

City of Wheeling

Mayor – Glenn F. Elliott, Jr.

City Manager – Robert Herron

Council

1st Ward – Chad Thalman

2nd Ward – Ken Imer

3rd Ward – Brian Wilson

4th Ward – Wendy Scatterday

5th Ward – Ty Thorngate

6th Ward – Dave Palmer

Public Works Committee Meeting

September 15, 2016

Chair – Brian Wilson

Vice-Chair – Wendy Scatterday

Member – Dave Palmer

Public Works Department

Water Pollution Control

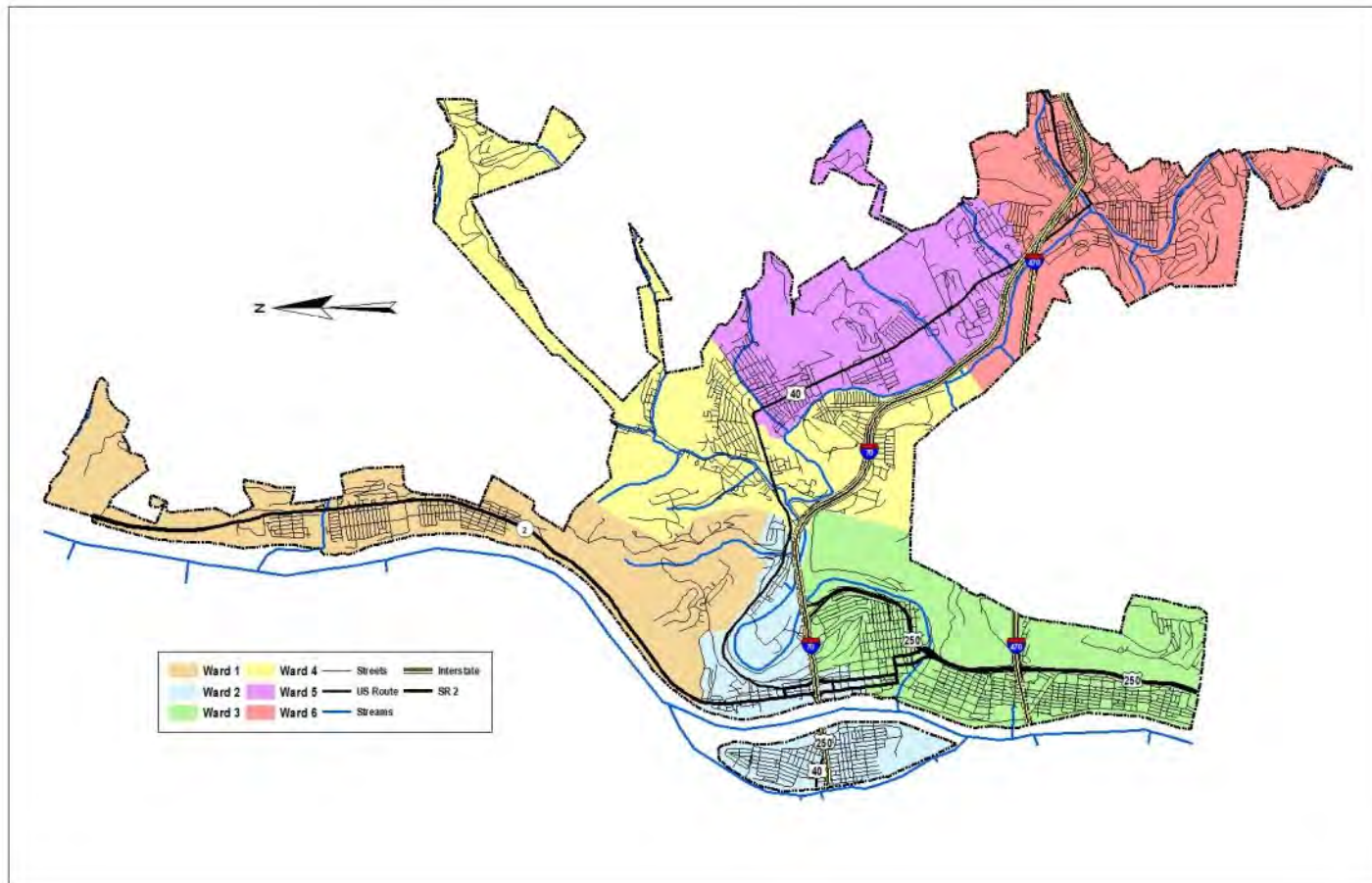
Director – Russell Jebbia

Plant Superintendent – Dan Villani

Summary of Presentation

- ❑ Sewer System Historical Development
- ❑ System Elements
- ❑ Completed Phase I & II Projects
- ❑ Regulatory Compliance Considerations
- ❑ Failing Infrastructure
- ❑ Asset Management and Future Capital Improvements

