TENTATIVE AGENDA

RAYTOWN BOARD OF ALDERMEN
COMMITTEE OF THE WHOLE
JUNE 16, 2020
RAYTOWN CITY HALL
10000 EAST 59TH STREET
RAYTOWN, MISSOURI 64133
6:00 P.M.

1. **Sanitary Sewer I/I Reduction Program**
   Point of Contact: Jose Leon, Public Works Director

2. **Stormwater Masterplan Phase I**
   Point of Contact: Jose Leon, Public Works Director

ADJOURNMENT

CITY OF RAYTOWN
Request for Board Action

Date: June 10, 2020 **Resolution No.: XXXX-XX**
To: Mayor and Board of Aldermen
From: Jose Leon, Director of Public Works

Department Head Approval: _____

Finance Director Approval: _____

City Administrator Approval: _____

Action Requested: To approve GBA Task Order as written.

Recommendation: Staff recommends approval of GBA Task Order for Sanitary Sewer I/I Reduction Program in an amount not to exceed $114,937.00

Analysis: The City has invested thousands of dollars over the last 15+ years to understand issues of Inflow and Infiltration into our sanitary sewer system. Those efforts have culminated into various construction projects to mitigate I/I in our sanitary system. As time has passed, the need to digitally organize and properly map several bits of information the City has paid for has become important. Staff is beginning to process to develop a 5-year CIP plan that addresses I/I reduction and maintenance needs.

Staff has worked with GBA, our on-call engineers, to develop a task order to help public works staff:

- Data-driven decision making by analyzing our existing data to develop a long term I/I reduction program
- Developing and improving comprehensive GIS based databases for viewing, analysis and data entry of CCTV, flow monitoring, inspection, maintenance, operational and project data
- Determine data gap issues for collecting the data required to implement an effective asset management system and for I/I removal
- Provide the City with near-term recommendations for the improvements in priority basins based on existing reports and data
- Develop a comprehensive 5-year capital improvement plan (CIP) that reduces I/I and aligns

Alternatives: Do not spend the dollars and Public Works staff will try to do this work in-house.

Budgetary Impact:

☐ Not Applicable
☐ Budgeted item with available funds
☒ Non-Budgeted item with available funds through prioritization
☐ Non-Budgeted item with additional funds requested

Amount to Spend:	$114,937.00
Fund:	Sanitary Sewer Fund 501-61-00-100-52250 and 501-62-00-100-57000

Additional Reports Attached: Task Order and Presentation

9801 Renner Boulevard
Lenexa, KS 66219

April 29, 2020

City of Raytown, MO
Mr. José Leon
Director of Public Works
10000 E 59th Street
Raytown, MO 64113

Subject: Sanitary Sewer Inflow and Infiltration Reduction Program Engineering Services

Dear Mr. Leon –

The GBA Team is pleased to present our proposed scope and fee for the requested sanitary sewer inflow and infiltration program engineering services.

Since the early 2000's the City of Raytown, MO (City) has invested time and financial resources in the investigation, evaluation and study of its sanitary sewer system. While this investment has resulted in several studies and volumes of data it has not provided a cohesive program for the maintenance and rehabilitation of the system to address aging infrastructure, and inflow and infiltration.

As an example, the City has acquired CCTV data throughout the system at an approximate replacement value of $2 million. However, the data is not managed in a way that allows the identified defects to be located and prioritized for repairs. This valuable data needs to be organized and reviewed to so that it can be used in prioritizing and designing sanitary sewer improvements especially in priority basins.

The scope of services has been developed to address this issue by:

- Providing the City with near-term recommendations for improvements in priority basins based on the existing reports and data.
- Developing comprehensive GIS based databases for the viewing, analysis and data entry of CCTV, flow monitoring, inspection, maintenance, operational and project data.
- Determining data gap issues for collecting the data required to implement an effective asset management system and for I/I removal.
- Analyzing the existing data sets to develop a long-term I/I reduction program based on data driven decisions and asset management principles.
- Developing a 5-year capital improvements plan that reduces I/I and aligns with the City's capital improvements budget.
- Preparing a report summarizing the work and providing recommendations for future improvements both to the repair program and additional data acquisition.

GBA has successfully provided these services to clients across the Midwest for over 30 years and look forward to working as part of the City's team to programmatically address Inflow and Infiltration.

Should you have any questions, please call Charles at 913.577.8459.

Sincerely,
George Butler Associates, Inc.

Philip E. Ciesielski, P.E.
Project Manager
pciesielski@gbateam.com

Charles McAllister
Point-of-Contact
cmcallister@gbateam.com

SCOPE OF SERVICES

It is expressly understood and agreed by the parties hereto that it is the intention of this Agreement to provide for furnishing engineering services for the subject project:

RAYTOWN, MISSOURI
SANITARY SEWER INFLOW AND INFILTRATION
REDUCTION PROGRAM ENGINEERING SERVICES

The City of Raytown, Missouri (City) has identified the need to remove sources of Inflow and Infiltration from the sanitary sewer system.

The project will: inventory, review, organize and analyze existing sources of information related to the City's sanitary sewer system; provide priority recommendations for system rehabilitation and replacement based on the City's existing information; identify data gaps; and develop a 5-year I/I reduction capital improvements plan and provide recommendations for further system study and evaluation.

Future phases of the project will provide services related to programmatic changes to improve the method of tracking, storage and reuse of the CCTV data so that identified defects can be located and prioritized for repair; application of mobile technologies for remote and consistent data entry of inspection and maintenance records; implementation of systems for the tracking of inspections, maintenance activities, and capital project status in GIS; and development of a systematic approach to determining appropriate repairs and rehabilitation strategies.

The Scope of Services for this Project is organized into Five (5) major Task Series:

Task Series 100 – Project Management
Task Series 200 – Existing Data Collection and Review
Task Series 300 – GIS Database Preparation and Data Entry
Task Series 400 – Data Analysis and Recommendations

TASK SERIES 100 – PROJECT MANAGEMENT

100. Project Administration. Provide the management functions required to successfully complete the project, including all project correspondence with the Client; Kick-off meeting consultation with the Client's staff; supervision and coordination of services, and a quality control/assurance; scheduling and assignment of personnel resources, continuous monitoring of work progress and invoicing for the work performed. Consultant shall prepare and distribute minutes of progress meetings with the Client with action items.

TASK SERIES 200 – EXISTING DATA COLLECTION, INVENTORY AND REVIEW

200. Data Collection. The Consultant shall collect, compile and evaluate pertinent and available data from the Client. Information anticipated to be obtained includes sanitary sewer system shapefiles; past system studies, evaluations and recommendations; flow metering locations and data; root control program data; system maintenance data; CCTV data; system backup and SSO data; history of operational and maintenance problems; construction plans for improvements completed from past study recommendations; and information related to system repairs and replacements.

Consultant shall review the existing sanitary sewer shapefiles for completeness, connectivity, attribute data integrity, and compliance with industry standard mapping and data conventions.

Consultant shall review recommended improvements from previous Bartlett & West and Burns & McDonnell studies. Consultant shall make recommendations on remaining improvements from these studies for priority design and construction. Resulting design tasks to be engaged by supplemental agreement to this scope of work.

Consultant shall provide budget of 40 hrs for field activities to resolve data discrepancies or acquire additional field data.

Consultant shall meet with representatives of the City to review the results of the data collection and review, and provide recommended direction for Task 300 GIS Database Preparation and Data Entry.

TASK SERIES 300 – GIS DATABASE PREPARATION AND DATA ENTRY

300. GIS Database Preparation and Data Entry. Based on the results of Task 200 Consultant shall develop, of modify the existing, GIS database structures and shapefiles for the purpose of mapping the data. Data to be mapped shall include –

limits of previously recommended improvements
limits of improvements completed from past study recommendations
flow metering locations
root control program extents
system maintenance data; jetting, root saw cleaning
CCTV locations and data
system backup and SSO locations
historic operational and maintenance problems
recorded system repairs and replacements
manhole inspection data

Consultant shall meet with representatives of the City to review the completed mapping and databases.

Consultant shall provide electronic files in shapefile or file geodatabase formats for the Client's use in updating their GIS. (Alternate – Consultant shall provide services related to integration of created shapefiles and databases into Client's existing GIS.)

TASK SERIES 400 – DATA ANALYSIS AND RECOMMENDATIONS

400. Data Analysis and Recommendations. Based on work completed in Tasks 200 and 300 Consultant shall perform analysis of the existing data to identify locations of inflow and infiltration; to quantify inflow and infiltration volumes and flows; identify assets based on condition assessment information that are candidates for rehabilitation or replacement; develop a list of priority projects, cost estimates and their impact on I/I reduction. The results will be used to develop a 5-year capital improvements program that reduces I/I and aligns with the City's capital improvements budget.

Consultant shall deliver a draft report to the City in hardcopy and pdf formats summarizing the available data as provided by the City, the results of the data analysis, the recommendations for rehabilitation or replacement, the 5-year capital improvements program; identification of data gaps and recommendations for additional data acquisition.

Consultant shall meet with representatives from the City to discuss the draft report and City comments.

Consultant shall deliver a final report to the City in hardcopy and pdf formats.

Consultant shall be available to present the project and recommendations at a Board of Alderman meeting.

ASSUMPTIONS

Existing sanitary sewer GIS shapefiles are constructed as a system network; ie upstream and downstream manholes and associated pipes are connected spatially.
Existing WINCAN CCTV video, defect information and pipe condition scoring can be exported to a format readily imported to an ESRI file geodatabase.

ADDITIONAL SERVICES

Field investigations to resolve data discrepancies or acquire additional data beyond the hours provided for in Task 200.
Survey services for acquisition of location and elevation information.
Design services related to recommended improvements identified in Task 200 and/or Task 400.
Services related to the modification of existing databases and/or creation of new databases for the purpose of future data collection.

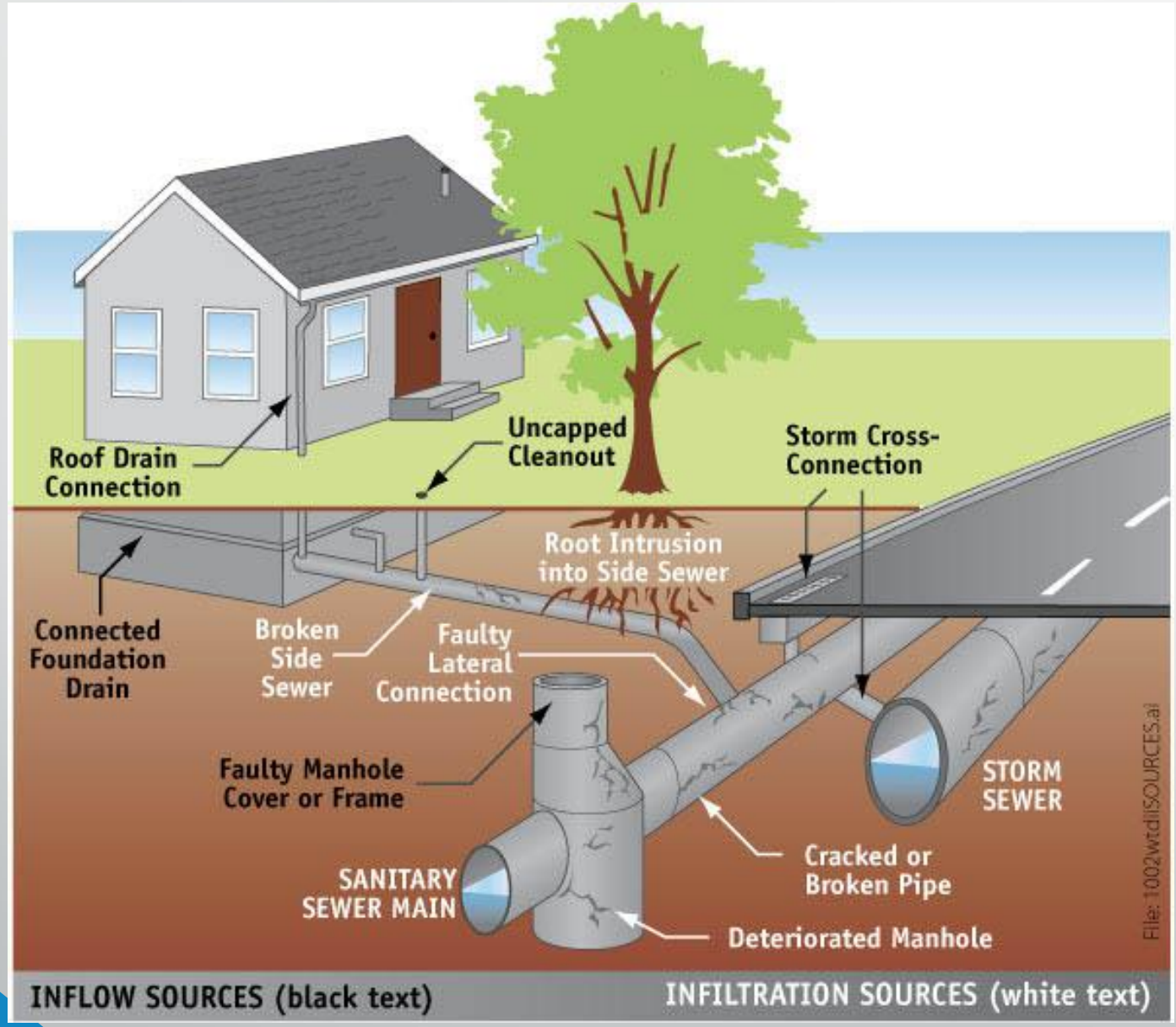
	CLASSIFICATION	PRIN	ASC	SAES	STECH	STEC	DAES	AES	SFT	AA1	TOTAL	TOTAL	TOTAL
	2020 HOURLY CHARGEOUT RATE	$276	$200	$164	$140	$140	$126	$114	$118	$85	HOURS	EXPENSES	COST
1	**Task 100 - Project Management**												
1.1	Progress Meetings (8 meetings)	4	16	8	6	8					42.0		$7,576.00
1.2	Monthly Invoice and Progress Report		4		8					8	20.0		$2,600.00
	Mileage (200 mi x $0.58)											$166.00	$166.00
	SUB TOTAL	4	20	8	14	8	0	0	0	8	62.0	$166.00	$10,342.00
2	**Task 200 - Existing Data Collection, Inventory, Review**												
2.1	Compile and Evaluate Data			32	12						44.0		$6,928.00
2.2	Review Existing Shapefiles			16	4						20.0		$3,184.00
2.2	Review Existing Reports, Provide Priority Recommendations		4	2	8		12				26.0		$3,760.00
2.3	40 hrs Field Activities			8				20	20		48.0		$5,952.00
2.4	Data Review Meeting		4	4	4	2					14.0		$2,296.00
	Mileage (200 mi x $0.58)											$166.00	$166.00
	SUB TOTAL	0	8	62	28	2	12	20	20	0	152.0	$166.00	$22,286.00
3	**Task 300 - GIS Database Preparation and Data Entry**												
3.1	Develop GIS Database and Shapefiles		2	80	72						154.0		$23,600.00
3.2	GIS and Database Review Meeting		4	4	2	2					12.0		$2,016.00
	SUB TOTAL	0	6	84	74	2	0	0	0	0	166.0	$0.00	$25,616.00
4	**Task 400 - Data Analysis and Recommendations**												
4.1	Data Analysis		10	20	32		24				86.0		$12,784.00
4.2	Develop Recommendations, Prioritization, Cost Estimates & 5-year CIP		10	10	32		40				92.0		$13,160.00
4.3	Determine Impact on I&I	2	6		16		24				48.0		$7,016.00
4.4	Develop Draft Report and Submit		12	18	40	4	16				90.0		$13,528.00
4.5	Draft Report Review Meeting		4	4	4						12.0		$2,016.00
4.6	Develop Final Report and Submit		6	12	20						38.0		$5,968.00
4.7	Present Findings to Board of Alderman	2	4		4	2					12.0		$2,192.00
	Mileage (50 mi x $0.58)											$29.00	$29.00
	SUB TOTAL	4	52	64	148	6	104	0	0	0	378	$29.00	$56,693.00
	GRAND TOTAL (Tasks 100-400)	8	86	218	264	18	116	20	20	8	758		**$114,937.00**

