

1 EXECUTIVE SUMMARY

1.1 MASTER PLAN PURPOSE AND FINDINGS

This Wastewater Master Plan provides the City of Lee's Summit (City) with a comprehensive plan for the development of its wastewater infrastructure to meet both the short-term and long-term growth of the City.

A major purpose of this master plan is to establish the plan for conveyance of all wastewater that will be generated within the City to the City's wastewater treatment providers, the Little Blue Valley Sewer District (LBVSD) and the Middle Big Creek Sub-District (MBC). Cooperation and proactive participation in master planning and the development of capital improvement plans for these wholesale treatment providers are critical to the ability of the City to serve its wastewater customers.

Another major purpose of this wastewater master plan is the identification of wastewater peak flows and the evaluation of the capacity of the existing collection and conveyance system to convey these peak flows without backups of wastewater into homes and businesses and without sanitary sewer overflows. The modeling of the entire system, owned by the City and that owned by the Little Blue Valley Sewer District, has provided the information to identify bottlenecks within the systems. From that modeling, improvements to the systems are recommended.

The identification of infiltration and inflow sources and the development of a plan for rehabilitation to reduce the extraneous wastewater from these sources, where cost-effective, has also been completed. Immediate attention to the primary source of inflow, illegal private connections, is recommended. This wastewater master plan also identifies the issues that the City must address related to the sustainability of the City's major wastewater asset, its collection system. Planning, for both infrastructure replacement and system maintenance, is critical to the long-term sustainability of this system.

Finally, this wastewater master plan provides the City with recommendations for capital improvements that are needed to achieve the major purposes identified above. These capital improvement recommendations are categorized into the two basic study periods. The first study period is from 2006 through 2015. The second study period is from 2016 through ultimate build-out of the City, estimated to take place after 2040. This Executive Summary also includes a prioritization of the capital improvements that are required in the next 5 years.

The highest priority projects are those that address the projected 2015 conveyance and collection system bottlenecks. Basement backups and/or sanitary sewer overflows could result if these capital improvements are not completed.

The next priority is the completion of additional sewer system evaluation studies and subsequent rehabilitation in areas where inflow is excessive and cost-effective to remove.

The third priority is comprised of recommended improvements to the City's conveyance system to accommodate projected growth. The projects are required to avoid future bottlenecks and potential risks of backups and overflow. The Capital Improvement Plan also includes an allowance for upsizing of future line extensions and allowances for sewer maintenance-related capital improvements and sewer relocations for future road projects.

The detailed capital improvement plan is provided to guide the City in implementation of the steps needed to complete its collection and conveyance infrastructure.

1.2 RECOMMENDATIONS

- A. The first step in planning wastewater infrastructure needs for the City of Lee's Summit is to establish a plan to collect and convey the projected wastewater to a location for treatment.

Figure 3-3 depicts the City's projection of its ultimate buildout land uses. Figure 5-2 shows the recommended wastewater conveyance plan.

- B. A major component of the recommended conveyance plan is the plan to serve the West and South Prairie Lee Watersheds. Based on the conveyance plan for ultimate buildout of the City, it is recommended that the wastewater generated in these watersheds be collected, stored, and pumped in accordance with Figure 5-3. It is recommended that the City make improvements to change the current operation of splitting the pumped wastewater from these watersheds between the Maybrook and the Little Cedar Creek Watersheds to pumping all of the West and South Prairie Lee Watershed flow to the Little Cedar Creek Watershed.
- C. It is recommended that the City support the Little Blue Valley Sewer District's plan to upgrade the capacity of its main interceptor. Specifically, the City should support the construction of an excess flow holding basin (EFHB) at a site near 103rd and I-470. This site previously served as a four-cell wastewater lagoon for the City of Kansas City, Missouri. In addition, the City should support an additional excess flow holding basin at a site in Raytown. Without these improvements, the LBVSD Interceptor will continue to be subject to excessive surcharging during wet weather, potentially surcharging parts of the City's wastewater system.
- D. It is recommended that the City support a plan proposed by the LBVSD's Subcommittee on Growth and the MBC Board of Trustees to construct a regional wastewater treatment plant to serve the Middle Big Creek, Big Creek, and Duncan Branch Watersheds.
- E. Based on an evaluation of previous studies and flow monitoring, it was determined that approximately 70 percent of the infiltration and inflow (I/I), entering the sanitary sewer system, comes from approximately 30 percent of the collection system. It was estimated that approximately 30 percent of the inflow can be cost-effectively removed. The following is recommended:
- Investigate sources of I/I in high priority watersheds.
 - Budget approximately \$23.3 million over next 9 years.
- F. As part of a plan for collection system sustainability and compliance with EPA's Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM), the City should:
- Assemble supporting data and documents referenced in the CMOM self audit.
 - Refine and set maintenance, performance, and reinvestment measures, as recommended in Section 7.
 - Refine reporting and data collection for sewer system overflows.
 - Continue ongoing collection system analysis and rehabilitation.
 - Measure effectiveness of I/I removal measures and adjust I/I removal program accordingly.
- G. Related to private sector I/I:
- Implement a private sector I/I removal program and evaluate regularly.
 - Develop a program to address legal and financial aspects of the program.

