit new water main installation will occur in phase 3 followed by pavement & sidewalk construction and removal of temporary traffic controls.

Activity Assumptions

The following assumptions for durations were made pipe jacking activities. The following tasks are consolidated into activities that are included in the schedule.

Driving Pit Activities

Mobilize Drive Shaft Equipment (7 Days)

- 
- Jacking Equipment
- Operation and Power Distribution
- 
- Lubrication Equipment
- Cranes
- Generators

Assemble and Prep Drive Shaft Equipment (12 Days)

- Set Cranes
- Set and Test Generators
-

- Jacking Equipment
- Operation and Power Distribution
- 
- Lubrication Equipment

#### Construct and Setup Drive Shaft Operations

- Concrete Base Slab Poured
- Thrust Wall and Entrance Portal poured and cured
- Install Jacking Rig
- Setup Pipe Jack System
- Test /Pipe jacking System

#### Reception Shaft Activities

##### Mobilize and Prep Reception Shaft Equipment (1 Days)

- Set Cranes

##### Construct and Setup Drive Shaft Operations (Varies by Location)

- Concrete Base Slab Poured and cured
- Form and Pour Exit Portal and Sealing Gaskets
- Install Receiving Rig

### VIII. RISKS

The following are concerns that can have an impact on the anticipated construction schedule:

1. Activities for utilities to be performed by other utility companies with their force account personnel are not included in the 60% CTD schedule. If there is utility work identified in the future, there will be substantial increase in the overall project duration.
2. The preparation and review and approval of submittals are critical to the beginning of the project. Any delay to submittals will delay the start of construction. There are multiple agencies involved in the project, including NBC and RIDOT coordination which will need to be closely coordinated.

### IX. RESOURCES

Activities in the schedule that require specialty equipment required for construction will need to be planned for and scheduled in advance to avoid any impact to the schedule, especially microtunneling and headhouse and other structure equipment and associated electrical work. The activities on the critical path require diligence in all aspects of the construction sequencing to ensure timely delivery. The availability of equipment and labor resources and materials for microtunneling and pipe jacking must be monitored carefully prior to the installation of consolidation conduit.

### X. COST

The schedule is not cost, or resource loaded. The current available cost and quantity estimates were

utilized to derive the activity and schedule duration. Refer to the current cost estimate for quantities and project value.

## XI. LIMITATIONS OF OPERATIONS

### HOLIDAY WORK RESTRICTIONS FOR CALENDAR YEAR 2021

The schedule has incorporated the federal holiday restrictions as outlined below into the calendars for the CTD schedule as per the special provisions of the work as described below. Only those restrictions that apply to this project have been included in the calendar restrictions. Below are the holiday work restrictions for the Calendar Year 2021. Assuming for CTD schedule that subsequent years are applied in the same fashion.

New Year's Day (Federal Holiday)  
Friday, January 1, 2021

Martin Luther King's Birthday (Federal Holiday)  
Monday, January 18, 2021

President's Day (Federal Holiday)  
Monday, February 15, 2021

Memorial Day (Federal Holiday)  
Monday, May 31, 2021

Independence Day (Federal Holiday)  
Sunday, July 4, 2021

Labor Day (Federal Holiday)  
Monday, September 6, 2021

Columbus Day (Federal Holiday)  
Monday, October 11, 2021

Veterans' Day (Federal Holiday)  
Thursday, November 11, 2021

Thanksgiving Day (Federal Holiday)  
Thursday, November 25, 2021

Christmas Day (Federal Holiday)  
Friday, December 25, 2021

## XII. TRAFFIC CONTROL

In Contract IIIA-4, traffic detour signage for road closures should be setup for each phase. It is assumed Taft Street and Roosevelt Avenue cannot be closed simultaneously.

## XIII. ATTACHMENTS

- a. Full Detailed Schedule Report
- b. Critical Path Report
- c. Electronic File – NBCPhaseIIISewer IIIA-4 60%CTD.XER

Prepared by,

Apoorva Paruchuri  
Lead Project Controls Specialist

Jim Stetson  
VP Project Controls  
City Point Partners LLC



Activity ID	Activity Name	Calendar	OD	Total Float	Start	Finish	Predecessors	Successors	2023	2024	2025	2026	2027
<b>RI NBC Abatement IIIA-4 60% CTD</b>			652	0	16-Dec-22	11-Jul-26							
<b>Milestones</b>			Cal01-7d/8Hr/No Hol (ms)	1304	0	16-Dec-22	11-Jul-26						
ADV	Advertise Date	Cal01-7d/8Hr/No Hol (ms)	0	1	16-Dec-22			BDO	◆				
BDO	Bid Opening	Cal01-7d/8Hr/No Hol (ms)	0	1		14-Jan-23	ADV	NTP	◆				
NTP	Issue Contractor NTP	Cal01-7d/8Hr/No Hol (ms)	0	1	16-Mar-23		BDO	P1830, P1600	◆				
<b>Milestones</b>			Cal01-7d/8Hr/No Hol (ms)	61	0	11-May-26	11-Jul-26						
SC IIIA-4	Substantial Completion Contract IIIA-4	Cal01-7d/8Hr/No Hol (ms)	0	0		11-May-26	A4010, A6790	C330, C380, C350				◆	
CFC	Contractor Field Completion	Cal01-7d/8Hr/No Hol (ms)	0	0		11-Jul-26	C360, C330, C380, C350					◆	
<b>Preconstruction</b>			Cal01-7d/8Hr/No Hol (ms)	165	420	16-Mar-23	27-Aug-23						
<b>Permits</b>			Cal01-7d/8Hr/No Hol (ms)	30	16	16-Mar-23	14-Apr-23						
P1600	Obtain Required Permits	Cal01-7d/8Hr/No Hol (ms)	30	16	16-Mar-23	14-Apr-23	NTP	C390	■				
<b>Submittals</b>			Cal01-7d/8Hr/No Hol (ms)	45	1	16-Mar-23	29-Apr-23						
P1830	Submittals - Prepare & Submit	Cal01-7d/8Hr/No Hol (ms)	30	1	16-Mar-23	14-Apr-23	NTP	P1840	■				
P1840	Submittals - Review & Approve	Cal01-7d/8Hr/No Hol (ms)	15	1	15-Apr-23	29-Apr-23	P1830	P1850, P1860, C390	■				
<b>Long Lead Items</b>			Cal01-7d/8Hr/No Hol (ms)	120	420	30-Apr-23	27-Aug-23						
P1850	Fabrication and Delivery of Precast Structures	Cal01-7d/8Hr/No Hol (ms)	120	168	30-Apr-23	27-Aug-23	P1840	A4680, A6630	■				
P1860	Fabricate and Deliver Pipes	Cal01-7d/8Hr/No Hol (ms)	75	465	30-Apr-23	13-Jul-23	P1840	A4530	■				
<b>Construction Contract IIIA-4</b>				577	0	01-May-23	11-May-26						
<b>Mobilization</b>			Cal02-5d/8Hr/10hol winter shtdwn	10	0	01-May-23	12-May-23						
C390	Contractor Mobilization	Cal02-5d/8Hr/10Hol	10	0	01-May-23	12-May-23	P1840, P1600	A6230, A6260, A6250, A6270	■				
<b>Initial Sitework</b>			Cal02-5d/8Hr/10hol winter shtdwn	20	0	15-May-23	13-Jun-23						
<b>Construction Road Signing &amp; Barriers</b>			Cal02-5d/8Hr/10hol winter shtdwn	3	0	15-May-23	17-May-23						
A6260	Install Safety Signing and Temporary Traffic Controls for Phase 1	Cal02-5d/8Hr/10Hol	3	0	15-May-23	17-May-23	C390	A6250	■				
<b>Clearing &amp; Grubbing</b>			Cal02-5d/8Hr/10hol winter shtdwn	2	0	18-May-23	19-May-23						
A6250	Clearing and Grubbing	Cal02-5d/8Hr/10Hol	2	0	18-May-23	19-May-23	C390, A6260	A6230, A6240, A3520	■				
<b>Erosion Control</b>			Cal02-5d/8Hr/10hol winter shtdwn	3	0	22-May-23	24-May-23						
A6230	Install Erosion Control	Cal02-5d/8Hr/10Hol	2	0	22-May-23	23-May-23	C390, A6250	A6240	■				
A6240	Install Silt Sacks	Cal02-5d/8Hr/10Hol	1	0	24-May-23	24-May-23	A6250, A6230	A6270	■				
<b>Testing and Test Pits</b>			Cal02-5d/8Hr/10hol winter shtdwn	7	0	25-May-23	06-Jun-23						
A6270	Test Pit for Exploration	Cal02-5d/8Hr/10Hol	7	0	25-May-23	06-Jun-23	C390, A6240	A6280	■				
<b>Utilities</b>			Cal02-5d/8Hr/10hol winter shtdwn	5	0	06-Jun-23	13-Jun-23						
A6280	Install Utility Protection	Cal02-5d/8Hr/10Hol	5	0	06-Jun-23	13-Jun-23	A6270	A6800, A6370, A2630, A2550	■				
<b>Utility Tunneling from Gate Screen Str. to Junction Chamber</b>				128	190	13-Jun-23	26-Dec-23						
<b>Gate and Screening Structure - Approach Channel Construction</b>				128	5	13-Jun-23	15-Dec-23						

■ Actual Work  
■ Remaining Work  
■ Critical Remaining Work  
◆ Milestone

User = aparuchuri, Filter = TASK filter: All Activities  
 Data Date = 16-Dec-22, Run Date = 29-Jul-21, 10:48  
 Project Start = 16-Dec-22 Project Finish = 11-Jul-26