Sanitary Sewer Inflow and Infiltration Reduction Program

Using On-Call Engineering Services

CITY OF RAYTOWN

What is Inflow and Infiltration (I&I)?



Inflow happens when groundwater and stormwater seep into the **sanitary sewer** system through private and public defects within the collection system.

Infiltration is when groundwater enters the **sanitary sewer** system through faulty pipes or manholes.

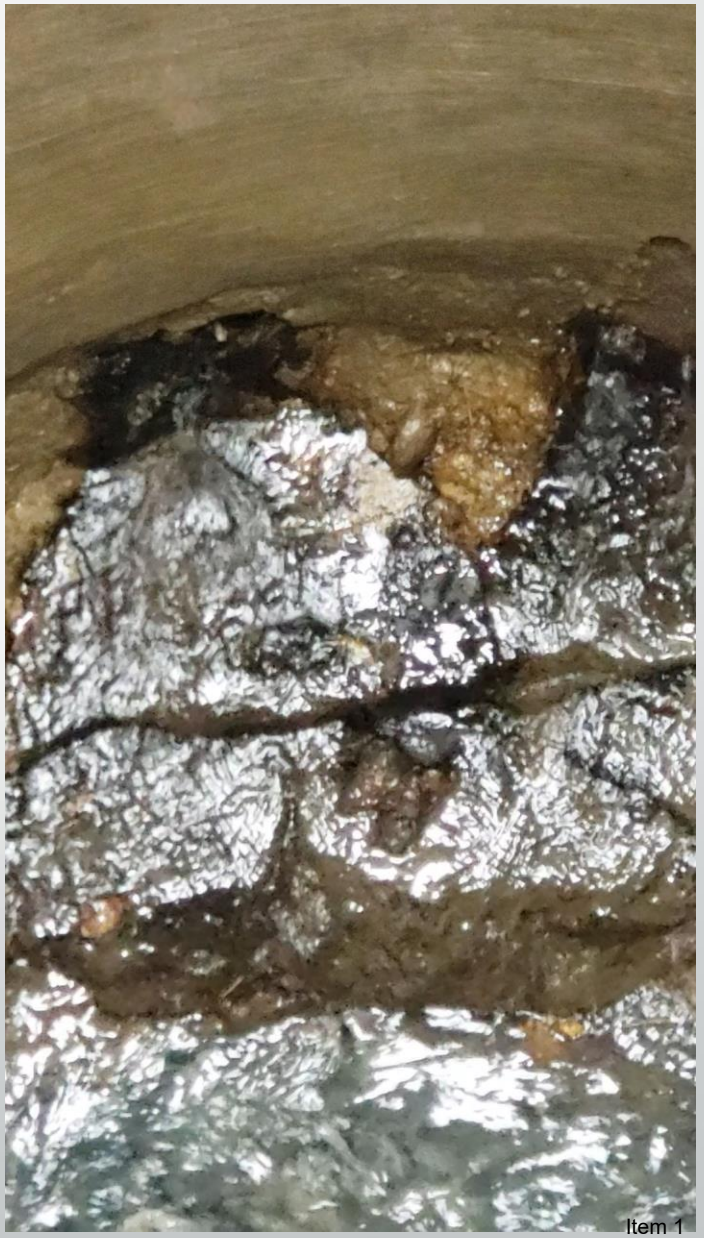
Does Raytown have an issue with I&I? Short Answer

59th & Raytown Rd – SE Corner
5/28/2020

Southwood Lagoon- 5/28/2020
6 Million Gallon Capacity

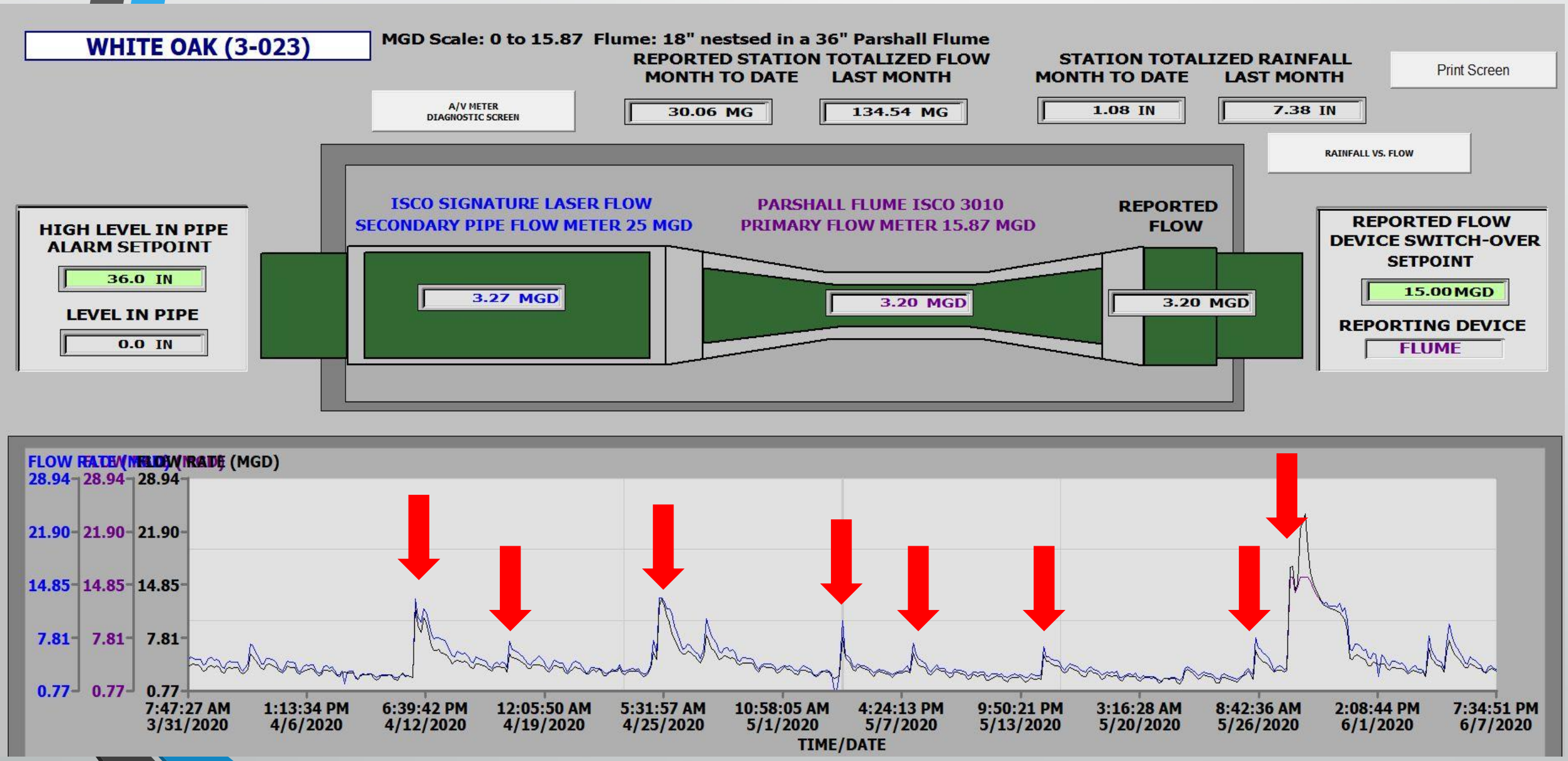
Does Raytown have an issue with I&I? Short Answer….Continued

