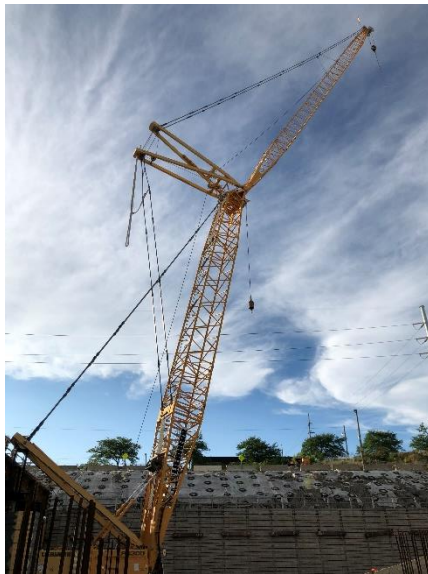


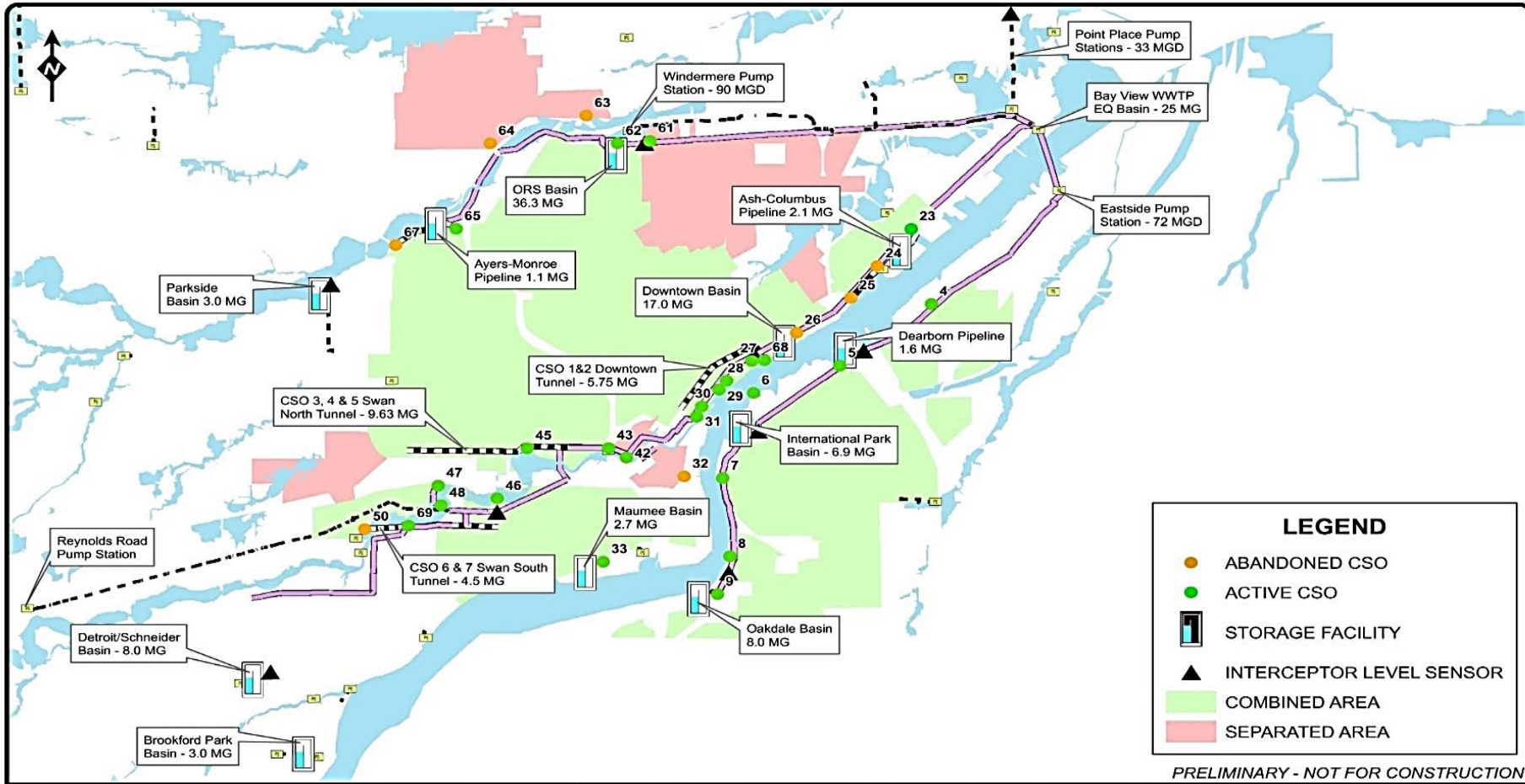
**Downtown BAC/CPAC Meeting
July 22, 2019**



TWI Current Status Summary July 2019



Bay View Water Reclamation Service Area Sewer System Storage Facility Map



DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CHK.	APP.

DESIGNED: J. BRESNOL	ENGINEER: TETRA TECH
DRAWN: J. BRESNOL	PROGRAM MANAGER: BLACK & VEATCH
CHECKED: J. BRESNOL	
APPROVED: J. BROZ	
DATE: 5/25/2016	

<p>Tetra Tech 432 Madison Avenue, 875, 1001 Toledo, Ohio 43605 TEL: (419) 255-8500 FAX: (419) 255-8501 Email: Toledo@tetra.com</p>	<p>Black & Veatch Corporation 400 Michigan Street, Suite 1000 Toledo, Ohio 43604 Tel: (419) 709-6200 Fax: (419) 709-6801 Email: TOLEDO@BV.COM</p>
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<p>TOLEDO WATERWAYS INITIATIVE SYSTEM-WIDE STORAGE DEWATERING PLAN</p>	<p>PROJECT NO. XXXXXX SCALE: 1" = 4,167' SHEET 1 OF 1</p>
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<p>SEWER SYSTEM STORAGE FACILITY MAP</p>
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<p>SEWER SYSTEM STORAGE FACILITY MAP</p>
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Control Combined Sewer Overflows



Keeping CSO's Out of Our Waterways

- ***95 MG Combined Sewer System storage at completion***
 - ***20 MG of tunnel storage completed in 1990s***
 - ***15 MG of storage in 5 projects***
 - ***36 MG of storage Joe E. Brown Park***
 - ***7 MG of storage International Park***
 - ***17 MG of storage in construction – Downtown SB***

Control Combined Sewer Overflows



Where are we today?

- ***Design 99% complete & Construction 97% complete***
- ***7 of 8 CSO outfalls eliminated....1 to go (Magnolia)***
- ***470 MG /year on average will be eliminated when complete***
 - ***8 Inflow reduction & sewer separation projects complete***
 - ***3 Optimization projects for ex. CSO Storage Tunnels complete***
 - ***6 Storage/conveyance projects complete***
 - ***2 Storage & 1 sewer separation project under construction***
 - ***2 Regulator projects under construction***