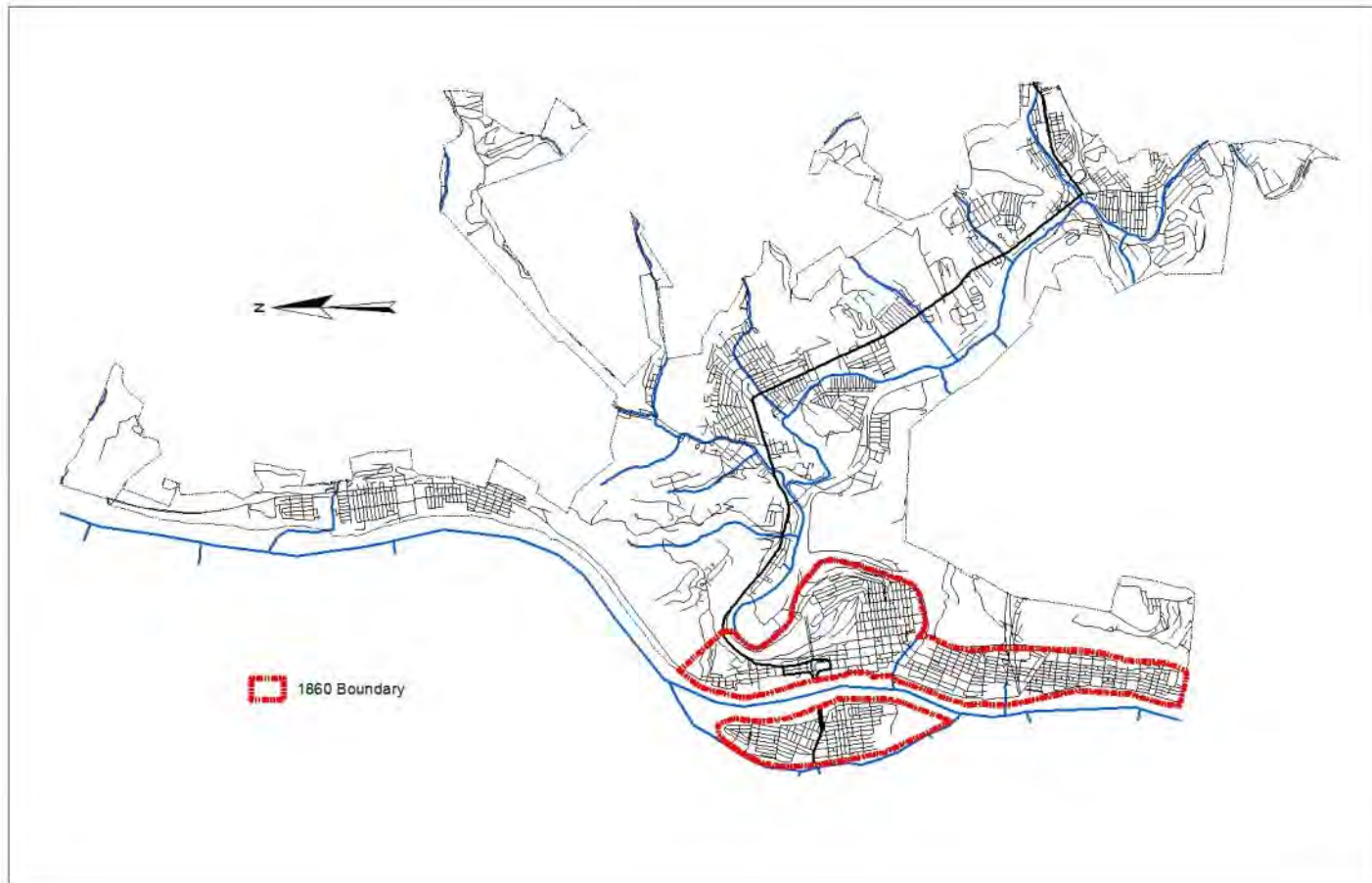
City Map with Wards



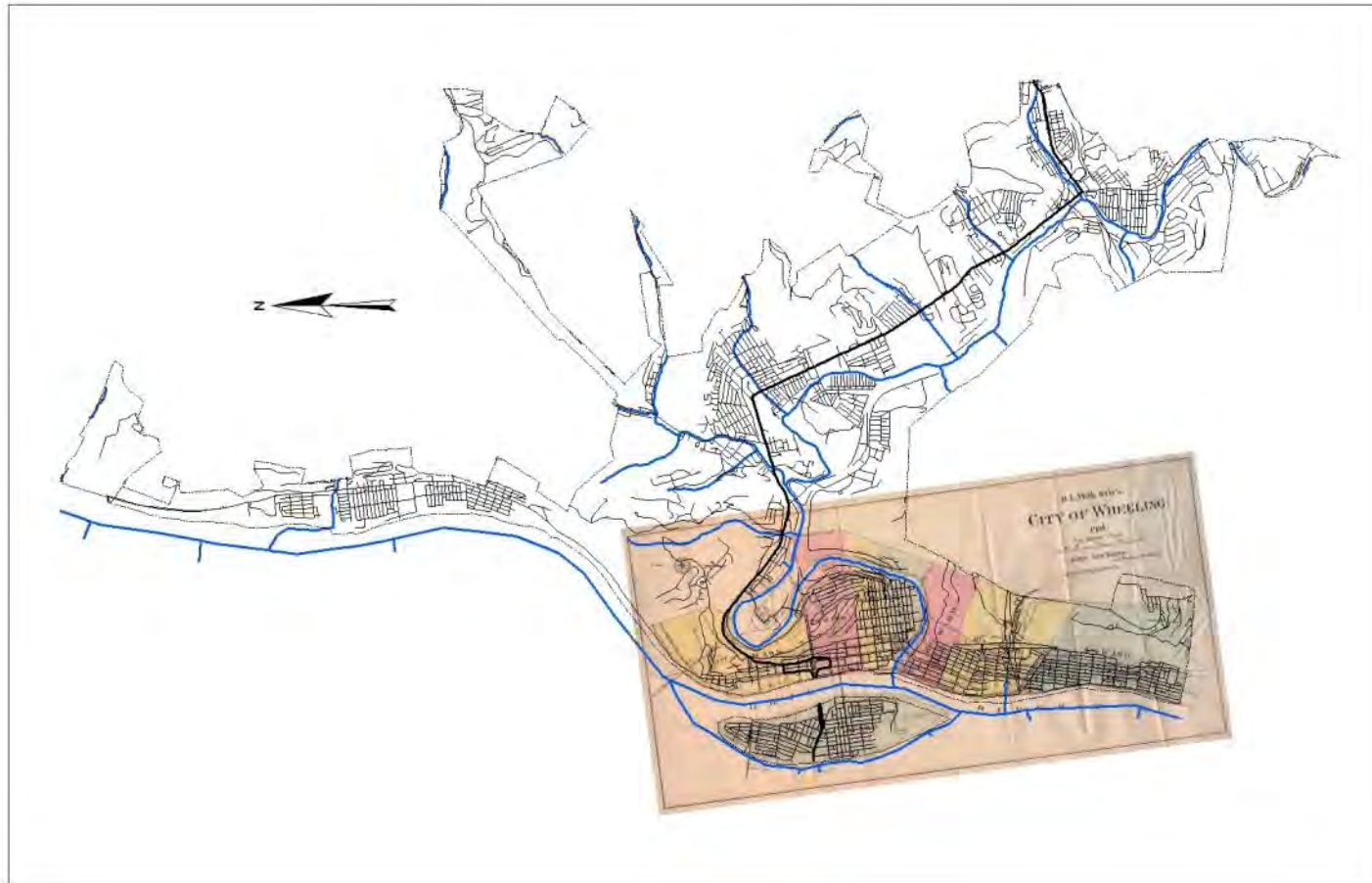
City Map 1870



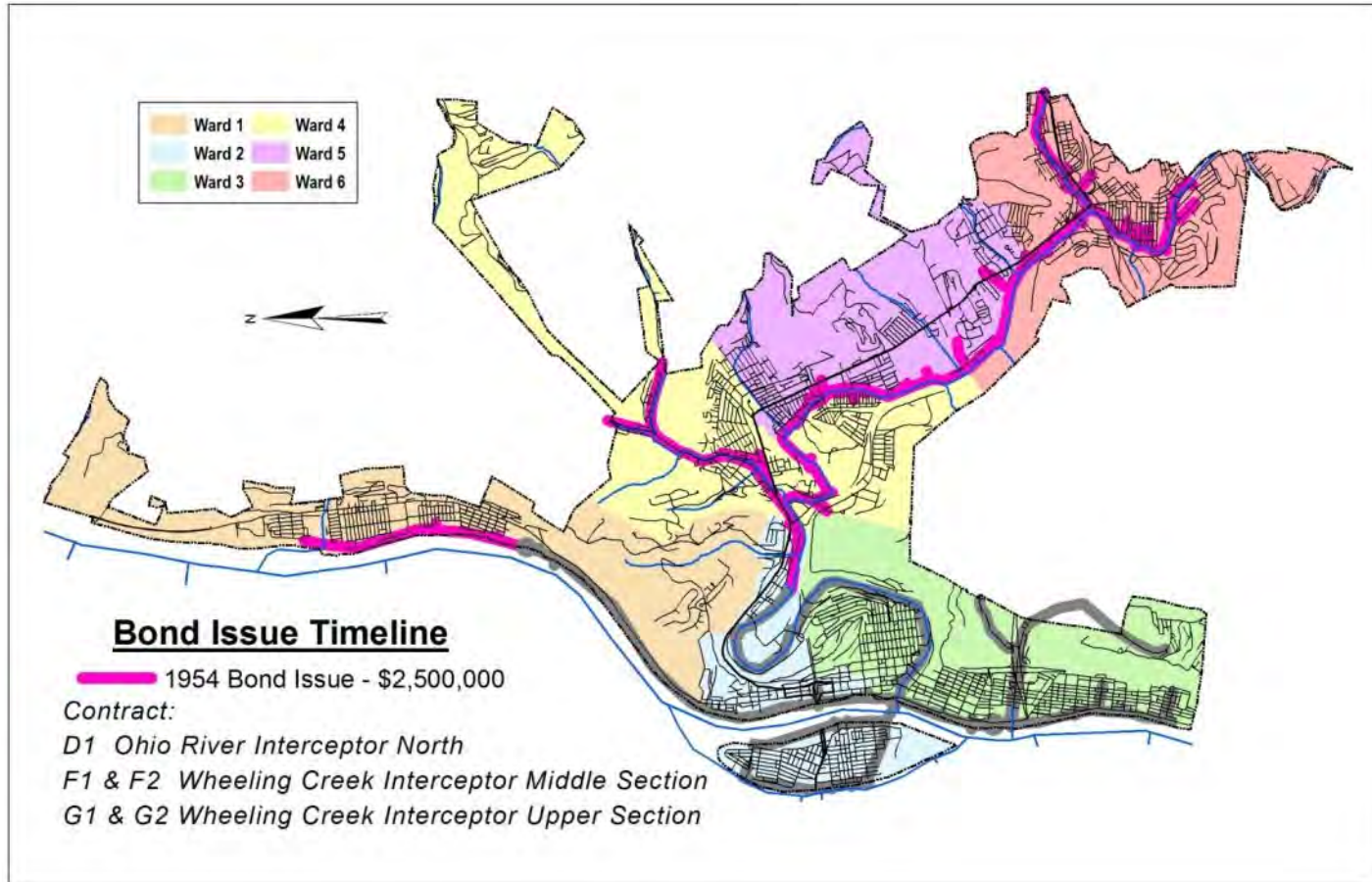
City Map 1870



City Map 1916



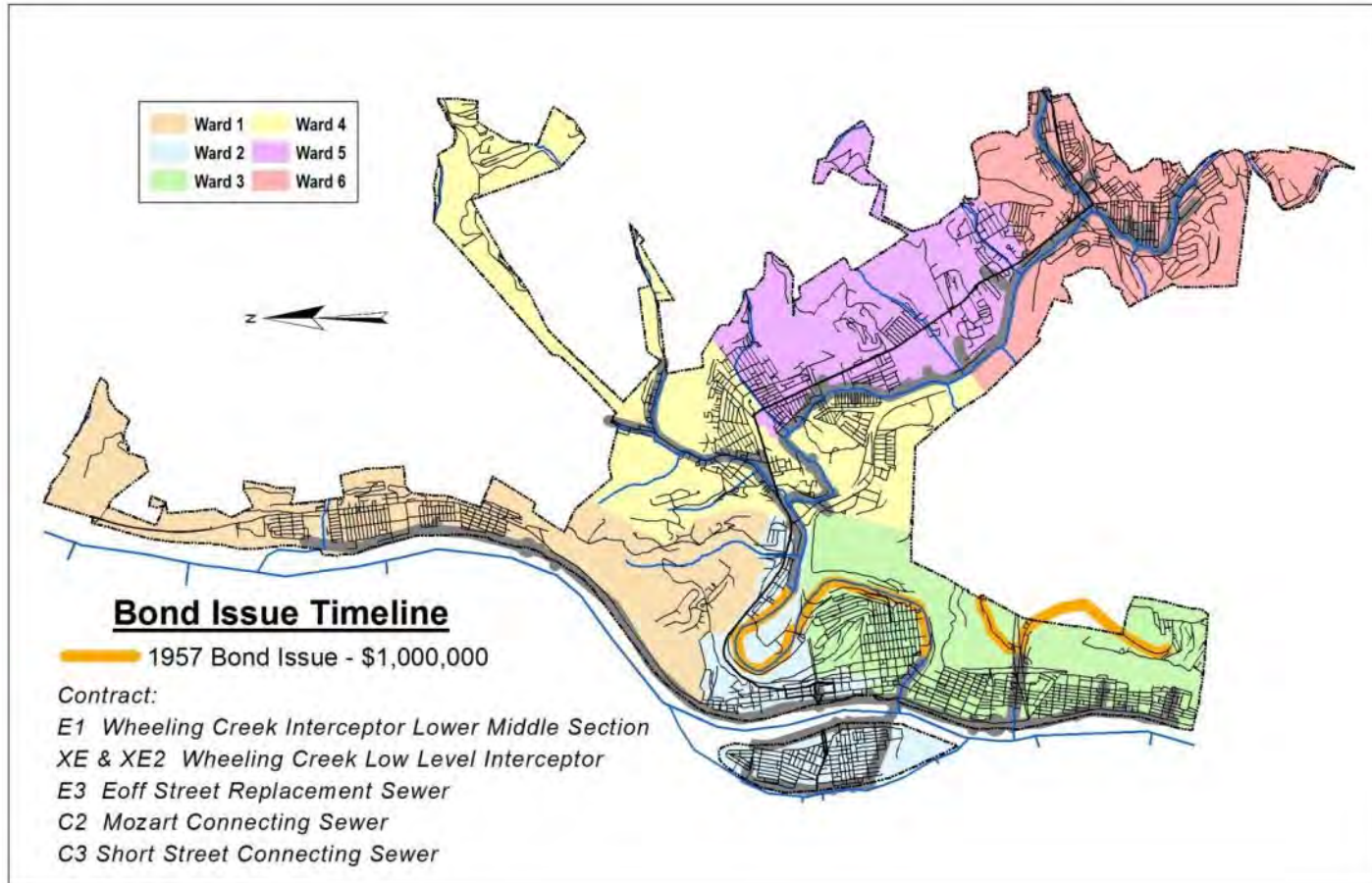
City Map 1954



* Today's Cost ~ \$22.4 Million

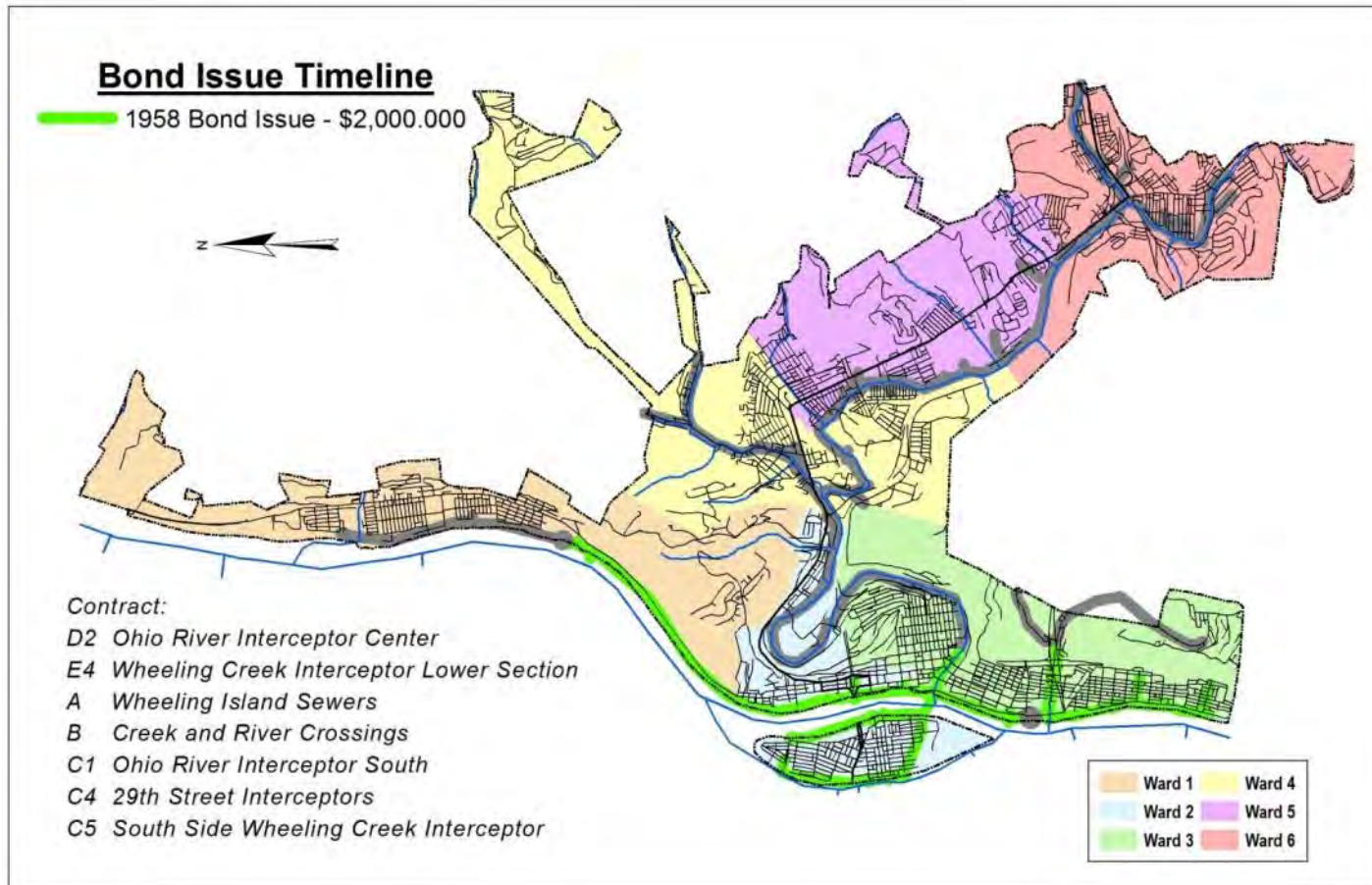
(Source: US Inflation Calculator)

City Map 1957



* Today's Cost ~ \$8.6 Million
(Source: US Inflation Calculator)

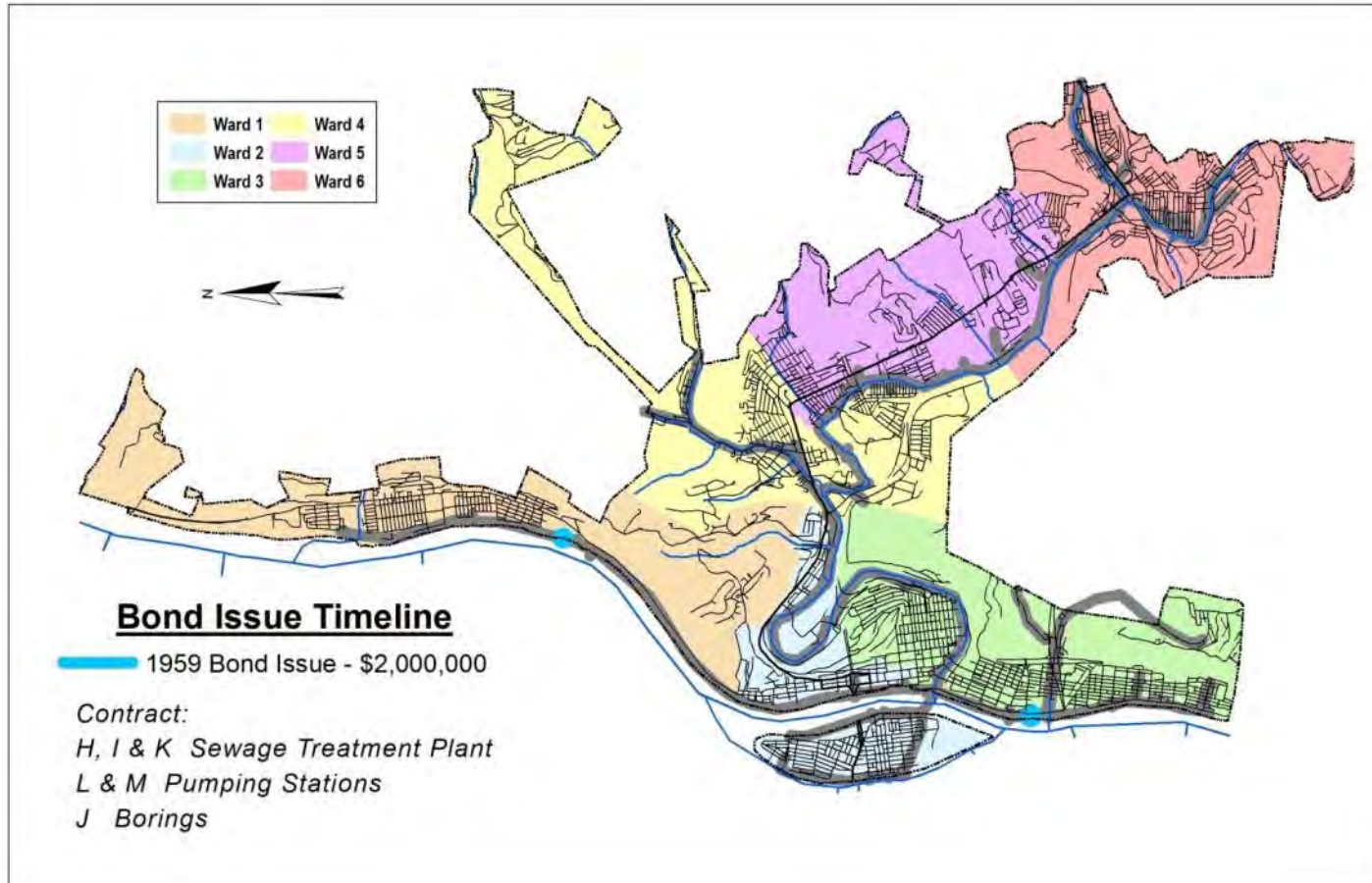
1958 Improvements



* Today's Cost ~ \$16.7 Million

(Source: US Inflation Calculator)