Cracks in our system allow water infiltration

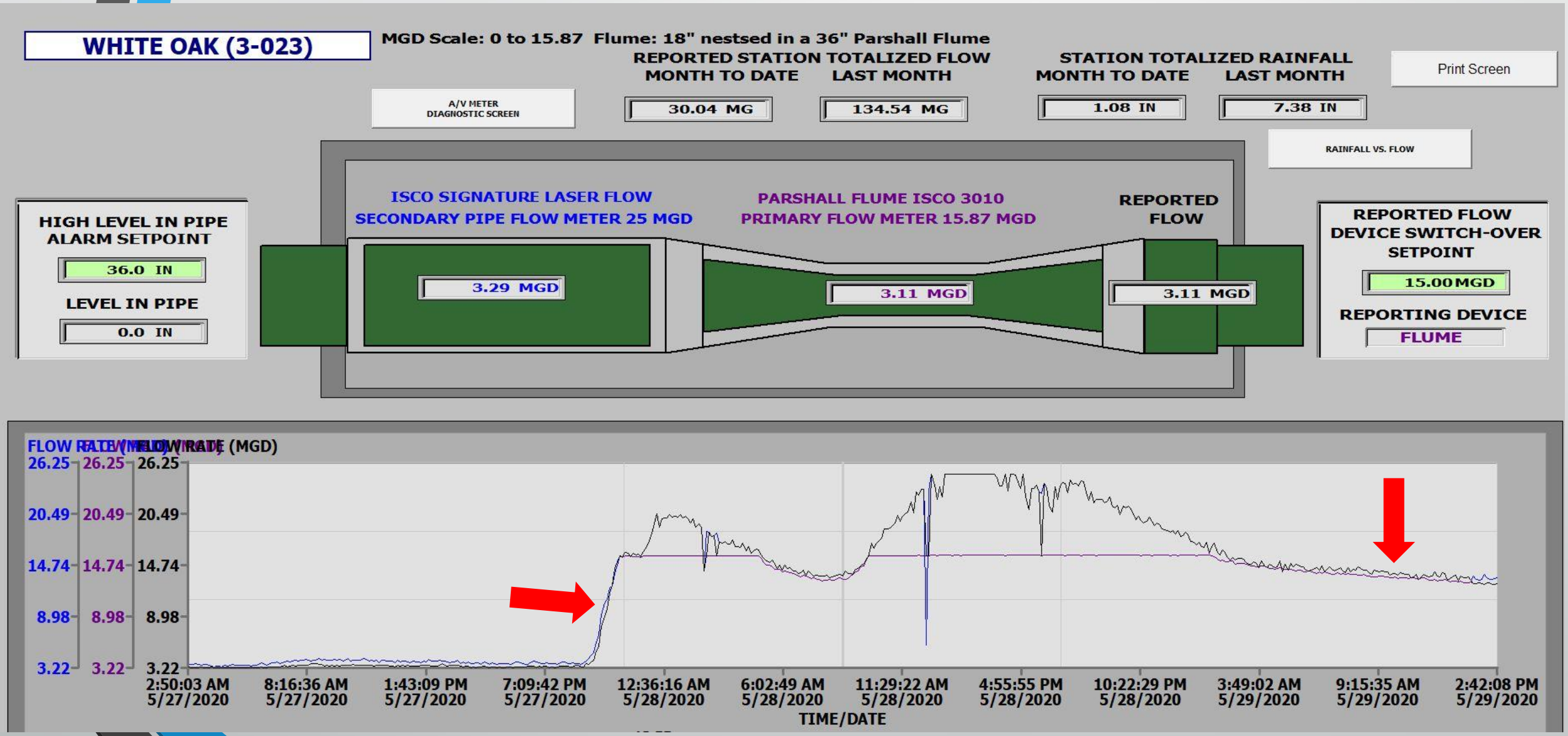


Inflow from leaky manholes

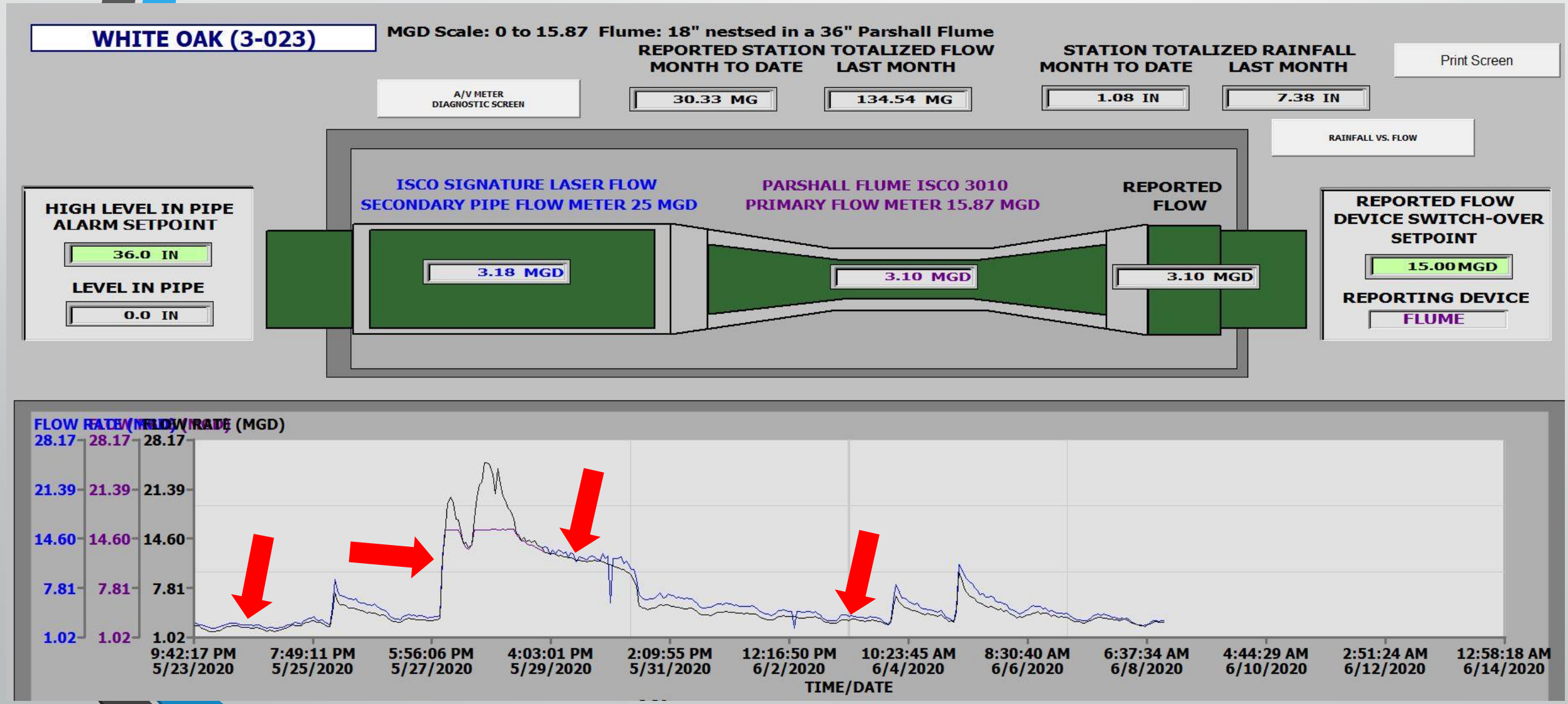
How big an issue is I&I for Raytown? Long Answer



How big an issue is I&I for Raytown? Long Answer Continued



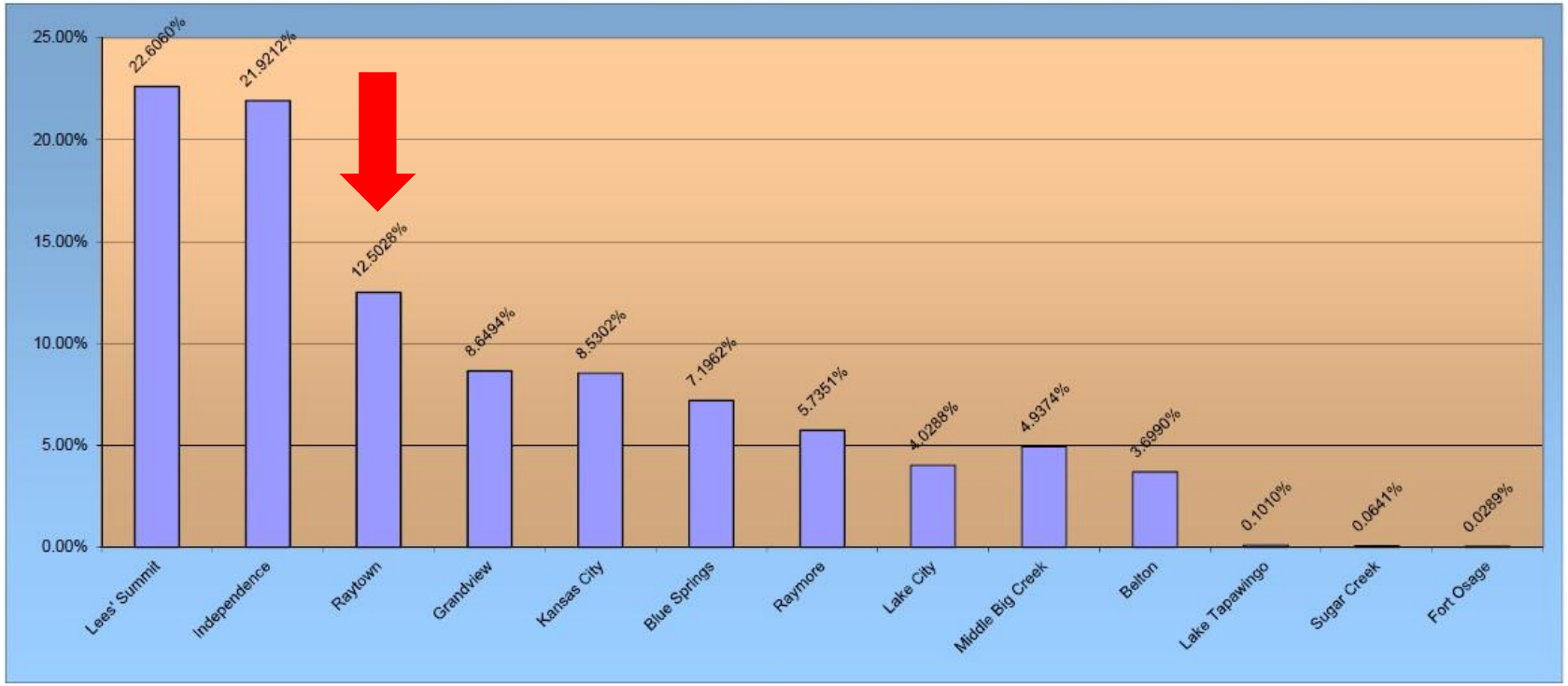
How big an issue is I&I for Raytown? Long Answer Continued



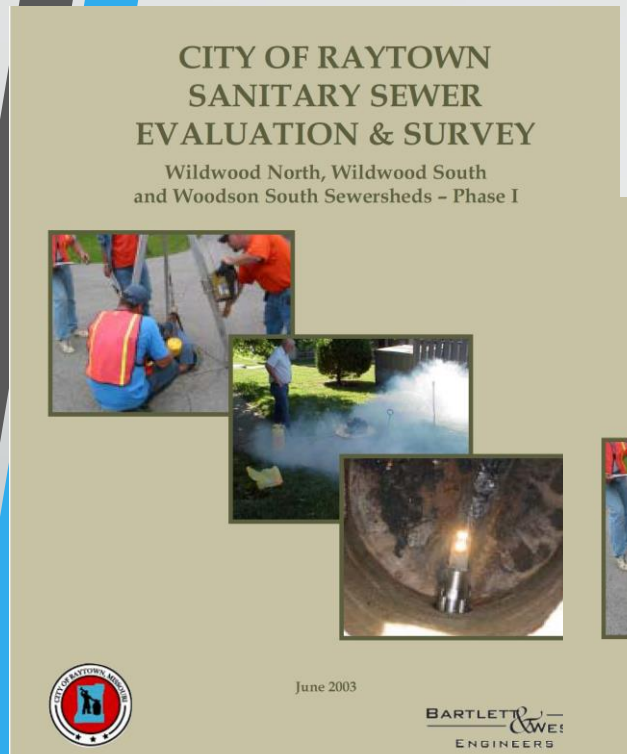
Does I&I cost us money? Short Answer.

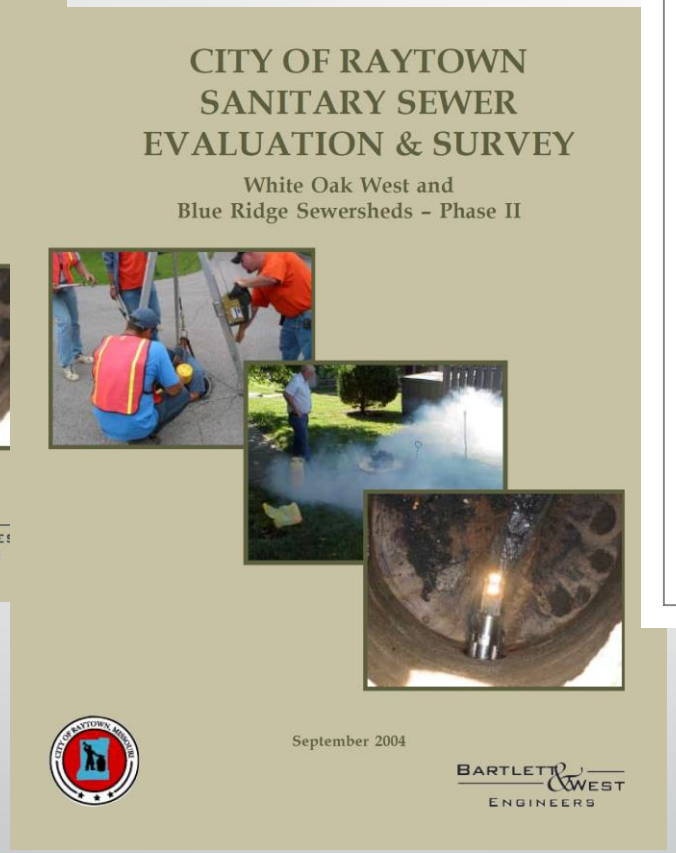
Customer City Flow Contribution per Quarter for Fiscal Year 2020

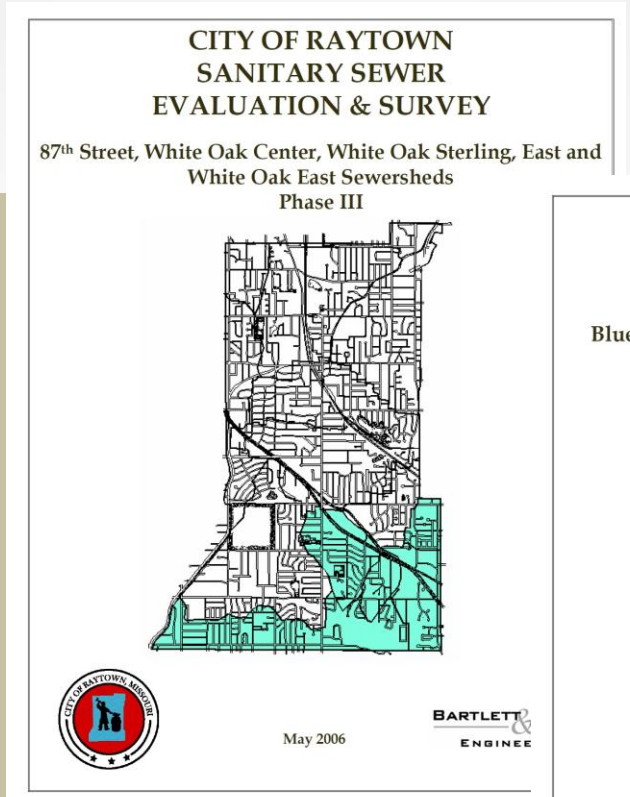
Customer	Lees' Summit	Independence	Raytown	Grandview	Kansas City	Blue Springs	Raymore	Lake City	Middle Big Creek	Belton	Lake Tapawingo	Sugar Creek	Fort Osage	Totals
1st QT	855.9791	793.2844	386.9073	310.8441	319.7472	269.3602	196.5294	171.4809	178.4894	137.7540	4.2188	3.0874	1.5514	3629.2336
2nd QT	1116.5816	1119.5212	704.0638	443.8909	424.5873	358.5688	303.9047	180.0667	252.3418	185.0154	4.5923	2.5035	0.9664	5096.6044
3rd QT	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4th QT	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total MG	1972.5607	1912.8056	1090.9711	754.7350	744.3345	627.9290	500.4341	351.5476	430.8312	322.7694	8.8111	5.5909	2.5178	8725.8380
1st QT %	23.5857%	21.8582%	10.6609%	8.5650%	8.8103%	7.4220%	5.4152%	4.7250%	4.9181%	3.7957%	0.1162%	0.0851%	0.0427%	100.00%
2nd QT %	21.9083%	21.9660%	13.8144%	8.7095%	8.3308%	7.0354%	5.9629%	3.5331%	4.9512%	3.6302%	0.0901%	0.0491%	0.0190%	100.00%
3rd QT %	*	*	*	*	*	*	*	*	*	*	*	*	*	0.00%
4th QT %	*	*	*	*	*	*	*	*	*	*	*	*	*	0.00%
Total %	22.6060%	21.9212%	12.5028%	8.6494%	8.5302%	7.1962%	5.7351%	4.0288%	4.9374%	3.6990%	0.1010%	0.0641%	0.0289%	100.00%