LTCP Progress Status Summary - June 2019



City of Toledo Toledo Waterways Initiative Segment 3 - CSO LTCP Implementation Progress								
Number	Project	LTCP Study	Facility Site Planning	Preliminary Design	Final Design			Construction
					60%	90%	100%	
1	O-1 Lockwood/Devilbiss SSES	Done	n/a	n/a	n/a	n/a	n/a	n/a
2	O-2 Lockwood/Devilbiss Sewer Separation	Done	Done	Done	Done	Done	Done	Done
3	W-1 Ash/Columbus Storage Pipeline	Done	Done	Done	Done	Done	Done	Done
4	E-6 Wheeling Area SSES and Sewer Separation	Done	Done	Done	Done	Done	Done	Done
5	S-3 Highland Area SSES and Sewer Separation	Done	Done	Done	Done	Done	Done	Done
6	S-4 Woodsdale Area SSES & Inflow Reduction	Done	Done	Done	Done	Done	Done	Done
7	W-2 Ash Area SSES & Sewer Separation	Done	Done	Done	Done	Done	Done	Done
8	W-5 Williams/Knapp Area SSES & Inflow Reduction	Done	Done	Done	Done	Done	Done	Done
9	W-7 New York Area SSES & Inflow Reduction	Done	Done	Done	Done	Done	Done	Done
10	W-6 Maumee Storage Basin	Done	Done	Done	Done	Done	Done	Done
11	E-7 Bay View Grit Facility	Done	Done	Done	Done	Done	Done	Done
12	O-3 Ayers/Monroe Storage/Conveyance Pipeline	Done	Done	Done	Done	Done	Done	Done
13	E-5 Oakdale Storage Basin	Done	Done	Done	Done	Done	Done	Done
14	S-1A Swan Creek North Tunnel Optimization	Done	Done	Done	Done	Done	Done	Done
15	S-2A Swan Creek South Tunnel Optimization	Done	Done	Done	Done	Done	Done	Done
16	W-4A Downtown Tunnel Optimization	Done	Done	Done	Done	Done	Done	Done
17	O-4A Ottawa River Storage Facility (Conveyance)	Done	Done	Done	Done	Done	Done	Done
18	O-4B Ottawa River Storage Facility (Basin)	Done	Done	Done	Done	Done	Done	Done
19	E-2 Dearborn Storage Pipeline	Done	Done	Done	Done	Done	Done	Done
20	E-3 International Park Storage Basin	Done	Done	Done	Done	Done	Done	Done
21	S-1B Swan Creek North Sewer Separation	Done	Done	Done	Done	Done	Done	Ongoing
22	W-4C Downtown Storage Basin	Done	Done	Done	Done	Done	Done	Ongoing
23	S-2B Swan Creek South In-System Storage	Done	Done	Done	Done	Done	Done	Ongoing
24	E-1 Paine Regulator Modifications	Done	Done	Done	Done	Done	Done	Ongoing
25	E-4 Fassett Regulator Modifications	Done	Done	Done	Done	Done	Done	Ongoing



CSO LTCP Construction Safety - June 2019



PHASE 2 LTCP PROGRAM-TO-DATE (111 Months - from 02/10 to 06/19)							
Contract	Total PH Worked	Recordable Injury/Illness Rate (IIR)	IIR Frequency Rate (2) x 200K / (1)	Lost Work Day Injury (LWDI)	Days Lost Due To LWDI	LWDI Frequency Rate (4) x 200K / (1)	Severity Rate (5) x 200K / (1)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
O-2A	11,191	0	0.0	0	0	0.0	0.0
O-2B	48,140	0	0.0	0	0	0.0	0.0
O-2C	19,948	0	0.0	0	0	0.0	0.0
O-3	24,735	0	0.0	0	0	0.0	0.0
W-1	32,594	0	0.0	0	0	0.0	0.0
E-7	74,288	1	2.7	0	0	0.0	0.0
W-6	38,519	1	5.2	1	6	5.2	31.2
E-5	86,491	2	4.6	1	13	2.3	30.1
W-4A/S-1A/S-2A	69,837	1	2.9	0	0	0.0	0.0
W-4A (Madison)	1,598	0	0.0	0	0	0.0	0.0
E-2	51,070	0	0.0	0	0	0.0	0.0
O-4A/O-4B	451,439	8	3.5	2	25	0.9	11.1
E-3	120,944	4	6.6	1	11	1.7	18.2
W-4C	198,695	6	0.0	0	0	0.0	0.0
PROGRAM TOTAL	1,229,490	23	3.7	5	55	0.8	8.9

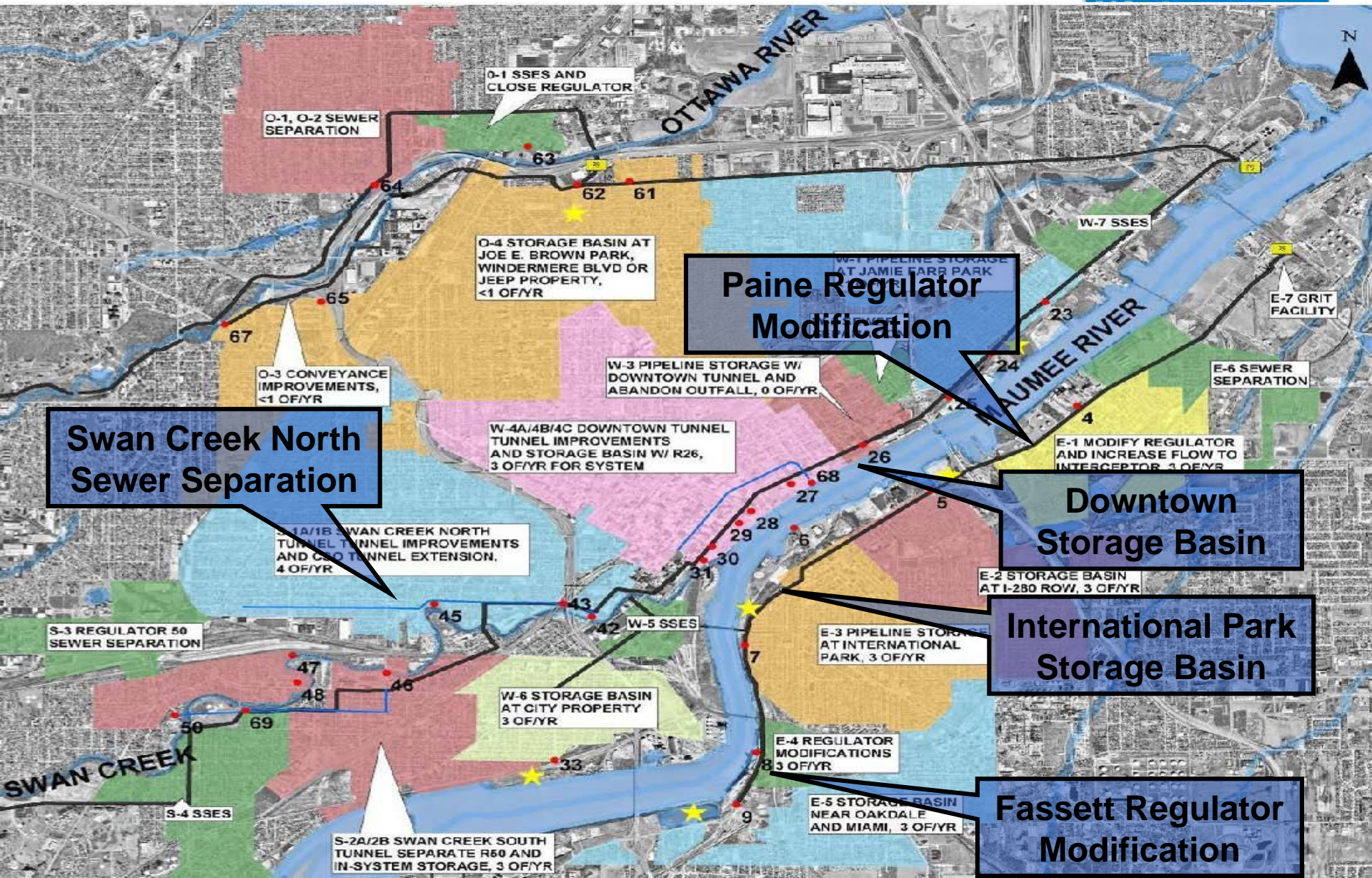
- **1,199,000 const. hours + 360,000 Eng. hours = 1.53 M total**
- **23 recordable injuries. 3.5 IIR. Nat. avg. is 3.5**
- **5 lost workdays due to injuries. 0.8 LWDI. Nat. avg. is 1.1**



Current Projects under Construction

- W-C4 – Downtown Storage Basin
- S-1B/S-2B – Swan Creek North Sewer Separation/Swan Creek South Tunnel In-System Storage
- ES-1, Paine Street Regulator Modifications
- ES-1, Fassett Regulator Modifications