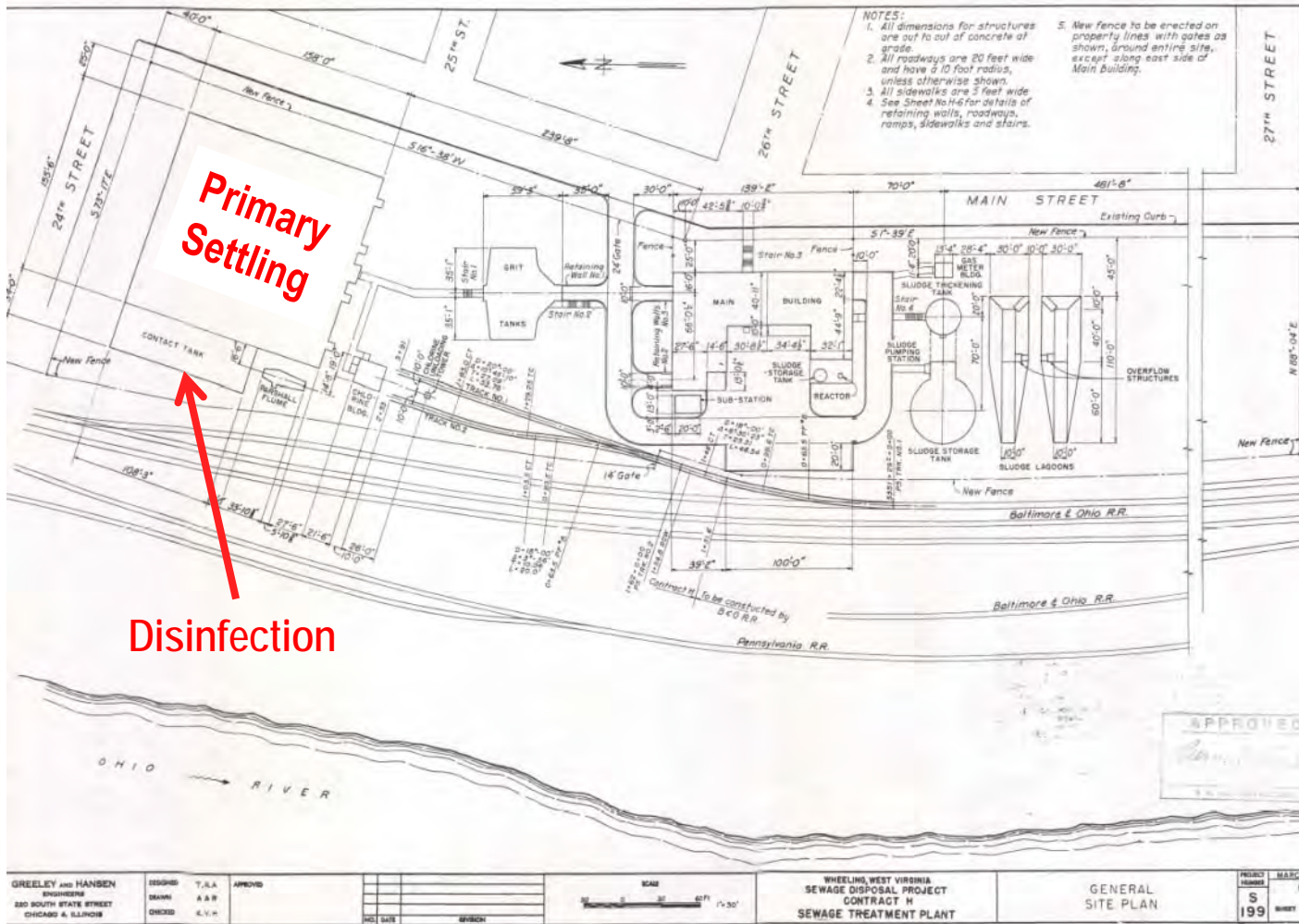
1959 Improvements



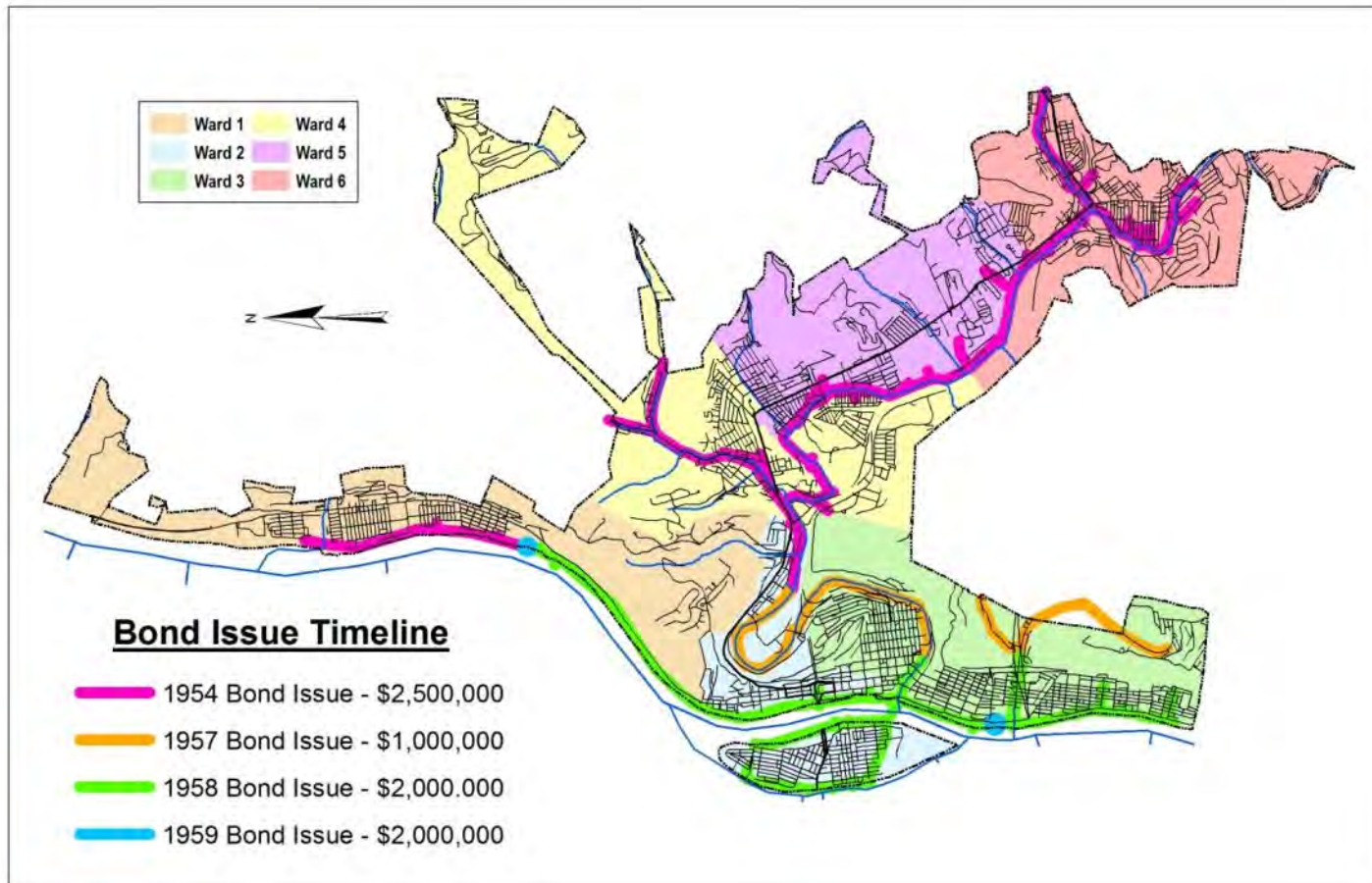
* Today's Cost ~ \$16.5 Million

(Source: US Inflation Calculator)

1959 Improvements



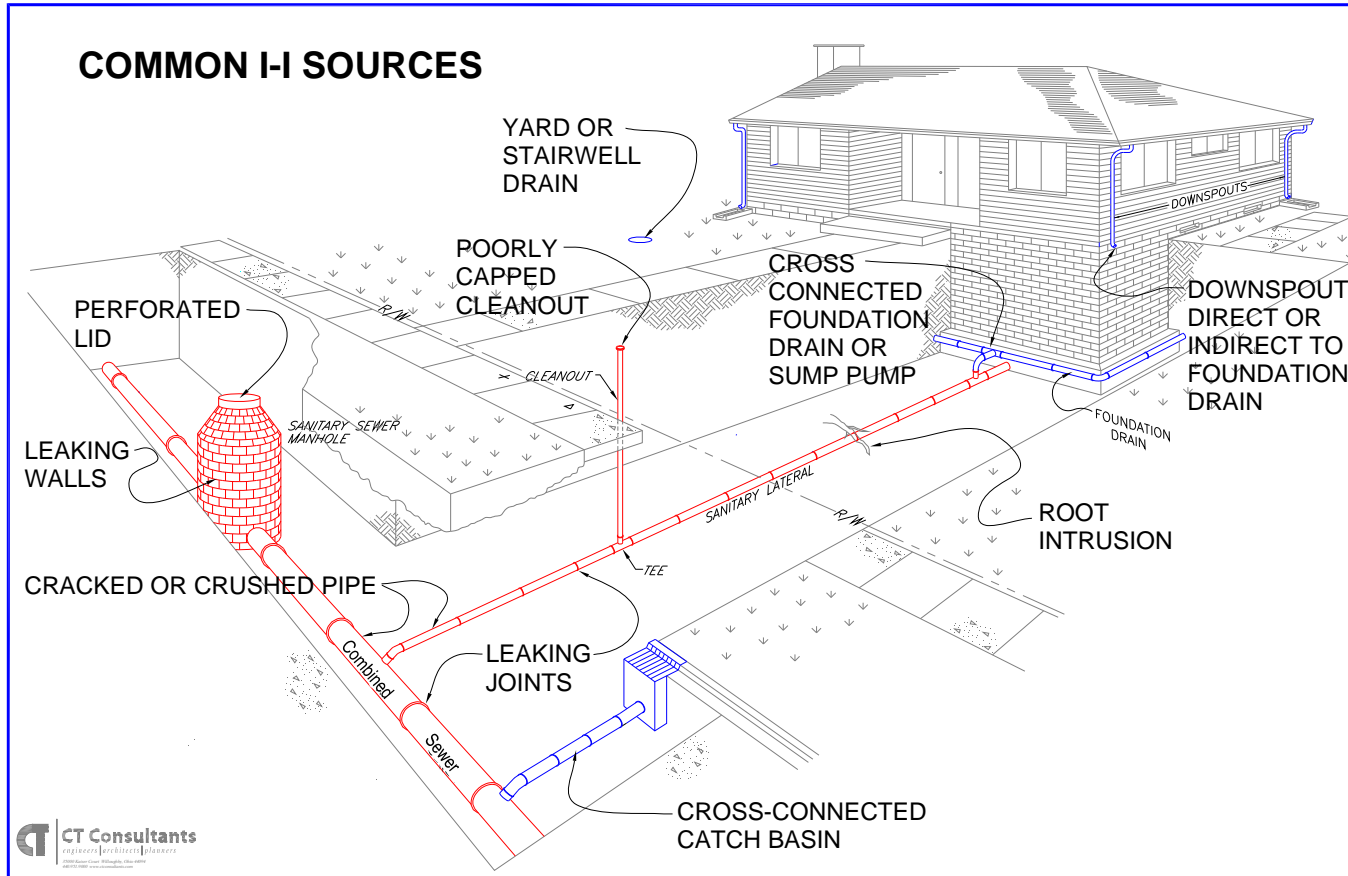
1960 Summary of Wheeling's Wastewater System



