CITY COUNCIL WORK SESSION

Council Chambers, 800 1st Terrace, Lansing, KS 66043
Thursday, September 28, 2023 at 7:00 PM

AGENDA

CALL TO ORDER

AGENDA ITEMS

1. 2023 Wastewater Master Plan Update

ADJOURNMENT

For information on how to view prior meetings, please visit our website at *https://www.lansingks.org*. If you require any special assistance, please notify the City Clerk prior to the meeting.

WORKSESSION ITEM

TO: Tim Vandall, City Administrator

FROM: Anthony J. Zell, Jr., Wastewater Utility Director

DATE: September 22, 2023

SUBJECT: 2023 Wastewater Collection System Master Plan Update

Director Zell and representatives from GBA will present the results and recommendations of the 2023 Master Plan to the City Council. A copy of the executive summary is attached.

WORKSESSION ITEM

EXECUTIVE SUMMARY

The Sanitary Sewer Collection System Master Plan Update project was initiated to: a) determine the results of recent sewer improvements; and b) to determine the needs of the sanitary sewer collection system into the future.

This Master Plan Update is intended to review the success of past projects and strategically layout additional capital improvements to the collection system to provide safe and efficient sanitary sewer flow collection. One goal of the Master Plan Update was to identify necessary improvements to the existing collection system so the City can schedule the improvements to be completed to allow for growth in the region. Overall the sewer improvements projects that the city has undertaken since the last Master Plan have greatly improved the collection system, and eliminated the need for multiple projects that were previously outlined.

One component of an aging collection system that does remain in the City's collection system is excessive infiltration and inflow (I/I). During the project it was determined by flow and rainfall monitoring that excessive I/I enters the system. I/I is rain water and ground water that enters the system through system defects. I/I is caused by the deterioration of the system and direct connections of storm drainage such as roof downspouts piped to the sanitary sewer collection system. I/I can reduce system capacity and can also inundate a system if left unchecked.

The growth of the city and excessive I/I has caused key interceptors in the City's collection system to be undersized for a 50-year design storm. Growth is expected to continue in Lansing, which will continue to reduce system capacity unless improvements are made.

To properly plan for improvements and expansion of the City's sewer system, the following study objectives were met:

1. Conducted flow and rainfall monitoring of the system and determined the current reaction of the system to rainfall.

2. Developed a computer capacity model and determined the current and future capacity needs of the main interceptors in the sanitary sewer collection system.

3. Developed a recommended plan to address existing and future capacity improvements. A phased plan for these recommendations is included to break down the improvements into manageable projects with a logical sequence of construction.

The project provided the following conclusions and recommendations:

1. Of the twelve basins established in the system during the flow monitoring stage, four basins were found to have excessive I/I that could be identified through I/I inspections and potentially removed. It is recommended that these basins be inspected to identify and remove cost-effective I/I sources.

   Removal of excessive I/I has the benefit of decreasing flow to the wastewater treatment plant, thereby extending the timeframe for a future plant expansion.

Removal of excessive I/I will also extend the useful life of major interceptors by not overloading them.

2. A 50-year storm event was selected for storm protection and future growth design flow criteria for the City. This protection is Lansing's current design storm event, and is used by other municipalities. It has proven to provide extensive protection when combined with I/I removal.

3. The hydraulic model identified the need for both relief sewers for existing conditions as well as areas that require relief for future growth conditions. Relief sewers are proposed for the following conditions:

   a. Current Capacity Issues: Relief sewers to address pipes undersized under current conditions are shown as Project 1. These relief sewers are sized to provide capacity for existing flows as well as future growth.

   b. Future Capacity Issues: Relief sewers were defined where pipes are not currently undersized, but do not have the capacity to serve future growth.

The phasing of these improvements should consider the following concepts:

- Current undersized sewers should be considered a higher priority than sewers needed to serve growth.

- The areas of excessive I/I resulted from many years of deterioration. Most I/I removal programs are completed over many years to spread costs of system renewal. However, the need for relief sewers for these areas is dependent on the understanding of the amount of I/I that can be removed. Therefore, the investigations to determine the potential for I/I reduction should be completed before the relief sewer improvements are implemented.