Date	Revision	Checked	Approved

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Activity ID	Activity Name	Calendar	OD	Total Float	Start	Finish	Predecessors	Successors	2023					2024					2025					2026					027						
A6800	Install Secan Piles for Approach Slab, GSS and Junction Chamber	Cal02-5d/8Hr/10hol winter shtdwn	30	0	13-Jun-23	26-Jul-23	A6280	A6810	■ Install Secan Piles for Approach Slab, GSS and Junction Chamber																										
A6810	Excavate for Approach Slab, and GSS and 12' Manhole	Cal02-5d/8Hr/10Hol	10	0	26-Jul-23	09-Aug-23	A6800	A6550,A2630	■ Excavate for Approach Slab, and GSS and 12' Manhole																										
A6550	Install Gravel Bedding	Cal02-5d/8Hr/10Hol	2	0	09-Aug-23	11-Aug-23	A6810	A6560	■ Install Gravel Bedding																										
A6560	Form and Pour Base Slab	Cal02-5d/8Hr/10hol winter shtdwn	15	0	11-Aug-23	01-Sep-23	A6550	A6570	■ Form and Pour Base Slab																										
A6570	Cure Time for Base Slab	Cal01-7d/8Hr/No Hol (ms)	7	0	25-Aug-23	01-Sep-23	A6560	A6580,A2550	■ Cure Time for Base Slab																										
A6580	Form and Pour Walls	Cal02-5d/8Hr/10hol winter shtdwn	20	5	01-Sep-23	02-Oct-23	A6570	A6590,A4280, A6820	■ Form and Pour Walls																										
A6590	Cure Time for Walls	Cal01-7d/8Hr/No Hol (ms)	7	8	25-Sep-23	02-Oct-23	A6580	A6600	■ Cure Time for Walls																										
A6600	Form and Pour Top Slab	Cal02-5d/8Hr/10hol winter shtdwn	12	5	02-Oct-23	19-Oct-23	A6590	A6610	■ Form and Pour Top Slab																										
A6610	Cure Time for Top Slab	Cal01-7d/8Hr/No Hol (ms)	7	7	12-Oct-23	19-Oct-23	A6600	A6620	■ Cure Time for Top Slab																										
A6820	Install 12' Manhole at GSS	Cal02-5d/8Hr/10Hol	5	0	18-Oct-23	25-Oct-23	A6580,A2700	A6620	■ Install 12' Manhole at GSS																										
A6620	Backfill Structure	Cal02-5d/8Hr/10Hol	4	0	25-Oct-23	31-Oct-23	A6610,A6820	A6630,A4280	■ Backfill Structure																										
A6630	Install Precast Head House	Cal02-5d/8Hr/10Hol	6	68	31-Oct-23	08-Nov-23	A6620,P1850	A6640	■ Install Precast Head House																										
A6640	Install Electric and Mechanical Systems	Cal02-5d/8Hr/10Hol	30	68	31-Oct-23	15-Dec-23	A6630	A3400,A6750	■ Install Electric and Mechanical Systems																										
<b>Utility Tunnel Driving Pit @ Gate Screen Str.</b>			<b>77</b>	<b>0</b>	<b>13-Jun-23</b>	<b>02-Oct-23</b>																													
A6370	Mobilize Pipe Jacking Equipment	Cal02-5d/8Hr/10Hol	7	47	13-Jun-23	22-Jun-23	A6280	A6380	■ Mobilize Pipe Jacking Equipment																										
A6380	Assemble and Prep Pipe Jacking Equipment	Cal02-5d/8Hr/10Hol	12	47	22-Jun-23	12-Jul-23	A6370	A2590	■ Assemble and Prep Pipe Jacking Equipment																										
A2550	Form and Pour Entrance Portal and Thrust Wall	Cal02-5d/8Hr/10hol winter shtdwn	3	0	01-Sep-23	07-Sep-23	A6280,A6570	A2560,A2640	■ Form and Pour Entrance Portal and Thrust Wall																										
A2560	Cure Time for Entrance Ceiling	Cal01-7d/8Hr/No Hol (ms)	7	0	07-Sep-23	14-Sep-23	A2550	A2570	■ Cure Time for Entrance Ceiling																										
A2570	Install Pipe Jacking Rig	Cal02-5d/8Hr/10Hol	1	0	14-Sep-23	15-Sep-23	A2560	A2580	■ Install Pipe Jacking Rig																										
A2580	Install Pipe Jacking Machine	Cal02-5d/8Hr/10Hol	1	0	15-Sep-23	18-Sep-23	A2570	A2590	■ Install Pipe Jacking Machine																										
A2590	Setup Pipe Jacking System	Cal02-5d/8Hr/10Hol	7	0	18-Sep-23	27-Sep-23	A2580,A6380	A2600	■ Setup Pipe Jacking System																										
A2600	Test Pipe Jacking System	Cal02-5d/8Hr/10Hol	3	0	27-Sep-23	02-Oct-23	A2590	A2610	■ Test Pipe Jacking System																										
<b>Utility Tunnel Receiving Pit @ Junction Chamber</b>			<b>36</b>	<b>1</b>	<b>09-Aug-23</b>	<b>29-Sep-23</b>																													
A2630	Excavate for Pipe Jacking Pit and Install Lagging	Cal02-5d/8Hr/10Hol	5	16	09-Aug-23	16-Aug-23	A6280,A6810	A2640,A6390	■ Excavate for Pipe Jacking Pit and Install Lagging																										
A6390	Mobilize Cranes	Cal02-5d/8Hr/10Hol	2	29	16-Aug-23	18-Aug-23	A2630	A2680	■ Mobilize Cranes																										
A2640	Form and Pour Base Slab	Cal02-5d/8Hr/10hol winter shtdwn	3	1	07-Sep-23	12-Sep-23	A2630,A2550	A2650	■ Form and Pour Base Slab																										
A2650	Cure Time for Base Slab	Cal01-7d/8Hr/No Hol (ms)	7	1	12-Sep-23	19-Sep-23	A2640	A2660	■ Cure Time for Base Slab																										
A2660	Form and Pour Entrance Ceiling for Pipe Jacking Equipment	Cal02-5d/8Hr/10hol winter shtdwn	2	1	19-Sep-23	21-Sep-23	A2650	A2670	■ Form and Pour Entrance Ceiling for Pipe Jacking Equipment																										
A2670	Cure Time for Entrance Ceiling	Cal01-7d/8Hr/No Hol (ms)	7	1	21-Sep-23	28-Sep-23	A2660	A2680	■ Cure Time for Entrance Ceiling																										
A2680	Install Receiving Rig	Cal02-5d/8Hr/10Hol	1	1	28-Sep-23	29-Sep-23	A2670,A6390	A2610	■ Install Receiving Rig																										
<b>Utility Tunneling</b>			<b>11</b>	<b>364</b>	<b>02-Oct-23</b>	<b>18-Oct-23</b>																													
A2610	Jack Utility Liner Plates from MH GSS to Junction Chamber	Cal02-5d/8Hr/10Hol	2	0	02-Oct-23	04-Oct-23	A2680,A2600	A6400,A2690	■ Jack Utility Liner Plates from MH GSS to Junction Chamber																										
A6400	Demobilize Pipe Jacking Equipment	Cal02-5d/8Hr/10Hol	2	371	04-Oct-23	06-Oct-23	A2610	A6410	■ Demobilize Pipe Jacking Equipment																										
A2690	Install 72" Dia Pipe inside Utility Tunnel	Cal02-5d/8Hr/10Hol	2	0	04-Oct-23	06-Oct-23	A2610	A2700	■ Install 72" Dia Pipe inside Utility Tunnel																										
A2700	Cementous Grouting between Pipe and Lining	Cal02-5d/8Hr/10Hol	7	0	06-Oct-23	18-Oct-23	A2690	A6820	■ Cementous Grouting between Pipe and Lining																										

<ul style="list-style-type: none"> <li><span style="color: blue;">■</span> Actual Work</li> <li><span style="color: green;">■</span> Remaining Work</li> <li><span style="color: red;">■</span> Critical Remaining Work</li> <li>◆ Milestone</li> </ul>	User = aparuchuri, Filter = TASK filter: All Activities Data Date = 16-Dec-22, Run Date = 29-Jul-21, 10:48 Project Start = 16-Dec-22 Project Finish = 11-Jul-26	Date	Revision	Checked	Approved	Prepared by CPP  Page 2 of 12