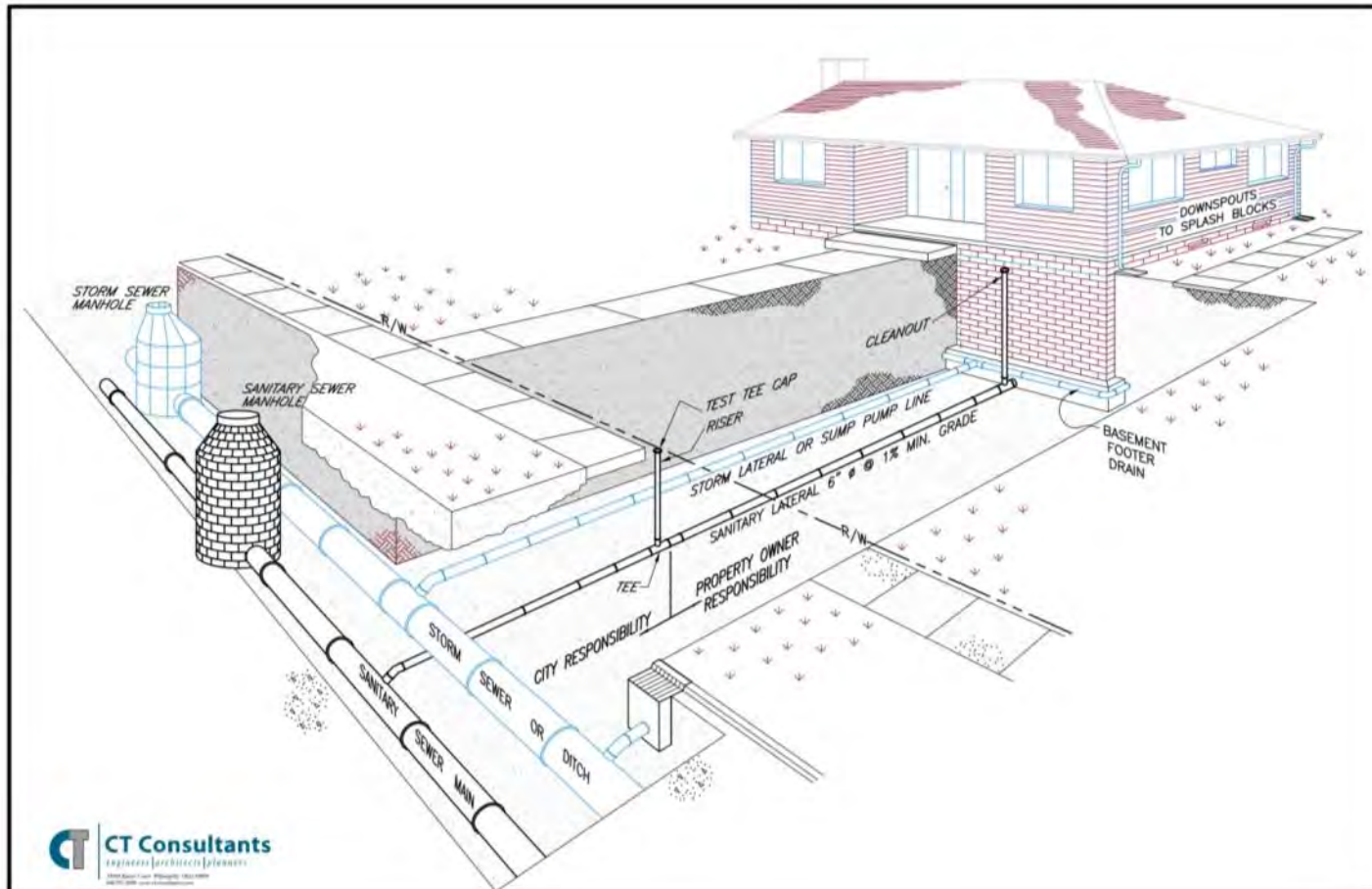
Today's Costs

\$22.4 Mill
\$8.6 Mill
\$16.7 Mill
\$16.5 Mill

Typical Wheeling Combined Sewer System House Connection

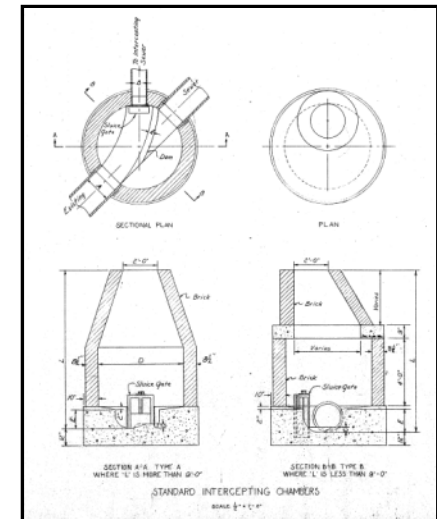


Preferred House Connection to Separate Sewer System

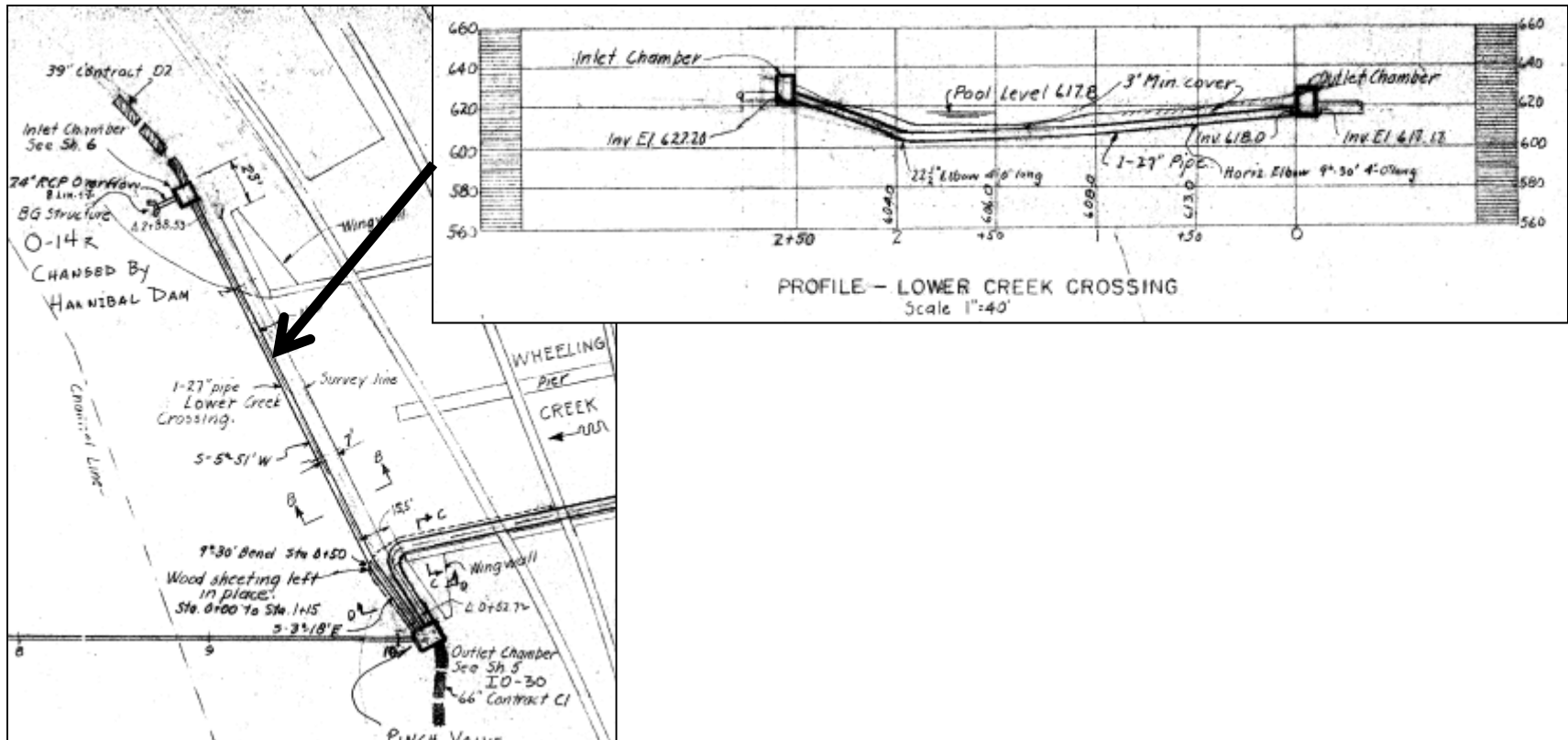


1960 Combined Sewer System Connections to Interceptors and Overflows

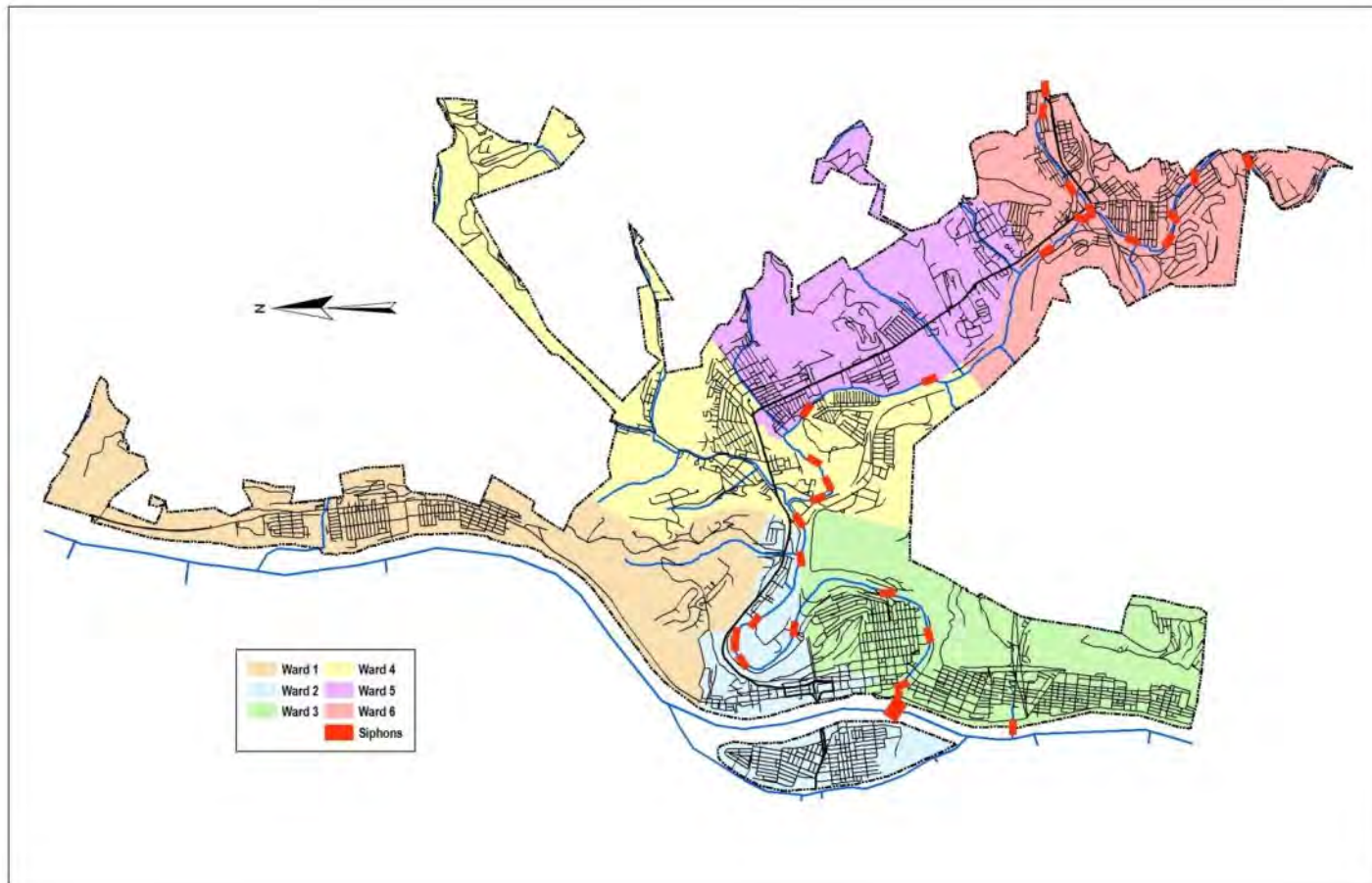
- 256 overflows in the system of various configurations