Control Combined Sewer Overflows Map of TWI CSO Projects in Construction



Swan Creek North Sewer Separation

Paine Regulator Modification

Downtown Storage Basin

International Park Storage Basin

Fassett Regulator Modification

O-1 SSES AND CLOSE REGULATOR

O-1, O-2 SEWER SEPARATION

O-4 STORAGE BASIN AT JOE E. BROWN PARK, WINDERMERE BLVD OR JEEP PROPERTY, <1 OF/YR

O-3 CONVEYANCE IMPROVEMENTS, <1 OF/YR

W-3 PIPELINE STORAGE W/ DOWNTOWN TUNNEL AND ABANDON OUTFALL, 0 OF/YR

W-4A/4B/4C DOWNTOWN TUNNEL TUNNEL IMPROVEMENTS AND STORAGE BASIN W/ R26, 3 OF/YR FOR SYSTEM

W-7 SSES

E-7 GRIT FACILITY

E-6 SEWER SEPARATION

E-1 MODIFY REGULATOR AND INCREASE FLOW TO INTERCEPTOR, 3 OF/YR

S-1A/1B SWAN CREEK NORTH TUNNEL TUNNEL IMPROVEMENTS AND C&O TUNNEL EXTENSION, 4 OF/YR

S-3 REGULATOR 50 SEWER SEPARATION

E-2 STORAGE BASIN AT I-280 ROW, 3 OF/YR

E-3 PIPELINE STORAGE AT INTERNATIONAL PARK, 3 OF/YR

W-6 STORAGE BASIN AT CITY PROPERTY 3 OF/YR

E-4 REGULATOR MODIFICATIONS 3 OF/YR

E-5 STORAGE BASIN NEAR OAKDALE AND MIAMI, 3 OF/YR

S-2A/2B SWAN CREEK SOUTH TUNNEL SEPARATE R60 AND IN-SYSTEM STORAGE, 3 OF/YR

S-4 SSES

International Park Storage Basin ASCE Toledo Section Awards



- 2019 Project of the Year
- Superior civil engineering
- Significant contribution to engineering practice and society



TWI Julie Cousino and David Selhorst accepting award

International Park Storage Basin

Final Completion



International Park Storage Basin –

International Park Improvements



International Park Storage Basin

Nevada Diversion Chamber



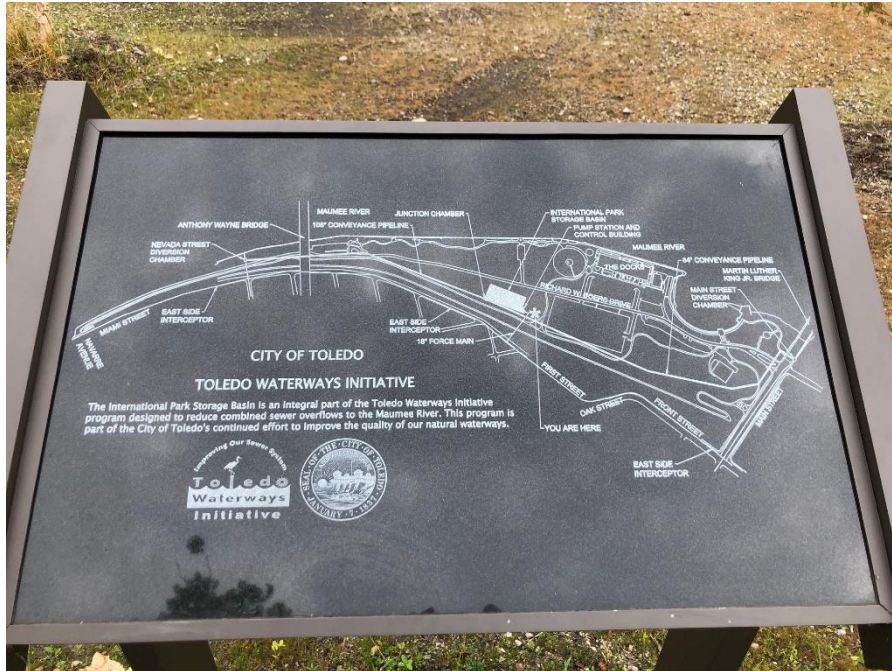
International Park Storage Basin

Control Building and Basin



International Park Storage Basin

TWI Information Signage and Trail Users



Downtown Storage Basin



Downtown Storage Basin

Orange Street Drop Shaft



Downtown Storage Basin –

Adams Street Drop Shaft



Swan Creek North Sewer Separation



Nebraska/City Park Reconstruction



Nebraska/Ewing Intersection - Reconstruction

Swan Creek North Sewer Separation



Miller Street - Surface Course Paving

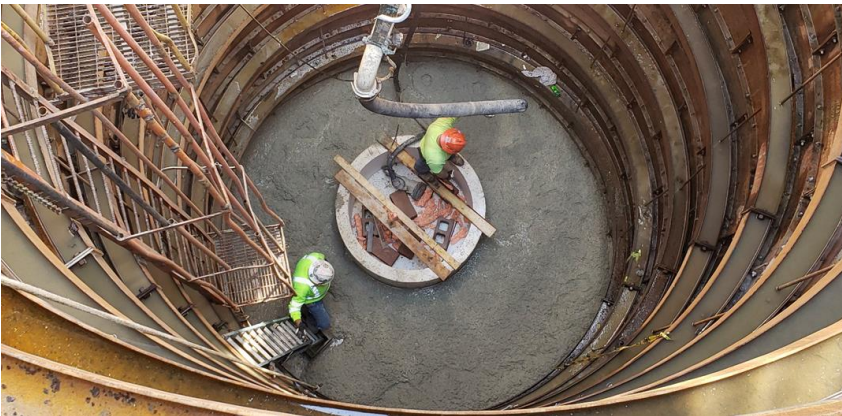


Miller St - Manhole Adjustment

Paine & Fassett Regulator Modifications



Fassett Manhole Slab



Connecting Sewers



Paine Regulator Modifications



Rebar

Concrete Placement/Curing





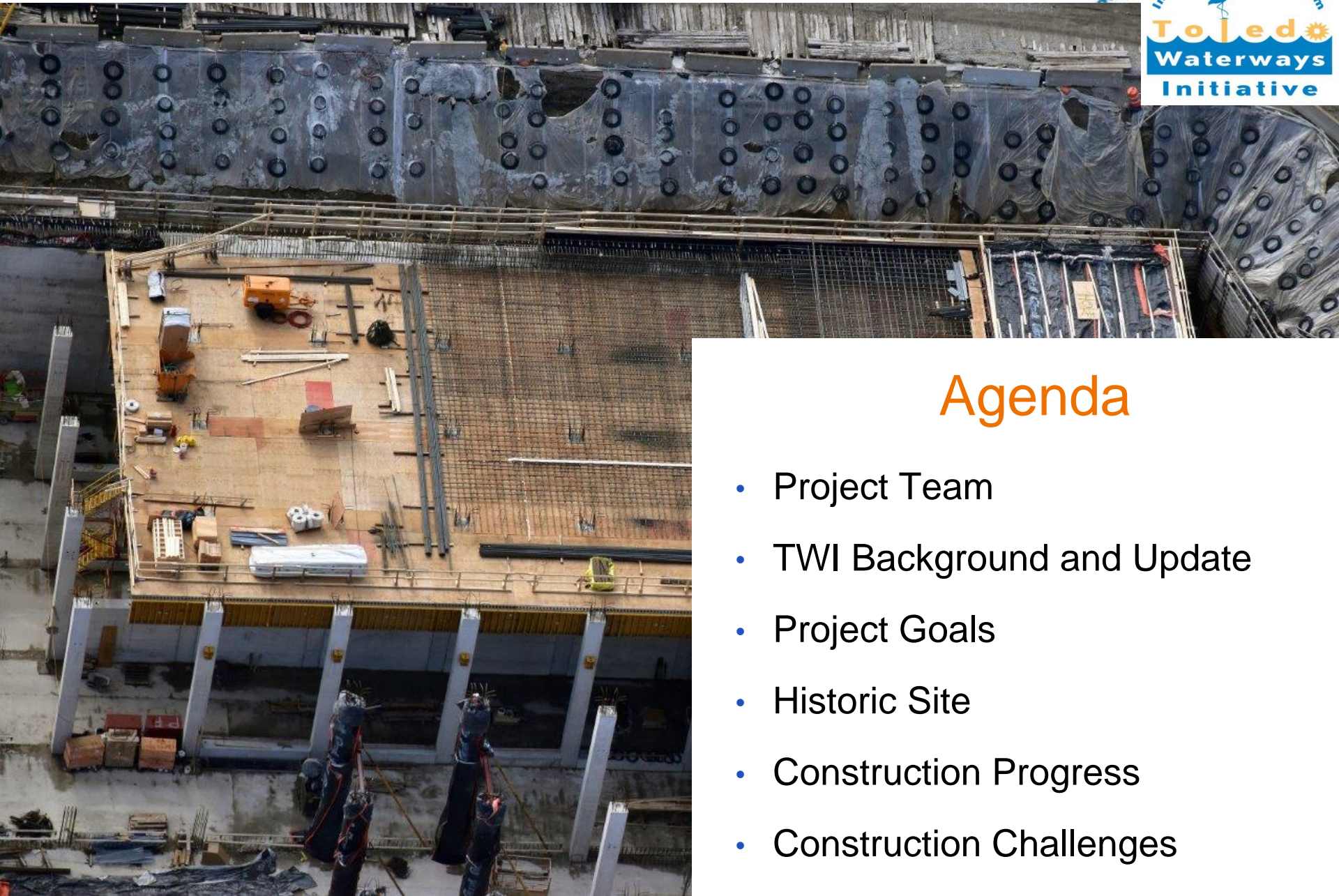
Questions??