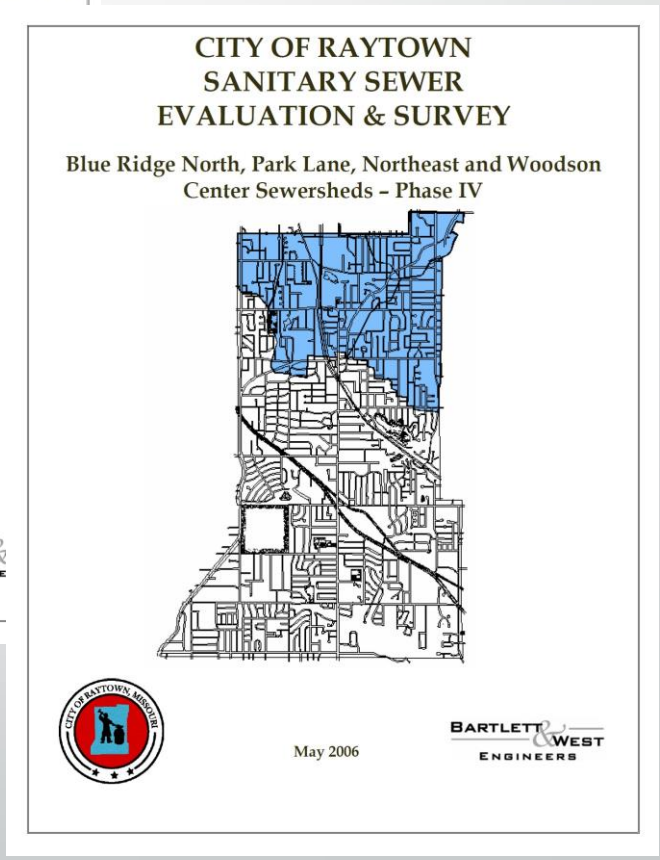


What work have we completed to identify I&I?









We Hired Bartlett & West to help us inventory, assess, and document our sanitary system from 2003 – 2006. Four (4) Phases to evaluate our entire system.

What work have we completed to identify I&I?… Continued

1.0 Introduction

The purpose of this report is to summarize techniques and results from the City of Raytown, Sanitary Sewer Evaluation and Survey (SSES) - Phase I. Phase I targeted three sewersheds: Wildwood North (WWN), Wildwood South (WWS), and Woodson South (WDS). These sewersheds were selected based on historical sewer back-up information, system age, and known hydraulic restrictions. Figure No. 1 shows the location of the three-targeted sewersheds within the community. This project included flow and rainfall monitoring, manhole inspection and condition assessment, smoke testing, dye water testing, global positioning and total station survey, hydraulic modeling, development of prioritized improvements and engineering opinion of probable project costs. The project goals were to:

- Increase collection system reliability
- Renew aged components within the collection system
- Reduce the potential for sanitary sewer overflows (SSOs)
- Reduce the potential for backups

The project schedule is provided in Appendix A and includes task descriptions and duration for Phase I.

The flow in the Raytown collection system originates from several sources: domestic, commercial and industrial wastewater, ground water infiltration, and rainfall derived inflow and infiltration. Generally, sewer systems become overloaded due to rainfall derived inflow and infiltration and groundwater infiltration causing SSOs and backups.

SSOs occur when there is an overflow, spill, or release of raw sewage from the collection system. SSOs contaminate surface waters, degrade water quality, and expose the pubic to enteric viruses and pathogens that may cause serious illness. SSOs are caused by excessive amounts of rainfall or snow melt seeping through the ground and into cracks in sewers (typically characterized as infiltration), and excess rainwater entering sewers through directly connected storm sewers, roof drains, or basement sump pumps (typically characterized as inflow). The most common causes of SSOs are sewer system deterioration, plugged pipes, or inadequate system capacity. The Clean Water Act prohibits the discharge of any pollutant to water from a point source, unless a permit authorizes the discharge.

The Environmental Protection Agency (EPA) has taken recent action to enforce the Clean Water Act as it relates to SSOs. In these enforcement actions, the EPA has required municipalities to assess their sewer system to understand the scope of the problem, and then create a plan to improve their wastewater collection system. Timelines are associated with these plans. Also, municipalities are usually required to develop and implement an effective operation and maintenance program. Recent enforcement actions include civil penalties over $500,000 and implementation of supplemental environmental projects to help reduce the environmental impacts of the violations. A newsletter published in March 2003 by the EPA is provided in Appendix B. The newsletter contains information about recent settlements between municipalities and the EPA to reduce SSOs. In addition to taking enforcement action under the Clean Water Act, the EPA is promulgating regulations called Capacity, Management, Operations and Maintenance (CMOM).

CITY OF RAYTOWN
SANITARY SEWER EVALUATION SURVEY
PHASE I - TARGETED SEWERSHEDS

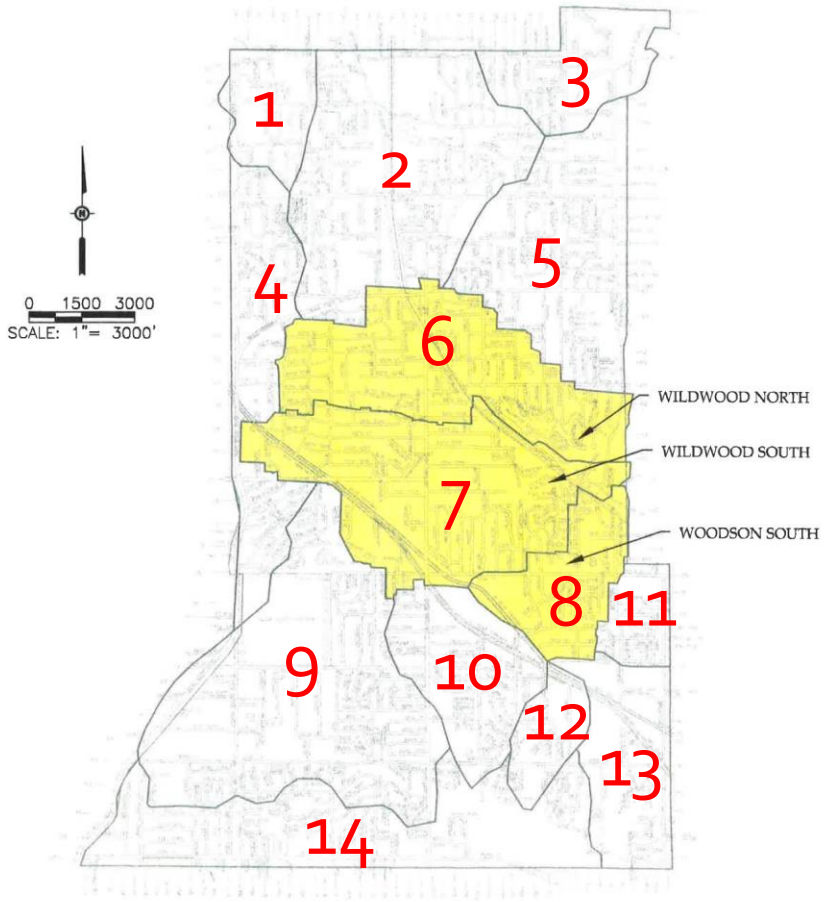


FIGURE 1

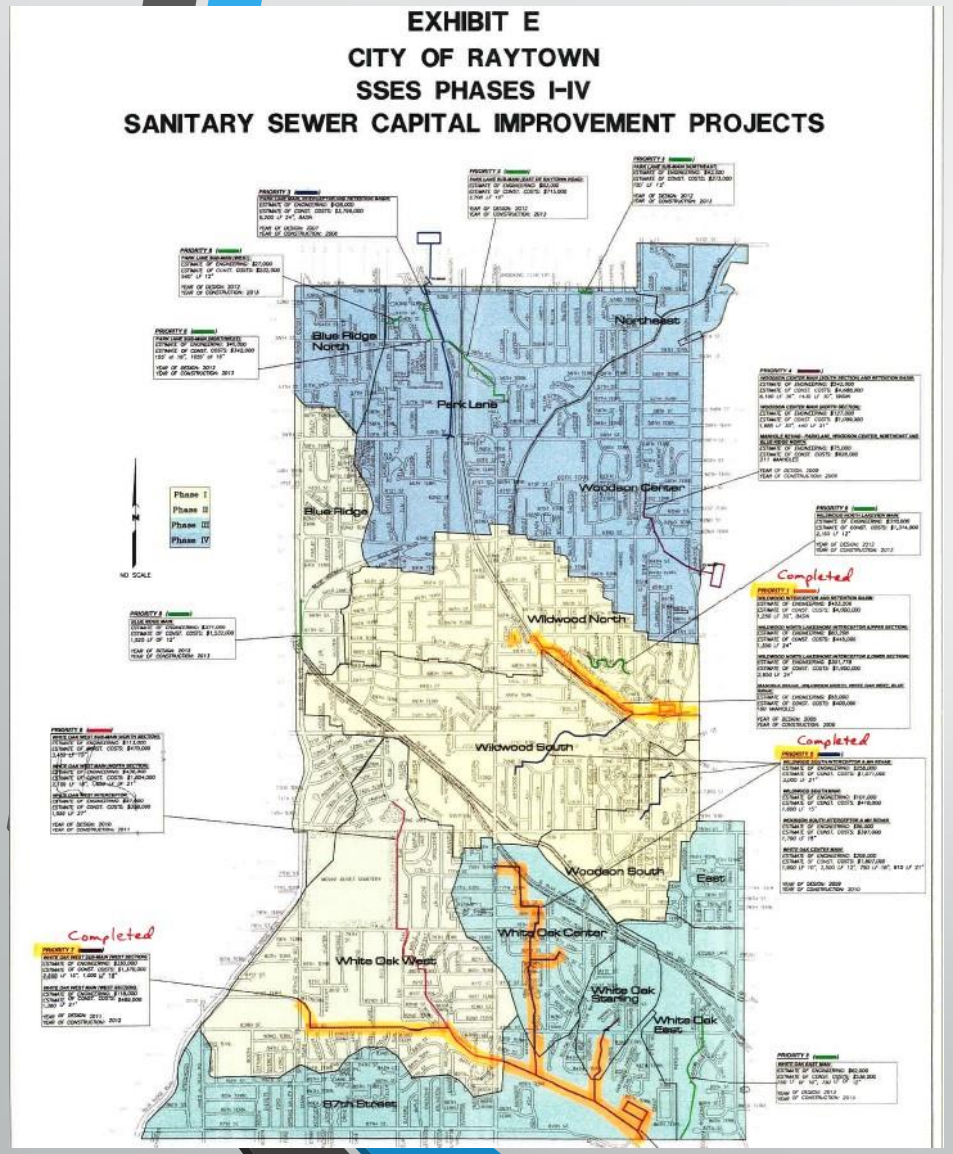
BARTLETT & WEST ENGINEERS

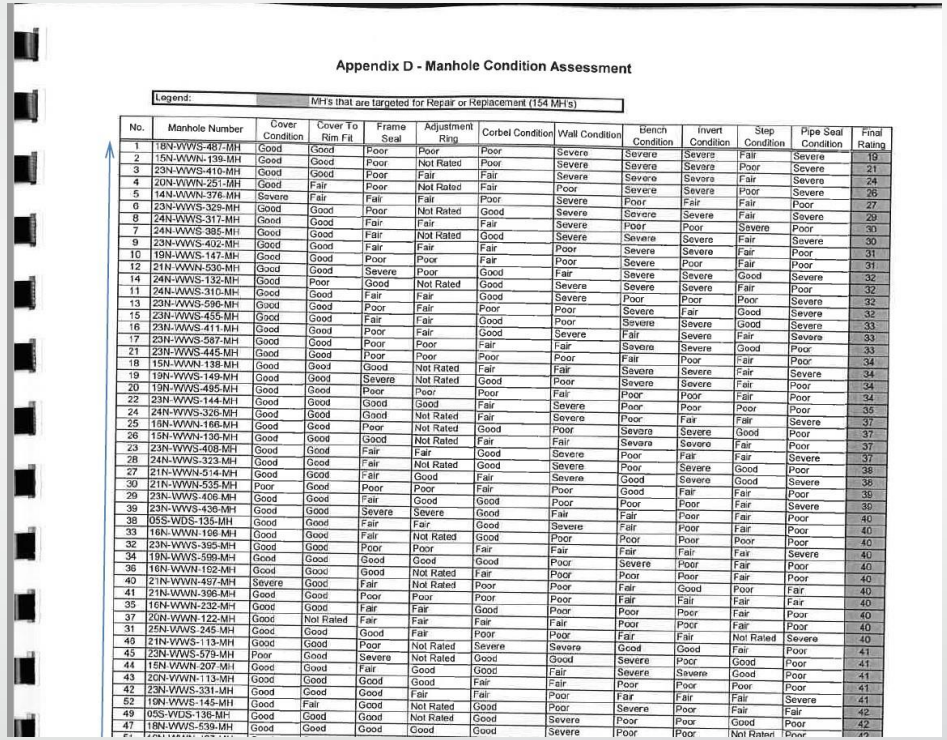
List of Figures

Lots of Great Information!