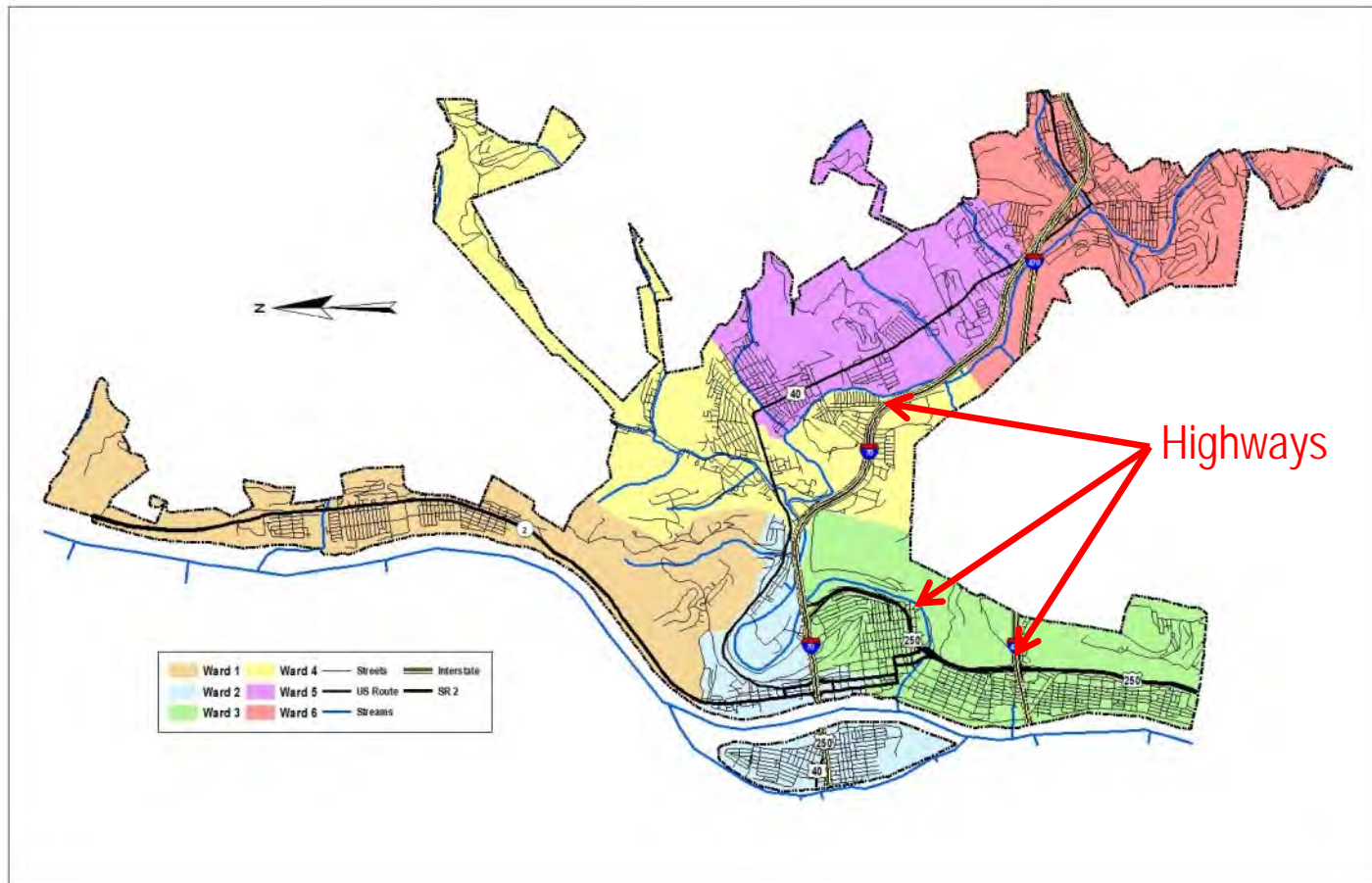
Typical Siphon for Creek Crossings



Siphon Locations



Mid 1960 Development

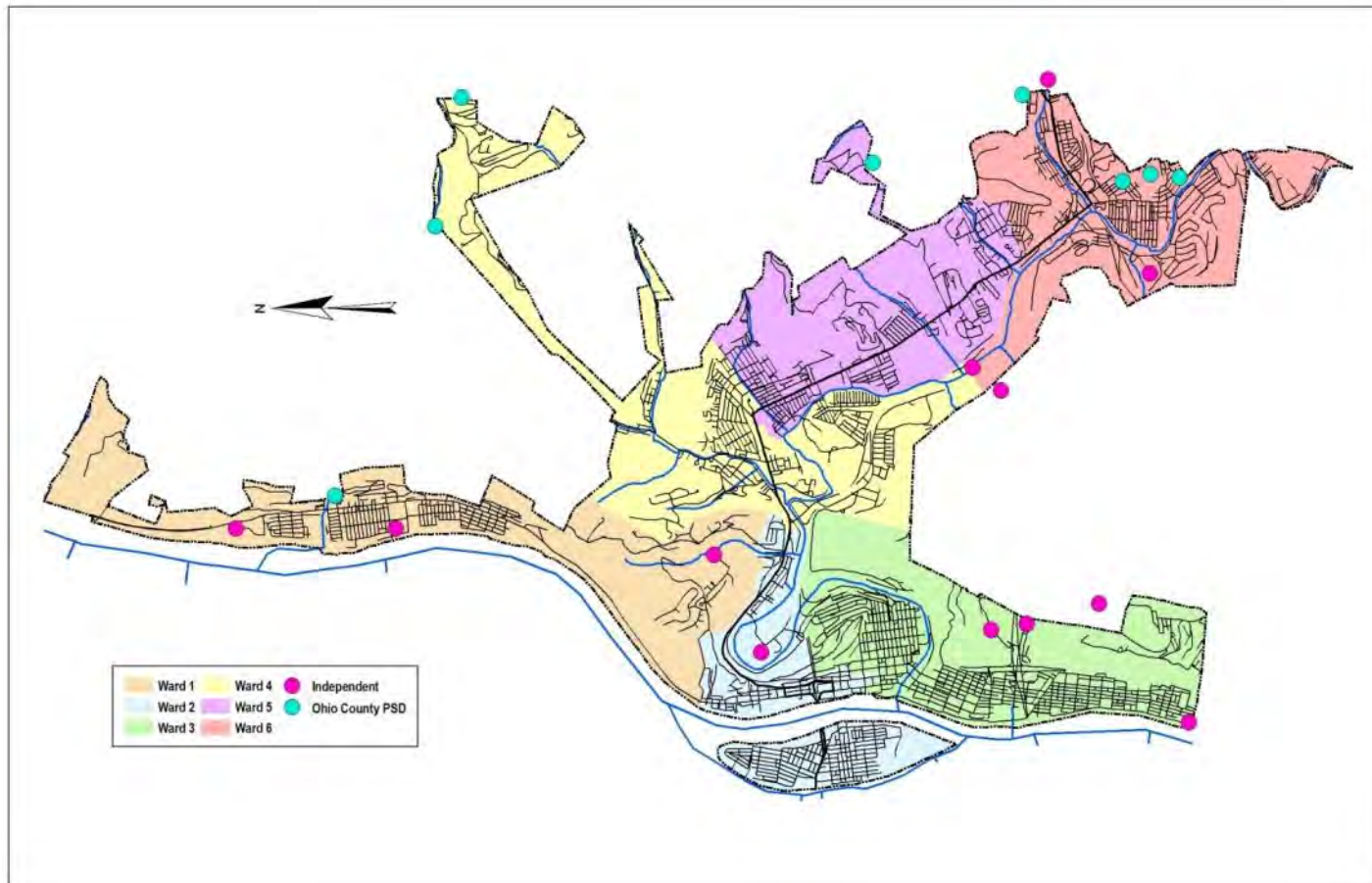


1977 to 1984 WWTP Expansion

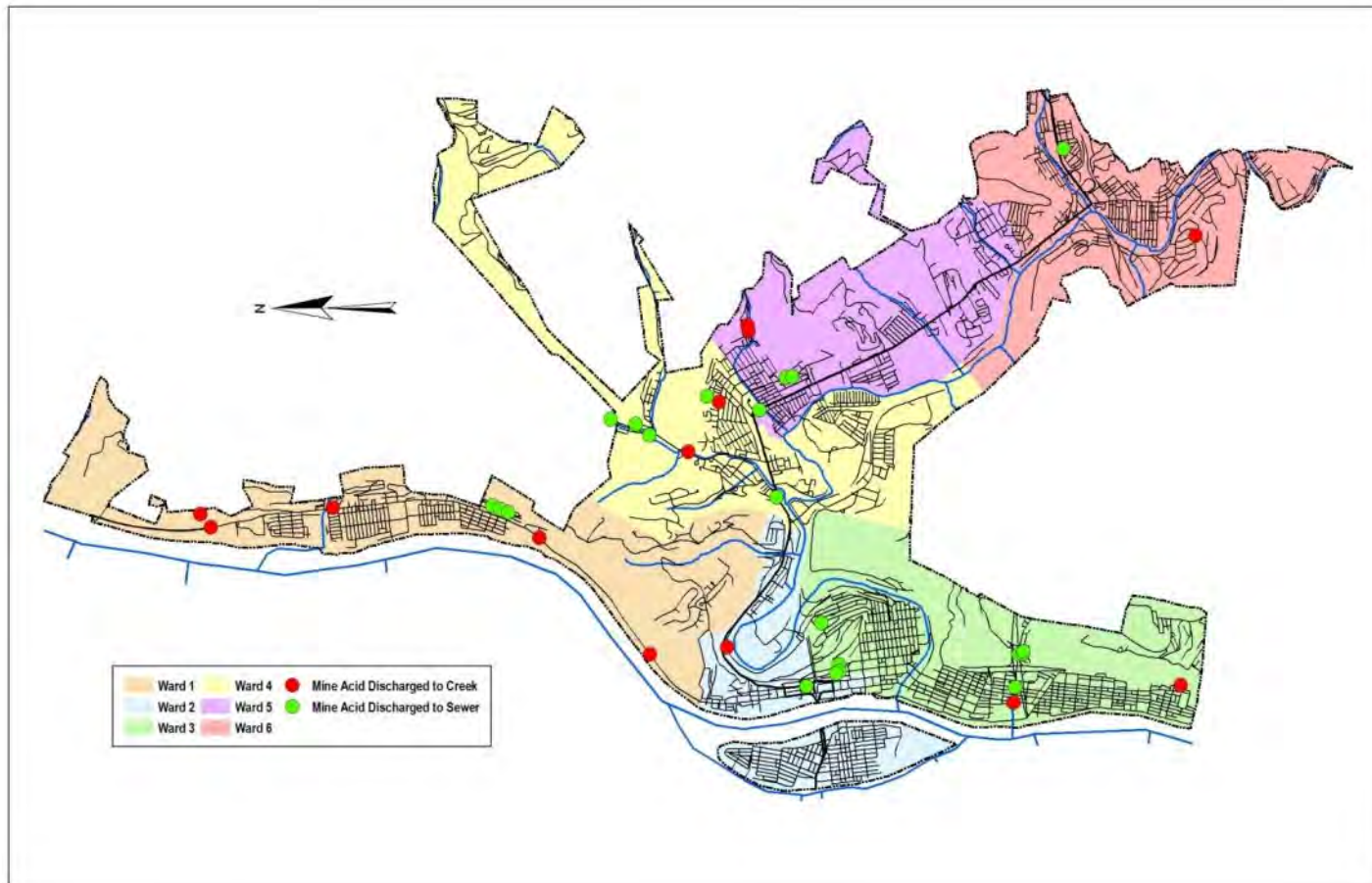
□ Secondary Treatment



Outside Customers



Acid Mine Locations





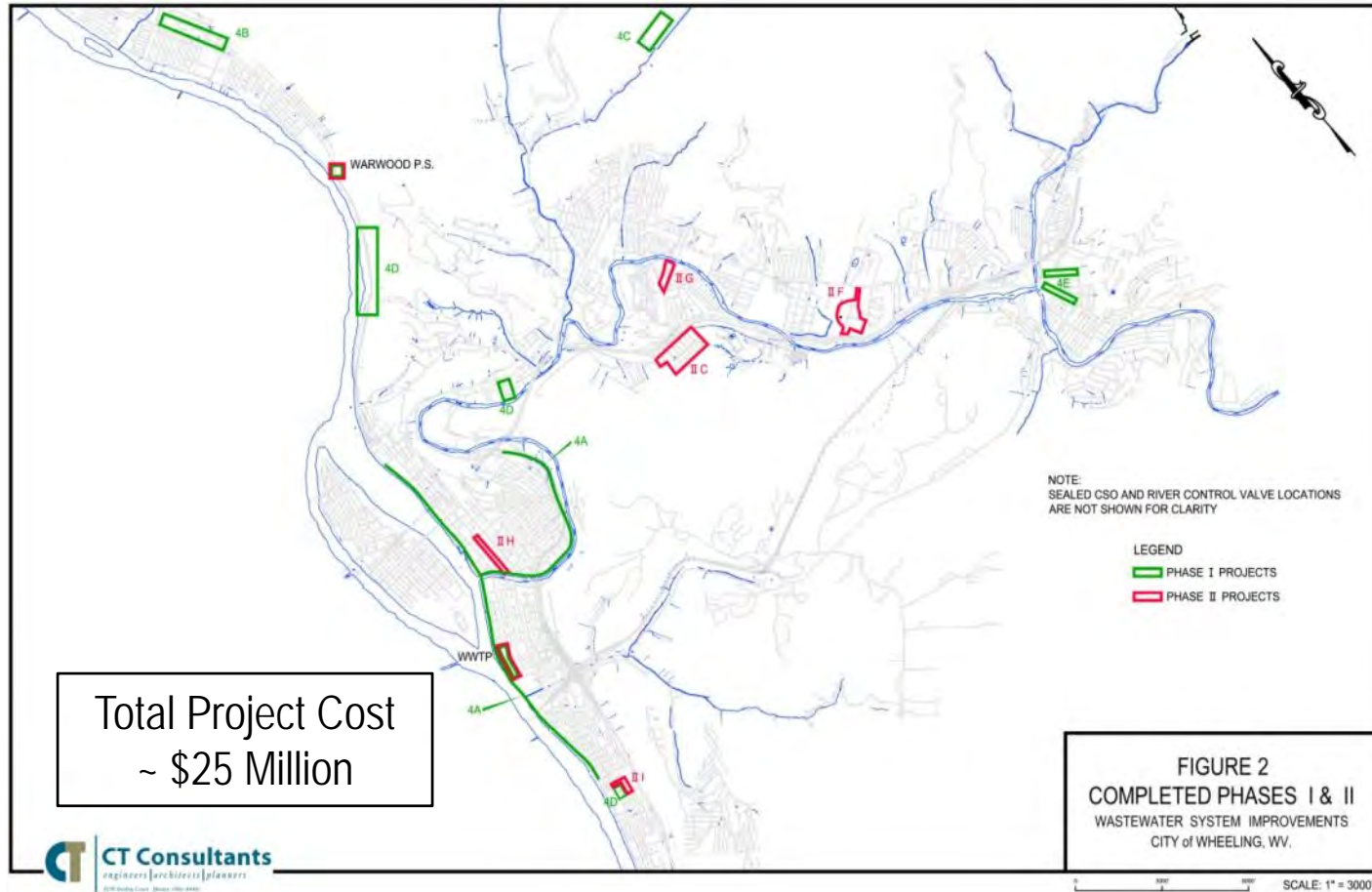
Projects Between 1980s and 2000

- General O&M
- Various Storm separation Improvements
- Closure of 156 overflows

Projects Between 2000 and 2012

- General O&M
- Various Storm separation Improvements
- Phase I Wastewater System Improvements
- Phase II Wastewater System Improvements
- Closure of 60 overflows

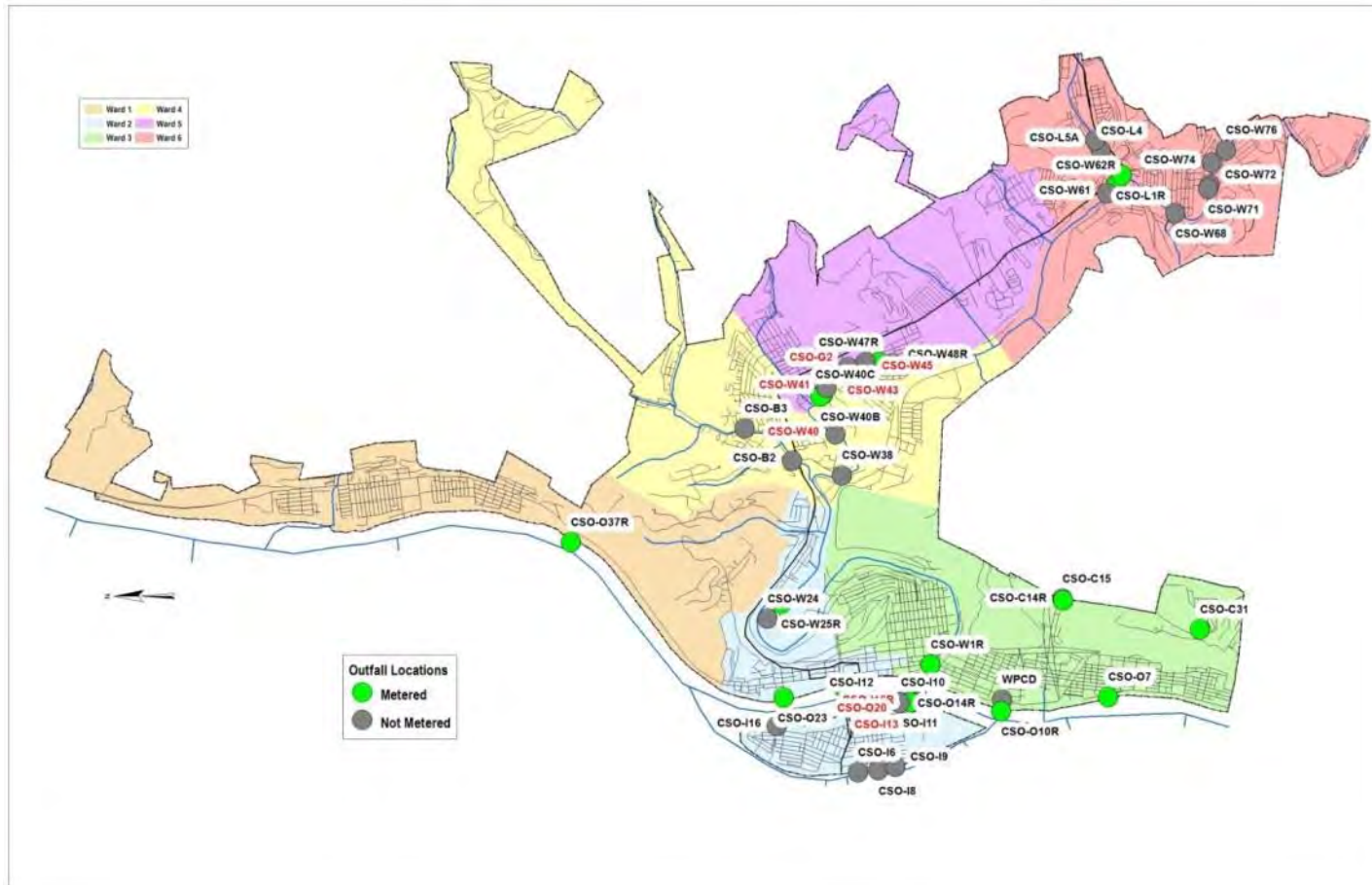
LTCP Phase I & II

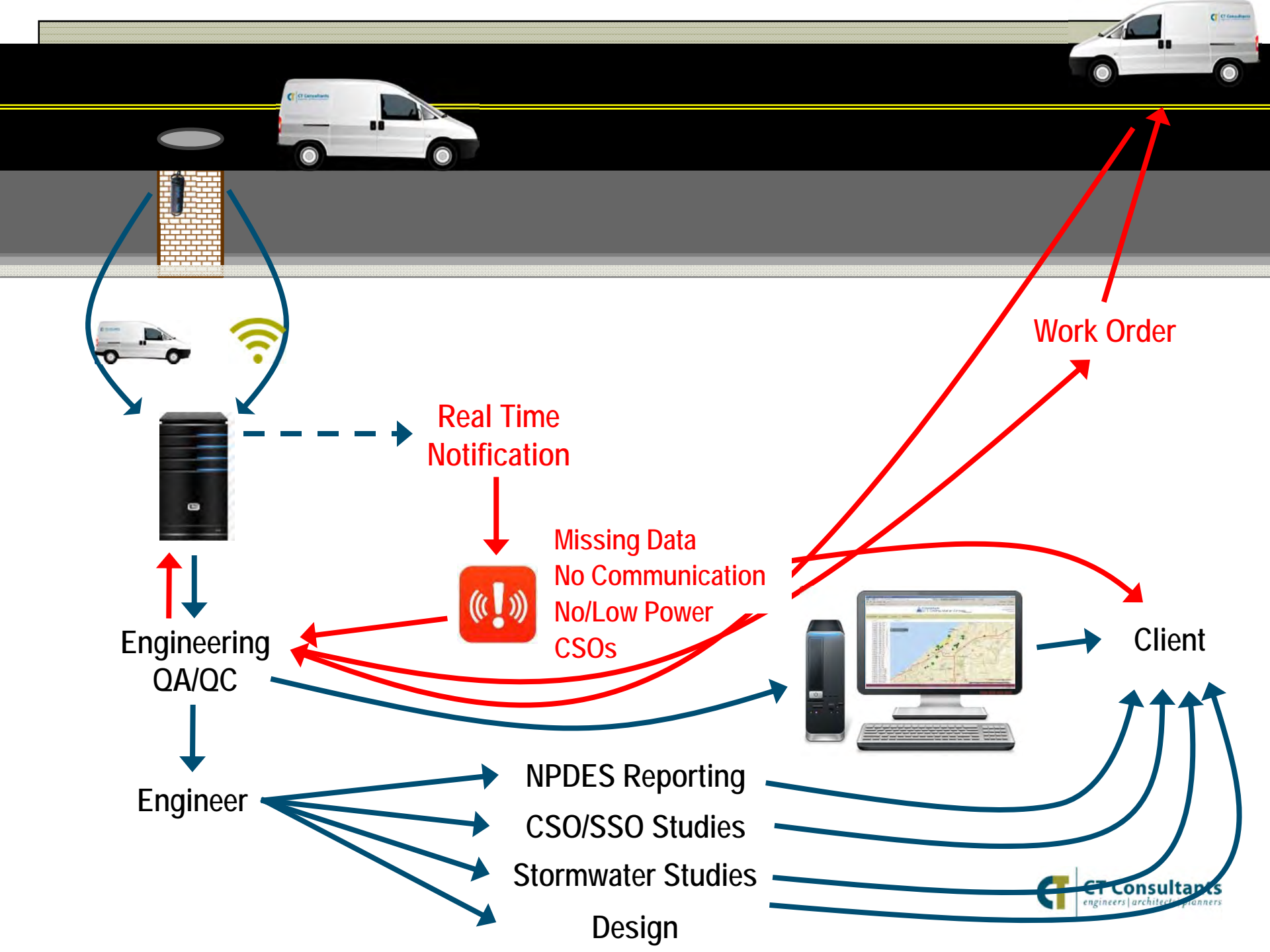


Total Project Cost
~ \$25 Million

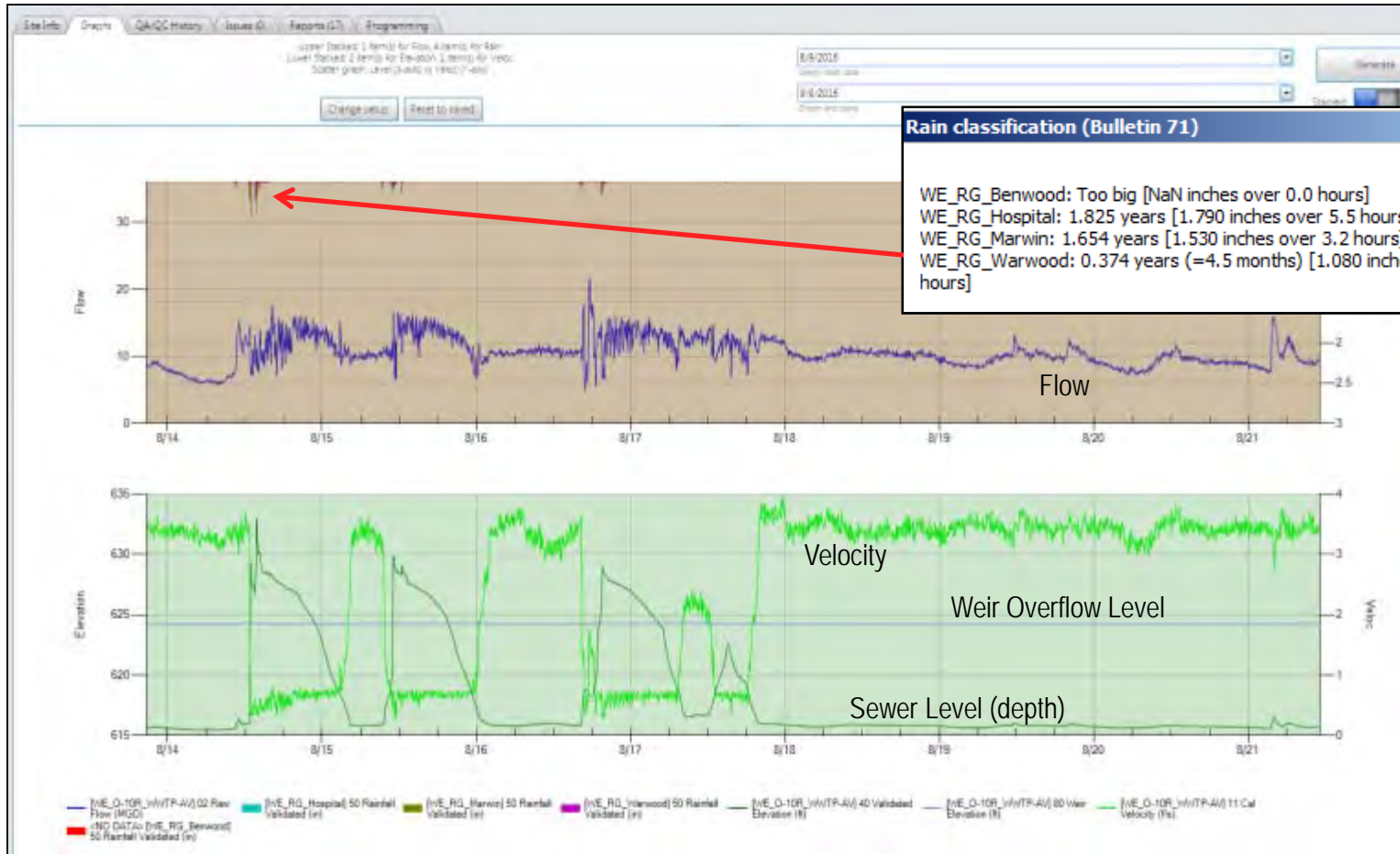
FIGURE 2
COMPLETED PHASES I & II
WASTEWATER SYSTEM IMPROVEMENTS
CITY OF WHEELING, WV.