Activity ID	Activity Name	Calendar	OD	Total Float	Start	Finish	Predecessors	Successors	2023	2024	2025	2026	2027
<b>Junction Chamber Construction</b>			30	0	31-Oct-23	26-Dec-23							
A4280	Install Gravel Bedding	Cal02-5d/8Hr/10Hol	2	0	31-Oct-23	02-Nov-23	A6580,A6620	A3480		█			
A3480	Form and Pour Base Slab	Cal02-5d/8Hr/10hol winter shtdwn	5	0	02-Nov-23	09-Nov-23	A4280	A3490		█			
A3490	Cure Time for Base Slab	Cal01-7d/8Hr/No Hol (ms)	7	3	09-Nov-23	16-Nov-23	A3480	A3500		█			
A3500	Form and Pour Manhole Walls	Cal02-5d/8Hr/10hol winter shtdwn	10	1	16-Nov-23	01-Dec-23	A3490	A3510		█			
A3510	Cure Time for Manhole Walls	Cal01-7d/8Hr/No Hol (ms)	7	3	01-Dec-23	08-Dec-23	A3500	A3530		█			
A3530	Form and Pour Top Slab	Cal02-5d/8Hr/10hol winter shtdwn	3	1	08-Dec-23	13-Dec-23	A3510	A3550		█			
A3550	Cure Time for Top Slab	Cal01-7d/8Hr/No Hol (ms)	7	71	13-Dec-23	20-Dec-23	A3530	A4290		█			
A4290	Backfill Structure	Cal02-5d/8Hr/10Hol	2	49	20-Dec-23	26-Dec-23	A3550	A3400,A3740		█			
<b>Phase 1 - Taft Street</b>			149	37	26-Dec-23	17-Oct-24							
<b>Open Trench from Junction Chamber to MH217-1</b>			26	63	26-Dec-23	01-Feb-24							
<b>Pipe Installation</b>			26	63	26-Dec-23	01-Feb-24							
A3400	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	6	63	26-Dec-23	04-Jan-24	A4290,A6640	A3410		█			
A3410	Excavate Trench and Install Lagging	Cal02-5d/8Hr/10Hol	10	63	04-Jan-24	18-Jan-24	A3400	A3420		█			
A3420	Install Bedding Material	Cal02-5d/8Hr/10Hol	2	63	18-Jan-24	22-Jan-24	A3410	A3430		█			
A3430	Install Pipe	Cal02-5d/8Hr/10Hol	5	63	22-Jan-24	29-Jan-24	A3420	A3440		█			
A3440	Backfill Trench	Cal02-5d/8Hr/10Hol	3	63	29-Jan-24	01-Feb-24	A3430	A2770		█			
<b>Taft St. Water Main Replacement</b>			40	49	26-Dec-23	21-Feb-24							
A3740	Excavate Trench - Taft St.	Cal02-5d/8Hr/10Hol	6	49	26-Dec-23	04-Jan-24	A4290	A3750		█			
A3750	Remove & Dispose Existing 12" Water Main	Cal02-5d/8Hr/10Hol	7	49	04-Jan-24	15-Jan-24	A3740	A3760		█			
A3760	Install New 12" Water Main	Cal02-5d/8Hr/10Hol	8	49	15-Jan-24	25-Jan-24	A3750	A3780		█			
A3780	Install Hydrant Assembly	Cal02-5d/8Hr/10Hol	9	49	25-Jan-24	07-Feb-24	A3760	A3790		█			
A3790	Backfill Trench - Taft St.	Cal02-5d/8Hr/10Hol	4	49	07-Feb-24	13-Feb-24	A3780	A3820		█			
A3820	Remove & Dispose Existing Abandoned Gas Main	Cal02-5d/8Hr/10Hol	6	49	13-Feb-24	21-Feb-24	A3790	A2770		█			
<b>Pipe Jacking MH217-1 to MH217-2</b>			36	63	21-Feb-24	07-May-24							
<b>Pipe Jack Driving Pit @ MH217-2</b>			29	37	21-Feb-24	26-Apr-24							
A2770	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	3	49	21-Feb-24	26-Feb-24	A3440,A3820	A2780,A3080		█			
A2780	Excavate for Pipe Jacking Pit and Install Lagging	Cal02-5d/8Hr/10Hol	4	49	26-Feb-24	01-Mar-24	A2770	A2790,A6300,A3080		█			
A6300	Mobilize Pipe Jacking Equipment	Cal02-5d/8Hr/10Hol	7	50	01-Mar-24	12-Mar-24	A2780	A6310		█			
A6310	Assemble and Prep Pipe Jacking Equipment	Cal02-5d/8Hr/10Hol	12	50	12-Mar-24	28-Mar-24	A6300	A2850		█			
A2790	Form and Pour Base Slab	Cal02-5d/8Hr/10hol winter shtdwn	3	37	18-Mar-24	20-Mar-24	A2780	A2800		█			
A2800	Cure Time for Base Slab	Cal01-7d/8Hr/No Hol (ms)	7	54	21-Mar-24	27-Mar-24	A2790	A2810		█			
A2810	Form and Pour Entrance Portal and Thrust Wall	Cal02-5d/8Hr/10hol winter shtdwn	4	37	28-Mar-24	02-Apr-24	A2800	A2820		█			
A2820	Cure Time for Entrance Portal	Cal01-7d/8Hr/No Hol (ms)	7	55	03-Apr-24	09-Apr-24	A2810	A2830		█			
A2830	Install Pipe Jacking Rig	Cal02-5d/8Hr/10hol winter shtdwn	1	37	10-Apr-24	10-Apr-24	A2820	A2840		█			

█ Actual Work  
█ Remaining Work  
█ Critical Remaining Work  
◆ Milestone

User = aparuchuri, Filter = TASK filter: All Activities  
 Data Date = 16-Dec-22, Run Date = 29-Jul-21, 10:48  
 Project Start = 16-Dec-22 Project Finish = 11-Jul-26


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Activity ID	Activity Name	Calendar	OD	Total Float	Start	Finish	Predecessors	Successors	2023	2024	2025	2026	2027
A2840	Install Pipe Jacking Machine	Cal02-5d/8Hr/10hol wintershtdwn	1	37	11-Apr-24	11-Apr-24	A2830	A2850					
A2850	Setup Pipe Jacking System	Cal02-5d/8Hr/10hol wintershtdwn	7	37	12-Apr-24	23-Apr-24	A2840,A6310	A2860					
A2860	Test Pipe Jacking System	Cal02-5d/8Hr/10hol wintershtdwn	3	37	24-Apr-24	26-Apr-24	A2850	A3180					
<b>Pipe Jack Receiving Pit @ MH 217-1</b>			35	37	01-Mar-24	06-May-24							
A3080	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	3	56	01-Mar-24	06-Mar-24	A2770,A2780	A3090					
A3090	Excavate for Pipe Jacking Pit and Install Lagging	Cal02-5d/8Hr/10Hol	4	56	06-Mar-24	12-Mar-24	A3080	A3100,A6360, A2880					
A6360	Mobilize Cranes	Cal02-5d/8Hr/10Hol	1	70	12-Mar-24	13-Mar-24	A3090	A3140					
A3100	Form and Pour Base Slab	Cal02-5d/8Hr/10hol wintershtdwn	3	50	18-Mar-24	20-Mar-24	A3090	A3110					
A3110	Cure Time for Base Slab	Cal01-7d/8Hr/No Hol (ms)	7	74	21-Mar-24	27-Mar-24	A3100	A3120					
A3120	Form and Pour Exit Portal	Cal02-5d/8Hr/10hol wintershtdwn	2	50	28-Mar-24	29-Mar-24	A3110	A3130,A6340					
A3130	Cure Time for Exit Portal	Cal01-7d/8Hr/No Hol (ms)	7	74	30-Mar-24	05-Apr-24	A3120	A3140					
A3140	Install Receiving Rig	Cal02-5d/8Hr/10Hol	1	52	08-Apr-24	08-Apr-24	A3130,A6360	A3180					
A3150	Demobilize Pipe Jacking Equipment	Cal02-5d/8Hr/10Hol	5	38	30-Apr-24	06-May-24	A3180	A3040,A6340, A6320					
<b>Pipe Jacking</b>			1	38	29-Apr-24	29-Apr-24							
A3180	Jack Pipe from MH217-2 to MH217-1	Cal02-5d/8Hr/10Hol	1	38	29-Apr-24	29-Apr-24	A3140,A2860	A4730,A3150, A4680					
<b>MH 217-1 Construction</b>			6	65	30-Apr-24	07-May-24							
A4680	Install Precast Manhole	Cal02-5d/8Hr/10Hol	3	65	30-Apr-24	02-May-24	P1850,A3180	A4690					
A4690	Backfill Manhole and Remove SOE	Cal02-5d/8Hr/10Hol	2	65	03-May-24	06-May-24	A4680	A4700					
A4700	Install Frame and Cover	Cal02-5d/8Hr/10Hol	1	65	07-May-24	07-May-24	A4690	A4730					
<b>Pipe Jacking MH 217-2 to MH 217-3</b>			66	102	12-Mar-24	19-Jun-24							
<b>Pipe Jack Driving Pit @ MH 217-2</b>			20	38	07-May-24	04-Jun-24							
A6340	Form and Pour Entrance Portal and Thrust Wall	Cal02-5d/8Hr/10hol wintershtdwn	4	37	07-May-24	10-May-24	A3120,A3150	A6350					
A6350	Cure Time for Entrance Portal	Cal01-7d/8Hr/No Hol (ms)	7	55	11-May-24	17-May-24	A6340	A3040					
A3040	Install Pipe Jacking Rig	Cal02-5d/8Hr/10Hol	1	39	20-May-24	20-May-24	A6350,A3150	A3050,A2940					
A3050	Install Pipe Jacking Machine	Cal02-5d/8Hr/10Hol	1	39	21-May-24	21-May-24	A3040	A3060					
A3060	Setup Pipe Jacking System	Cal02-5d/8Hr/10Hol	7	39	22-May-24	30-May-24	A3050	A3070					
A3070	Test Pipe Jacking System	Cal02-5d/8Hr/10Hol	3	39	31-May-24	04-Jun-24	A3060	A2870					
<b>Pipe Jack Receiving Pit @ MH 217 - 3</b>			63	105	12-Mar-24	14-Jun-24							
A2880	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	3	77	12-Mar-24	15-Mar-24	A3090	A2890					
A2890	Excavate for Pipe Jacking Pit and Install Lagging	Cal02-5d/8Hr/10Hol	4	77	15-Mar-24	21-Mar-24	A2880	A2900,A6320, A4500					
A2900	Form and Pour Base Slab	Cal02-5d/8Hr/10hol wintershtdwn	3	74	21-Mar-24	26-Mar-24	A2890	A2910					
A2910	Cure Time for Base Slab	Cal01-7d/8Hr/No Hol (ms)	7	107	26-Mar-24	02-Apr-24	A2900	A2920					
A2920	Form and Pour Exit Portal for Pipe Jacking Equipment	Cal02-5d/8Hr/10hol wintershtdwn	2	74	02-Apr-24	04-Apr-24	A2910	A2930					
A2930	Cure Time for Exitportal	Cal01-7d/8Hr/No Hol (ms)	7	109	04-Apr-24	11-Apr-24	A2920	A2940					
A6320	Mobilize Cranes	Cal02-5d/8Hr/10Hol	2	57	07-May-24	08-May-24	A2890,A3150	A2940					

<ul style="list-style-type: none"> <li><span style="color: blue;">█</span> Actual Work</li> <li><span style="color: green;">█</span> Remaining Work</li> <li><span style="color: red;">█</span> Critical Remaining Work</li> <li>◆ Milestone</li> </ul>	<p>User = aparuchuri, Filter = TASK filter: All Activities            Data Date = 16-Dec-22, Run Date = 29-Jul-21, 10:48            Project Start = 16-Dec-22 Project Finish = 11-Jul-26</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Date</th> <th>Revision</th> <th>Checked</th> <th>Approved</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	Date	Revision	Checked	Approved													<p>Prepared by CPP</p> <div style="text-align: right;">  <p>Page 4 of 12</p> </div>
Date	Revision	Checked	Approved																