What information do we have to address I&I?

- 4 Phases of Capital Improvement Maps
- 4 Phases of Manhole Condition Assessments
- 4 Phases of Smoke Testing Results

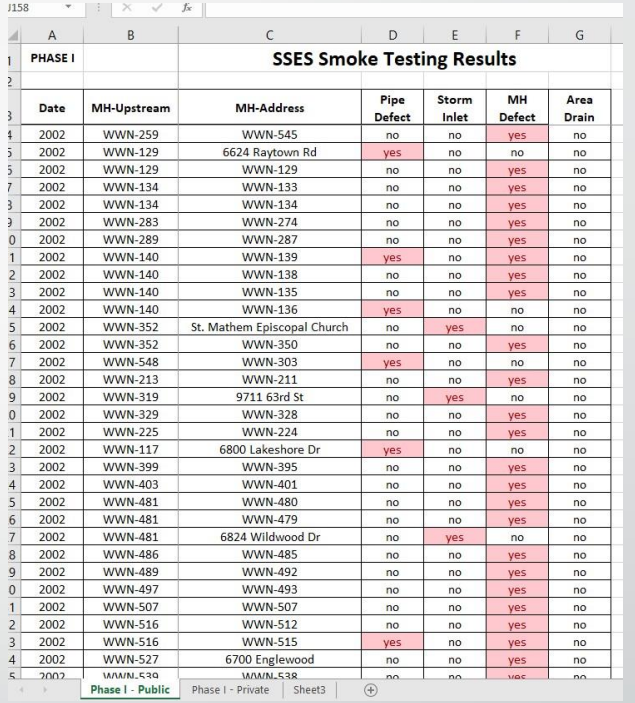




Appendix D - Manhole Condition Assessment

Legend: MH's that are targeted for Repair or Replacement (154 MH's)

No.	Manhole Number	Cover Condition	Cover To Rim Fit	Frame Seal	Adjustment Ring	Corbel Condition	Wall Condition	Bench Condition	Invert Condition	Step Condition	Pipe Seal Condition	Final Rating
1	18N-WWS-487-MH	Good	Good	Poor	Poor	Poor	Severe	Severe	Severe	Fair	Severe	19
2	15N-WWN-139-MH	Good	Good	Poor	Not Rated	Poor	Severe	Severe	Severe	Poor	Severe	21
3	23N-WWS-410-MH	Good	Good	Poor	Fair	Fair	Severe	Severe	Severe	Fair	Severe	24
4	20N-WWN-251-MH	Good	Fair	Poor	Not Rated	Fair	Poor	Severe	Severe	Poor	Severe	26
5	14N-WWN-376-MH	Severe	Fair	Fair	Fair	Poor	Severe	Poor	Fair	Fair	Poor	27
6	23N-WWS-329-MH	Good	Good	Poor	Not Rated	Good	Severe	Severe	Severe	Fair	Severe	29
8	24N-WWS-317-MH	Good	Good	Fair	Fair	Fair	Severe	Poor	Poor	Severe	Poor	30
7	24N-WWS-385-MH	Good	Good	Fair	Not Rated	Good	Severe	Severe	Severe	Fair	Severe	30
9	23N-WWS-402-MH	Good	Good	Fair	Fair	Fair	Poor	Severe	Severe	Fair	Poor	31
10	19N-WWS-147-MH	Good	Good	Poor	Poor	Fair	Poor	Severe	Poor	Fair	Poor	31
12	21N-WWN-530-MH	Good	Good	Severe	Poor	Good	Fair	Severe	Severe	Good	Severe	32
14	24N-WWS-132-MH	Good	Poor	Good	Not Rated	Good	Severe	Severe	Severe	Fair	Poor	32
11	24N-WWS-310-MH	Good	Good	Fair	Fair	Good	Severe	Poor	Poor	Poor	Severe	32
13	23N-WWS-596-MH	Good	Good	Poor	Fair	Poor	Poor	Severe	Fair	Good	Severe	32
15	23N-WWS-455-MH	Good	Good	Fair	Fair	Good	Poor	Severe	Severe	Good	Severe	33
16	23N-WWS-411-MH	Good	Good	Poor	Fair	Good	Severe	Fair	Severe	Fair	Severe	33
17	23N-WWS-587-MH	Good	Good	Poor	Poor	Fair	Fair	Severe	Severe	Good	Poor	33
21	23N-WWS-445-MH	Good	Good	Poor	Poor	Poor	Poor	Fair	Poor	Fair	Poor	34
18	15N-WWN-138-MH	Good	Good	Good	Not Rated	Fair	Fair	Severe	Severe	Fair	Severe	34
19	19N-WWS-149-MH	Good	Good	Severe	Not Rated	Good	Poor	Severe	Severe	Fair	Poor	34
20	19N-WWS-495-MH	Good	Good	Poor	Poor	Poor	Fair	Poor	Poor	Fair	Poor	34
22	23N-WWS-144-MH	Good	Good	Good	Good	Fair	Severe	Poor	Poor	Poor	Poor	35
24	24N-WWS-326-MH	Good	Good	Good	Not Rated	Fair	Severe	Poor	Fair	Fair	Severe	37
25	15N-WWN-166-MH	Good	Good	Poor	Not Rated	Good	Poor	Severe	Severe	Good	Poor	37
26	15N-WWN-136-MH	Good	Good	Good	Not Rated	Fair	Fair	Severe	Severe	Fair	Poor	37
23	23N-WWS-408-MH	Good	Good	Fair	Fair	Good	Severe	Poor	Fair	Fair	Severe	37
28	24N-WWS-323-MH	Good	Good	Fair	Not Rated	Good	Severe	Poor	Severe	Good	Poor	38
27	21N-WWN-514-MH	Good	Good	Fair	Good	Fair	Severe	Good	Severe	Good	Severe	38
30	21N-WWN-535-MH	Poor	Good	Poor	Poor	Fair	Poor	Good	Fair	Fair	Poor	39
29	23N-WWS-408-MH	Good	Good	Fair	Good	Good	Poor	Poor	Poor	Fair	Severe	39
39	23N-WWS-436-MH	Good	Good	Severe	Severe	Good	Fair	Fair	Poor	Fair	Poor	40
38	05S-WDS-135-MH	Good	Good	Fair	Fair	Good	Severe	Fair	Poor	Fair	Poor	40
33	16N-WWN-106-MH	Good	Good	Fair	Not Rated	Good	Poor	Poor	Poor	Poor	Poor	40
32	23N-WWS-395-MH	Good	Good	Poor	Poor	Fair	Fair	Fair	Fair	Fair	Severe	40
34	19N-WWS-599-MH	Good	Good	Good	Good	Good	Poor	Severe	Poor	Fair	Poor	40
36	16N-WWN-102-MH	Good	Good	Good	Not Rated	Fair	Poor	Poor	Poor	Fair	Poor	40
40	21N-WWN-497-MH	Severe	Good	Fair	Not Rated	Poor	Poor	Fair	Good	Poor	Fair	40
41	21N-WWN-398-MH	Good	Good	Poor	Poor	Poor	Poor	Fair	Fair	Fair	Fair	40
35	16N-WWN-232-MH	Good	Good	Fair	Fair	Good	Poor	Poor	Poor	Fair	Poor	40
37	20N-WWN-122-MH	Good	Not Rated	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Poor	40
31	25N-WWS-245-MH	Good	Good	Good	Fair	Poor	Poor	Fair	Fair	Not Rated	Severe	40
49	21N-WWS-113-MH	Good	Good	Poor	Not Rated	Severe	Severe	Good	Good	Fair	Poor	41
45	23N-WWS-579-MH	Poor	Good	Severe	Not Rated	Good	Good	Severe	Poor	Good	Poor	41
44	15N-WWN-207-MH	Good	Good	Fair	Good	Good	Fair	Severe	Severe	Good	Poor	41
43	20N-WWN-113-MH	Good	Good	Good	Good	Fair	Fair	Poor	Poor	Poor	Poor	41
42	23N-WWS-331-MH	Good	Good	Good	Fair	Fair	Poor	Fair	Fair	Fair	Severe	41
52	19N-WWS-145-MH	Good	Fair	Good	Not Rated	Good	Poor	Severe	Poor	Fair	Fair	42
49	05S-WDS-136-MH	Good	Good	Good	Not Rated	Good	Severe	Poor	Poor	Good	Poor	42
47	18N-WWS-539-MH	Good	Good	Good	Good	Good	Severe	Poor	Poor	Not Rated	Poor	42



J158

	A	B	C	D	E	F	G
1	PHASE I		SSES Smoke Testing Results				
2							
3	Date	MH-Upstream	MH-Address	Pipe Defect	Storm Inlet	MH Defect	Area Drain
4	2002	WWN-259	WWN-545	no	no	yes	no
5	2002	WWN-129	6624 Raytown Rd	yes	no	no	no
5	2002	WWN-129	WWN-129	no	no	yes	no
7	2002	WWN-134	WWN-133	no	no	yes	no
8	2002	WWN-134	WWN-134	no	no	yes	no
9	2002	WWN-283	WWN-274	no	no	yes	no
0	2002	WWN-289	WWN-287	no	no	yes	no
1	2002	WWN-140	WWN-139	yes	no	yes	no
2	2002	WWN-140	WWN-138	no	no	yes	no
3	2002	WWN-140	WWN-135	no	no	yes	no
4	2002	WWN-140	WWN-136	yes	no	no	no
5	2002	WWN-352	St. Mathem Episcopal Church	no	yes	no	no
6	2002	WWN-352	WWN-350	no	no	yes	no
7	2002	WWN-548	WWN-303	yes	no	no	no
8	2002	WWN-213	WWN-211	no	no	yes	no
9	2002	WWN-319	9711 63rd St	no	yes	no	no
0	2002	WWN-329	WWN-328	no	no	yes	no
1	2002	WWN-225	WWN-224	no	no	yes	no
2	2002	WWN-117	6800 Lakeshore Dr	yes	no	no	no
3	2002	WWN-399	WWN-395	no	no	yes	no
4	2002	WWN-403	WWN-401	no	no	yes	no
5	2002	WWN-481	WWN-480	no	no	yes	no
6	2002	WWN-481	WWN-479	no	no	yes	no
7	2002	WWN-481	6824 Wildwood Dr	no	yes	no	no
8	2002	WWN-486	WWN-485	no	no	yes	no
9	2002	WWN-489	WWN-492	no	no	yes	no
0	2002	WWN-497	WWN-493	no	no	yes	no
1	2002	WWN-507	WWN-507	no	no	yes	no
2	2002	WWN-516	WWN-512	no	no	yes	no
3	2002	WWN-516	WWN-515	yes	no	yes	no
4	2002	WWN-527	6700 Englewood	no	no	yes	no
5	2002	WWN-538	WWN-538	no	no	yes	no