Flow Monitoring – Created in Phase II

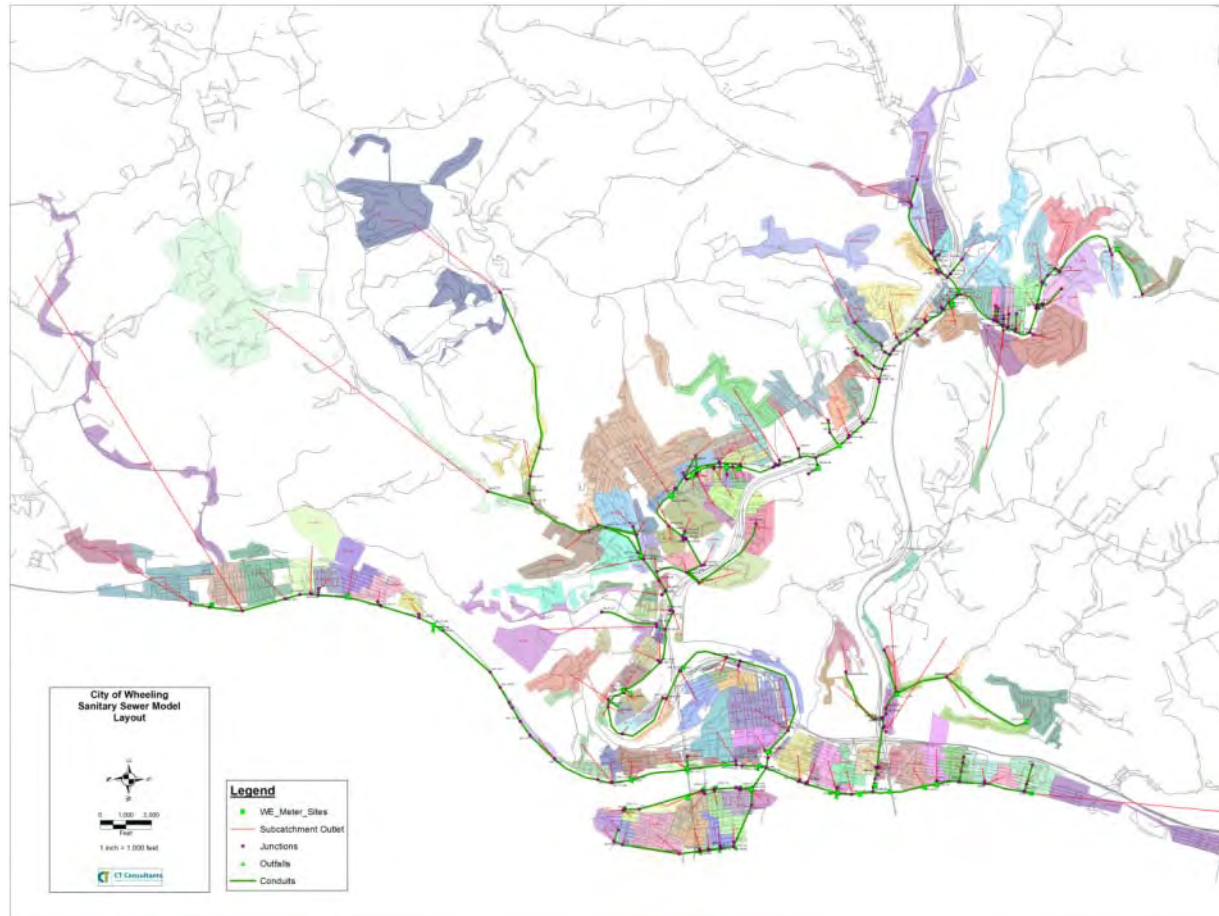




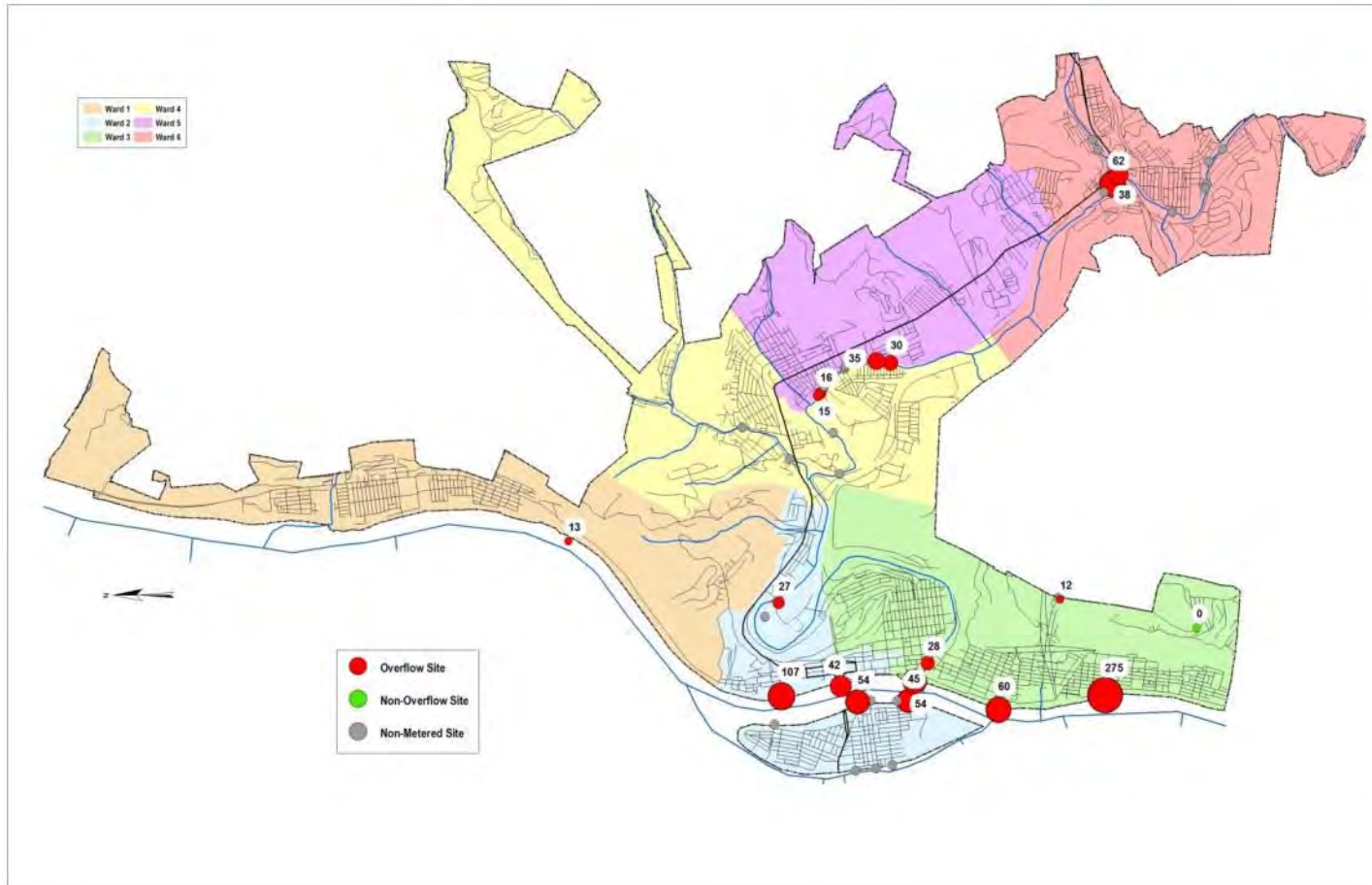
Phase II Flow Monitoring



Hydraulic Model



2015 Overflow Summary



Overflow

- Active overflows



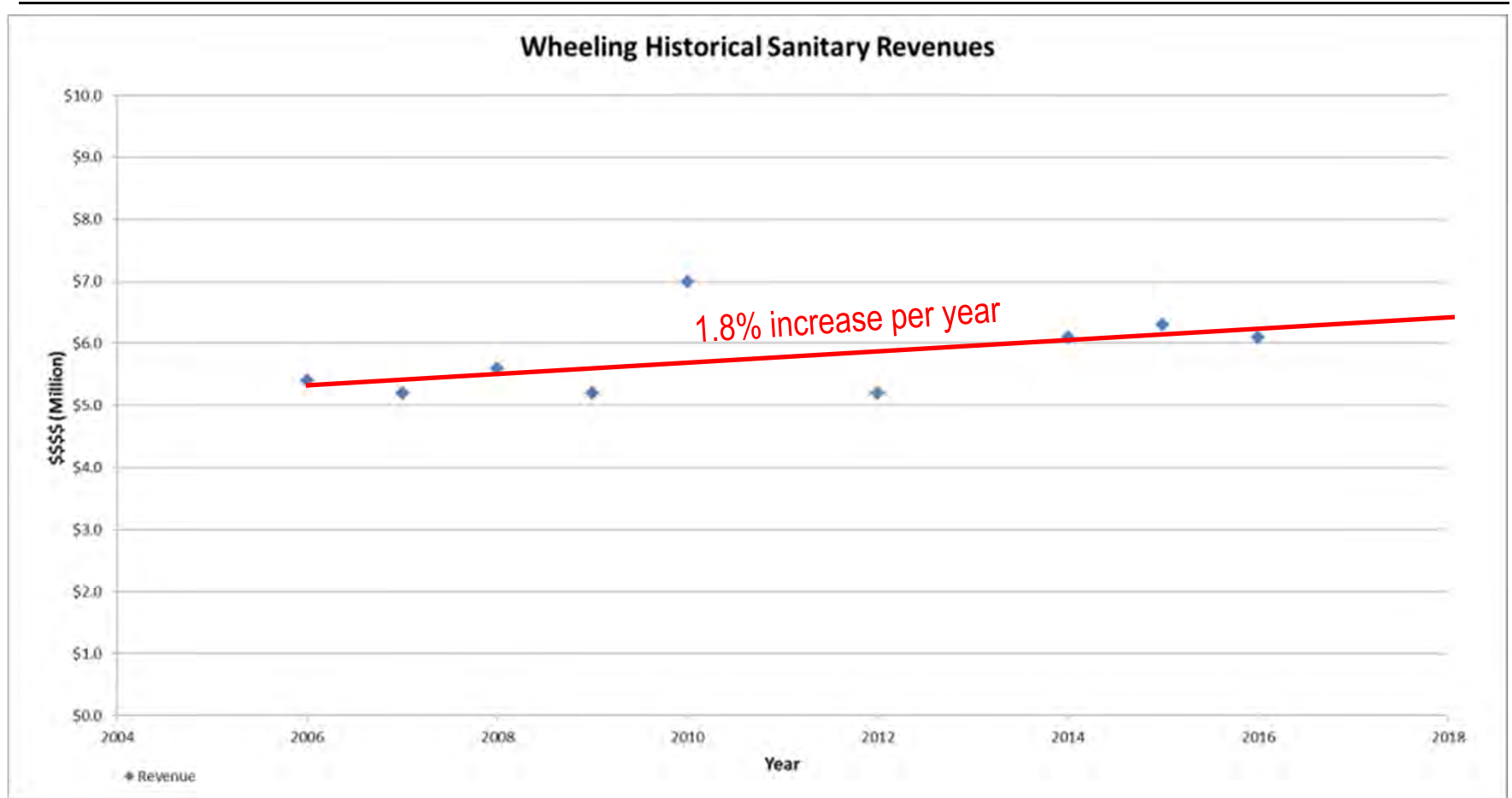
2016 Current Situation - Inventory

Sewer Inventory	
Item	No.
Overflows	42
Gravity Sewers (2 to 72 Inch)	370 Miles
Manholes	5500
Lift Stations	13 (2 Primary)
Forcemain (2 to 20 inch)	1,700 LF
Sewersheds	200+
Siphons	29
Mine Acid	34
to Creek	13
to Sewer	21
Outside Customers (1 to 3 mgd)	20
Receiving Streams	
Ohio River	—
Wheeling Creek	—
Little Wheeling Creek	—
Long Run	—
Glens Run	—
Caldwell Run	—

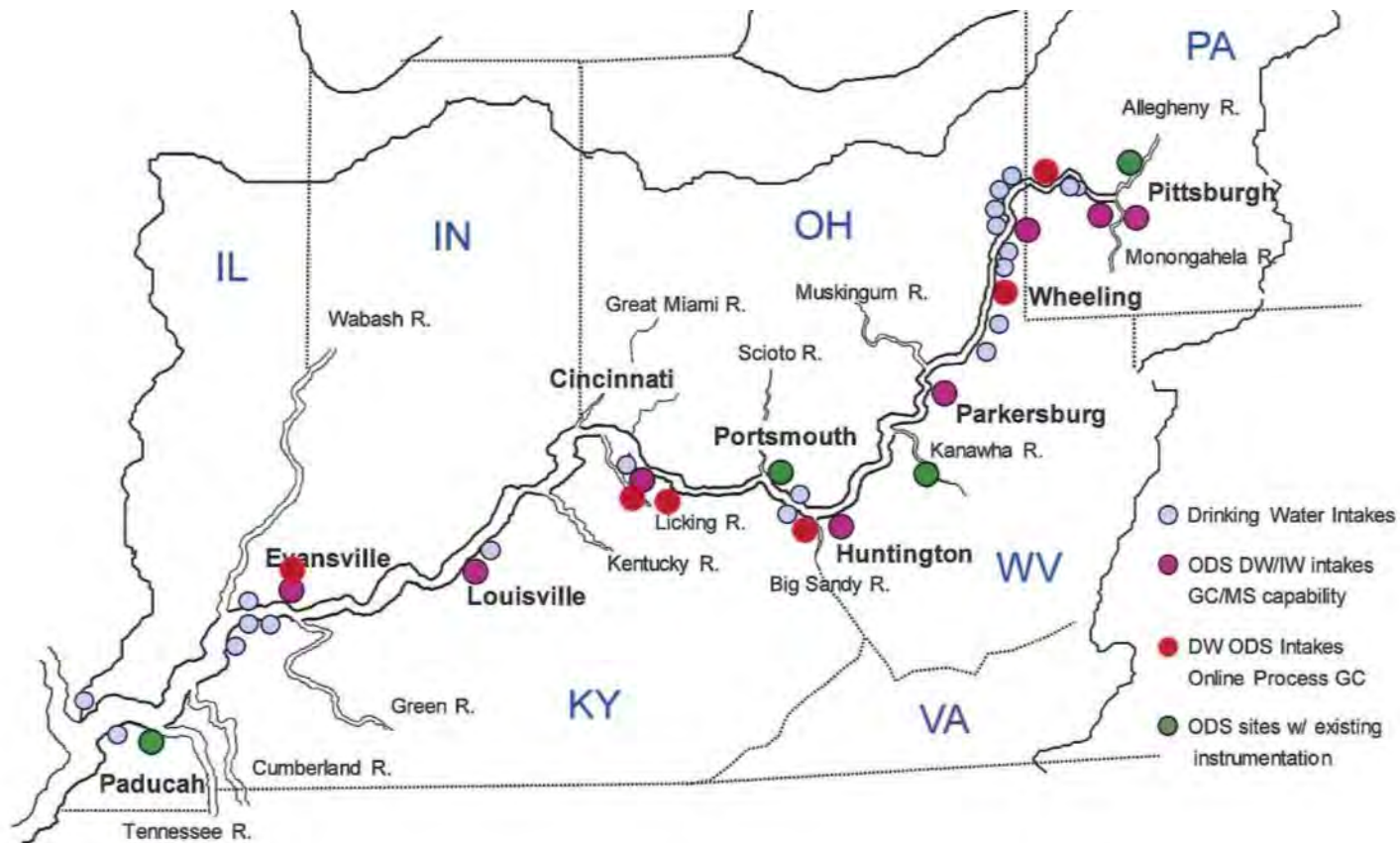
Plant Capacity	
Treatment	Flow (MGD)
Average Day 2015	7 to 8
Pumping	35
Secondary Treatment	10
Primary Treatment	25
Temporary Secondary	25 to 30
Peak Interceptor Capacity (flow meter max 163 MGD)	>163