Please visit: toledowaterwaysinitiative.com



City of Toledo
Downtown Storage Basin

CPAC Update
July 22, 2019



Agenda

- Project Team
- TWI Background and Update
- Project Goals
- Historic Site
- Construction Progress
- Construction Challenges
- Conclusions

Project Team



- Owner – City of Toledo
- Program Manager – Black & Veatch
- Preliminary Design:
 - Prime Engineer/ SWMM Modeling – Tetra Tech
 - Geotechnical – TTL
 - Transient Modeling of Tunnel – Applied Science, Inc.
 - CFD Modeling – Black & Veatch
- Final Design:
 - Prime Engineer – Stantec
 - Electrical Engineer – DJE
 - Instrumentation & Control – SSOE
 - Survey – Garcia Surveyors & Northwest Consultants, Inc

Project Team



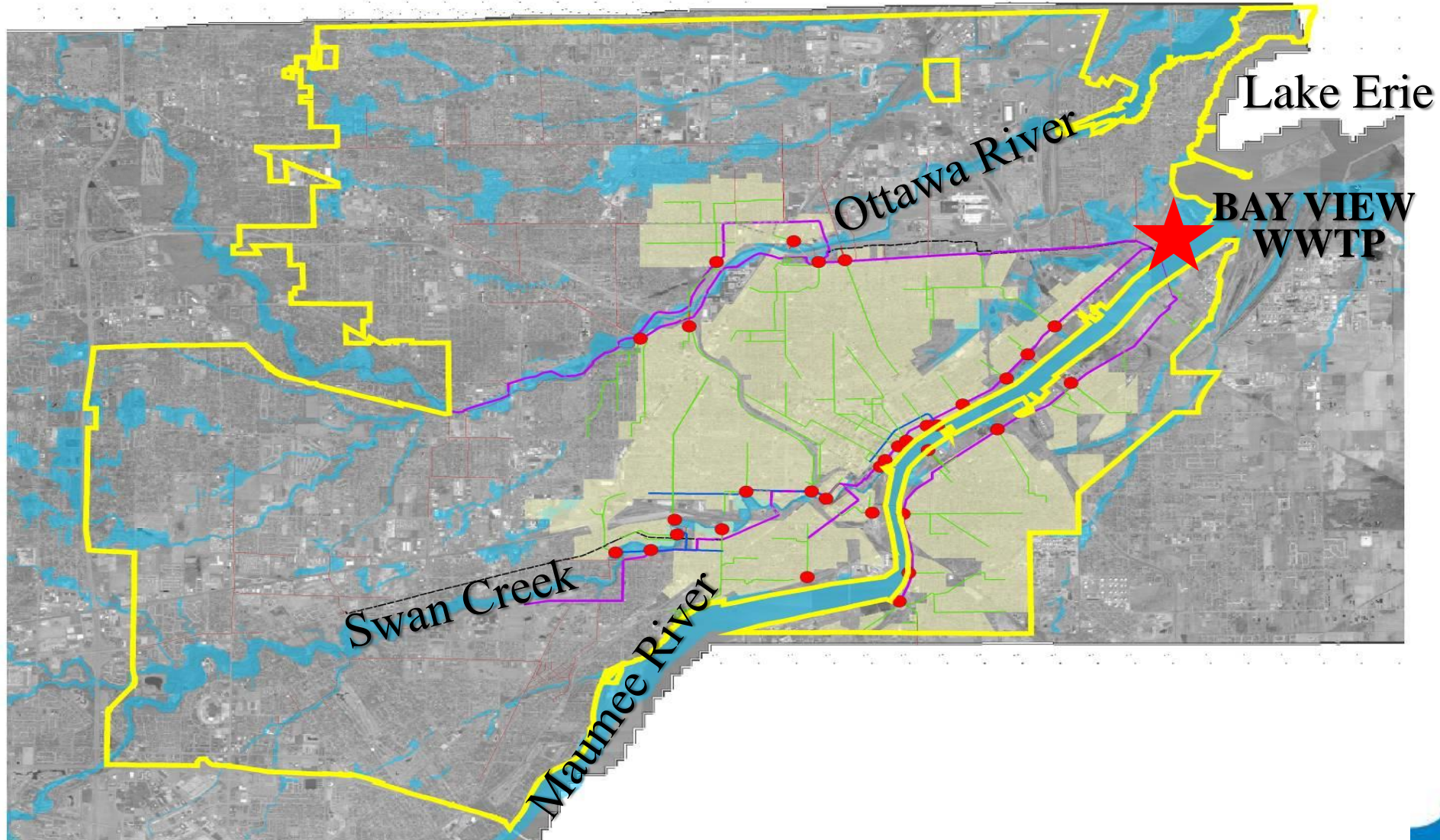
- Construction:
 - Construction Manager – G. Stephens and Black & Veatch
 - Construction Engineering – Stantec
 - Prime Contractor – Kokosing Industrial
 - Electrical Contractor – Transtar Corporation
 - Tunneling Contractor – Turn Key Tunneling



TWI Background and Update – Program Background

- Toledo Waterways Initiative (TWI)
 - Federally mandated program to improve water quality
 - 18-year program at a total cost over \$500 million
 - Three components in the program – Plant, SSDs, CSOs
- In 2002: 32 combined sewer overflow (CSO) locations discharging on average 624 MG per year
- In 2010: USEPA approved Toledo's plan to eliminate 8 CSO locations and significantly reduce CSO volumes
- Downtown Storage Basin (DSB) one of 25 CSO projects
 - Construction Contract = \$44 million