Activity ID	Activity Name	Calendar	OD	Total Float	Start	Finish	Predecessors	Successors	2023	2024	2025	2026	2027
A2940	Install Receiving Rig	Cal02-5d/8Hr/10Hol	1	49	21-May-24	21-May-24	A2930,A6320,A3040	A2870					
A6330	Demobilize Pipe Jacking Equipment	Cal02-5d/8Hr/10Hol	2	109	13-Jun-24	14-Jun-24	A2870	A6490					
<b>Pipe Jacking</b>		Cal02-5d/8Hr/10hol wintershtdwn	6	39	05-Jun-24	12-Jun-24							
A2870	Jack Pipe from MH217-2 to MH217-3	Cal02-5d/8Hr/10Hol	6	39	05-Jun-24	12-Jun-24	A2940,A3070	A4580,A6330,A4730					
<b>MH 217-2 Construction</b>		Cal02-5d/8Hr/10hol wintershtdwn	5	99	13-Jun-24	19-Jun-24							
A4730	Install Precast Manhole	Cal02-5d/8Hr/10Hol	2	39	13-Jun-24	14-Jun-24	A3180,A4700,A2870	A4740					
A4740	Backfill Manhole and Remove SOE	Cal02-5d/8Hr/10Hol	2	39	17-Jun-24	18-Jun-24	A4730	A4750,A6830					
A4750	Install Frame and Cover	Cal02-5d/8Hr/10Hol	1	99	19-Jun-24	19-Jun-24	A4740	A4580					
<b>Drainage Replacement at Taft Street</b>		Cal02-5d/8Hr/10hol wintershtdwn	30	39	19-Jun-24	30-Jul-24							
A6830	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	3	39	19-Jun-24	21-Jun-24	A4740	A6840					
A6840	Excavate Trench and Install Lagging	Cal02-5d/8Hr/10Hol	5	39	24-Jun-24	28-Jun-24	A6830	A6850					
A6850	Install Bedding Material	Cal02-5d/8Hr/10Hol	3	39	01-Jul-24	03-Jul-24	A6840	A6860					
A6860	Install 12" RCP	Cal02-5d/8Hr/10Hol	4	39	04-Jul-24	09-Jul-24	A6850	A6870,A6880					
A6880	Install MH800, MH786, MH784, MH785	Cal02-5d/8Hr/10Hol	12	39	10-Jul-24	25-Jul-24	A6860	A6870					
A6870	Backfill Trench	Cal02-5d/8Hr/10Hol	3	39	26-Jul-24	30-Jul-24	A6860,A6880	A4500					
<b>Open Trench from MH 217-3 to MH 217-4</b>			38	39	31-Jul-24	20-Sep-24							
<b>Pipe Installation</b>			31	39	31-Jul-24	11-Sep-24							
A4500	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	5	39	31-Jul-24	06-Aug-24	A2890,A6870	A4510					
A4510	Excavate Trench and Install Lagging	Cal02-5d/8Hr/10Hol	10	39	07-Aug-24	20-Aug-24	A4500	A4520					
A4520	Install Bedding Material	Cal02-5d/8Hr/10Hol	4	39	21-Aug-24	26-Aug-24	A4510	A4530					
A4530	Install Pipe	Cal02-5d/8Hr/10Hol	7	39	27-Aug-24	04-Sep-24	A4520,P1860	A4540					
A4540	Backfill Trench	Cal02-5d/8Hr/10Hol	5	39	05-Sep-24	11-Sep-24	A4530	A4610,A4580					
<b>MH 217-3 Construction</b>		Cal02-5d/8Hr/10Hol	5	39	12-Sep-24	18-Sep-24							
A4580	Install Precast Manhole	Cal02-5d/8Hr/10Hol	2	39	12-Sep-24	13-Sep-24	A2870,A4750,A4540	A4590					
A4590	Backfill Manhole and Remove SOE	Cal02-5d/8Hr/10Hol	2	39	16-Sep-24	17-Sep-24	A4580	A4600					
A4600	Install Frame and Cover	Cal02-5d/8Hr/10Hol	1	39	18-Sep-24	18-Sep-24	A4590	A4610					
<b>Connect to Existing MH 217-4</b>		Cal02-5d/8Hr/10Hol	2	39	19-Sep-24	20-Sep-24							
A4610	Connect Pipe to Existing MH 217-4	Cal02-5d/8Hr/10Hol	2	39	19-Sep-24	20-Sep-24	A4540,A4600	A6490					
<b>Pavement and Sidewalk</b>		Cal02-5d/8Hr/10hol wintershtdwn	18	37	23-Sep-24	17-Oct-24							
A6490	Install Sidewalk - Taft Street	Cal02-5d/8Hr/10hol wintershtdwn	10	37	23-Sep-24	04-Oct-24	A6330,A4610	A6500					
A6500	Install Pavement and Pavement Markings - Taft Street	Cal02-5d/8Hr/10hol wintershtdwn	6	37	07-Oct-24	15-Oct-24	A6490	A6520					
A6520	Remove Temporary Traffic Controls	Cal02-5d/8Hr/10Hol	2	39	16-Oct-24	17-Oct-24	A6500	A6510					
<b>Phase 2 - Roosevelt Avenue</b>			179	41	18-Oct-24	01-Oct-25							
<b>Construction Road Signing &amp; Barriers</b>		Cal02-5d/8Hr/10hol wintershtdwn	1	39	18-Oct-24	18-Oct-24							
A6510	Install Safety Signing and Temporary Traffic Controls for Phase 2	Cal02-5d/8Hr/10Hol	1	39	18-Oct-24	18-Oct-24	A6520	A3660,A3520,A2720,A6890					

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Activity ID	Activity Name	Calendar	OD	Total Float	Start	Finish	Predecessors	Successors	2023	2024	2025	2026	2027
<b>Temporary Water Bypass</b>		Cal02-5d/8Hr/10hol winter shtdwn	28	39	21-Oct-24	27-Nov-24							
A3520	Excavate Trench	Cal02-5d/8Hr/10Hol	4	39	21-Oct-24	24-Oct-24	A6250,A6510	A3540					
A3540	Install 6" HDPE Temporary Bypass Pipe	Cal02-5d/8Hr/10Hol	6	39	25-Oct-24	01-Nov-24	A3520	A3580					
A3580	Install 2" Service Pipe	Cal02-5d/8Hr/10Hol	1	39	04-Nov-24	04-Nov-24	A3540	A3590					
A3590	Install 6" Fire Service	Cal02-5d/8Hr/10Hol	1	39	05-Nov-24	05-Nov-24	A3580	A3600					
A3600	Install 4" Service Pipe	Cal02-5d/8Hr/10Hol	1	39	06-Nov-24	06-Nov-24	A3590	A3610					
A3610	Install UNK Size Service Pipe	Cal02-5d/8Hr/10Hol	1	39	07-Nov-24	07-Nov-24	A3600	A3620					
A3620	Install Feed Hydrants	Cal02-5d/8Hr/10Hol	3	39	08-Nov-24	12-Nov-24	A3610	A3630					
A3630	Install Temporary Hydrants	Cal02-5d/8Hr/10Hol	6	39	13-Nov-24	20-Nov-24	A3620	A3640					
A3640	Backfill Trench	Cal02-5d/8Hr/10Hol	3	39	21-Nov-24	25-Nov-24	A3630	A3650					
A3650	Test Existing Water Main Valves and Hydrants	Cal02-5d/8Hr/10Hol	2	39	26-Nov-24	27-Nov-24	A3640	A3660,A2720					
<b>Drainage Replacement at DS 214</b>		Cal02-5d/8Hr/10hol winter shtdwn	27	40	21-Oct-24	26-Nov-24							
A6890	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	2	40	21-Oct-24	22-Oct-24	A6510	A6900					
A6900	Excavate Trench and Install Lagging	Cal02-5d/8Hr/10Hol	4	40	23-Oct-24	28-Oct-24	A6890	A6910					
A6910	Install Bedding Material	Cal02-5d/8Hr/10Hol	3	40	29-Oct-24	31-Oct-24	A6900	A6920					
A6920	Install 15" RCP	Cal02-5d/8Hr/10Hol	4	40	01-Nov-24	06-Nov-24	A6910	A6930,A6940					
A6940	Install MH800, MH786, MH784, MH785	Cal02-5d/8Hr/10Hol	12	40	07-Nov-24	22-Nov-24	A6920	A6930					
A6930	Backfill Trench	Cal02-5d/8Hr/10Hol	2	40	25-Nov-24	26-Nov-24	A6920,A6940	A2720					
<b>Open Trench from Junction Chamber to Diversion Structure 214</b>			32	13	28-Nov-24	14-Apr-25							
<b>Pipe Installation</b>		Cal02-5d/8Hr/10Hol	26	39	28-Nov-24	02-Jan-25							
A2720	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	5	39	28-Nov-24	04-Dec-24	A6510,A6930,A3650	A2730,A4300					
A2730	Excavate Trench and Install Lagging	Cal02-5d/8Hr/10Hol	10	39	05-Dec-24	18-Dec-24	A2720	A2740,A2090					
A2740	Install Bedding Material	Cal02-5d/8Hr/10Hol	4	39	19-Dec-24	24-Dec-24	A2730	A2750					
A2750	Install 60" RCP	Cal02-5d/8Hr/10Hol	7	39	25-Dec-24	02-Jan-25	A2740	A2760					
A2760	Backfill Trench	Cal02-5d/8Hr/10Hol	7	39	25-Dec-24	02-Jan-25	A2750	A4400,A3470,A4320,A7010					
<b>Pipe Installation to Outfall</b>			13	15	03-Jan-25	02-Apr-25							
A7010	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	2	39	03-Jan-25	06-Jan-25	A2760	A7020					
A7020	Excavate Trench and Install Lagging	Cal02-5d/8Hr/10Hol	5	39	07-Jan-25	13-Jan-25	A7010	A7030,A7300,A2090					
A7300	Demo Existing Retaining Wall	Cal02-5d/8Hr/10Hol	4	49	14-Jan-25	17-Jan-25	A7020	A7030					
A7030	Install bedding Material	Cal02-5d/8Hr/10Hol	4	49	20-Jan-25	23-Jan-25	A7020,A7300	A7040					
A7040	Install Pipe	Cal02-5d/8Hr/10Hol	2	49	24-Jan-25	27-Jan-25	A7030	A7050,A7310,A3470					
A7310	Construct Retaining Wall	Cal02-5d/8Hr/10hol winter shtdwn	10	15	17-Mar-25	28-Mar-25	A7040	A7050					
A7050	Backfill Trench	Cal02-5d/8Hr/10hol winter shtdwn	3	15	31-Mar-25	02-Apr-25	A7040,A7310	A4390					
<b>Diversion Structure 214 Construction</b>			25	13	05-Dec-24	09-Apr-25							
A4300	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	3	78	05-Dec-24	09-Dec-24	A2720	A4310					