- The funding of the rehabilitation program should also consider that areas that currently do not exhibit excessive I/I will deteriorate and need attention in the future.

- The City needs to consider the available capacity in existing sewers in the approval process for proposed developments. Until capacity improvements are completed, the perceived cause of a basement backup or overflow will be new upstream developments, regardless of the actual cause (i.e. blockage).

The recommended phased plan is summarized in Table ES-1 and shown on

Figure ES- 1, Figure ES- 2-, and Figure ES- 3. The detailed plan for each project including figures showing project locations is presented in CHAPTER 4 of this report.

Table ES-1 Recommended Plan Summary

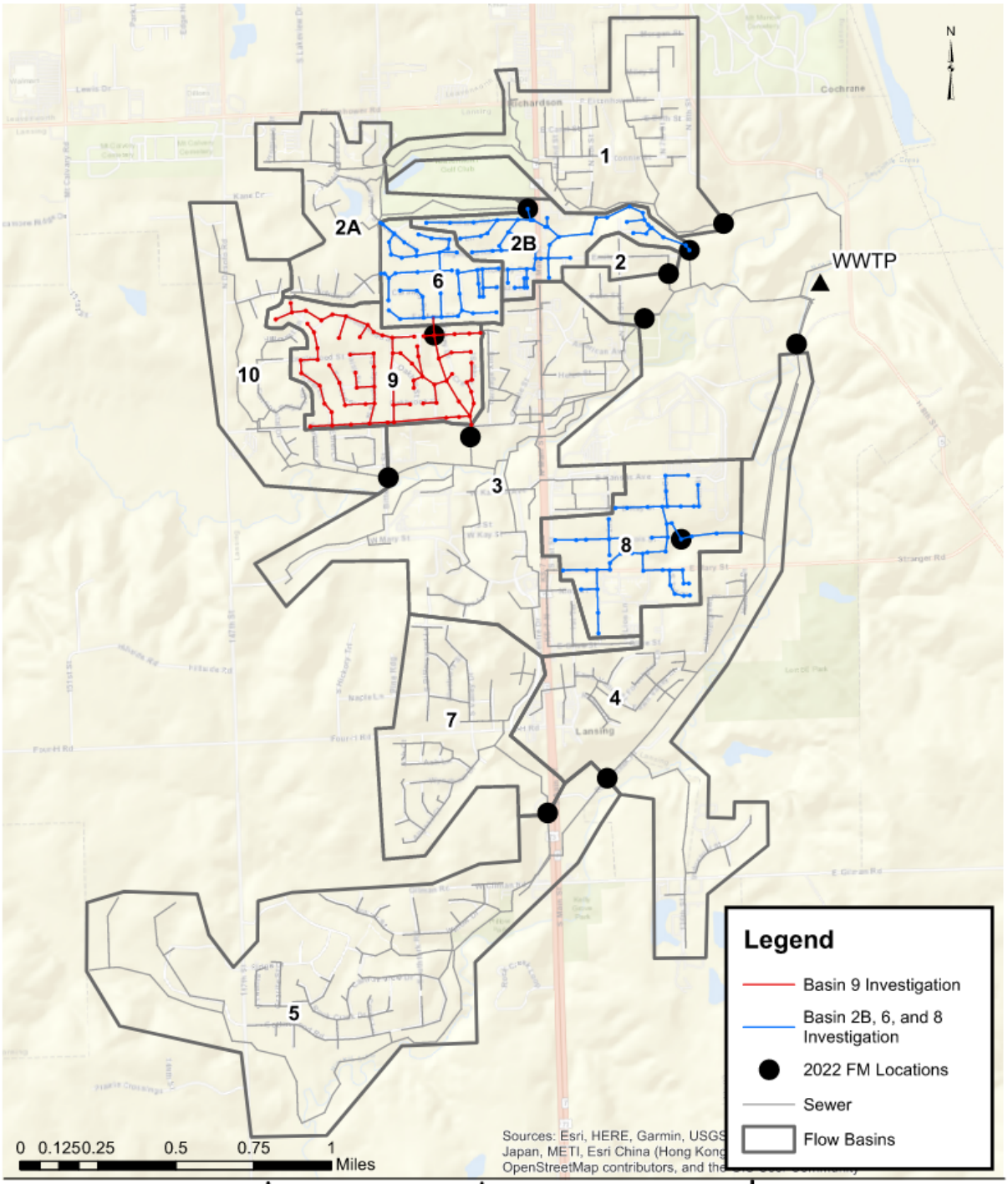
PROGRESS	TASK		UNIT	AMOUNT	UNIT COST ($/unit)	Estimated Cost ($)	Completed Cost ($)	Future Project Cost (1) ($)
	I/I Investigation and Reduction							
Future	I/I Investigation (Basins 2B, 6, 8, 9)		LF	55,000	10	N/A	N/A	$ 550,000
Future	System Repair (Basins 2B, 6, 8, 9)		LF	14,000	130	$ 1,820,000	N/A	$ 2,548,000
	SUBTOTAL					**$ 1,820,000**	**$ -**	**$ 3,098,000**
	Relief Sewer for Existing System							
	Description	**Location**						