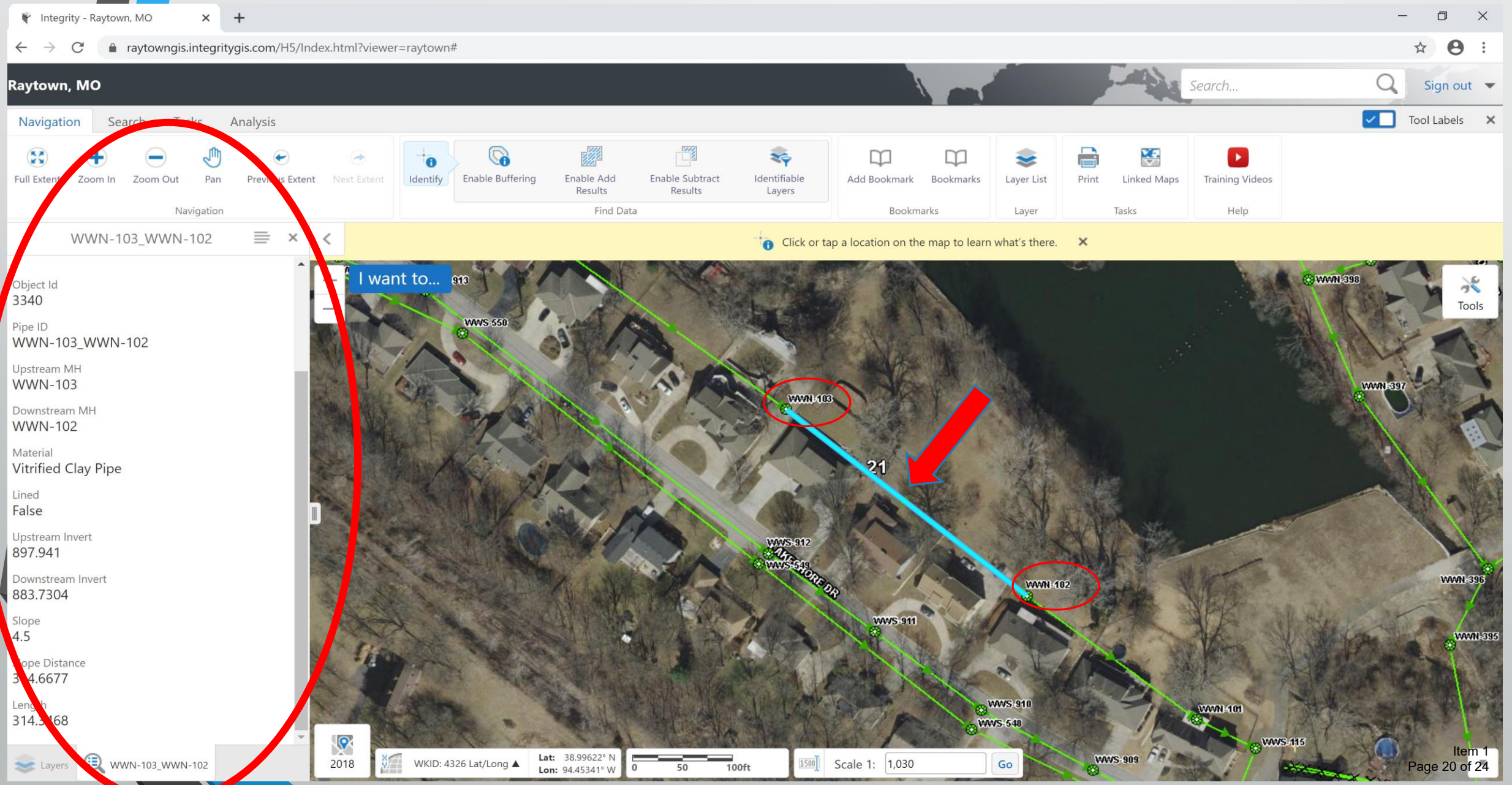
Phase I - Public | Phase I - Private | Sheet3

All Great Information!

What have we completed in last 5 years?

Name	Date modified	Type	Size
SSM-2015-01 Pipe Bursting at 7909 to 7919 Hedges Ave	4/17/2020 12:05 PM	File folder	
SSM-2015-02 Pipe Bursting at 9309 E 82nd Street	4/17/2020 12:03 PM	File folder	
SSM-2016-01 Emergency Repair at 11605 E 62nd Terrace	4/17/2020 12:06 PM	File folder	
SSM-2016-02 Emergency Repair at 10717 E 71st Terrace	3/18/2020 10:55 AM	File folder	
SSM-2017-01 Emergency Repair at 9404 and 9406 E 82nd Street	4/15/2020 11:58 AM	File folder	
SSM-2017-02 Emergency Repair at 7508 Maple Lane	4/17/2020 2:16 PM	File folder	
SSM-2018-01 Emergency Repair at 9805 MO-350 Highway	3/18/2020 11:30 AM	File folder	
SSM-2018-02 Emergency Repair at 9705 E 80th Terrace	3/18/2020 11:30 AM	File folder	
SSM-2018-03 Pipe Bursting at 6800 Block of Raytown Road	3/18/2020 11:32 AM	File folder	
SSM-2018-04 Pipe Bursting at 8923 to 9007 E 79th Street	3/18/2020 11:33 AM	File folder	
SSM-2018-05 Emergency Repair of Manhole at 87th Street Lagoon Creek	5/12/2020 3:39 PM	File folder	
SSM-2018-06 Emergency Repair at 5825 Cedar Avenue	5/12/2020 4:07 PM	File folder	
SSM-2019-01 Sanitary Sewer Maintanence Program	4/14/2020 3:50 PM	File folder	
SSM-2019-02 Emergency Repair of Manhole at 10200 E 85th Terrace	5/12/2020 4:19 PM	File folder	
SSM-2019-03 Emergency Repair at 8402 Woodson Road	5/12/2020 4:23 PM	File folder	
SSM-2019-04 Emergency Repair at 8520 Harvard Terrace	4/15/2020 11:51 AM	File folder	
SSM-2019-05 CIPP East Basin Sewer Rehabilitation	4/14/2020 4:29 PM	File folder	
SSM-2020-01 Sanitary Sewer I&I Reduction Program	6/8/2020 9:51 AM	File folder	
SSM-2020-02 Emergency Repair at 6637 Maywood Avenue	4/24/2020 10:41 AM	File folder	
SSM-2020-03 Sanitary Sewer Maintenance Program	4/20/2020 10:55 AM	File folder	
TEMPLATE	3/18/2020 8:31 AM	File folder	

What information do we have to address I&I? .....GIS Mapping



What information do we have to address I&I?

BURNS McDONNELL

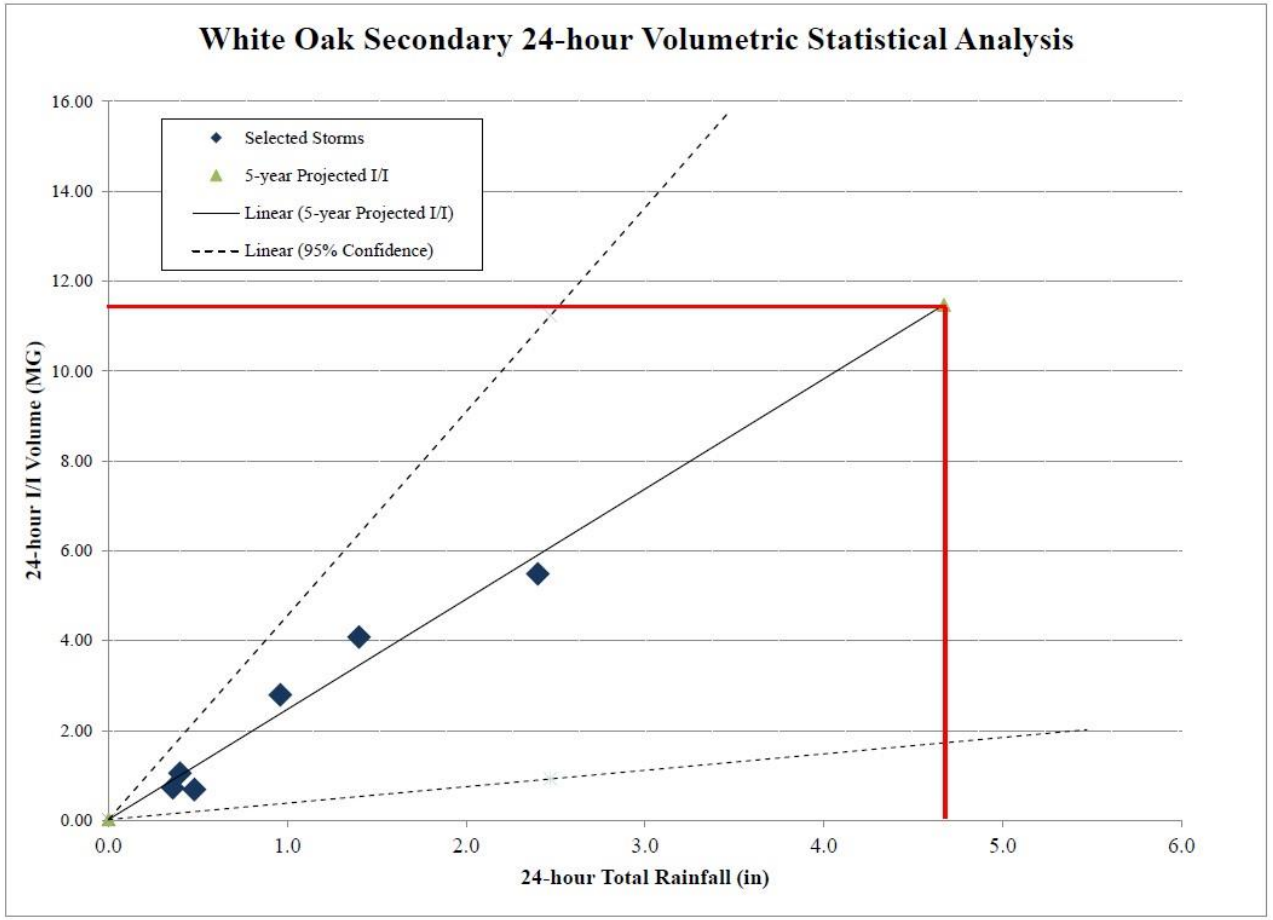
2016 Sanitary Sewer System Review, Flow Analysis, and Billing Study Appendices A-M

CITY OF RAYTOWN

City of Raytown

2016
Project No. 91935

Final Revision
10/20/2016



"Do Something or Else….."

"Let's Do Something Special"

Needs

- Centralization of Data - Lots of good information, but difficult to put everything together. We need to digitize this information in a database.
- GIS Mapping – Sanitary System is mapped but has not been maintained with new data and there are still gaps in our mapping we need to fix.
- Develop a comprehensive improvement and maintenance program using existing and new information
- Fund and budget appropriately. We will learn more as we go.

Goals of GBA Task Order

- Data-Driven Decision Making by analyzing the existing data to develop a long term I&I reduction program
- Developing and Improve comprehensive GIS based databases for viewing, analysis and data entry of CCTV, flow monitoring, inspection, maintenance, operational and project data
- Determine data gap issues for collecting the data required to implement an effective asset management system and for I/I removal
- Provide the City with near-term recommendations for the improvements in priority basins based on existing reports and data
- Develop a comprehensive 5-year capital improvement plan (CIP) that reduces I/I and aligns with the City's CIP budget
- Prepare a report summarizing the work and provide recommendations for future improvements both to the repair program and additional data acquisition

Cost = $114,937.00

QUESTIONS

CITY OF RAYTOWN
Request for Board Action

Date: June 10, 2020 **Resolution No.: XXXX-20**
To: Mayor and Board of Aldermen
From: Jose Leon, Director of Public Works

Department Head Approval: _____

Finance Director Approval: _____

City Administrator Approval: _____

Action Requested: To approve GBA Task Order as written.

Recommendation: Staff recommends approval of GBA Task Order for Stormwater Master Plan Phase I in an amount not to exceed $100,065.00

Analysis: The City completed a Stormwater Master Plan in 1996 which helped identify Capital Improvement Projects for the City to invest. The City has completed a couple of projects over the years but the single largest issue the City is managing is the failing infrastructure in Raytown; particularly with Corrugated Metal Pipe (CMP). One of the issues staff has identified is the lack of viable information related to our existing stormwater infrastructure. It is not properly mapped and the information that is mapped does not have much information associated with it. This makes it difficult for staff to properly plan and program an improvement and maintenance program with little information.

Staff has worked with GBA, our on-call engineers, to develop a task order to help Public Works staff:

- Stormwater Master Plan Phase I of 4
- GPS Locate and Assess 1300 Structures
- Provide Accurate Inventory of system
- Develop comprehensive GIS database
- Develop 5-year CIP of maintenance and improvements

Alternatives: Do not spend the dollars and Public Works staff will try to do this work in-house.

Budgetary Impact:

☐ Not Applicable
☐ Budgeted item with available funds
☒ Non-Budgeted item with available funds through prioritization
☐ Non-Budgeted item with additional funds requested

Amount to Spend:	$100,065.00
Fund:	Stormwater Fund 401-62-00-100-53600

Additional Reports Attached: Task Order and Presentation.

9801 Renner Boulevard
Lenexa, KS 66219

May 18, 2020

City of Raytown, MO
Mr. José Leon
Director of Public Works
10000 E 59th Street
Raytown, MO 64113

Subject: Stormwater Master Plan Engineering Services

Dear Mr. Leon –

The GBA Team is pleased to present our proposed scope and fee for the requested Stormwater Master Plan engineering services to gain a complete account of asset inventory which will assist staff in developing a 3-5 year CIP.

Since the 1980's the City of Raytown, MO (City) has invested time and financial resources in the evaluation and prioritization of its storm sewer system. While this investment has resulted in a master plan and two subsequent updates, it has not provided a clear inventory of what the City of Raytown has nor has it prioritized projects based on this information and has not been updated since 1996.

As a result, the City has completed twelve projects from the 1996 Stormwater Master Plan, while the rest of the storm sewer projects have been emergency repairs due to failing infrastructure.

The scope of services has been developed to address this issue by:

- Providing the City with an accurate inventory of their system in order to identify replacement needs.
- Developing comprehensive GIS based databases for the viewing, analysis and data entry of the storm sewer system along with a basic rating of each system component.
- Developing a revised priority listing of projects based on data obtained from the system inventory will aid the City in strategic planning and having a more proactive approach to storm sewer improvements.
- Reducing costs to the City with this priority listing due to a reduction in emergency repairs needed, which drive up construction costs.
- Providing the City with the storm sewer inventory will also help in tracking maintenance needed over the years as projects are completed and tracked within the GIS database.
- Assisting the City in developing a 5 year Capital Improvement Plan (CIP)

GBA has successfully provided these services to clients across the Midwest for over 30 years and look forward to working as part of the City's team to shift the City to a more proactive role by allowing them to identify areas of concern before they become emergencies.

Should you have any questions, please call Charles at 913.577.8459.

Sincerely,
George Butler Associates, Inc.