TWI Background and Update – Toledo Wastewater System





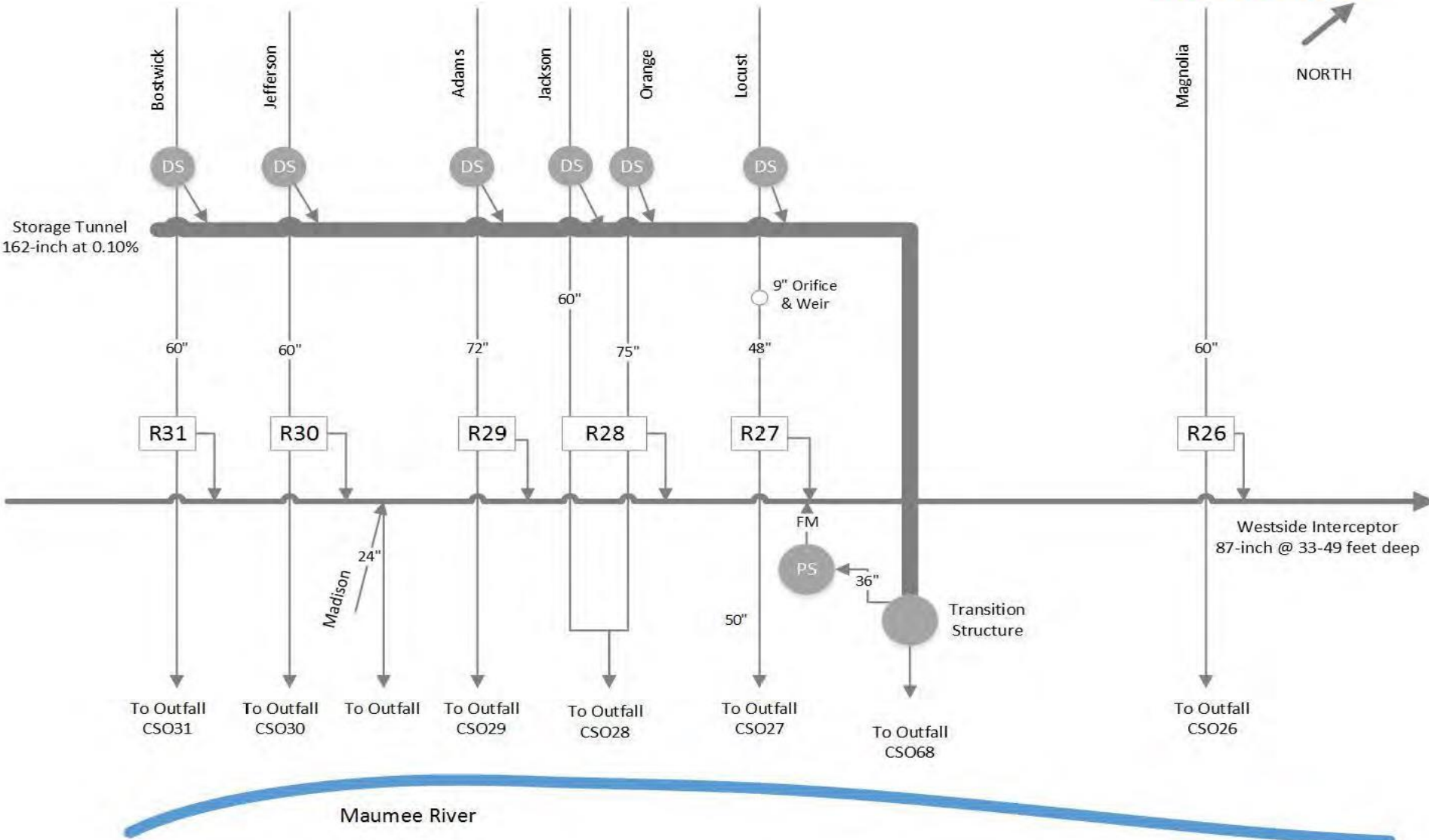
TWI Background and Update – Project History

- 1988-1993 – 3 CSO Storage Tunnels Constructed – Downtown Tunnel, Swan Creek North, Swan Creek South
- Downtown Tunnel (5.75 MG) installed as part of CSO Phases 1 & 2 to provide first flush flow storage for 6 combined sewer systems, dimensions 13.5' I.D., 5,374' L
- Long Term Control Plan (2009) – Improvements to Downtown Tunnel System
- Two Downtown Tunnel Projects – Tunnel Optimization, Downtown Storage Basin

TWI Background and Update – Tunnel Service Area & CSO Locations



NORTH



Project Goals – CSO Reduction Goals (Overflow Statistics)



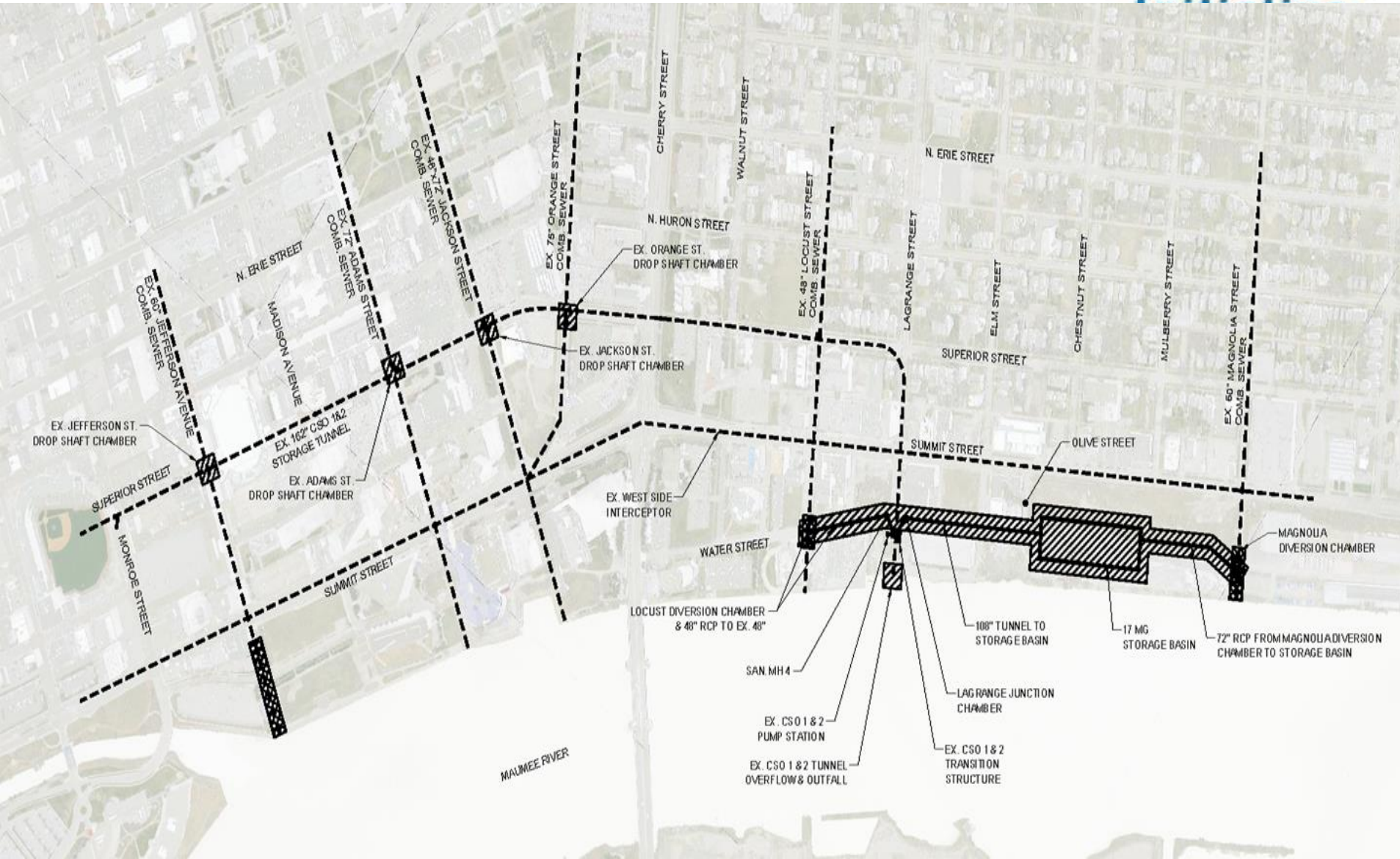
CSO Outfall	Pre-Construction Frequency, Overflows/Year	Volume, MG/Year	Peak Flow, CFS	Post-Construction Allowable Overflows/Year
26 – Magnolia	33.6	33.6	132	Eliminated
27 – Locust	29.6	26.2	130	3
28 – Orange/Locust	15.6	7.8	164	3
29 – Adams	14.2	7.7	121	3
30 – Jefferson	22	12.1	110	3
31 – Monroe	1.2	0.2	22	3
68 – Tunnel/ CSO1&2	16.8	144.7	529	3
Total	34	232.3	1,210	3