Completed	7-Mile Action Plan (12" to 36")	7-Mile Interceptor	LF	12,726		$ 5,408,550	$ 4,706,835	$ -
Completed	Project 1 (10"-12" Pipe)	Basin 1 (3)	LF	3,500		$ 437,500	$ 397,706	$ -
In Progress	Project 2 (12"-15" Pipe)	Basin 1 (3)	LF	3,300	130	$ 429,000	$ 429,000	$ -
Eliminated	Project 3 (10" Pipe)	Basin 3	LF	2,100		ELIMINATED	$ -	$ -
Completed	Project 4 (10"-15" Pipe)	Basins 6, 9	LF	3,400		$ 1,066,000	$ 2,502,801	$ -
Future	Project 4 (10"-15" Pipe)	Basins 6, 9	LF	4,800	160	$ 429,000		$ 600,600
Completed	Project 5 (12"-18" Pipe)	Basin 8	LF	3,200		$ 480,000	$ 422,000	$ -
Completed	Project 6A (36" Pipe)	9-Mile Interceptor	LF	4,700		$ 2,350,000	$ 2,068,000	$ -
Future	Project 6B (36" Pipe)	9-Mile Interceptor	LF	4,700	620	$ 2,914,000		$ 4,079,600
		2014 SUBTOTAL		**29,700**		**$ 15,718,850**	**$ 10,526,342**	
		2022 SUBTOTAL		**9,500**		**$ 3,343,000**		**$ 4,680,200**
	Future Relief Sewers for Growth							
	Phase 1							
Future	9-Mile Interceptor (54" Pipe), Mary St to Main St		LF	4,500	580	$ 2,610,000	$ -	$ 3,654,000
Future	Basin 10 (15"-21" Pipe)		LF	4,400	200	$ 880,000	$ -	$ 1,232,000
	Phase 2							
Future	9-Mile Interceptor (48" Pipe), Main St SW		LF	6,800	740	$ 5,032,000	$ -	$ 7,044,800
	SUBTOTAL			**15,700**		**$ 8,522,000**	**$ -**	**$11,930,800**
	TOTAL							**$19,709,000**