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A4310	Excavate and Install Lagging	Cal02-5d/8Hr/10Hol	3	78	10-Dec-24	12-Dec-24	A4300	A4320					
A4320	Install Gravel Bedding	Cal02-5d/8Hr/10Hol	1	63	03-Jan-25	03-Jan-25	A4310,A2760	A4330					
A4330	Form and Pour Base Slab	Cal02-5d/8Hr/10hol winter shdtwn	3	13	17-Mar-25	19-Mar-25	A4320	A4340					
A4340	Cure Time for Base Slab	Cal01-7d/8Hr/No Hol (ms)	7	17	17-Mar-25	23-Mar-25	A4330	A4350					
A4350	Form and Pour Manhole Walls	Cal02-5d/8Hr/10hol winter shdtwn	6	13	24-Mar-25	31-Mar-25	A4340	A4360					
A4360	Cure Time for Manhole Walls	Cal01-7d/8Hr/No Hol (ms)	7	17	24-Mar-25	30-Mar-25	A4350	A4370					
A4370	Form and Pour Top Slab	Cal02-5d/8Hr/10hol winter shdtwn	3	13	31-Mar-25	02-Apr-25	A4360	A4380,A3470					
A4380	Cure Time for Top Slab	Cal01-7d/8Hr/No Hol (ms)	7	17	31-Mar-25	06-Apr-25	A4370	A4390					
A4390	Backfill Structure and Remove SOE	Cal02-5d/8Hr/10hol winter shdtwn	3	13	07-Apr-25	09-Apr-25	A4380,A7050	A4140,A3560					
<b>DS 214 Structure 2 Installation</b>		Cal02-5d/8Hr/10hol winter shdtwn	8	13	03-Apr-25	14-Apr-25							
A3470	Install Gravel Bedding	Cal02-5d/8Hr/10Hol	1	15	03-Apr-25	03-Apr-25	A2760,A4370,A7040	A3770					
A3770	Install Precast Manhole	Cal02-5d/8Hr/10Hol	2	15	04-Apr-25	07-Apr-25	A3470	A3560					
A3560	Backfill Manhole and Remove SOE	Cal02-5d/8Hr/10Hol	2	13	10-Apr-25	11-Apr-25	A3770,A4390	A3570					
A3570	Install Frame and Cover	Cal02-5d/8Hr/10Hol	1	13	14-Apr-25	14-Apr-25	A3560	A6950					
<b>Pipe Jacking Sta 5+50 to MH 213-3</b>			<b>98</b>	<b>83</b>	<b>14-Jan-25</b>	<b>01-Aug-25</b>							
<b>Pipe Jack Driving Pit @ Sta 5+50</b>			<b>29</b>	<b>2</b>	<b>14-Jan-25</b>	<b>24-Apr-25</b>							
A2090	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	3	39	14-Jan-25	16-Jan-25	A2730,A7020	A2100					
A2100	Excavate for Pipe Jacking Pit and Install Lagging	Cal02-5d/8Hr/10Hol	4	39	17-Jan-25	22-Jan-25	A2090	A2110,A6410,A2200					
A6410	Mobilize Pipe Jacking Equipment	Cal02-5d/8Hr/10Hol	7	39	23-Jan-25	31-Jan-25	A2100,A6400	A6420					
A6420	Assemble and Prep Pipe Jacking Equipment	Cal02-5d/8Hr/10Hol	12	39	03-Feb-25	18-Feb-25	A6410	A2170					
A2110	Form and Pour Base Slab	Cal02-5d/8Hr/10hol winter shdtwn	3	2	17-Mar-25	19-Mar-25	A2100	A2120					
A2120	Cure Time for Base Slab	Cal01-7d/8Hr/No Hol (ms)	7	4	20-Mar-25	26-Mar-25	A2110	A2130					
A2130	Form and Pour Entrance Portal and Thrust Wall	Cal02-5d/8Hr/10hol winter shdtwn	4	2	27-Mar-25	01-Apr-25	A2120	A2140,A2220					
A2140	Cure Time for Entrance Ceiling	Cal01-7d/8Hr/No Hol (ms)	7	2	02-Apr-25	08-Apr-25	A2130	A2150					
A2150	Install Pipe Jacking Rig	Cal02-5d/8Hr/10Hol	1	2	09-Apr-25	09-Apr-25	A2140	A2160					
A2160	Install Pipe Jacking Machine	Cal02-5d/8Hr/10Hol	1	2	10-Apr-25	10-Apr-25	A2150	A2170					
A2170	Setup Pipe Jacking System	Cal02-5d/8Hr/10Hol	7	2	11-Apr-25	21-Apr-25	A2160,A6420	A2180					
A2180	Test Pipe Jacking System	Cal02-5d/8Hr/10Hol	3	2	22-Apr-25	24-Apr-25	A2170	A2190					
<b>Pipe Jack Receiving Pit @ MH 213 - 3</b>			<b>34</b>	<b>147</b>	<b>23-Jan-25</b>	<b>01-May-25</b>							
A2200	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	3	44	23-Jan-25	27-Jan-25	A2100	A2210					
A2210	Excavate for Pipe Jacking Pit and Install Lagging	Cal02-5d/8Hr/10Hol	4	44	28-Jan-25	31-Jan-25	A2200	A2220,A6430					
A6430	Mobilize Cranes	Cal02-5d/8Hr/10Hol	2	58	03-Feb-25	04-Feb-25	A2210	A2260					
A2220	Form and Pour Base Slab	Cal02-5d/8Hr/10hol winter shdtwn	3	2	02-Apr-25	04-Apr-25	A2210,A2130	A2230					
A2230	Cure Time for Base Slab	Cal01-7d/8Hr/No Hol (ms)	7	4	05-Apr-25	11-Apr-25	A2220	A2240					
A2240	Form and Pour Exit Portal	Cal02-5d/8Hr/10hol winter shdtwn	3	2	14-Apr-25	16-Apr-25	A2230	A2250					



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A2250	Cure Time for Entrance Ceiling	Cal01-7d/8Hr/No Hol (ms)	7	4	17-Apr-25	23-Apr-25	A2240	A2260					
A2260	Install Receiving Rig	Cal02-5d/8Hr/10Hol	1	2	24-Apr-25	24-Apr-25	A2250,A6430	A2190,A2190					
A6440	Demobilize Pipe Jacking Equipment	Cal02-5d/8Hr/10Hol	2	152	30-Apr-25	01-May-25	A2190	A6450,A6470					
<b>Pipe Jacking</b>		Cal02-5d/8Hr/10hol wintershtdwn	3	2	25-Apr-25	29-Apr-25							
A2190	Jack Pipe from MH213-4 to MH213-3	Cal02-5d/8Hr/10Hol	3	2	25-Apr-25	29-Apr-25	A2260,A2180,A2260	A2300,A4110,A6440,A6950					
<b>Drainage Replacement at DS 213</b>		Cal02-5d/8Hr/10hol wintershtdwn	29	44	30-Apr-25	09-Jun-25							
A6950	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	3	2	30-Apr-25	02-May-25	A2190,A3570	A6960					
A6960	Excavate Trench and Install Lagging	Cal02-5d/8Hr/10Hol	5	2	05-May-25	09-May-25	A6950	A6970,A7320					
A7320	Remove and Dispose Existing Electric Ductbank	Cal02-5d/8Hr/10Hol	6	2	12-May-25	19-May-25	A6960	A6970					
A6970	Install Bedding Material	Cal02-5d/8Hr/10Hol	3	2	20-May-25	22-May-25	A6960,A7320	A6980					
A6980	Install 24" RCP	Cal02-5d/8Hr/10Hol	4	2	23-May-25	28-May-25	A6970	A6990,A7000					
A7000	Install DMH3, DMH4, DMH6 and DMH5	Cal02-5d/8Hr/10Hol	5	2	29-May-25	04-Jun-25	A6980	A6990,A7330					
A6990	Backfill Trench	Cal02-5d/8Hr/10Hol	3	44	05-Jun-25	09-Jun-25	A6980,A7000	A4400					
<b>Diversion Structure 213 Construction</b>			38	42	10-Jun-25	01-Aug-25							
A4400	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	3	44	10-Jun-25	12-Jun-25	A2760,A6990	A4410					
A4410	Excavate and Install Lagging	Cal02-5d/8Hr/10Hol	5	44	13-Jun-25	19-Jun-25	A4400	A4420					
A4420	Install Gravel Bedding	Cal02-5d/8Hr/10Hol	1	44	20-Jun-25	20-Jun-25	A4410	A4430					
A4430	Form and Pour Base Slab	Cal02-5d/8Hr/10hol wintershtdwn	3	43	23-Jun-25	25-Jun-25	A4420	A4440					
A4440	Cure Time for Base Slab	Cal01-7d/8Hr/No Hol (ms)	7	62	26-Jun-25	02-Jul-25	A4430	A4450					
A4450	Form and Pour Manhole Walls	Cal02-5d/8Hr/10hol wintershtdwn	6	42	03-Jul-25	11-Jul-25	A4440	A4460					
A4460	Cure Time for Manhole Walls	Cal01-7d/8Hr/No Hol (ms)	7	61	12-Jul-25	18-Jul-25	A4450	A4470					
A4470	Form and Pour Top Slab	Cal02-5d/8Hr/10hol wintershtdwn	3	42	21-Jul-25	23-Jul-25	A4460	A4480					
A4480	Cure Time for Top Slab	Cal01-7d/8Hr/No Hol (ms)	7	61	24-Jul-25	30-Jul-25	A4470	A4490					
A4490	Backfill Structure and Remove SOE	Cal02-5d/8Hr/10Hol	2	43	31-Jul-25	01-Aug-25	A4480	A6750					
<b>Drainage Replacement at MH 213-3</b>			18	2	05-Jun-25	30-Jun-25							
A7330	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	3	2	05-Jun-25	09-Jun-25	A7000	A7340					
A7340	Excavate Trench and Install Lagging	Cal02-5d/8Hr/10Hol	5	2	10-Jun-25	16-Jun-25	A7330	A7350					
A7350	Install Bedding Material	Cal02-5d/8Hr/10Hol	3	2	17-Jun-25	19-Jun-25	A7340	A7360					
A7360	Install 24" RCP	Cal02-5d/8Hr/10Hol	1	2	20-Jun-25	20-Jun-25	A7350	A7370,A7380					
A7380	Install DMH7, CB2, CB3	Cal02-5d/8Hr/10Hol	3	2	23-Jun-25	25-Jun-25	A7360	A7370					
A7370	Backfill Trench	Cal02-5d/8Hr/10Hol	3	2	26-Jun-25	30-Jun-25	A7360,A7380	A4140					
<b>Open Trench from MH 213-3 to MH 213-2</b>		Cal02-5d/8Hr/10Hol	31	31	01-Jul-25	12-Aug-25							
<b>Pipe Installation</b>		Cal02-5d/8Hr/10Hol	26	2	01-Jul-25	05-Aug-25							
A4140	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	4	2	01-Jul-25	04-Jul-25	A4390,A7370	A4150					
A4150	Excavate Trench and Install Lagging	Cal02-5d/8Hr/10Hol	7	2	07-Jul-25	15-Jul-25	A4140	A4230					