- Develop and implement a public awareness campaign relative to private sector I/I removal.
- Enforce construction standards and inspection procedures for new building laterals and for building's being sold.
 - Improved foundation drains, avoiding illegal use of sanitary sewers.
 - Trench checks outside of building excavations.
 - Inspection of basement floor drains and sump pumps prior to occupancy.

H. Consider the Capital Improvement Project for Years 2006 through 2015, as summarized in Table 8-1, for funding and implementation over the next nine years. Approximately 16% of these capital projects are related to the extension of the City's wastewater system into undeveloped areas and should be funded directly by developers. Approximately 19% of these capital improvements are associated with improvements planned by the City's wholesale conveyance and treatment providers, the Little Blue Valley Sewer District and the Middle Big Creek Sub-District. The remaining projects, totaling \$68,714,100 (2006\$), are recommended to address the existing and projected improvements to the City's collection and conveyance system through Year 2015 and will be funded by tap fees and user rates.

Of the City-funded projects, projects totaling \$21,616,500, are recommended improvements to the City's existing wastewater system that are related to growth and new development. It is recommended that these projects be funded through the City's connection and/or tap fee revenues.

The remaining projects, totaling \$47,097,600, are recommended improvements to the City's existing system. The improvements primarily represent rehabilitation projects that are needed to address excessive infiltration and inflow, as documented in previous sewer system flow metering and hydraulic evaluations. Other projects include parallel and/or replacement sewers in areas where the existing sewers lack sufficient capacity to convey the projected 2015 peak flows, without the risk of basement backup and/or sanitary sewer overflows.

Table 1-1 summarizes the highest priority projects. Locations of these projects are depicted on Figures 1-1 and 1-2. It is recommended that the City's Capital Improvement Plan include these projects for implementation during the next five years. Table 1-2 includes a brief description of each of these projects.