Project Goals

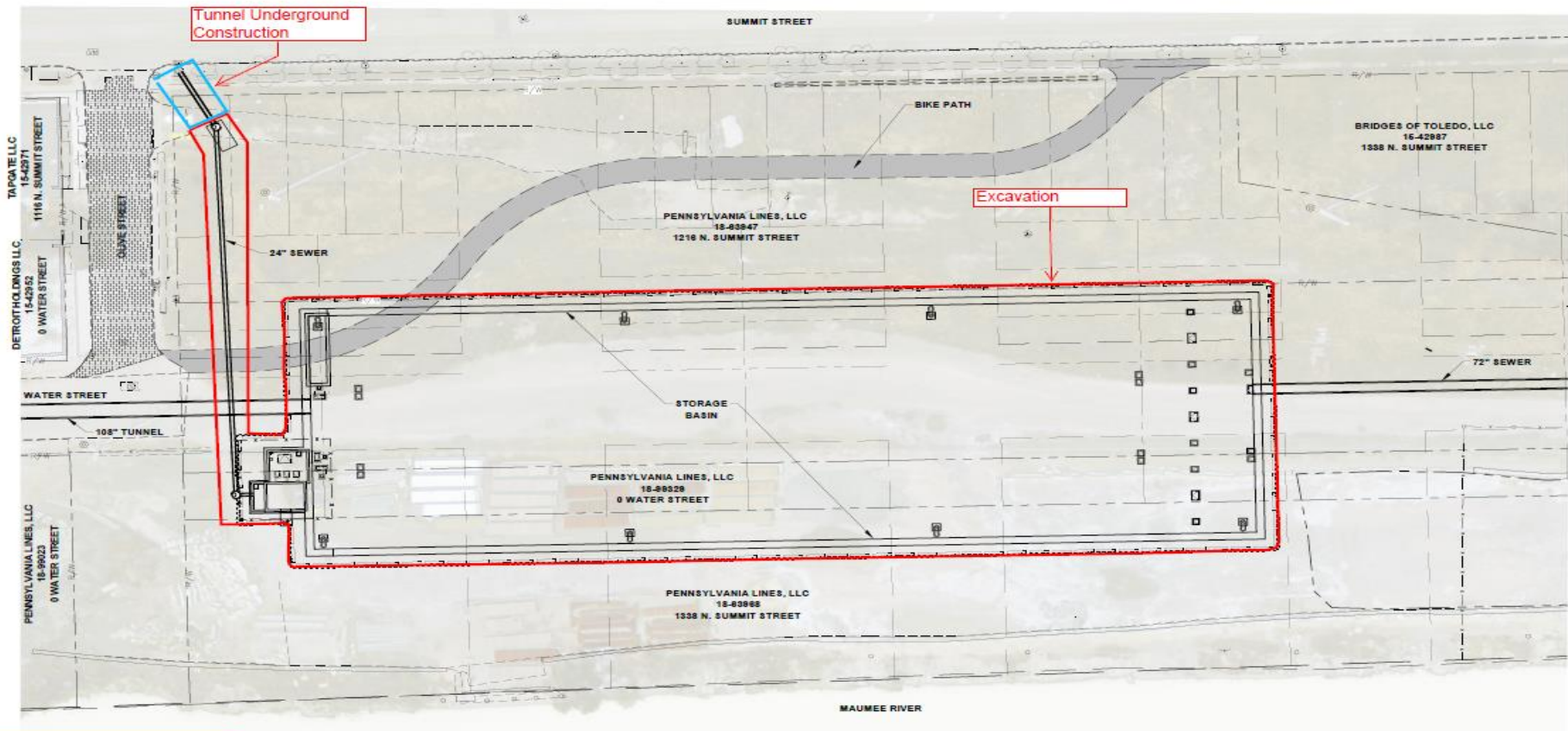
- 17 MG storage basin
- 108-inch connection from the Tunnel Transition Structure to the basin
- 72-inch connection from the Magnolia (CSO 26) outfall to the basin
- 48-inch connection from the Locust (CSO 27) outfall to the Tunnel Transition Structure
- Modifications to four existing tunnel drop shafts