Katie Handley Stucky, P.E., CFM, ENV SP
Project Manager
kstucky@gbateam.com

Charles McAllister
Point-of-Contact
cmcallister@gbateam.com

SCOPE OF SERVICES – PHASE 1

It is expressly understood and agreed by the parties hereto that it is the intention of this Agreement to provide for furnishing engineering services for the subject project:

RAYTOWN, MISSOURI
STORMWATER MASTER PLAN

The City of Raytown, Missouri has identified the need to develop a City-Wide Stormwater Master Plan Update. The previous Stormwater Master Plan Update was completed in 1996. The update will reflect a more comprehensive inventory and assessment of the enclosed stormwater conveyance system, projects not previously implemented, and projects subsequently identified by the City. Prior and current projects identified will be based on the upgrades needed to meet current APWA 5600 Stormwater standards or modifications thereof.

It is anticipated that the Stormwater Master Plan will be completed in phases. Therefore, the Scope of Services for Phase of this Project is organized into Four (4) major Task Series:

Task Series 100 – Project Management
Task Series 200 – Data Collection (Desktop Only)
Task Series 300 – System Inventory and Assessment
Task Series 400 – Revised System Connectivity

TASK SERIES 100 – PROJECT MANAGEMENT

100. Project Administration. Provide the management functions required to successfully complete the System connectivity, inventory and assessment, including all project correspondence with the Client; Kick-off meeting consultation with the Client's staff; supervision and coordination of services, and a quality control/assurance; scheduling and assignment of personnel resources, continuous monitoring of work progress and invoicing for the work performed (for an assumed 8 months). Consultant shall prepare and distribute minutes of progress meetings (limited to two) with the Client with action items.

Total Task Series 100 - $2,727

TASK SERIES 200 – Data Collection (Desktop Only)

200. Data Collection. The Consultant shall collect, compile and evaluate pertinent and available data from the Client. Information anticipated to be obtained includes stormwater collection systems shapefiles; history or operational and maintenance problems including locations of drainage backups, overflows and/or surcharging; and history of system modifications not shown on the construction record drawings or visible from observation in the field. The Consultant will compile an inventory of the system and digitally map the storm sewer system and its connectivity to develop a field map for field system inventory and assessment.

Total Task Series 200 - $3,456

TASK SERIES 300 – System Inventory and Assessment

300. System Inventory and Assessment. The Consultant shall locate and assess, those structures accessible, based on Task Series 300 for a total of 1300 structures. This work will effectively comprise a site reconnaissance of the stormwater collection, conveyance, and discharge system. This physical

sewer data collection is summarized by line segments between structures (manholes and/or surface intakes), and includes the following essential information:

- Upstream and downstream structure numbers
- Top Elevations to be determined at structures
- Invert Depths to be determined at structures
- Structure-to- structure length
- Inlet Size, throat depth and widths
- Pipe size
- Pipe material
- Pipe slope

Photographic records will be made of each storm structure and/or outfall identified. Should structures and/or conveyance be on private property those will be noted as such and follow up with City to gain access. In addition, if during field reconnaissance we find structures that are plugged, capacity of system compromised and/or collapsing that will be communicated with City Staff immediately. In some cases water testing and/or CCTV may need to be utilized to confirm connectivity and/or extent of damages that are not currently anticipated in our scope.

Total Task Series 300 - $86,010

TASK SERIES 400 – REVISED SYSTEM INVENTORY

400. Revised System Inventory. Based on Task Series 200 and 300 the Consultant shall revise the digital mapping to include the revised (connectivity, structures/conveyance located in field, etc.) stormwater system for delivery in digital and hard copy format to Raytown.

401. Priority Listing of Projects. Based on the previous task series, a priority listing of the projects will be developed based on the data collected and the projects identified as stormwater improvements needed with high level cost estimates.

Total Task Series 400 - $10,112

TOTAL PHASE 1 - $100,065

SCOPE OF SERVICES – PHASE 2

It is expressly understood and agreed by the parties hereto that it is the intention of this Agreement to provide for furnishing engineering services for the subject project:

RAYTOWN, MISSOURI
STORMWATER MASTER PLAN

The City of Raytown, Missouri has identified the need to develop a City-Wide Stormwater Master Plan Update. The previous Stormwater Master Plan Update was completed in 1996. The update will reflect a more comprehensive inventory and assessment of the enclosed stormwater conveyance system, projects not previously implemented, and projects subsequently identified by the City. Prior and current projects identified will be based on the upgrades needed to meet current APWA 5600 Stormwater standards or modifications thereof.

It is anticipated that the Stormwater Master Plan will be completed in phases. Therefore, the Scope of Services for Phase of this Project is organized into Four (4) major Task Series:

Task Series 100 – Project Management
Task Series 200 – Field Map Development
Task Series 300 – System Inventory and Assessment
Task Series 400 – Revised System Connectivity

TASK SERIES 100 – PROJECT MANAGEMENT

100. Project Administration. Provide the management functions required to successfully complete the System connectivity, inventory and assessment, including all project correspondence with the Client; Kick-off meeting consultation with the Client's staff; supervision and coordination of services, and a quality control/assurance; scheduling and assignment of personnel resources, continuous monitoring of work progress and invoicing for the work performed (for an assumed 8 months). Consultant shall prepare and distribute minutes of progress meetings (limited to 2) with the Client with action items.

Total Task Series 100 - $2,727

TASK SERIES 200 – Field Map Development

200. Field Map Development. The Consultant will compile an inventory of the system and digitally map the storm sewer system and its connectivity to develop a field map for field system inventory and assessment.

Total Task Series 200 - $1,448

TASK SERIES 300 – System Inventory and Assessment

300. System Inventory and Assessment. The Consultant shall locate and assess, those structures accessible, based on Task Series 300, limited to 1800 structures. This work will effectively comprise a site reconnaissance of the stormwater collection, conveyance, and discharge system. This physical sewer data collection is summarized by line segments between structures (manholes and/or surface intakes), and includes the following essential information:

- Upstream and downstream structure numbers
- Top Elevations to be determined at structures

- Invert Depths to be determined at structures
- Structure-to- structure length
- Inlet Size, throat depth and widths
- Pipe size
- Pipe material
- Pipe slope

Photographic records will be made of each storm structure and/or outfall identified. Should structures and/or conveyance be on private property those will be noted as such and follow up with City to gain access. In addition, if during field reconnaissance we find structures that are plugged, capacity of system compromised and/or collapsing that will be communicated with City Staff immediately. In some cases water testing and/or CCTV may need to be utilized to confirm connectivity and/or extent of damages that are not currently anticipated in our scope.

Total Task Series 300 - $100,792

TASK SERIES 400 – REVISED SYSTEM INVENTORY

400. Revised System Inventory. Based on Task Series 200 and 300 the Consultant shall revise the digital mapping to include the revised (connectivity, structures/conveyance located in field, etc.) stormwater system for delivery in digital and hard copy format to Raytown.

401. Priority Listing of Projects. Based on the previous task series, a priority listing of the projects will be developed based on the data collected and the projects identified as stormwater improvements needed with high level cost estimates.

Total Task Series 400 - $9,456

TOTAL PHASE 2 - $114,423

SCOPE OF SERVICES – PHASE 3

It is expressly understood and agreed by the parties hereto that it is the intention of this Agreement to provide for furnishing engineering services for the subject project:

RAYTOWN, MISSOURI
STORMWATER MASTER PLAN

The City of Raytown, Missouri has identified the need to develop a City-Wide Stormwater Master Plan Update. The previous Stormwater Master Plan Update was completed in 1996. The update will reflect a more comprehensive inventory and assessment of the enclosed stormwater conveyance system, projects not previously implemented, and projects subsequently identified by the City. Prior and current projects identified will be based on the upgrades needed to meet current APWA 5600 Stormwater standards or modifications thereof.

It is anticipated that the Stormwater Master Plan will be completed in phases. Therefore, the Scope of Services for Phase of this Project is organized into Four (4) major Task Series:

Task Series 100 – Project Management
Task Series 200 – Field Map Development
Task Series 300 – System Inventory and Assessment
Task Series 400 – Revised System Connectivity

TASK SERIES 100 – PROJECT MANAGEMENT

100. Project Administration. Provide the management functions required to successfully complete the System connectivity, inventory and assessment, including all project correspondence with the Client; Kick-off meeting consultation with the Client's staff; supervision and coordination of services, and a quality control/assurance; scheduling and assignment of personnel resources, continuous monitoring of work progress and invoicing for the work performed (for an assumed 8 months). Consultant shall prepare and distribute minutes of progress meetings (limited to 2) with the Client with action items.

Total Task Series 100 - $2,727

TASK SERIES 200 – Field Map Development

200. Field Map Development. The Consultant will compile an inventory of the system and digitally map the storm sewer system and its connectivity to develop a field map for field system inventory and assessment.

Total Task Series 200 - $1,448

TASK SERIES 300 – System Inventory and Assessment

300. System Inventory and Assessment. The Consultant shall locate and assess, those structures accessible, based on Task Series 300, limited to 1800 structures. This work will effectively comprise a site reconnaissance of the stormwater collection, conveyance, and discharge system. This physical sewer data collection is summarized by line segments between structures (manholes and/or surface intakes), and includes the following essential information:

- Upstream and downstream structure numbers
- Top Elevations to be determined at structures

- Invert Depths to be determined at structures
- Structure-to- structure length
- Inlet Size, throat depth and widths
- Pipe size
- Pipe material
- Pipe slope

Photographic records will be made of each storm structure and/or outfall identified. Should structures and/or conveyance be on private property those will be noted as such and follow up with City to gain access. In addition, if during field reconnaissance we find structures that are plugged, capacity of system compromised and/or collapsing that will be communicated with City Staff immediately. In some cases water testing and/or CCTV may need to be utilized to confirm connectivity and/or extent of damages that are not currently anticipated in our scope.

Total Task Series 300 - $100,792

TASK SERIES 400 – REVISED SYSTEM INVENTORY

400. Revised System Inventory. Based on Task Series 200 and 300 the Consultant shall revise the digital mapping to include the revised (connectivity, structures/conveyance located in field, etc.) stormwater system for delivery in digital and hard copy format to Raytown.

401. Priority Listing of Projects. Based on the previous task series, a priority listing of the projects will be developed based on the data collected and the projects identified as stormwater improvements needed with high level cost estimates.

Total Task Series 400 - $9,456

TOTAL PHASE 3 - $114,423

2020 STORMWATER MASTERPLAN – PHASE I

Using On-Call Engineering Services

CITY OF RAYTOWN

WHAT DO WE KNOW?

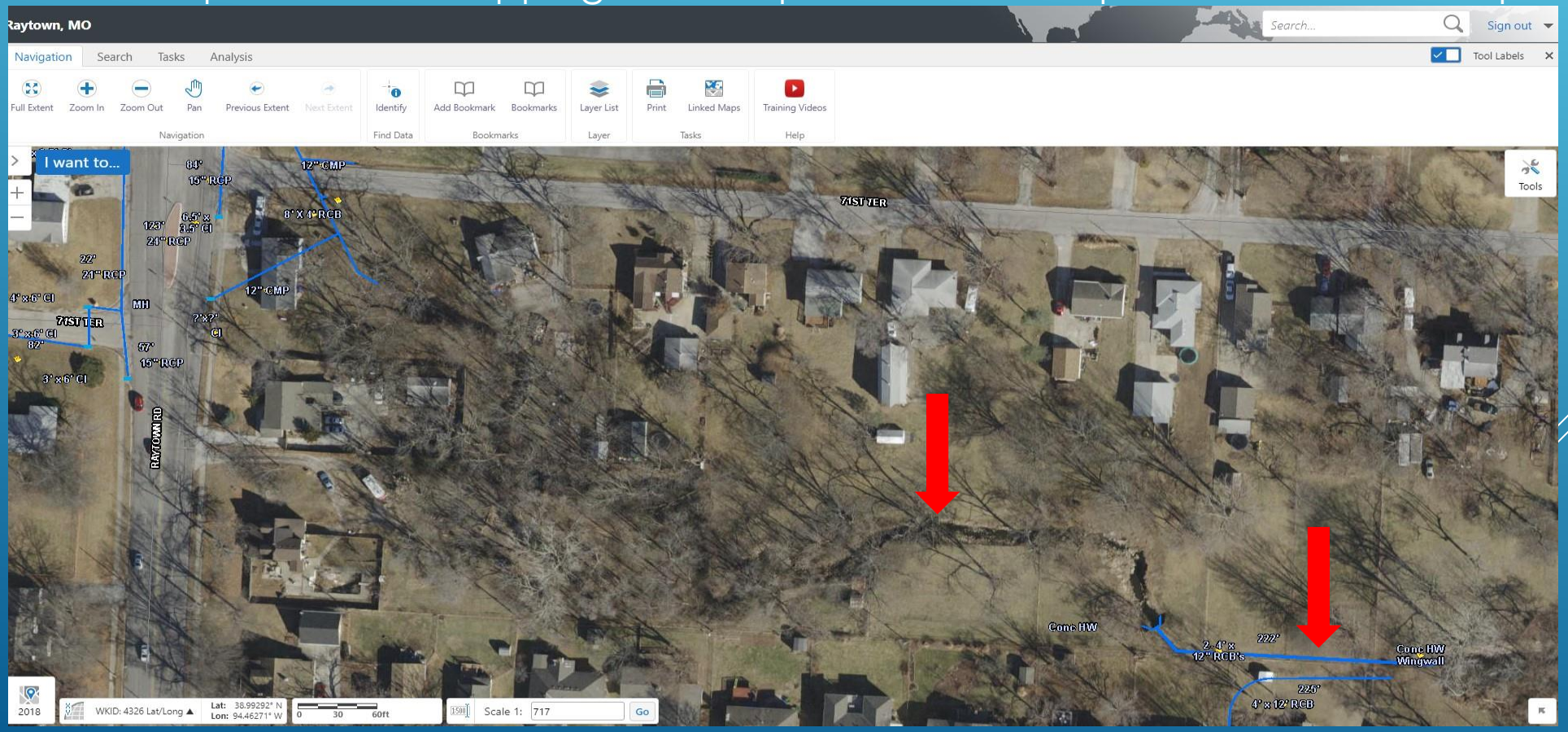
INVENTORY and OTHER

- Over 5,000 Structures (manholes, curb inlets, area inlet, etc)
- Over 60 miles of pipe (corrugated metal, concrete, etc)
- Nearly 1 mile of lined channel
- Our GIS Mapping is not accurate
- Metal pipe is a problem
- We are chasing our tail