**Table 1-1
Prioritized Capital Improvements
5 Year Plan**

Improvement Number	Watershed	Project Description	Recommended Schedule	Opinion of Total Project Costs (2006\$)					
				Total	City Funded			Developer Funded	LBVSD or MBC Funded
					Category 1	Category 2	Category 3		
1	LBVSD	103rd Street Excess Flow Holding Basin	2007-2008	\$ 7,879,000					\$ 7,879,000
2	West Prairie Lee	Todd George Road Wet Weather Pump Station	2007	\$ 216,000		\$ 216,000			
3	West Prairie Lee	Parallel Relief Lines (MH25-186 to MH18-076)	2007-2008	\$ 256,000		\$ 256,000			
		Parallel Relief Lines (MH24-069 to MH24-075)	2007-2008	\$ 204,000		\$ 204,000			
4	South Prairie Lee	Parallel Relief Lines (MH26-040 to MH26-085)	2007-2008	\$ 255,000		\$ 255,000			
		Parallel Relief Lines (MH65-020 to MH33-258)	2007-2008	\$ 152,000		\$ 152,000			
		Parallel Relief Lines (MH40-130 to MH40-127)	2007-2008	\$ 36,000		\$ 36,000			
		Parallel Relief Lines (MH40-110 to MH40-204)	2007-2008	\$ 179,000		\$ 179,000			
5	West Prairie Lee	SSES & I/I Rehabilitation (WP-08,WP-10, WP-06, WP-09, WP-11)	2007-2008	\$ 2,773,000			\$ 2,773,000		
6	Cedar Creek	SSES & I/I Rehabilitation (CC-17)	2007-2008	\$ 314,300			\$ 314,300		
7	South Prairie Lee	Legacy Wood/Summit Mill EFHB	2007-2009	\$ 726,700	\$ 650,700			\$ 76,000	
8	Middle Big Creek	MBC/Mouse Creek EFHB and Relief Lines	2007-2009	\$ 5,625,000	\$ 5,625,000				
9	Blue Springs	Carp Lake Sewer Improvements	2007	\$ 178,000		\$ 178,000			
10	City Wide	Sanitary Sewer Maintenance Projects	2007-2011	\$ 549,000		\$ 549,000			
11	City Wide	Sanitary Sewer Relocation Projects	2007-2011	\$ 1,206,000	\$ 1,206,000				
12	Cedar Creek	Interceptor Improvements Segment 1	2007-2010	\$ 3,090,000	\$ 586,600	\$ 2,503,400			
13	West Prairie Lee	SSES & I/I Rehabilitation (WP-06)	2009	\$ 839,900			\$ 839,900		
	Cedar Creek	SSES & I/I Rehabilitation (CC-17,CC-14,CC-20)	2009	\$ 1,301,900			\$ 1,301,900		
	South Prairie Lee	SSES & I/I Rehabilitation (SP-01,SP-04)	2009	\$ 285,600			\$ 285,600		
	Boggs Hollow	SSES & I/I Rehabilitation (BH-01)	2009	\$ 186,800			\$ 186,800		
14	Little Cedar	24" Parallel Forcemain along Tudor Road	2009-2010	\$ 4,083,700	\$ 4,083,700				
		Interceptor Improvements	2009-2010	\$ 3,028,000	\$ 3,028,000				
15	West Prairie Lee	Tudor PS Upgrade	2009-2010	\$ 2,994,900	\$ 2,994,900				
16	South Prairie Lee	Scruggs Road PS Improvements	2010-2015	\$ 998,300	\$ 998,300				
		Scruggs Road Forcemain to Tudor	2010-2015	\$ 771,500	\$ 771,500				
		Scruggs Road EFHB Improvements	2009-2010	\$ 564,000	\$ 564,000				
17	Big Creek	Ultrasonic Flow Metering	2007	\$ 10,000		\$ 10,000			
18	MBCSD	Improvements to Middle Big Creek Conveyence System (May be replaced with treatment alternative)	2010	\$ 5,800,000					\$ 5,800,000
19	Maybrook	Parallel Relief Sewers	2007-2009	\$ 615,000		\$ 615,000			
20	Mouse Creek	Upsizing of New Trunk Lines	2007-2015	\$ 300,000	\$ 300,000				
	Middle Big Creek	Upsizing of New Trunk Lines	2007-2015	\$ 300,000	\$ 300,000				
	Maybrook	Upsizing of New Trunk Lines	2007-2015	\$ 300,000	\$ 300,000				
21	West Prairie Lee	SSES & I/I Rehabilitation (WP-09,WP-07,WP-02)	2010	\$ 1,347,400			\$ 1,347,400		
	Cedar Creek	SSES & I/I Rehabilitation (CC-21,CC-04,CC-19,CC-03)	2010	\$ 1,421,600			\$ 1,421,600		
22	West Prairie Lee	SSES & I/I Rehabilitation (WP-11)	2011	\$ 1,151,600			\$ 1,151,600		
	Cedar Creek	SSES & I/I Rehabilitation (CC-16)	2011	\$ 1,805,600			\$ 1,805,600		
23	West Prairie Lee	Prairie Lee LPS System	2011-2015	\$ 2,954,000		\$ 954,000		\$ 2,000,000	
Total - All Improvements				\$ 54,698,800	\$ 21,408,700	\$ 6,107,400	\$ 11,427,700	\$ 2,076,000	\$ 13,679,000