Project Sites



Final Design – 17 MG Basin

- Storage Basin and Bike Path
- Basin Dimensions 163'W x 552'L x 50'D



PRELIMINARY

STORAGE BASIN AND BIKE PATH

Historic Site Photos – View From Downtown 1940s



Historic Site Photos – Train Bridge to Site



Historic Site Photos – Train Depot / Site



1-2125

Water Street Project Site



BASIN SITE

WATER STREET



Construction Challenges – Buried Infrastructure / Debris



Construction Challenges – Buried Infrastructure / Debris



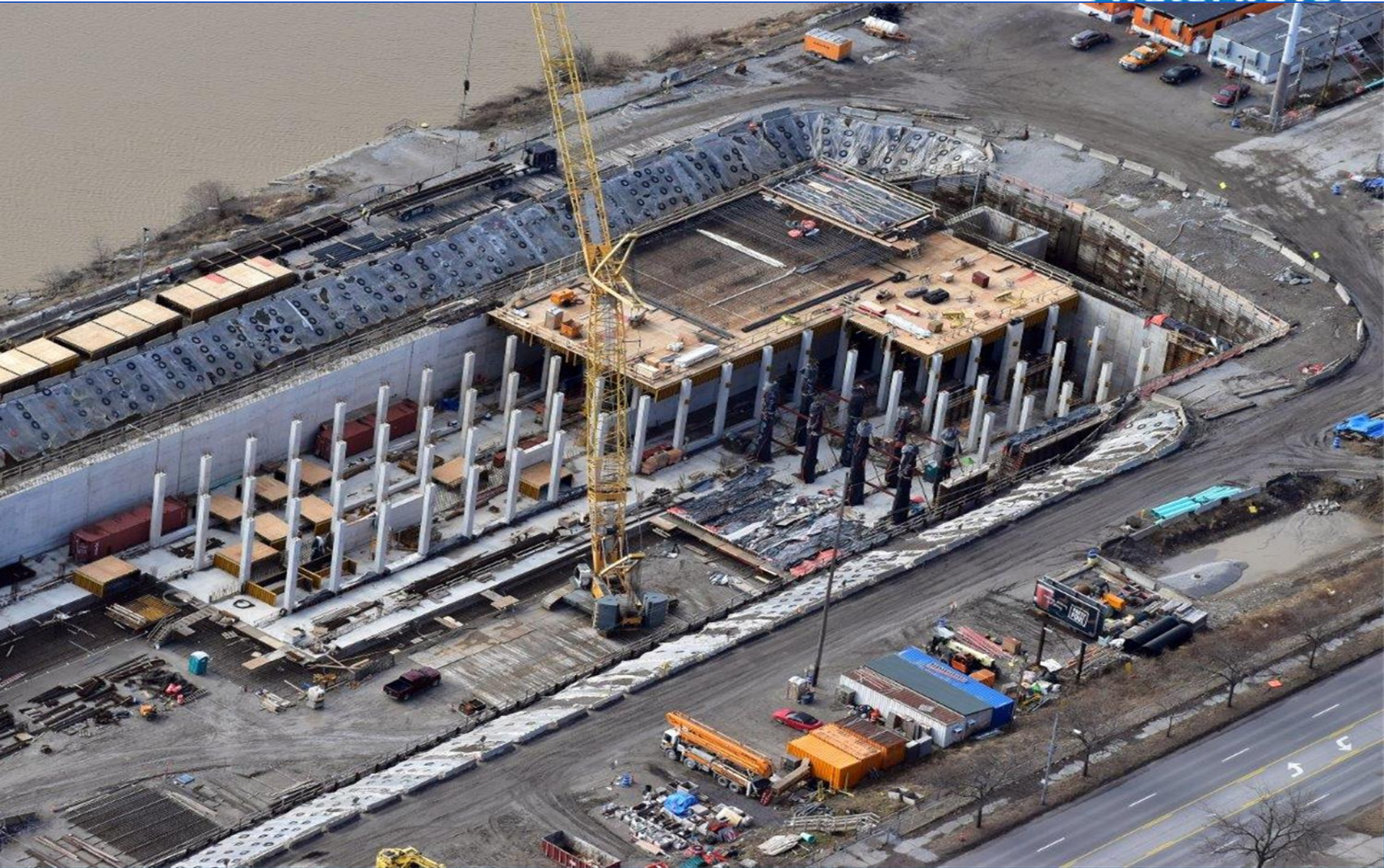
Construction Challenges – Dewatering



Construction Challenges – Dewatering



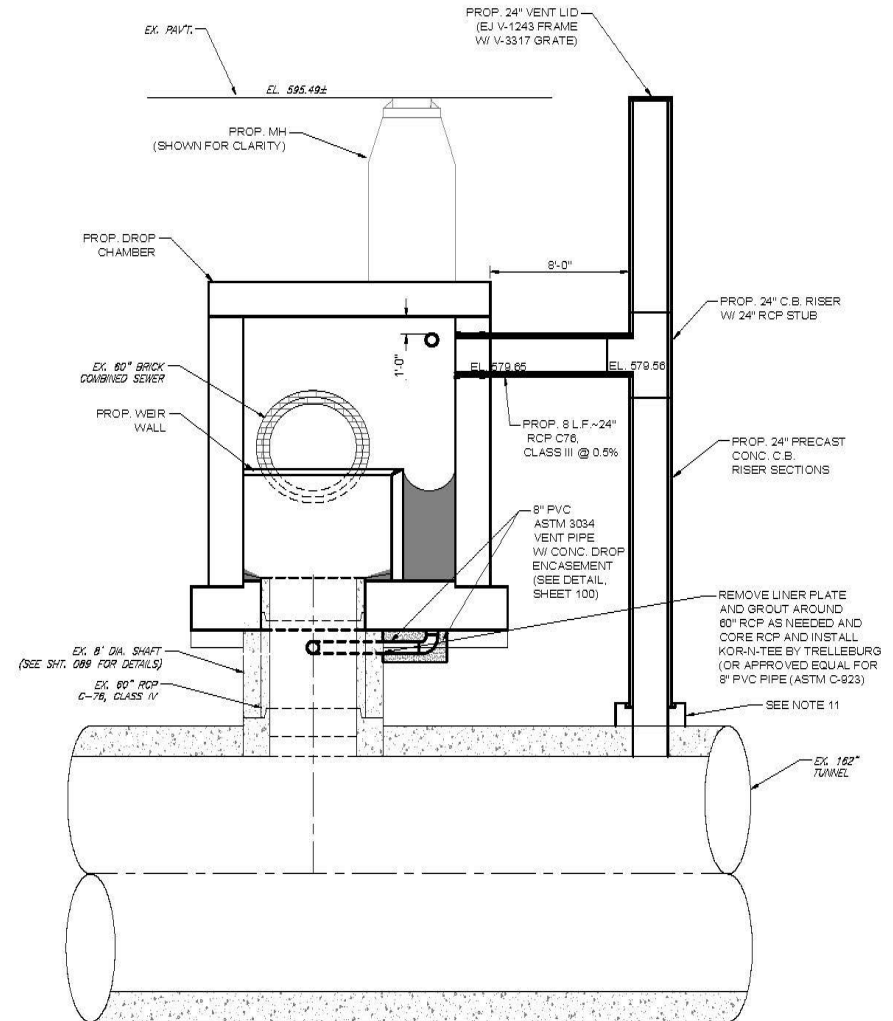
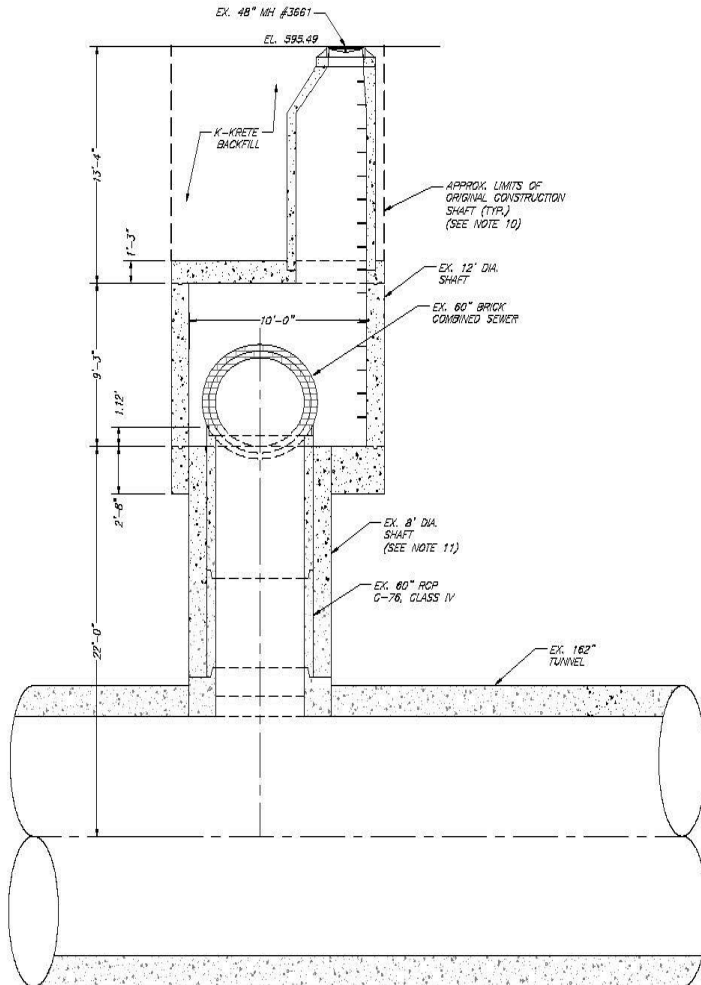
Construction Progress – Basin



Construction Progress – Basin



Drop Shaft Structures



Construction Progress – Drop Shaft Structures



Jackson / Superior Drop Shaft Construction
Photo Taken by David Patch, Photographer for The Toledo Blade