WE DO NOT KNOW

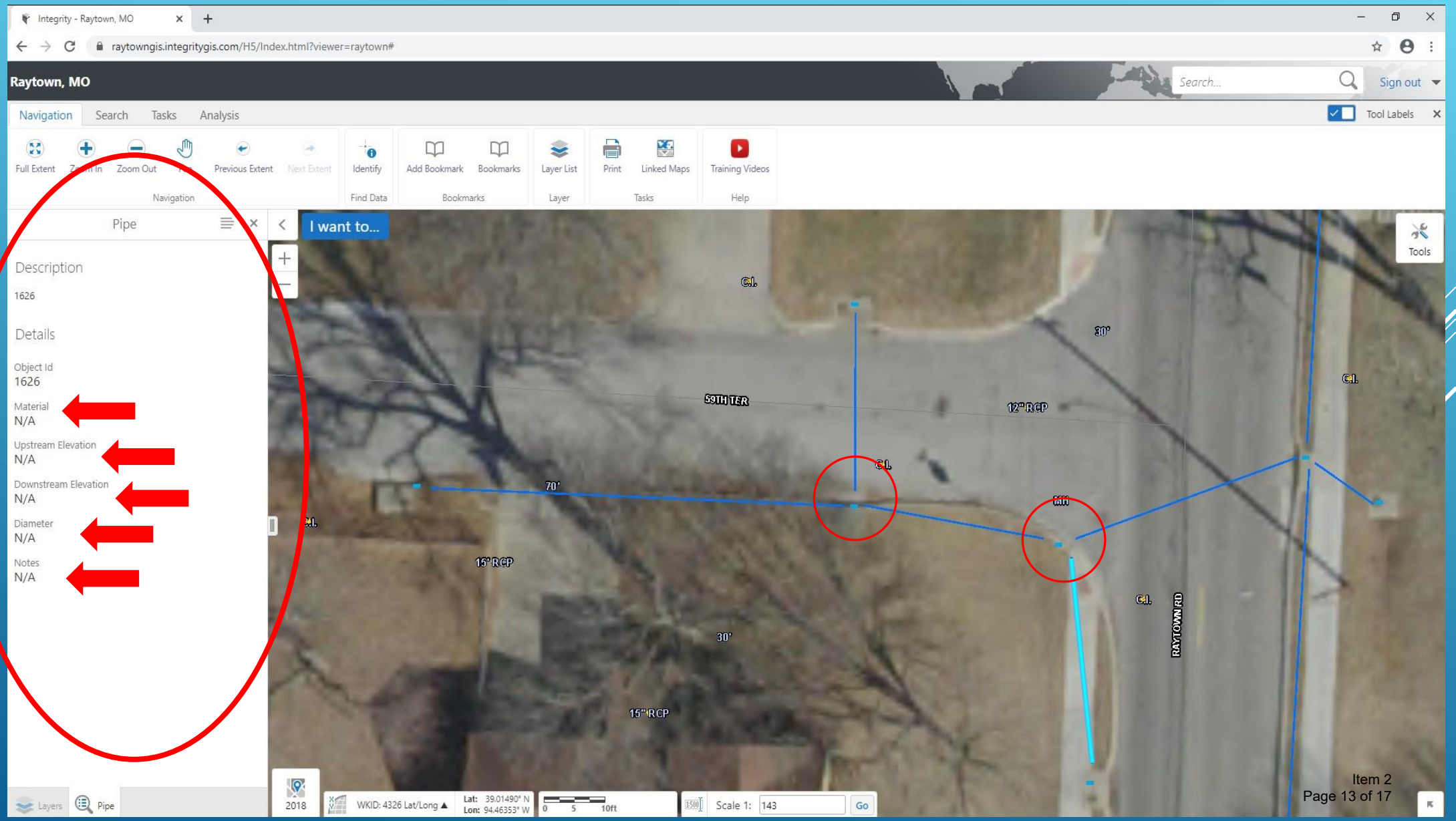
Questions

- Whole system – hard versus green inventory?
- Location, material, and size of stormwater system?
- How much funding we need to address maintenance issues?
- Which systems are maintenance not good enough? Where do we need more infrastructure?
- Which locations are the highest priority and why?
- We have not updated our mapping when improvements or replacements are completed.

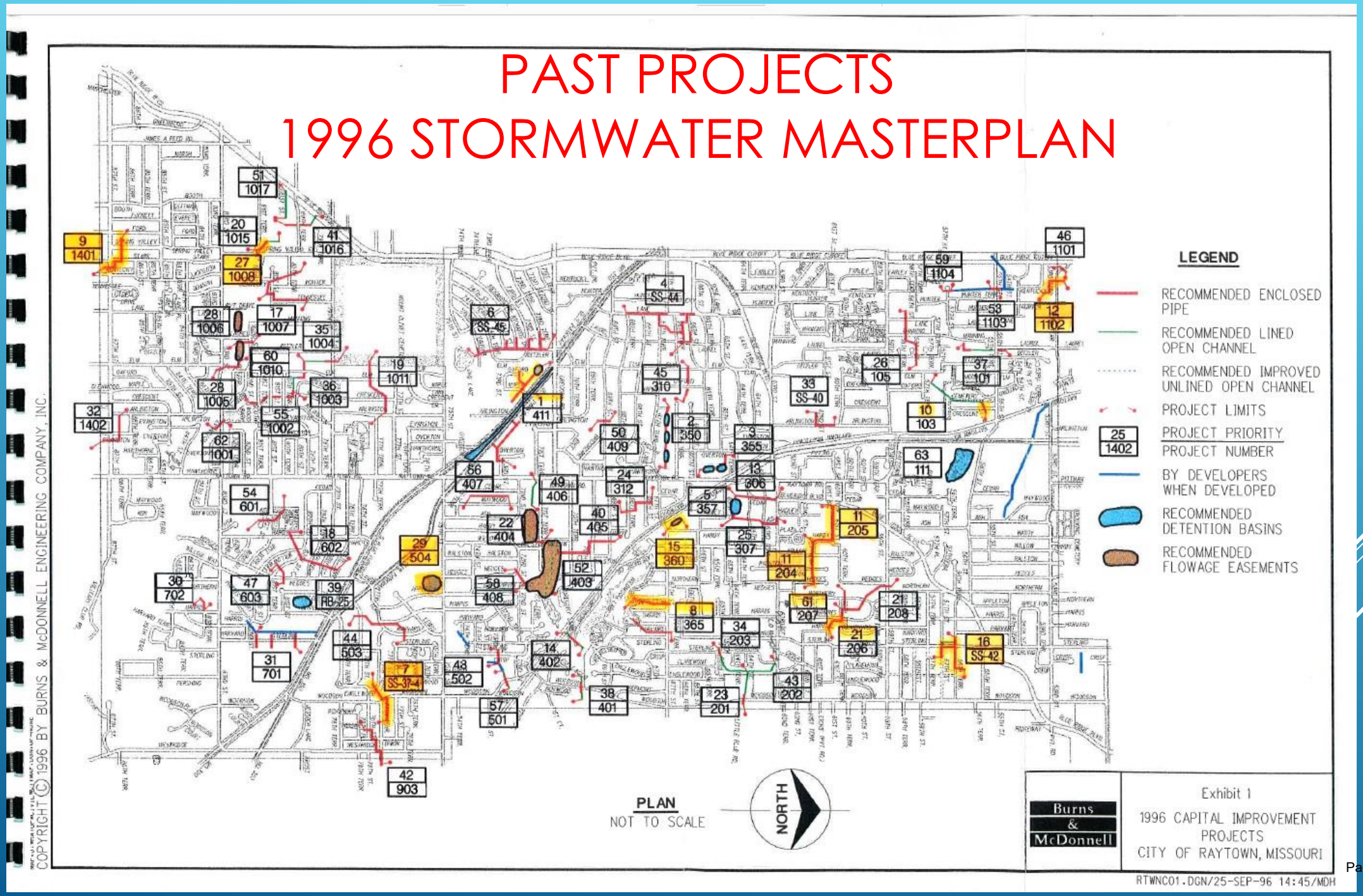


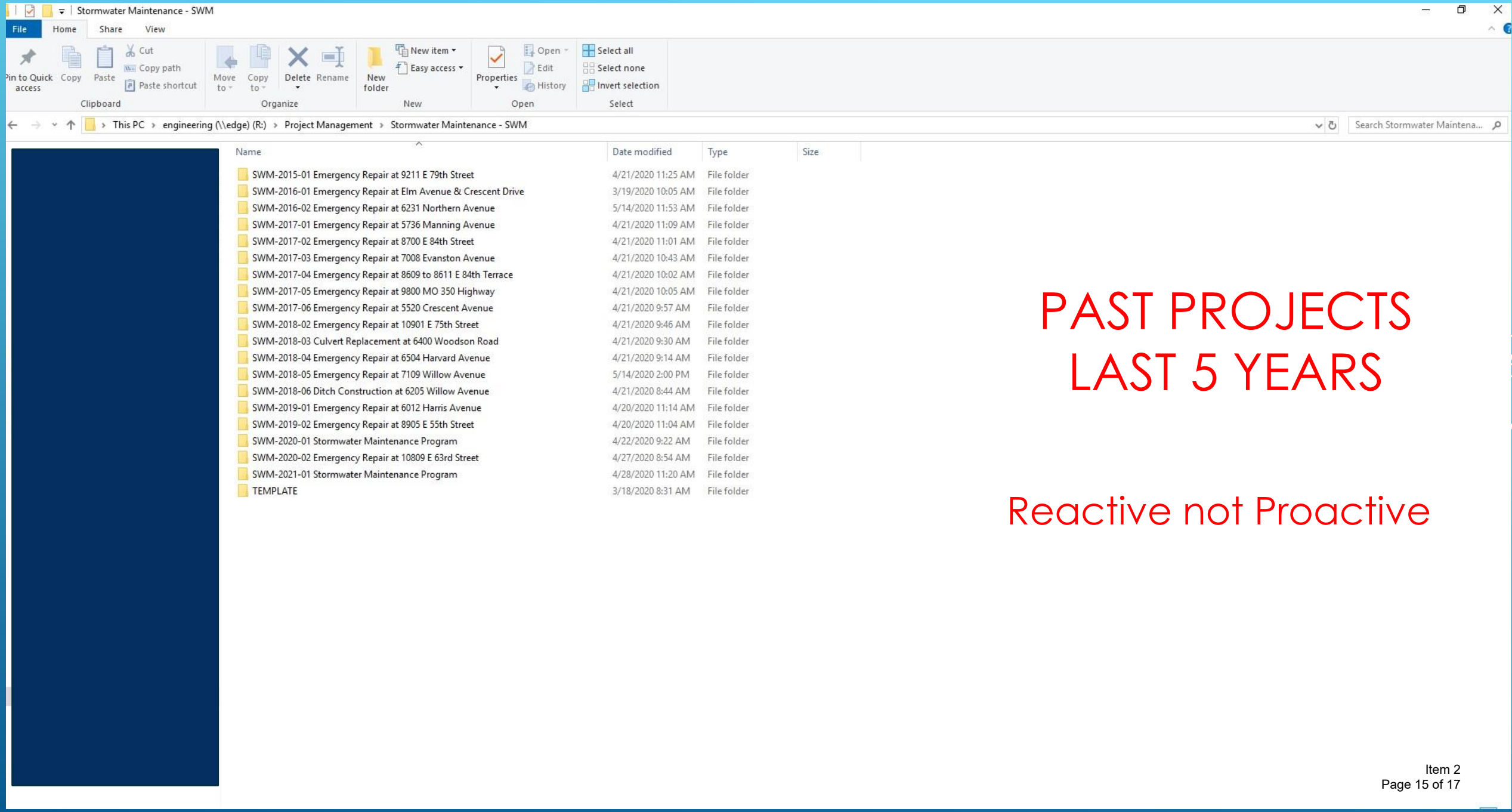
GIS MAPPING

MicroStation into GIS Mapping



PAST PROJECTS
1996 STORMWATER MASTERPLAN





PAST PROJECTS LAST 5 YEARS

Reactive not Proactive

GBA Task Order

- Stormwater Masterplan Phase I or 4
- 1300 Structures
- Provide Accurate Inventory of system
- Develop comprehensive GIS database
  - Basic rating of system
  - History of maintenance
  - Size
  - Material
  - Slope of pipe
  - Invert Elevations
  - GPS located
  - Photos of each inlet
- Develop 5-year CIP of maintenance and improvements
- Cost = $100,065.00

- $110,000 each of next 3 years to complete

QUESTIONS