<ul style="list-style-type: none"> <li><span style="color: blue;">█</span> Actual Work</li> <li><span style="color: green;">█</span> Remaining Work</li> <li><span style="color: red;">█</span> Critical Remaining Work</li> <li>◆ Milestone</li> </ul>	User = aparuchuri, Filter = TASK filter: All Activities Data Date = 16-Dec-22, Run Date = 29-Jul-21, 10:48 Project Start = 16-Dec-22 Project Finish = 11-Jul-26	<table border="1"> <tr> <th>Date</th> <th>Revision</th> <th>Checked</th> <th>Approved</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	Date	Revision	Checked	Approved													Prepared by CPP 
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Activity ID	Activity Name	Calendar	OD	Total Float	Start	Finish	Predecessors	Successors	2023	2024	2025	2026	2027
A4230	Install Bedding Material	Cal02-5d/8Hr/10Hol	3	2	16-Jul-25	18-Jul-25	A4150	A4240					
A4240	Install Pipe	Cal02-5d/8Hr/10Hol	5	2	21-Jul-25	25-Jul-25	A4230	A4250					
A4250	Backfill Trench	Cal02-5d/8Hr/10Hol	7	2	28-Jul-25	05-Aug-25	A4240	A4110,A3990,A3660					
<b>MH 213-3 Construction</b>		Cal02-5d/8Hr/10Hol	5	31	06-Aug-25	12-Aug-25							
A4110	Install Precast Manhole	Cal02-5d/8Hr/10Hol	2	2	06-Aug-25	07-Aug-25	A4250,A2190	A4120					
A4120	Backfill Manhole and Remove SOE	Cal02-5d/8Hr/10Hol	2	2	08-Aug-25	11-Aug-25	A4110	A4130,A7060					
A4130	Install Frame and Cover	Cal02-5d/8Hr/10Hol	1	31	12-Aug-25	12-Aug-25	A4120	A7160					
<b>Open Trench from MH 213-2 to MH 213-1</b>		Cal02-5d/8Hr/10Hol	35	2	12-Aug-25	29-Sep-25							
<b>Pipe Installation</b>		Cal02-5d/8Hr/10Hol	26	2	12-Aug-25	16-Sep-25							
A7060	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	4	2	12-Aug-25	15-Aug-25	A4120	A7070					
A7070	Excavate Trench and Install Lagging	Cal02-5d/8Hr/10Hol	7	2	18-Aug-25	26-Aug-25	A7060	A7080					
A7080	Install Bedding Material	Cal02-5d/8Hr/10Hol	3	2	27-Aug-25	29-Aug-25	A7070	A7090					
A7090	Install Pipe	Cal02-5d/8Hr/10Hol	5	2	01-Sep-25	05-Sep-25	A7080	A7100					
A7100	Backfill Trench	Cal02-5d/8Hr/10Hol	7	2	08-Sep-25	16-Sep-25	A7090	A7110					
<b>MH 213-2 Construction</b>		Cal02-5d/8Hr/10Hol	9	2	17-Sep-25	29-Sep-25							
A7110	Drill Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	1	2	17-Sep-25	17-Sep-25	A7100	A7120					
A7120	Excavate and Install Lagging	Cal02-5d/8Hr/10Hol	2	2	18-Sep-25	19-Sep-25	A7110	A7130					
A7130	Install Gravel Bedding	Cal02-5d/8Hr/10Hol	1	2	22-Sep-25	22-Sep-25	A7120	A7160					
A7160	Install Precast Manhole	Cal02-5d/8Hr/10Hol	2	2	23-Sep-25	24-Sep-25	A7130,A4130	A7140					
A7140	Backfill Manhole and Remove SOE	Cal02-5d/8Hr/10Hol	2	2	25-Sep-25	26-Sep-25	A7160	A7150					
A7150	Install Frame and Cover	Cal02-5d/8Hr/10Hol	1	2	29-Sep-25	29-Sep-25	A7140	A6750					
<b>Roosevelt Ave. Water Main Replacement</b>		Cal02-5d/8Hr/10hol winter shtdwn	20	21	06-Aug-25	02-Sep-25							
A3660	Excavate Trench - Roosevelt Ave.	Cal02-5d/8Hr/10Hol	4	21	06-Aug-25	11-Aug-25	A6510,A3650,A4250	A3670					
A3670	Remove & Dispose Existing 12" Water Main	Cal02-5d/8Hr/10Hol	3	21	12-Aug-25	14-Aug-25	A3660	A3680					
A3680	Install New 12" Water Main	Cal02-5d/8Hr/10Hol	5	21	15-Aug-25	21-Aug-25	A3670	A3690					
A3690	Install New 6" Water Main	Cal02-5d/8Hr/10Hol	4	21	22-Aug-25	27-Aug-25	A3680	A3710					
A3710	Backfill Trench - Roosevelt Ave.	Cal02-5d/8Hr/10Hol	4	21	28-Aug-25	02-Sep-25	A3690	A6750					
<b>Pavement and Sidewalk</b>		Cal02-5d/8Hr/10hol winter shtdwn	2	2	30-Sep-25	01-Oct-25							
A6750	Remove Temporary Traffic Controls	Cal02-5d/8Hr/10hol winter shtdwn	2	2	30-Sep-25	01-Oct-25	A6640,A3710,A4490,A7150	A6760					
<b>Phase 3 - Main Street</b>			91	0	02-Oct-25	11-May-26							
<b>Construction Road Signing &amp; Barriers</b>		Cal02-5d/8Hr/10hol winter shtdwn	2	2	02-Oct-25	03-Oct-25							
A6760	Install Safety Signing and Temporary Traffic Controls for Main Street Closure	Cal02-5d/8Hr/10Hol	2	2	02-Oct-25	03-Oct-25	A6750	A6650,A2300					
<b>Main St. Water Main Replacement</b>		Cal02-5d/8Hr/10hol winter shtdwn	11	137	06-Oct-25	20-Oct-25							
A6650	Excavate Trench - Main St Watermain	Cal02-5d/8Hr/10Hol	2	2	06-Oct-25	07-Oct-25	A6760	A6660					
A6660	Remove & Dispose Existing 12" Water Main	Cal02-5d/8Hr/10Hol	1	2	08-Oct-25	08-Oct-25	A6650	A6670					