WPCD No. of Employees		
Item	No.	Comments
Staff	35	6 short of budgeted amount 3 positions eliminated in 2014 due to "right sizing"

Historical WPCD Revenue



Regulatory Reasons for WQ Improvements



Regulatory Issues for WQ Improvements

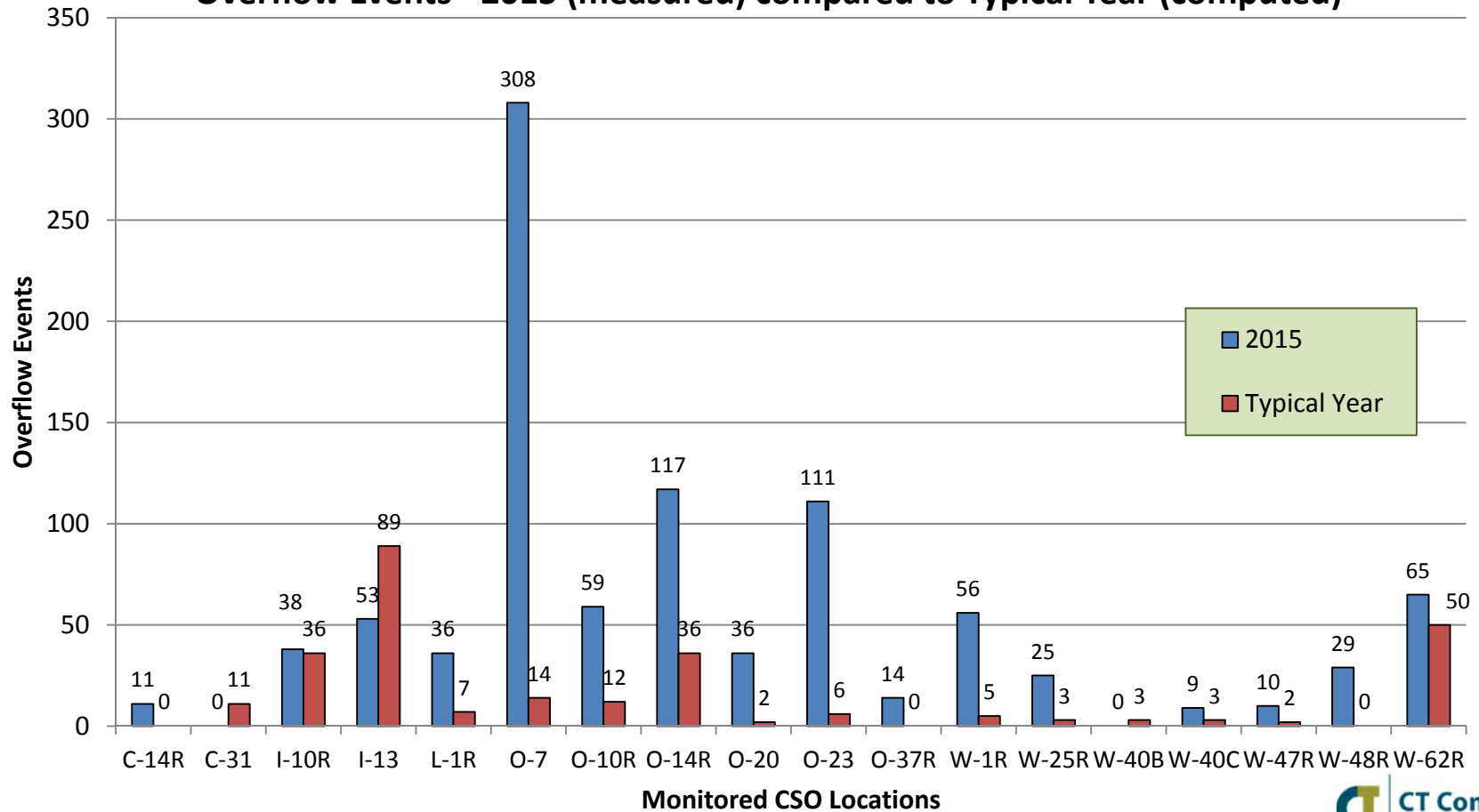
- NPDES WWTP Permits – **Limits Concentrations of Pollutant Discharge**
 - Plant Improvements Required
- CSO Regulations
 - National – **Reduction of CSO Discharge to 4/Year for a Typical Year Rainfall Event**
 - State – **Discharge Limits are required**
 - 2014 DEP Agreement (Delays Limits Until LTCP Implemented)
 - 2014 LTCP Requires Revisions (Schedule & Priority Changes, Funding Limits)
 - Increased Interceptor & Siphon Capacity
 - Detention Storage
 - Relief Sewers
 - Reduce I/I (separation, private downspout disconnect, cross connections)

Regulatory Issues for WQ Improvements

- Stormwater Regulations
 - State - **Currently have compliance inspection deficiencies**
 - 30 deficiencies listed
 - Requires implementation of City's deficiency response

Condition Assessment – Overflow Events

Overflow Events - 2015 (measured) compared to Typical Year (computed)



Failing Infrastructure

Miscellaneous Collection Section Jobs						
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Complaint Follow Up & Utility Checks	2,068	2,120	2,363	2,177	2,667	2,388
Repairs & Replacements	270	348	474	474	454	373
Sewer Cleaning (LF)	8,808	7,918	11,320	16,838	17,241	19,041
Sewer Televising (LF)	649	3,215	3,155	2,968	3,197	1,310
No. of Staff	15	15	14	12	12	13

Failing Infrastructure

Storm Water Separation & Sewer Improvement Projects

2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
<ul style="list-style-type: none"> • 21st Street • Orchard Road • 3rd Street • Russell Lane • Sligar Avenue • E. off + Chapline • Jacob Street 	<ul style="list-style-type: none"> • Carmel Road • Lane B + Hess Avenue • Lane A + Hazlett Avenue • 39th Street • Sealed CSOS: L6, W67, W65, W49, W50, W51 	<ul style="list-style-type: none"> • Nottoway Drive • Rush Avenue • 44th – 39th Streets • 41st Street • 12th + Main Street 	<ul style="list-style-type: none"> • National Road • Hazlett Avenue • Warwood Lane • Hess A + Lane A • River Road 	<ul style="list-style-type: none"> • Elmcrest Drive • Edington Lane • Wade Avenue • Citywide Repairs (blockages to collapsed sewers) • Jay Court 	<ul style="list-style-type: none"> • Island Marina • Chapline Street • Forest Hill • Quail Court • Interceptor Repairs due to ___ in Ohio River + Barge Traffic

Failing Infrastructure Examples

- ❑ Lifted manholes
- ❑ Failed Siphon
- ❑ Clarifier issues
- ❑ Active overflows
- ❑ Sedimented tideflex
- ❑ Cobble in interceptor at siphon
- ❑ Outfall foundation failure at WWTP

Failing Infrastructure Examples

□ Lifted Manholes



Failing Infrastructure Examples

❑ Failed Siphon



Failing Infrastructure Examples

□ Clarifier issues



Failing Infrastructure Examples

❑ Outfall Conditions



Failing Infrastructure Examples

- Outfall foundation failure at WWTP



Asset Management Plan

- What is it? – A business management tool to help Cities manage the impacts of aging infrastructure in a proactive and cost effective manner.
 - More efficient and effective O&M
 - Improved emergency response
 - Better customer commitment
 - Increased acceptance of rates
- **Capital Improvement projects that meet the true needs of the system by providing a balance between failing infrastructure and regulatory compliance.**



Asset Management Plan

1. Asset Inventory
 - What is owned?
 - Where is it located?
 - What is the condition?
 - What is remaining life?
 - What is replacement value?

Asset Management Plan

2. Level of Service – Defines how the City AND WPCD want the system to perform. Example:
 - ❑ No CSO discharges for rain events within the typical year
 - ❑ Maintain compliance with WWTP effluent limits at all times
 - ❑ Clean and televise 10% of all trunk sewers every year and perform point repairs within WPCD's capabilities
 - ❑ Etc...

Asset Management Plan

3. Criticality = Probability of Failure x Consequence of Failure

Multiplied		Consequence of Failure				
		1	2	3	4	5
Probability of Failure <ul style="list-style-type: none"> • Pipe Collapse/Blocked Flow • Excessive Maintenance • River Intrusion • Equipment Failure • Etc. 	1	1	2	3	4	5
	2	2	4	6	8	10
	3	3	6	9	12	15
	4	4	8	12	16	20
	5	5	10	15	20	25

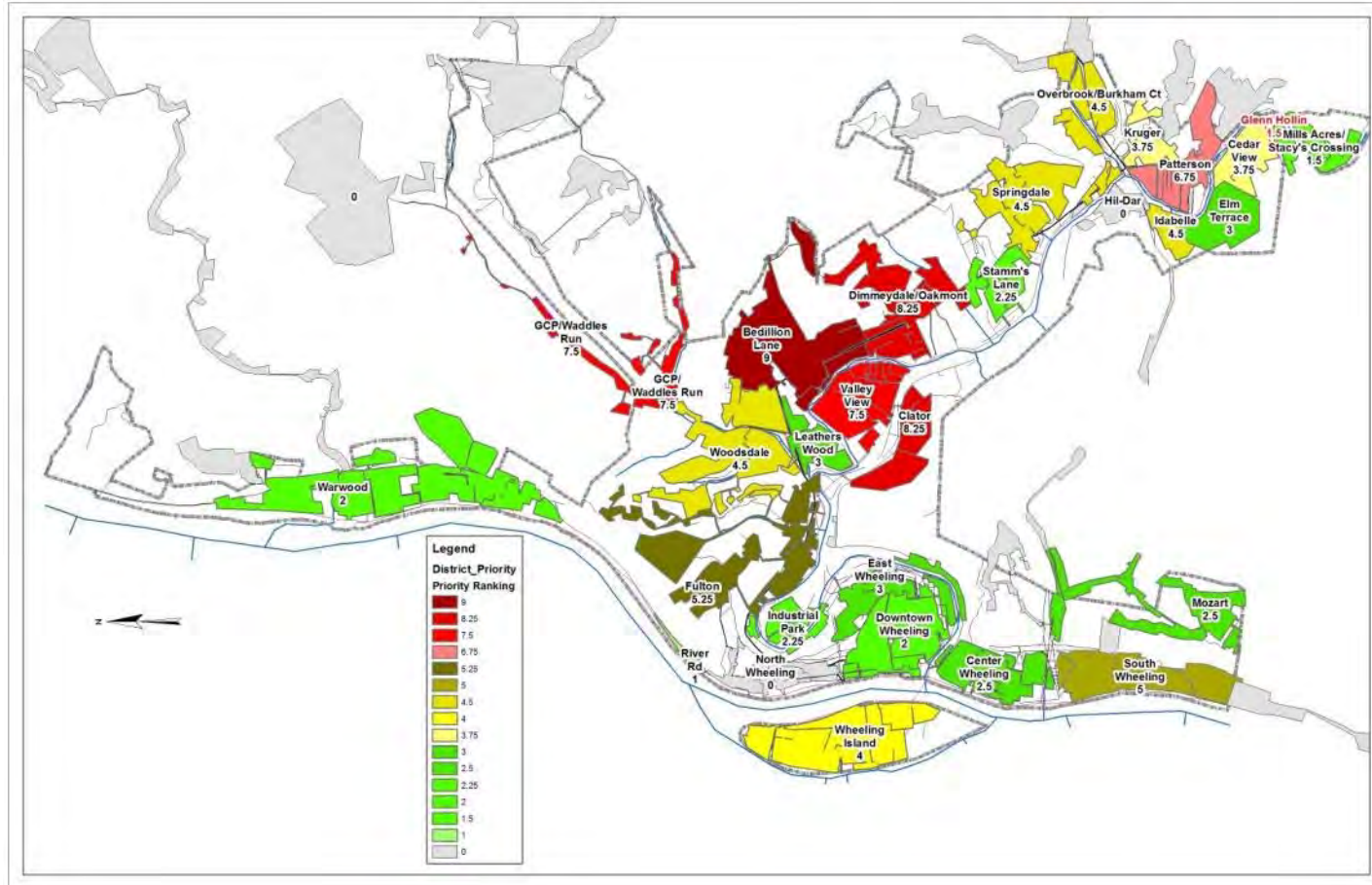
1	Very Low	4	High
2	Low	5	Very High
3	Moderate		



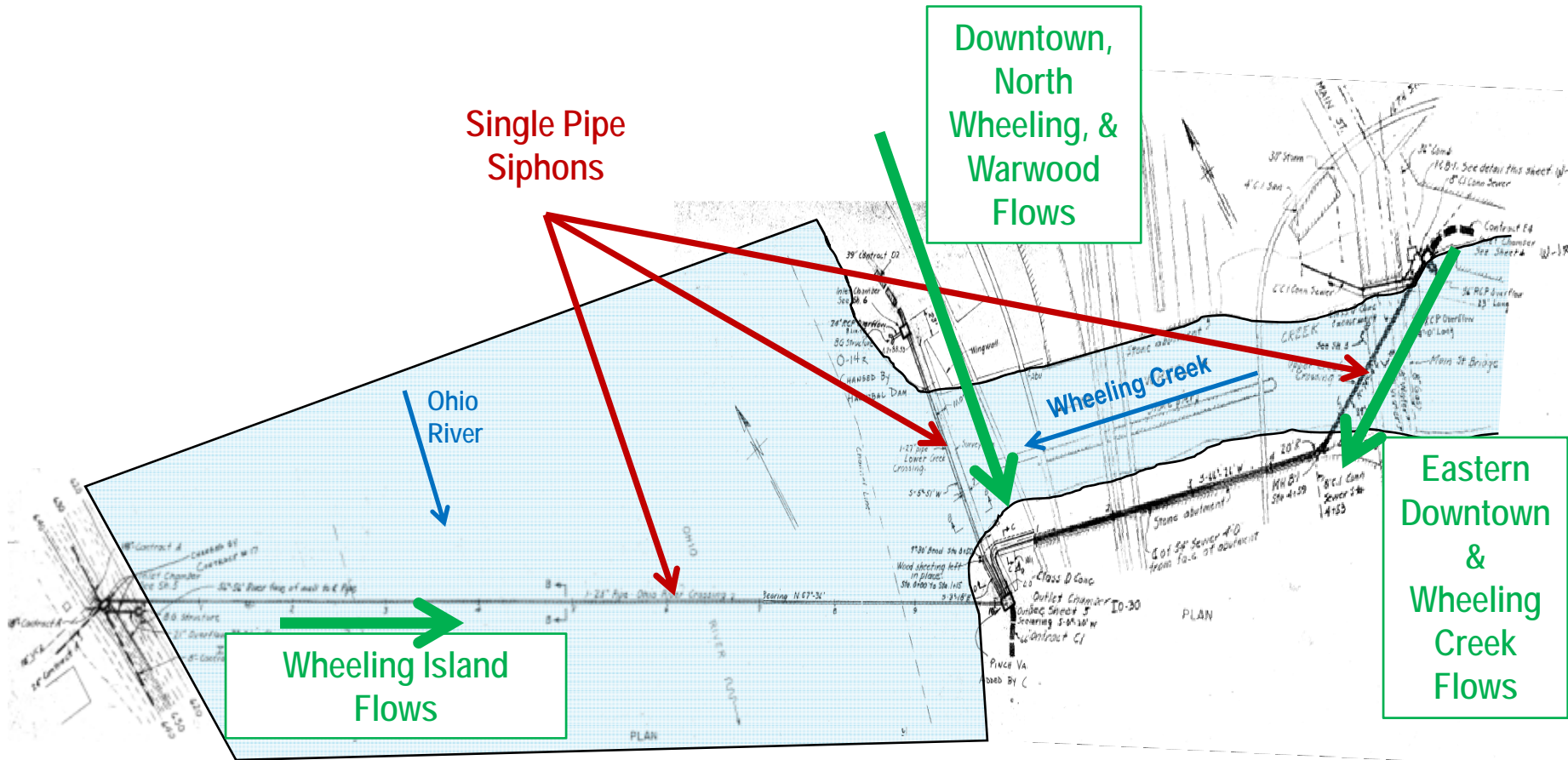
Asset Management Plan

- A. Cost Analysis / CIP – Prioritize short term and long term repairs or replacements, schedule into a CIP, and secure funding