Construction Progress – Drop Shaft Structures



Construction Progress – Drop Shaft Structures



Adams / Superior Drop Shaft Construction

Construction Progress – Drop Shaft Structures



Orange / Superior Drop Shaft Construction

Construction Challenges – Urban Construction

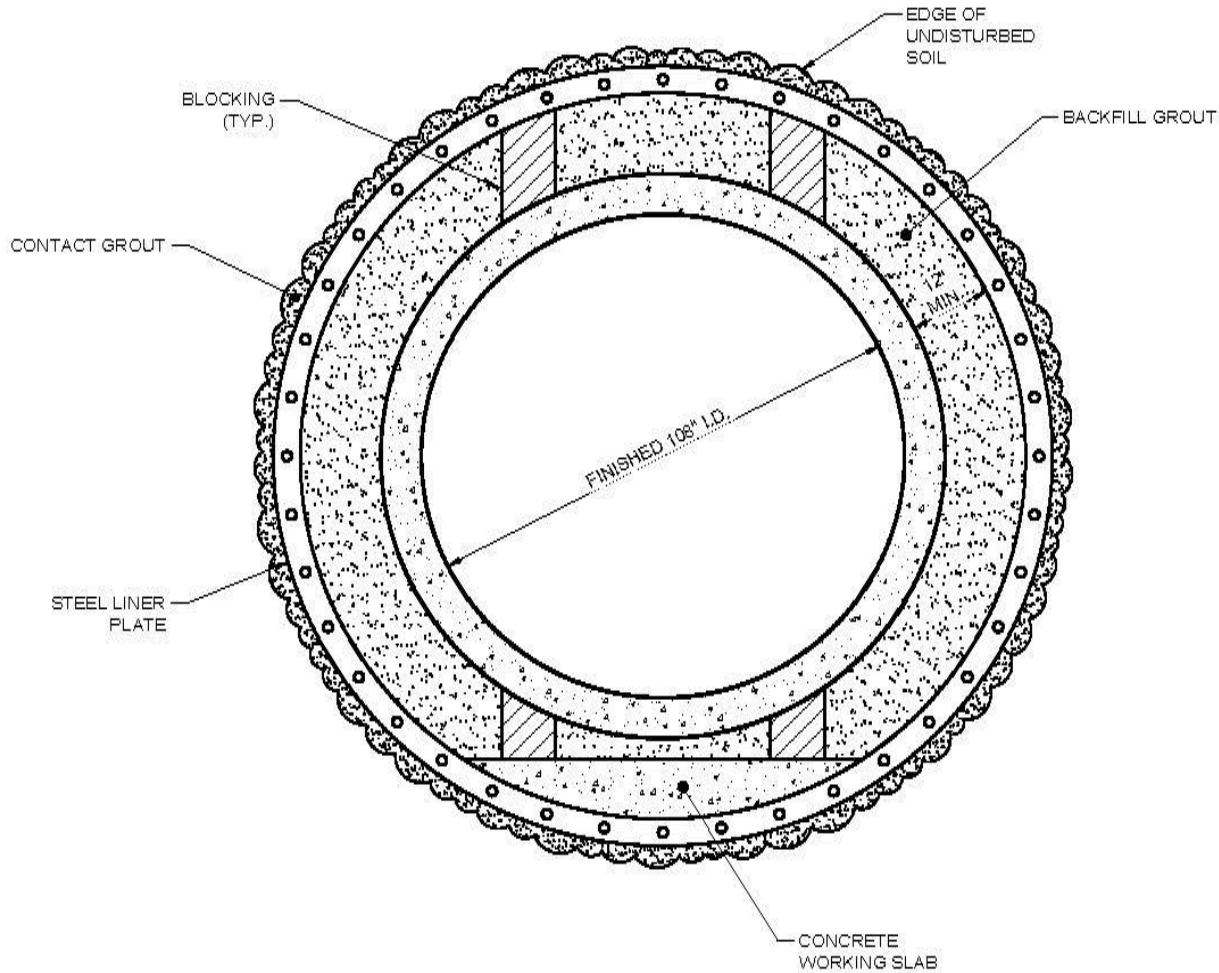


Construction Challenges – Geotechnical Instrumentation



11/27/2017 08:17

108"/110" Tunnel Design



HAND MINED TUNNEL SECTION
N.T.S.

Construction Progress – Tunnel



Construction Progress – Tunnel



Construction Progress – Tunnel



Construction Progress – Tunnel



Construction Progress – Basin

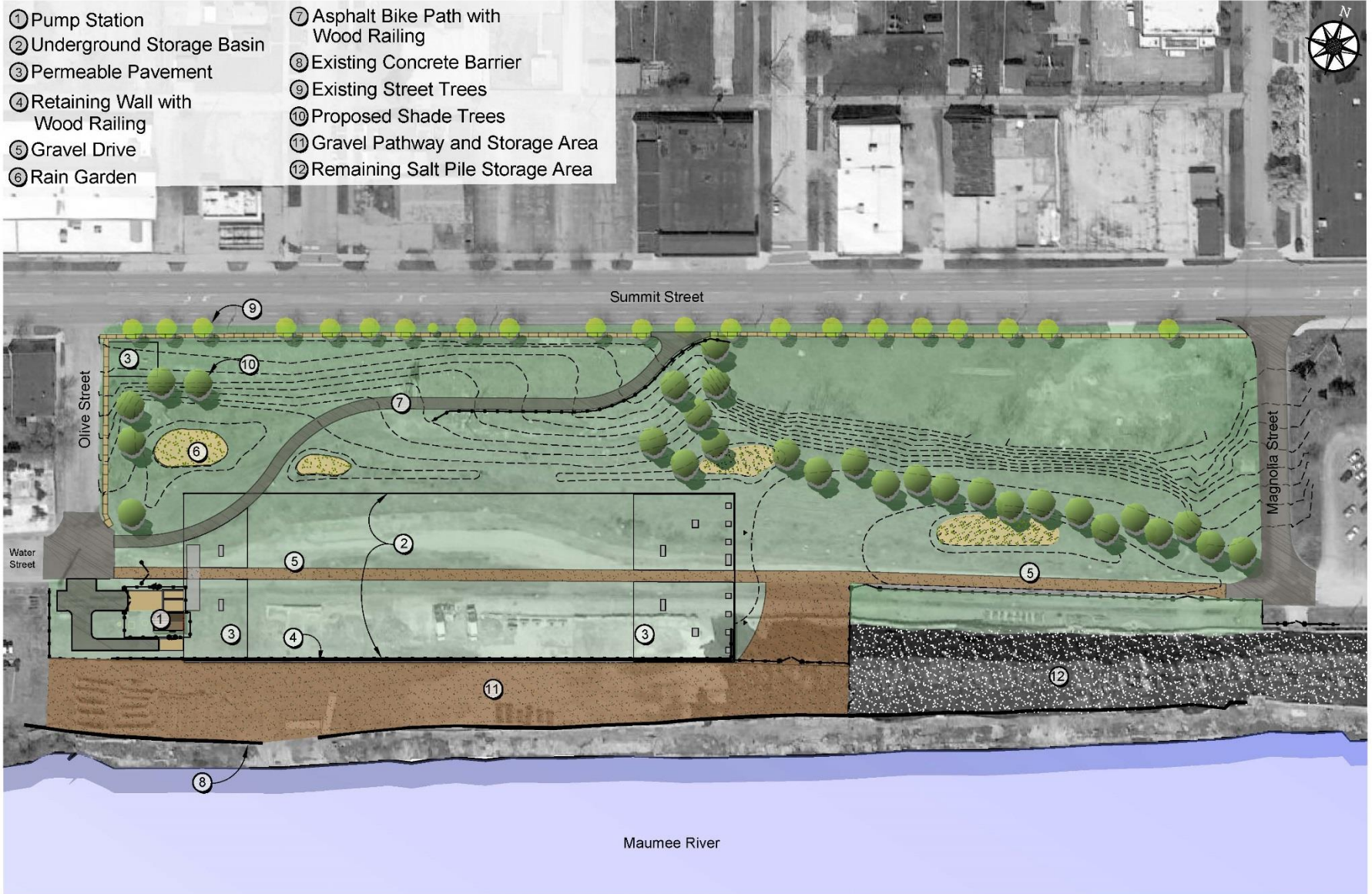


Construction Progress – Basin



Post Construction Rendering

- ① Pump Station
- ② Underground Storage Basin
- ③ Permeable Pavement
- ④ Retaining Wall with Wood Railing
- ⑤ Gravel Drive
- ⑥ Rain Garden
- ⑦ Asphalt Bike Path with Wood Railing
- ⑧ Existing Concrete Barrier
- ⑨ Existing Street Trees
- ⑩ Proposed Shade Trees
- ⑪ Gravel Pathway and Storage Area
- ⑫ Remaining Salt Pile Storage Area



Post Construction Rendering



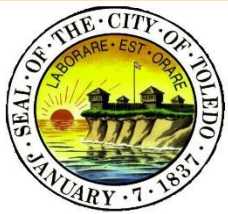
Post Construction Rendering





Conclusions

- Planning and public outreach is critical.
 - Work with the nearby business and residents to communicate impacts to them.
- Pre-construction exploratory excavation.
 - Will prevent delays and minimize changes.
- A project team with a common goal of successfully completing the project.
 - A collaborative and flexible project team including the owner, contractor, construction manager, and engineer.



Questions ?