<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: blue; margin-right: 5px;"></span> Actual Work</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid green; margin-right: 5px;"></span> Remaining Work</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid red; margin-right: 5px;"></span> Critical Remaining Work</li> <li><span style="display: inline-block; width: 0; height: 0; border-left: 5px solid transparent; border-right: 5px solid transparent; border-bottom: 8px solid black; margin-right: 5px;"></span> Milestone</li> </ul>	User = aparuchuri, Filter = TASK filter: All Activities Data Date = 16-Dec-22, Run Date = 29-Jul-21, 10:48 Project Start = 16-Dec-22 Project Finish = 11-Jul-26	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">Date</th> <th style="width: 40%;">Revision</th> <th style="width: 15%;">Checked</th> <th style="width: 10%;">Approved</th> </tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>	Date	Revision	Checked	Approved																	Prepared by CPP  <div style="text-align: right;"> </div>
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A6670	Install New 12" Water Main	Cal02-5d/8Hr/10Hol	2	2	09-Oct-25	10-Oct-25	A6660	A6680					
A6680	Install New 6" Water Main	Cal02-5d/8Hr/10Hol	2	2	13-Oct-25	14-Oct-25	A6670	A6700					
A6700	Backfill Trench - Main St	Cal02-5d/8Hr/10Hol	2	2	15-Oct-25	16-Oct-25	A6680	A6710					
A6710	Install 20" Water Main, Line Stop and Butterfly Stops - Main Street Watermain	Cal02-5d/8Hr/10Hol	1	2	17-Oct-25	17-Oct-25	A6700	A6720,A2300					
A6720	Remove Service Box & Abandon Service - Main St	Cal02-5d/8Hr/10Hol	1	137	20-Oct-25	20-Oct-25	A6710	A6780					
<b>Pipe Jacking MH 213-1 to Diversion Str. 210</b>			<b>39</b>	<b>41</b>	<b>20-Oct-25</b>	<b>30-Dec-25</b>							
<b>Pipe Jack Driving Pit @ MH 213 - 1</b>			<b>30</b>	<b>9</b>	<b>20-Oct-25</b>	<b>01-Dec-25</b>							
A2300	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	3	2	20-Oct-25	22-Oct-25	A2190,A6760,A6710	A2310					
A2310	Excavate for Pipe Jacking Pit and Install Lagging	Cal02-5d/8Hr/10Hol	3	2	23-Oct-25	27-Oct-25	A2300	A2320,A6450					
A2320	Form and Pour Base Slab	Cal02-5d/8Hr/10hol winter shtdwn	3	2	28-Oct-25	30-Oct-25	A2310	A2330					
A6450	Mobilize Pipe Jacking Equipment	Cal02-5d/8Hr/10Hol	7	25	28-Oct-25	05-Nov-25	A6440,A2310	A6460					
A2330	Cure Time for Base Slab	Cal01-7d/8Hr/No Hol (ms)	7	4	31-Oct-25	06-Nov-25	A2320	A2340					
A6460	Assemble and Prep Pipe Jacking Equipment	Cal02-5d/8Hr/10Hol	12	25	06-Nov-25	21-Nov-25	A6450	A2380					
A2340	Form and Pour Entrance Portal and Thrust Wall	Cal02-5d/8Hr/10hol winter shtdwn	3	2	07-Nov-25	11-Nov-25	A2330	A2350					
A2350	Cure Time for Entrance Portal	Cal01-7d/8Hr/No Hol (ms)	7	2	12-Nov-25	18-Nov-25	A2340	A2360,A2400					
A2360	Install Pipe Jacking Rig	Cal02-5d/8Hr/10Hol	1	26	19-Nov-25	19-Nov-25	A2350	A2370					
A2370	Install Pipe Jacking Machine	Cal02-5d/8Hr/10Hol	1	26	20-Nov-25	20-Nov-25	A2360	A2380					
A2380	Setup Pipe Jacking System	Cal02-5d/8Hr/10Hol	3	25	24-Nov-25	26-Nov-25	A2370,A6460	A2390					
A2390	Test Pipe Jacking System	Cal02-5d/8Hr/10Hol	3	25	27-Nov-25	01-Dec-25	A2380	A2500					
<b>Pipe Jack Receiving Pit @ Diversion Str. 210</b>			<b>17</b>	<b>0</b>	<b>19-Nov-25</b>	<b>25-Dec-25</b>							
A2400	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	3	2	19-Nov-25	21-Nov-25	A2350	A2410					
A2410	Excavate for Pipe Jacking Pit and Install Lagging	Cal02-5d/8Hr/10Hol	3	2	24-Nov-25	26-Nov-25	A2400	A2420,A6470					
A6470	Mobilize Cranes	Cal02-5d/8Hr/10Hol	2	25	27-Nov-25	28-Nov-25	A2410,A6440	A2460					
A2420	Form and Pour Base Slab	Cal02-5d/8Hr/10hol winter shtdwn	3	1	28-Nov-25	02-Dec-25	A2410	A2430					
A2430	Cure Time for Base Slab	Cal01-7d/8Hr/No Hol (ms)	7	1	03-Dec-25	09-Dec-25	A2420	A2440					
A2440	Form and Pour Exit Portal	Cal02-5d/8Hr/10hol winter shtdwn	2	1	10-Dec-25	11-Dec-25	A2430	A2450					
A2450	Cure Time for Exit Rig	Cal01-7d/8Hr/No Hol (ms)	7	17	12-Dec-25	18-Dec-25	A2440	A2460					
A2460	Install Receiving Rig	Cal02-5d/8Hr/10Hol	1	11	19-Dec-25	19-Dec-25	A2450,A6470	A2500					
A6480	Demobilize Pipe Jacking Equipment	Cal02-5d/8Hr/10Hol	2	39	24-Dec-25	25-Dec-25	A2500	A4820					
<b>Pipe Jacking</b>			<b>2</b>	<b>11</b>	<b>22-Dec-25</b>	<b>23-Dec-25</b>							
A2500	Jack Pipe from MH 213-1 to Diversion Str. 210	Cal02-5d/8Hr/10Hol	2	11	22-Dec-25	23-Dec-25	A2460,A2390	A3990,A4820,A6480					
<b>MH 213-1 Construction</b>			<b>5</b>	<b>94</b>	<b>24-Dec-25</b>	<b>30-Dec-25</b>							
A3990	Install Precast Manhole	Cal02-5d/8Hr/10Hol	2	11	24-Dec-25	25-Dec-25	A2500,A4250	A4000					
A4000	Backfill Manhole and Remove SOE	Cal02-5d/8Hr/10Hol	2	11	26-Dec-25	29-Dec-25	A3990	A4010,A7170					
A4010	Install Frame and Cover	Cal02-5d/8Hr/10Hol	1	94	30-Dec-25	30-Dec-25	A4000	SC IIIA-4					

█ Actual Work  
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█ Critical Remaining Work  
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Activity ID	Activity Name	Calendar	OD	Total Float	Start	Finish	Predecessors	Successors	2023	2024	2025	2026	2027
<b>Open Trench from DS 210 to MH210-1</b>			29	4	30-Dec-25	23-Apr-26							
<b>Pipe Installation</b>		Cal02-5d/8Hr/10hol winter shtdwn	26	11	30-Dec-25	03-Feb-26							
A7170	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	4	11	30-Dec-25	02-Jan-26	A4000	A7180					Install Soldier Piles
A7180	Excavate Trench and Install Lagging	Cal02-5d/8Hr/10Hol	7	11	05-Jan-26	13-Jan-26	A7170	A7190					Excavate Trench and
A7190	Install Bedding Material	Cal02-5d/8Hr/10Hol	3	11	14-Jan-26	16-Jan-26	A7180	A7200					Install Bedding Mat
A7200	Install Pipe	Cal02-5d/8Hr/10Hol	5	11	19-Jan-26	23-Jan-26	A7190	A7210					Install Pipe
A7210	Backfill Trench	Cal02-5d/8Hr/10Hol	7	11	26-Jan-26	03-Feb-26	A7200	A4820					Backfill Trench
<b>Diversion Structure 210 Construction</b>			29	4	04-Feb-26	23-Apr-26							
A4820	Install Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	3	11	04-Feb-26	06-Feb-26	A2500,A6480,A7210	A4830					Install Soldier Piles
A4830	Excavate and Install Lagging	Cal02-5d/8Hr/10Hol	5	11	09-Feb-26	13-Feb-26	A4820	A4840,A7220					Excavate and Ins
A4840	Install Gravel Bedding	Cal02-5d/8Hr/10Hol	1	23	16-Feb-26	16-Feb-26	A4830	A4760					Install Gravel Bed
A4760	Form and Pour Base Slab	Cal02-5d/8Hr/10hol winter shtdwn	3	4	16-Mar-26	18-Mar-26	A4840	A4770					Form and Pour
A4770	Cure Time for Base Slab	Cal01-7d/8Hr/No Hol (ms)	7	6	19-Mar-26	25-Mar-26	A4760	A4780					Cure Time for B
A4780	Form and Pour Manhole Walls	Cal02-5d/8Hr/10hol winter shtdwn	6	4	26-Mar-26	02-Apr-26	A4770	A4790					Form and Pour
A4790	Cure Time for Manhole Walls	Cal01-7d/8Hr/No Hol (ms)	7	6	03-Apr-26	09-Apr-26	A4780	A4800					Cure Time for M
A4800	Form and Pour Top Slab	Cal02-5d/8Hr/10hol winter shtdwn	3	4	10-Apr-26	14-Apr-26	A4790	A4810					Form and Pou
A4810	Cure Time for Top Slab	Cal01-7d/8Hr/No Hol (ms)	7	6	15-Apr-26	21-Apr-26	A4800	A4850					Cure Time for
A4850	Backfill Structure and Remove SOE	Cal02-5d/8Hr/10hol winter shtdwn	2	4	22-Apr-26	23-Apr-26	A4810	A6780,A6780					Backfill Struct
<b>MH 210-1 Construction</b>		Cal02-5d/8Hr/10hol winter shtdwn	9	11	16-Feb-26	26-Feb-26							
A7220	Drill Soldier Piles for SOE	Cal02-5d/8Hr/10Hol	1	11	16-Feb-26	16-Feb-26	A4830	A7230					Drill Soldier Piles
A7230	Excavate and Install Lagging	Cal02-5d/8Hr/10Hol	2	11	17-Feb-26	18-Feb-26	A7220	A7240					Excavate and Ins
A7240	Install Gravel Bedding	Cal02-5d/8Hr/10Hol	1	11	19-Feb-26	19-Feb-26	A7230	A7270					Install Gravel Bed
A7270	Install Precast Manhole	Cal02-5d/8Hr/10Hol	2	11	20-Feb-26	23-Feb-26	A7240	A7250					Install Precast Ma
A7250	Backfill Manhole and Remove SOE	Cal02-5d/8Hr/10Hol	2	11	24-Feb-26	25-Feb-26	A7270	A7260,A7280					Backfill Manhole
A7260	Install Frame and Cover	Cal02-5d/8Hr/10Hol	1	11	26-Feb-26	26-Feb-26	A7250	A7280					Install Frame and
<b>Site Electrical</b>		Cal02-5d/8Hr/10hol winter shtdwn	18	0	16-Mar-26	08-Apr-26							
A7280	Remove and Install Lighting Conduit-RooseveltAve	Cal02-5d/8Hr/10hol winter shtdwn	12	0	16-Mar-26	31-Mar-26	A7250,A7260	A7290					Remove and In
A7290	Remove and Install Street Lighting-RooseveltAve	Cal02-5d/8Hr/10hol winter shtdwn	6	0	01-Apr-26	08-Apr-26	A7280	A6780,A7390					Remove and In
<b>Pavement and Sidewalk</b>		Cal02-5d/8Hr/10hol winter shtdwn	23	0	09-Apr-26	11-May-26							
A7390	Install Sidewalk - RooseveltAve.	Cal02-5d/8Hr/10hol winter shtdwn	15	0	09-Apr-26	29-Apr-26	A7290	A6780					Install Sidewa
A6780	Install Pavement and Pavement Markings - RooseveltAve & Main Street	Cal02-5d/8Hr/10hol winter shtdwn	6	0	30-Apr-26	07-May-26	A4850,A6720,A4850,A7290,A73	A6790					Install Pavem
A6790	Remove Temorary Traffic Controls	Cal02-5d/8Hr/10hol winter shtdwn	2	0	08-May-26	11-May-26	A6780	SC IIIA-4					Remove Tem
<b>Close-Out</b>		Cal04-7d/8Hr/No Hol (ms)	61	0	11-May-26	11-Jul-26							
C350	NBCRIDOT Punchlist Inspection	Cal04-7d/8Hr/No Hol (ms)	21	0	11-May-26	01-Jun-26	SC IIIA-4	CFC, C380, C330					NBCRIDOT
C330	Punchlist	Cal04-7d/8Hr/No Hol (ms)	20	0	01-Jun-26	21-Jun-26	C350, SC IIIA-4	CFC, C380, C360					Punchlist