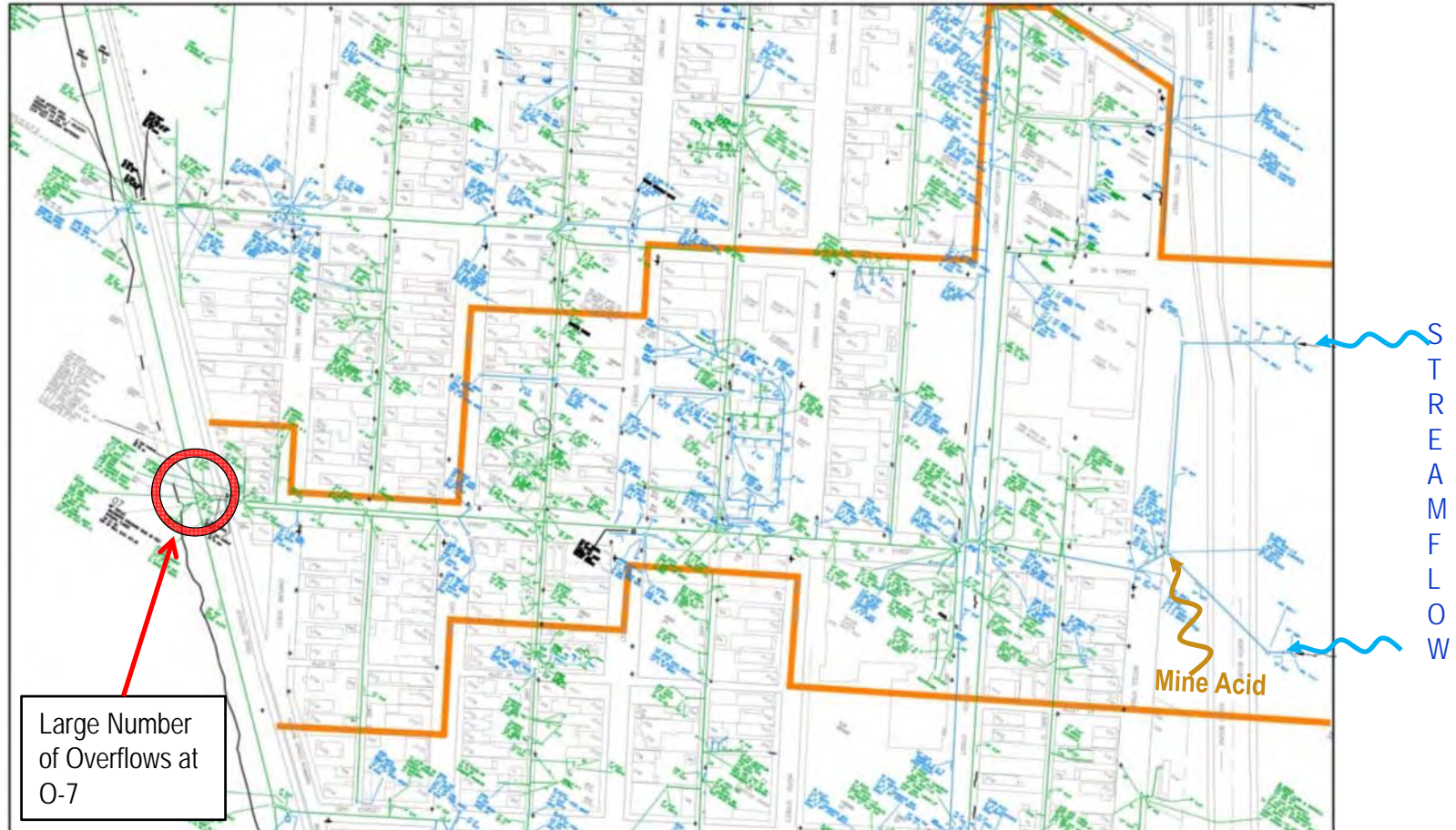
Sewer Shed Asset Priority Rankings



Very High Criticality Example

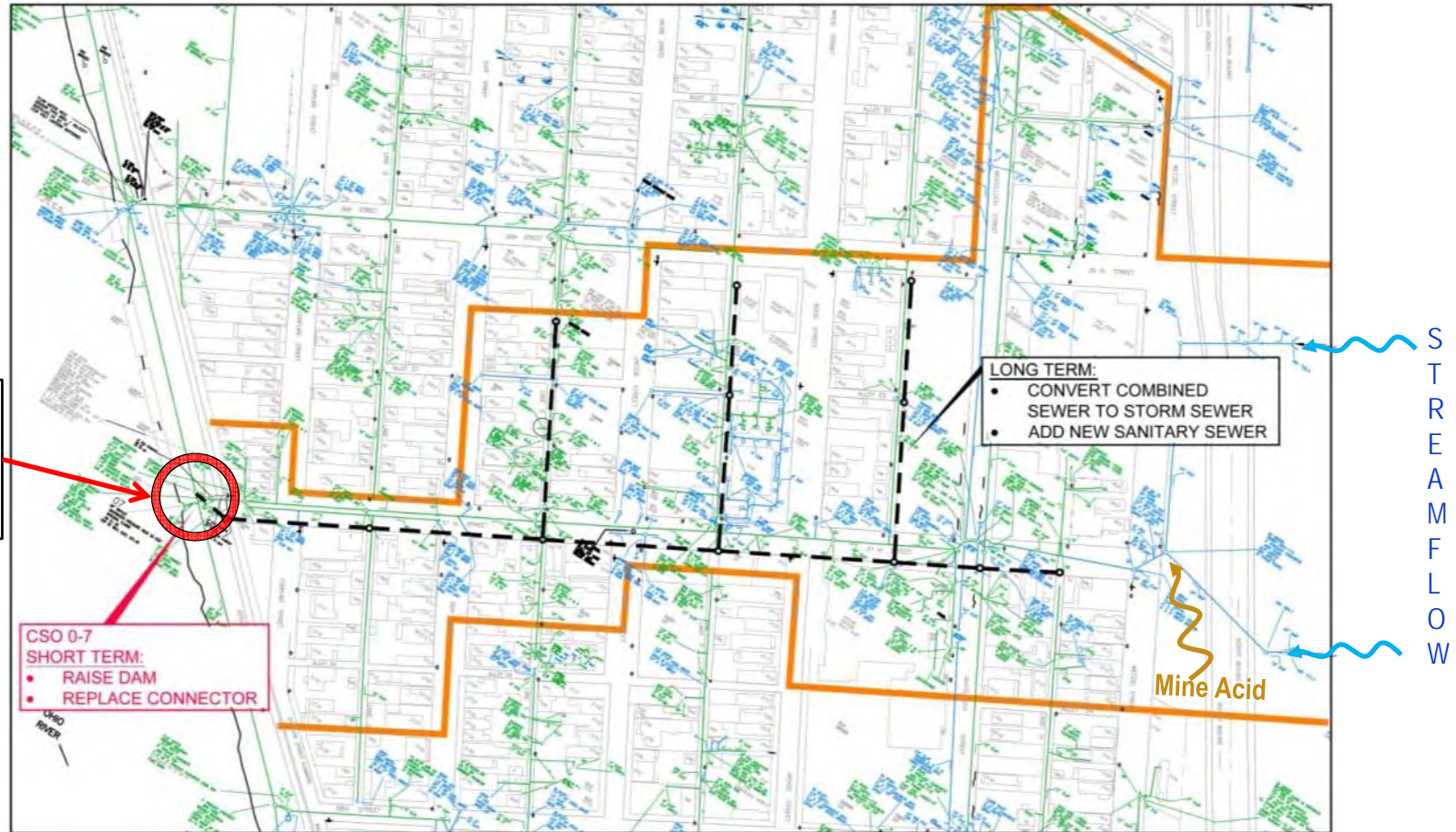


Future Improvements Example



Large Number
of Overflows at
O-7

Future Improvements Example



Long Term
Elimination
of Overflows
at O-7

CSO 0-7
SHORT TERM:
• RAISE DAM
• REPLACE CONNECTOR

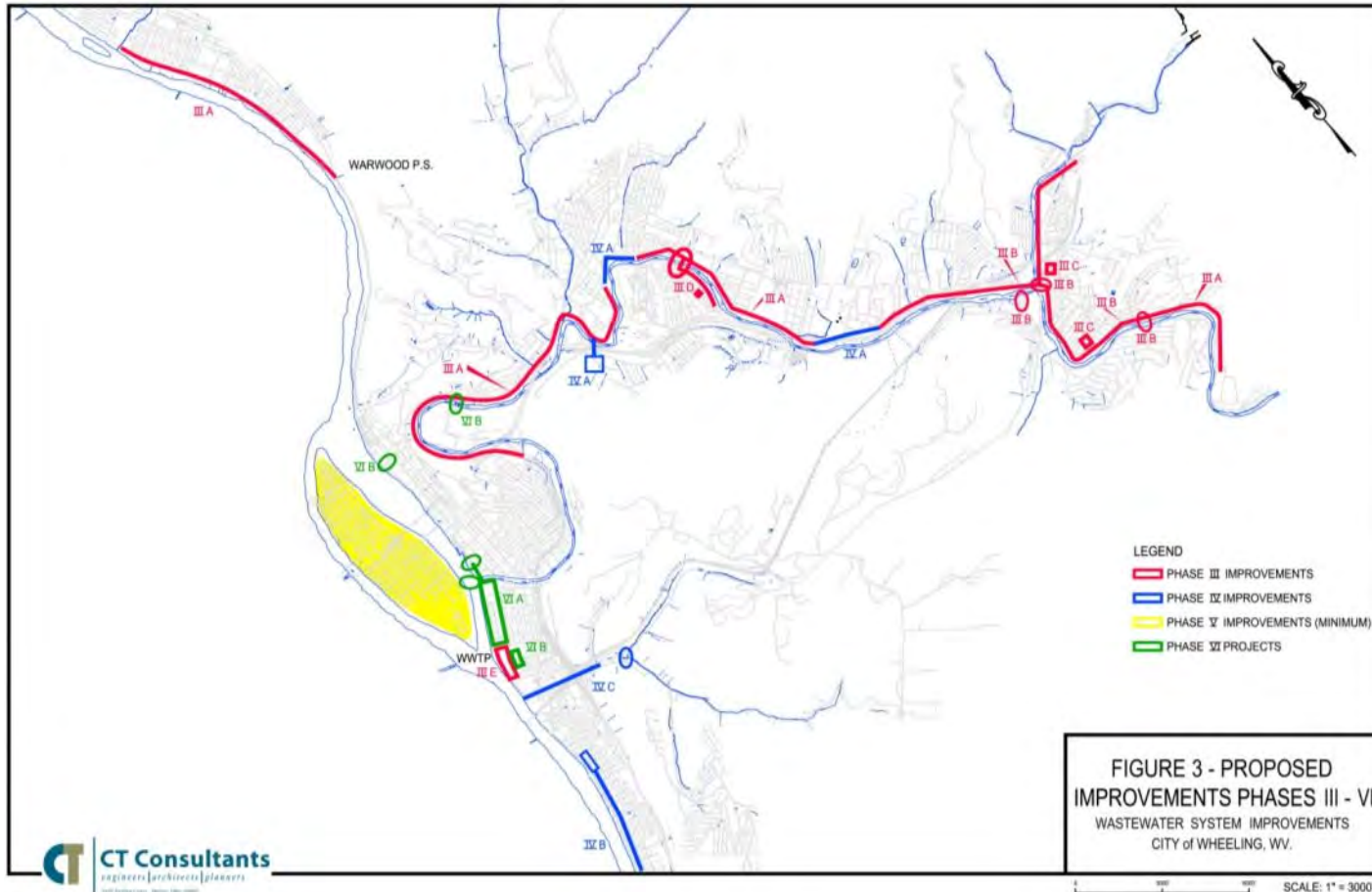
LONG TERM:
• CONVERT COMBINED
SEWER TO STORM SEWER
• ADD NEW SANITARY SEWER

S
T
R
E
A
M
F
L
O
W

Mine Acid

Cost Opinion - \$750,000

LTCP Phase III thru VI



Phase III Approach Comparison

Current LTCP

Revised for Infrastructure

	Current LTCP	Revised for Infrastructure
LTCP Projects	\$6,660,000	\$1,688,000
Add second siphon near CSO W-76	\$225,000	\$0
Increase Interceptor between CSOs 72 and 76	\$661,000	\$0
Add Detention Basin @ Patterson Ball Fields	\$1,905,000	\$0
Increase siphon size near CSO L-1R	\$365,000	\$0
Add detention basin @ Bethlem Blvd/ I-70	\$2,535,000	\$0
Increase interceptor from CSO W-61 to W-62R	\$209,000	\$0
Increase connector sewer @ CSO W-62R	\$49,000	\$0
Raise dam height @ CSO W-61	\$0	\$0
Add second siphon from Valley View (VV)	\$267,000	\$0
Increase VV trunk sewer (siphon-CSO W-45)	\$444,000	\$488,000 ¹
Fifth and Main St separation	\$0	\$1,000,000
O-7 connector and partial sewer separation	\$0	\$200,000
Infrastructure Improvements	\$1,040,000	\$6,312,000
Bedillion Lane Improvements	\$0	\$2,000,000
Addl Kruger/Marshall St	\$0	\$1,000,000
GC and P Relief sewer	\$0	\$1,000,000
22nd St	\$0	\$200,000
Hildar Separation	\$0	\$200,000
Forest Hills	\$0	\$200,000
Dimmeydale	\$0	\$200,000
Replace remaining VV Trunk sewer	\$372,000	\$409,000 ¹
VV sewer separation up stream CSO W-47R	\$668,000	\$735,000 ¹
Additional VV area separation	\$0	\$368,000 ¹
Interceptor Condition (Clean, televise, repairs)	\$1,700,000	\$1,800,000
WWTP Improvements	\$6,570,000	\$7,700,000
O and M	\$2,880,000	\$1,675,000
Project Costs	\$1,150,000	\$825,000
Total	\$20,000,000	\$20,000,000

Future Improvements LTCP

City of Wheeling Long Term Control Plan Needs					
Phase	Description	Project Cost Opinion (Escalated @ 3%/Year)			
		2017	2024	2031	2038
III	Failing Infrastructure Interceptor Condition	\$20 Mil	—	—	—
IV	LTCP - Interceptor Capacity Wastewater Detention	\$30 Mil	\$40 Mil	—	—
V	LTCP - Complete Sewer Separation on Wheeling Island	\$40 to \$80 Mil	—	\$60 to \$120 Mil	—
VI	LTCP - Wastewater Detention (If Affordable)	\$80 to \$90 Mil	—	—	\$150 to ??? Mil
VII	Post LTCP Monitoring	—	—	—	??
	Additional Failing Infrastructure	\$10 to \$20 Mil ??	??	??	??
	Stormwater Management	??	??	??	??
	Operations & Maintenance	10% - 30% Increase	??	??	??



Rate Impacts – Next Meeting

Questions?