Notes:
(1) Includes a contingency for project costs of 40%

Short term improvements include inflow and infiltration investigations for Basins 2B, 6, 8, and 9. These can be phased over multiple years to enable cost efficiencies.

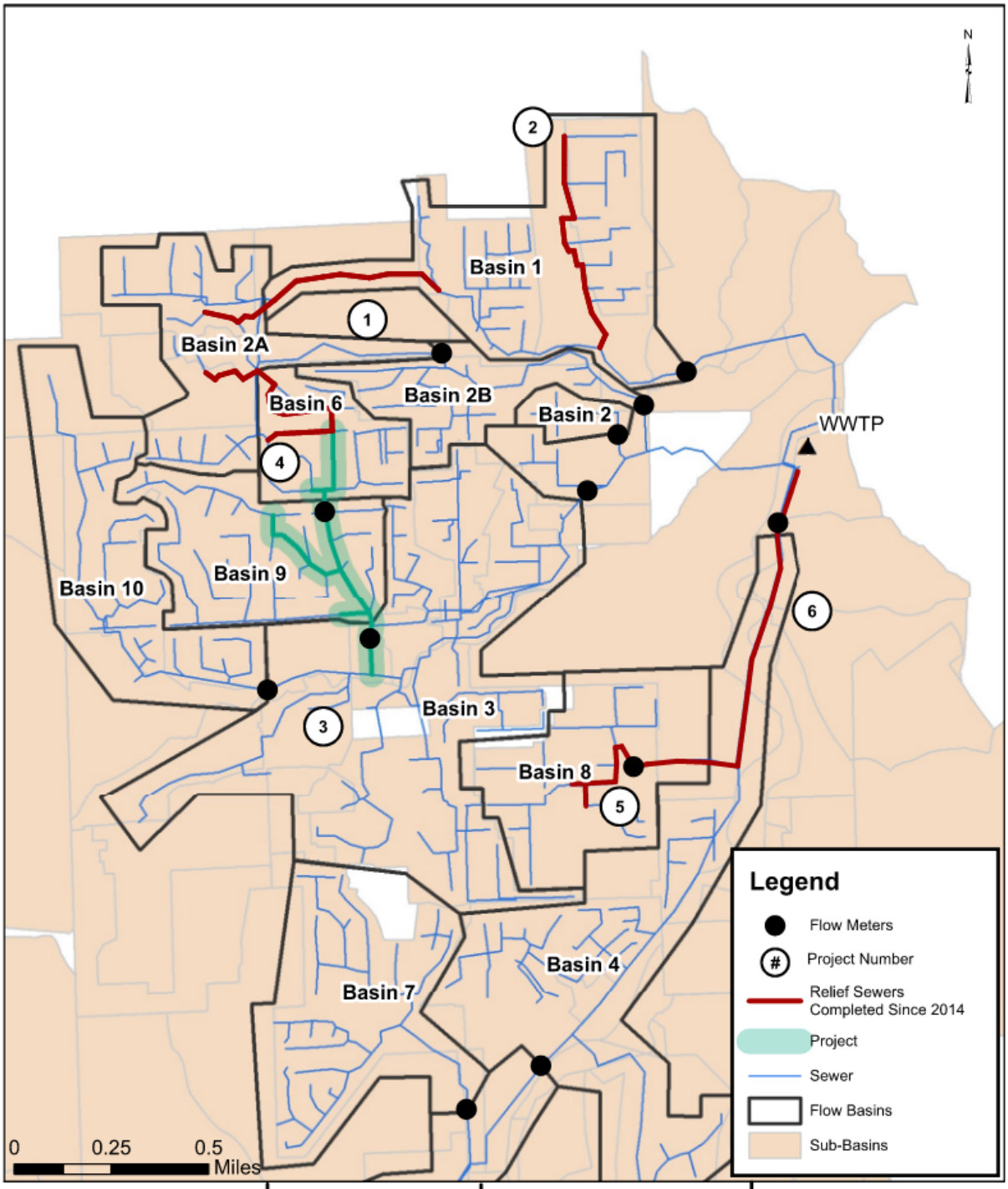
Short Term Improvements	Estimated Project Cost
I/I Investigations: Investigation of areas with excessive I/I would help the City decided whether to initially fund rehabilitation to remove excessive I/I or relief sewers to provide capacity for the peak flows.	$550,000
Total	**$550,000**