Notes

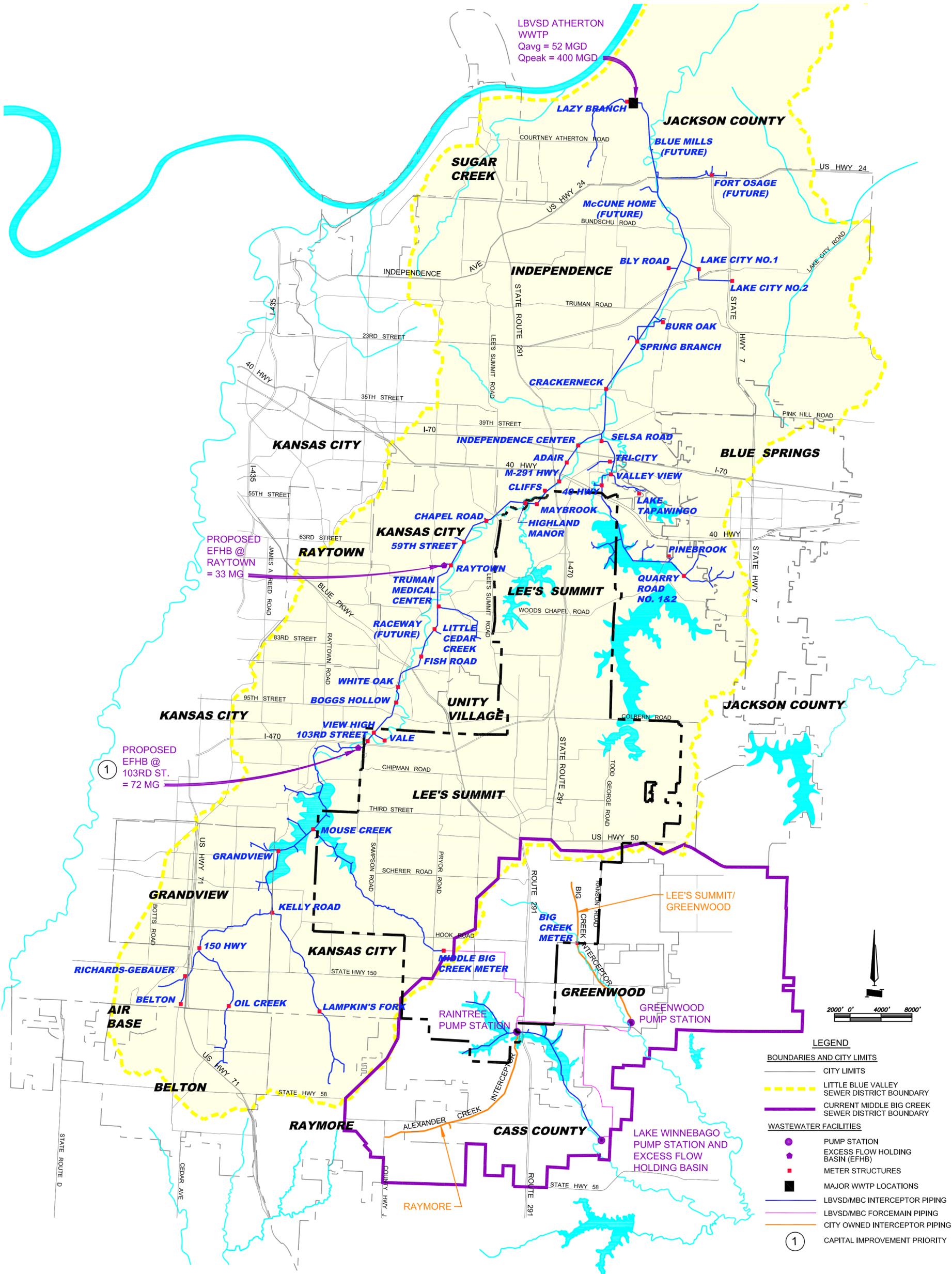
- 1 Category 1 : Growth related improvements to existing system. Funded by tap fee.
- 2 Category 2 : Improvements to existing sewers due to higher inflow than originally projected. Funded by user rates.
- 3 Category 3 : Improvements associated with identification and removal of excess inflow. Funded by user rates.

**Table 1-2
Project Descriptions**

Improvement Number	Project Identification	Description
1	103 rd Street EFHB	This project consists of the construction, by the Little Blue Valley Sewer District, of an excess flow holding basin at 103 rd Street and I-470. The basin is designed to contain peak flows that exceed the downstream capacity of the District's Interceptor.
2	The Todd George Road Wet Weather Pump Station	The project consists of a wet weather pump station to serve a residential area north of the Tudor Road Pump Station. This pump station will eliminate potential sanitary sewer backups.
3	West Prairie Lee Parallel Relief Lines <ul style="list-style-type: none"> • MH25-186 to MH18-076 • MH24-069 to MH24-075 	This project consists of the construction of sanitary sewer relief lines. The existing lines do not have capacity to convey the predicted peak sanitary sewer flows. Additionally, sanitary sewer backups have been reported on these lines.
4	South Prairie Lee Parallel Relief Lines <ul style="list-style-type: none"> • MH26-040 to MH26-085 • MH65-020 to MH33-258 • MH40-130 to MH40-127 • MH40-110 to MH40-204 	This project consists of the construction of sanitary sewer relief lines. The existing lines do not have capacity to convey the predicted peak sanitary sewer flows. Additionally, sanitary sewer backups have been reported on these lines.
5	SSES and I/I Rehabilitation in Targeted Watersheds: WP-08, WP-10, WP-06, WP-11, & WP-09	This project consists of completing sewer system evaluation surveys in the identified subwatersheds. Improvements will be completed in subwatersheds WP-8 and WP-10.
6	SSES in Targeted Watersheds: CC-17, CC-21, & CC-16	This project consists of completing sewer system evaluation surveys in the identified subwatersheds.
7	Legacy Wood/Summit Mill EFHB	This project consists of the construction of an excess flow holding basin at the existing Legacy Wood Pump Station. The basin is designed to contain peak flows that exceed the downstream capacity of the existing facilities in the South Prairie Lee Watershed.
8	Middle Big Creek EFHB and Parallel Relief Sewer in Middle Big Creek Watershed	This project consists of an excess flow holding basin designed to contain excess flows that exceed the capacity of existing interceptors located under Raintree Lake. It includes the construction of sanitary sewer relief lines to the holding basin.