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C360	Project Documentation and Closeout	Cal04-7d/8Hr/No Hol (ms)	20	0	21-Jun-26	11-Jul-26	C330	CFC					
C380	Contractor Demobilization	Cal04-7d/8Hr/No Hol (ms)	5	15	21-Jun-26	26-Jun-26	C330, C350, SC IIIA-4	CFC					

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APPENDIX 12  
PROGRAM DESIGN CHECKLIST &  
QA/QC STATEMENT



## 60% Design Project Checklist

**Project Name:** Phase III CSO Control Facilities - 210/213/214 Facilities

**Project Manager (DC):** Christopher Cronin, P.E.

**Project Manager (PM/CM):** Christopher Feeney, P.E.

**Date Completed:** 7/30/21

**Planning/Design Manager Approval (PM/CM):**

**Date Approved:**

**Chief Engineer/Program PTL Approval (PM/CM):**

**Date Approved:**

**60% Submittal Date:** 7/30/21

**60% Milestone Date:** 7/30/21

**Purpose:** The 60% design should generally consist of the proposed alignment and profile, location of all structures, resolution of utility conflicts, property lines, proposed utility relocations, and easements. The intent is for the design to show an essentially complete project to allow a complete PM/CM, NBC, utility, municipal, and permitting review to including contract drawings, project manual, cost estimate, and subsurface investigations. The 60% submittal should include all Division 0 and Division 1 specifications essentially complete with draft versions of all remaining specification sections. The 60% design documents should identify anticipated type and limits of temporary SOE, construction dewatering, present findings of field investigations during previous phase, and prepare documentation to support permit level plans for regulatory submission. OPCC should be consistent with OPCC standards.

This **60% Design Project Checklist** is provided to Project Managers and Design Consultants responsible for project design. Items presented in this checklist are a compilation of industry-standard design criteria, program specific design criteria and general lessons learned from previously constructed projects. This list is not intended to be all inclusive. Project Managers shall review each item listed in this checklist and indicate whether or not the item has been addressed in the 60% submittal or if it is not applicable. For every item not addressed a comment shall be provided. All items not addressed shall be addressed in the 90% Design Checklist.



A completed **60% Design Project Checklist** shall be required prior to scheduling a Technical Review Meeting.

Yes	No	N/A	General and Project Management	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Have all unresolved items in the 30% checklist been resolved?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Design coordination meetings conducted with City, RIDEM, RIDOT, or other agency?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Have updates to design criteria, 30% design, OPCC update, and revision/updates Basis of Design (if applicable) been prepared?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Were Program, PWSB, and RIDOT standard details used?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. List of project stakeholders for future outreach and traffic management been prepared. Contact information included?	City of Pawtucket
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Has the project area been re-walked with the 60% plans to look for accuracy and any changes?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Have easement plans been prepared? Legal descriptions and easement filings to be prepared by others.	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. If appropriate, have the plans been distributed for peer review and/or value engineering?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. If structure inspections are included, are they complete and has a draft summary report been submitted?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Does the drawing set include a Phase III program standard cover sheet; index sheet; general notes, abbreviations, and legend sheet as appropriate? Does it comply Program CAD Standards?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11. Does the design documentation include a project specific checklist developed by the DC? Does the design include cross-discipline review?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12. Has private property restoration been identified and clearly defined including driveway repaving?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13. Does the submission include Program Standard specification (DIV 0 and 1) and applicable technical specifications? It is noted that some technical specifications may not be fully developed.	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14. Has a 60% QA/QC statement been provided by the DC?	

Yes	No	N/A	Drawing Layouts/ Data Collection/Survey Coordination	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Has required clearing and grubbing been shown and limits defined?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Proposed and existing ground elevations shown on plans/profiles?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. All new sanitary sewers, drains and major water mains are profiled?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Are large diameter pipes, manholes, catch basins, vaults, electrical ducts, etc. shown to scale, including outside dimensions?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Are final site restoration of all disturbed areas delineated on drawings?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Are paving limits delineated on drawings?	



<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Does drawing set delineate required erosion and sediment control details and notes?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Accuracy of surface features/structures checked via site walks?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. Benchmark(s) identified on the site plan and located at a minimum every 500 feet along the route?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. All rights-of-way, property lines, and easements shown (source of data noted)?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11. All flood plains, edge of wetlands, buffer zones and setbacks shown?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12. Have highway and railroad right-of-ways been identified?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13. If applicable, has a note been added stating that Contractor is required to coordinate with railroad prior to start of work?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14. Lawn or kept areas, trees and shrubs are shown (size and type)?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15. All underground utilities and structures, ducts, overhead wires, and service connections shown?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16. Location of existing houses (plat/lot, ownership name), buildings, fences, walls, signs, poles, mailboxes, and structures shown?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17. Has the DC team completed a field walk through along the alignment and documented field notes and photos?	

Yes	No	N/A	Utility Coordination	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Have duct bank dimensions been verified through test pits and/or confirmation by utilities? Often times they are stacked.	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. All existing fire hydrants and valve locations shown and verified?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Water mains of any size crossing other utilities are profiled, conflicts resolved?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Have any SUE investigation been conducted? Are the results shown on the drawings?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Have City/Town records been checked to locate the presence of underdrains?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Have all overhead conflicts been identified during site walks?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Have all the dimensions and shape (egg, oval, cradle, etc.) of all large diameter and crossing sewers and drains been verified?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Design coordination meetings conducted with Utilities when needed. Have 60% plans been submitted to utilities (list at bottom of checklist)?	Will send 60% Design Plans following Review.



Yes	No	N/A	Soils/Groundwater/ Erosion Control	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Supplemental soil borings and monitoring wells complete?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Where refusal is encountered above final excavation depth, have rock cores been taken and has rock been profiled and characterized? Has geotechnical engineer confirmed adequacy of spacing?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Has a draft soils management plan been incorporated into the design drawings and specifications? Have regulated/impacted soils been identified during the environmental investigation?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Does the design include temporary SOE, construction dewatering, construction sequence, and geotechnical instrumentation?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Do drawings conform to RIDEM erosion control and sedimentation regulations?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Erosion and sediment control devices shown and details included?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Have groundwater levels been determined and shown on boring logs?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Have water levels been monitored in monitoring wells?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. Has a draft geotechnical/environmental summary memo been prepared? Did EH&S consultant review?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Has the soil disposal method been defined? Soil pre-characterization may require additional delineation over stockpiling or centralized soil disposal.	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11. Have the borings and monitoring wells been shown on the plans and profiles, including supplemental borings and monitoring wells.	

Yes	No	N/A	Permitting	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Local and State permit/approval applications prepared (as needed). Submit following the 60% review.	To be prepared by Program Manager (PM)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	a. CRMC	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	b. RIDOT Physical Alternation	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	c. RIDEM Order of Approval	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	d. RIPDES permit for stormwater	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	e. National Grid Gas – encroachment review	



Yes	No	N/A	Roadway and Traffic Management	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Have pavement and sub-base thicknesses been clearly identified in the borings including asphalt and concrete?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Has a preliminary concept for maintaining traffic been prepared?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Has anticipated paving schedules been coordinated with City/Town?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Have state highways been identified?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Has a note been added stating that Contractor is required to obtain permits from RIDOT prior to start of work?	

Yes	No	N/A	Water Main Design	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Did 30% design drawings identify need for water main relocation to accommodate proposed design elements?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Does the plan identify existing valves and proposed valves and number of services impacted by shutdown?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Did design identify need for water by-pass plan?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Are noted water main relocation and/or placement in conformance with PWSB standards?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Does the design report include PWSB design checklist as an attachment?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Are pipe material and valve type identified and consistent with PWSB?	

Yes	No	N/A	Sewer	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. The manhole diameter is adequate for the number, diameter, and angle of pipes entering and leaving?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. A minimum of 10' horizontal separation is maintained between sewer lines; between sewer lines and water lines; and between sewer lines and storm drainage structures, where possible.	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. If water and sewer lines cross perpendicular, is joint spacing maximized from the crossing location?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. All sewers are labeled with size, grade, length, direction of flow, and type and class of pipes?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. All manholes are labeled with rim and invert elevations; coordinates; and/or locations, size and inverts of drop pipes?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Drops of at least 0.1' included in all manholes to comply with RIDEM criteria?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Verify Minimum slopes meet TR-16 criteria.	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. Avoid siphons where possible. If required, are pig launching and flushing connections provided in access manholes?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. Velocities greater than 10 fps should be avoided, unless special provisions have been made for erosion.	





Yes	No	N/A	Storm Drain Design	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Catch basin connector laterals are profiled, where necessary?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. The pipe material, size, and slope shown?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Are grates or trash racks at inlets and access barriers (outlet end) shown on exposed ends of all drains 18" or greater?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Have utility conflicts been resolved on catch basin laterals?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Manholes have been designed such that changes in pipe size match crown elevations?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Specific requirements such as hoods, deep sumps, etc. are incorporated.	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. If building disconnections are included, are they sufficiently detailed?	

Yes	No	N/A	CSO Consolidation Design	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Does the hydraulic capacity meet the defined hydraulic criteria based on model results (i.e. peak flow, maximum velocity)?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Does the HGL meet the defined level of service?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. All crossings with other utilities are shown and conflicts resolved?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Existing sewer connections to the property shown on drawings.	

Yes	No	N/A	GSI Design	Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Does the design comply with RIDEM SW Design Manual?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Does maximum capture volume and promote infiltration?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Drainage maps completed with pre- and post-development sub-areas delineated?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. Details meet RIDEM standards?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Basis of design identifies capture volume and reduction of volume for 3-month storm.	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Design incorporates features to minimize maintenance and use native plantings.	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. Minimum velocity in a drain is 2 fps.	



**Other Specific Issues or Concerns of the PM:**

Yes	No	N/A		Comments
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. Direct Manager (PM/CM) recommends proceeding to technical review meeting.	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. Did the DC submit the necessary inputs to facilitate technical review meeting?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Yes	No		Date
<input type="checkbox"/>	<input type="checkbox"/>	<b>1. Design Consultant Authorized to Advance to Next Stage of Design?            (If DC is Conditionally Authorized to Advance the Design, Attach a Summary of these Conditions to this Checklist)</b>	