Figure ES- 1 – Recommended I/I Investigations



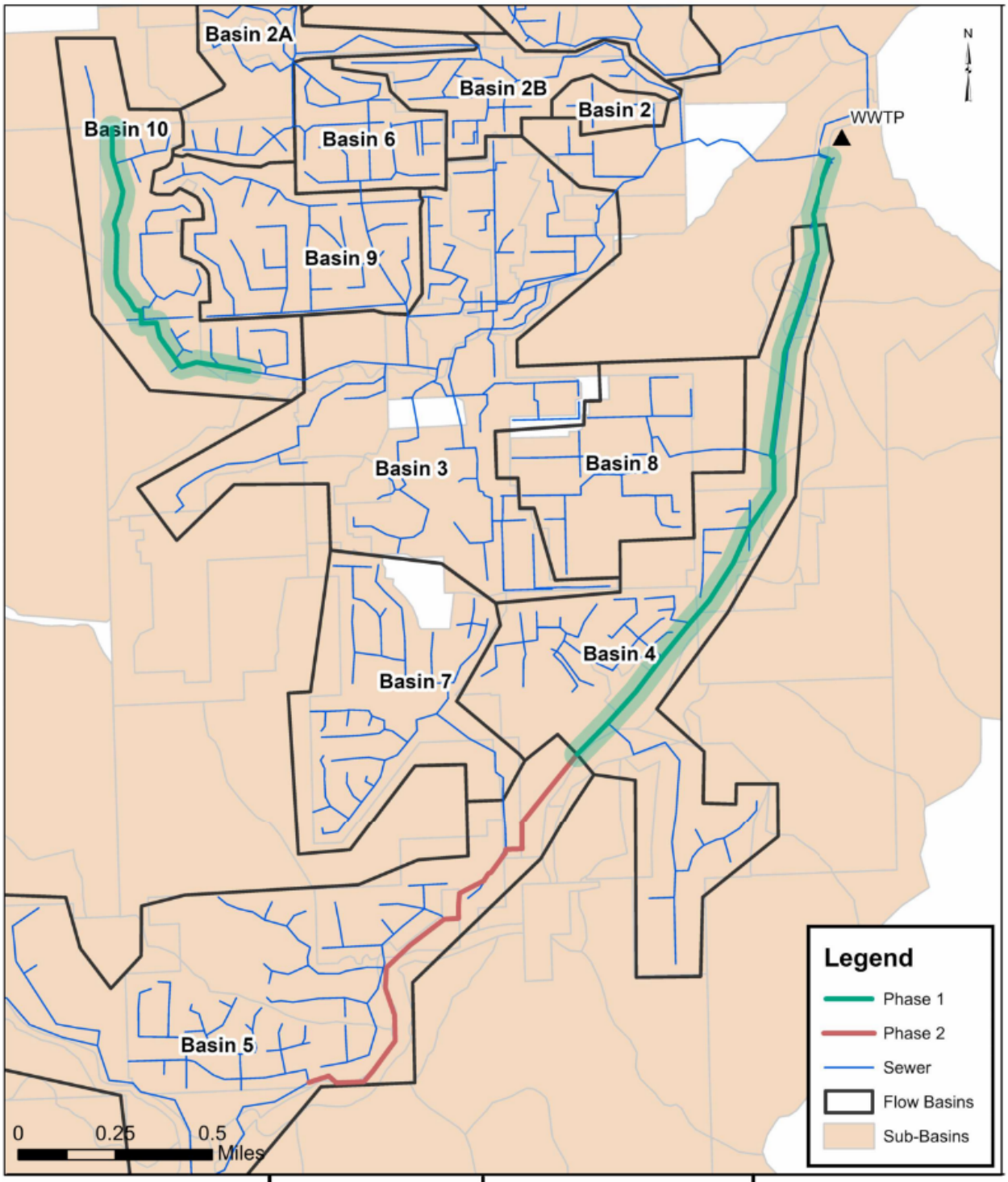
GBA	PROJECT NUMBER 15190	FIGURE ES-1	LANSING, KS SANITARY SEWER MASTER PLAN
	JUNE 2023	I/I FUTURE INVESTIGATIONS RECOMMENDATIONS	

Figure ES- 2- Potential Relief Sewer Projects



GBA	PROJECT NUMBER 15190	FIGURE ES-2 POTENTIAL RELIEF SEWER PROJECTS	LANSING, KS SANITARY SEWER MASTER PLAN
	JUNE 2023		

Figure ES- 3 – Potential Relief Sewer Projects (Growth)



GBA	PROJECT NUMBER 15190	FIGURE ES-3 POTENTIAL RELIEF SEWER PROJECTS (FUTURE)	LANSING, KS SANITARY SEWER MASTER PLAN
	JUNE 2023		