Improvement Number	Project Identification	Description
9	Carp Lake Sewer Improvements	This project consists of the installation of new sewer line with an alignment that will be outside the zone of influence of the Carp Lake Dam. The new alignment is intended to prevent further pipe failure due to instability of the Carp Lake Dam.
10	City Wide Sanitary Sewer Maintenance Projects	This project consist of miscellaneous sanitary sewer maintenance projects, previously identified.
11	City Wide Sanitary Sewer Relocation Projects	This project consists of miscellaneous sanitary sewer relocation projects associated with road projects.
12	Cedar Creek Interceptor Improvements - Segment 1	This project consists of the construction of sanitary sewer relief lines on the lower segments of the Cedar Creek Interceptor. The existing lines do not have capacity to convey the predicted peak sanitary sewer flows.
13	<ul style="list-style-type: none"> • SSES in Targeted Watersheds: BH-01,CC-14, CC-20, SP- 01, & SP-04 ,I/I • Rehabilitation in Targeted Watersheds: WP-06, CC-17, & BH-01 	<ul style="list-style-type: none"> • This project consists of completing sewer system evaluation surveys in the identified subwatersheds. • This project consists of completing improvements in the identified subwatersheds.
14	<ul style="list-style-type: none"> • 24" Parallel Forcemain along Tudor Road • Little Cedar Creek Interceptor Improvements 	This project consists of the construction of a new 24-inch force main along Tudor Road from M 291 Highway to near Douglas Road and upgrades to the Little Cedar Creek Interceptor. The improvements allow 24 million gallons per day to be conveyed to the Little Cedar Creek Watershed from West and South Prairie Lee Watersheds.
15	Tudor Road Pump Station Upgrade	This project consists of upgrading the Tudor Road Pump Station to a capacity of 24 million gallons per day. The existing extended shaft pumps will be replaced with dry pit submersible pumps.
16	<ul style="list-style-type: none"> • Scruggs Road PS Improvements • Scruggs Road Forcemain to Tudor • Scruggs Road EFHB Improvements 	This project consists of upgrading the Scruggs Road Pump Station to a capacity of 16 million gallons per day, upgrade of the force main leading to the gravity interceptor to the Tudor Road Pump Station, and expansion of the Scruggs Road Excess Flow Holding Basin.

Improvement Number	Project Identification	Description
17	Ultrasonic Flow Metering	This project consists of the installation of a flow meter in the Little Blue Valley Sewer District's Big Creek Meter Structure. This meter will allow the City to evaluate peak flow produced within the Big Creek Watershed and time improvements with the Watershed.
18	Improvements to Middle Big Creek Conveyance System (may be replaced with treatment alternatives)	This project consists of expansion of the Middle Big Creek-owned conveyance system.
19	Parallel Relief Sewer in Maybrook Watershed	This project consists of the construction of sanitary sewer relief lines. The existing lines do not have capacity to convey the predicted peak sanitary sewer flows.
20	Upsizing Trunk Lines w/ New Sewer Pipe in Targeted Watersheds: <ul style="list-style-type: none"> • Mouse Creek • Middle Big Creek • Maybrook 	This project consists of an allowance for the upsizing of new trunk sewers, to ultimate capacity, of developer-constructed new sewers to unsewered subwatersheds.
21	<ul style="list-style-type: none"> • SSES in Targeted Watersheds: WP-07, WP-02, CC-04, CC-19, & CC-03 • I/I Rehabilitation in Targeted Watersheds: WP-09 & CC-21 	<ul style="list-style-type: none"> • This project consists of completing sewer system evaluation surveys in the identified subwatersheds. • This project consists of completing improvements in the identified subwatersheds.
22	I/I Rehabilitation in Targeted Watersheds: WP-11 & CC-16	This project consists of completing improvements in the identified subwatersheds.
23	Prairie Lee LPS System	This project consists of providing assistance to the residents of Prairie Lee Lake to provide a low pressure sewer system designed to eliminate all septic tanks within the area.



PROPOSED
EFHB @
RAYTOWN
= 33 MG

PROPOSED
EFHB @
103RD ST.
= 72 MG

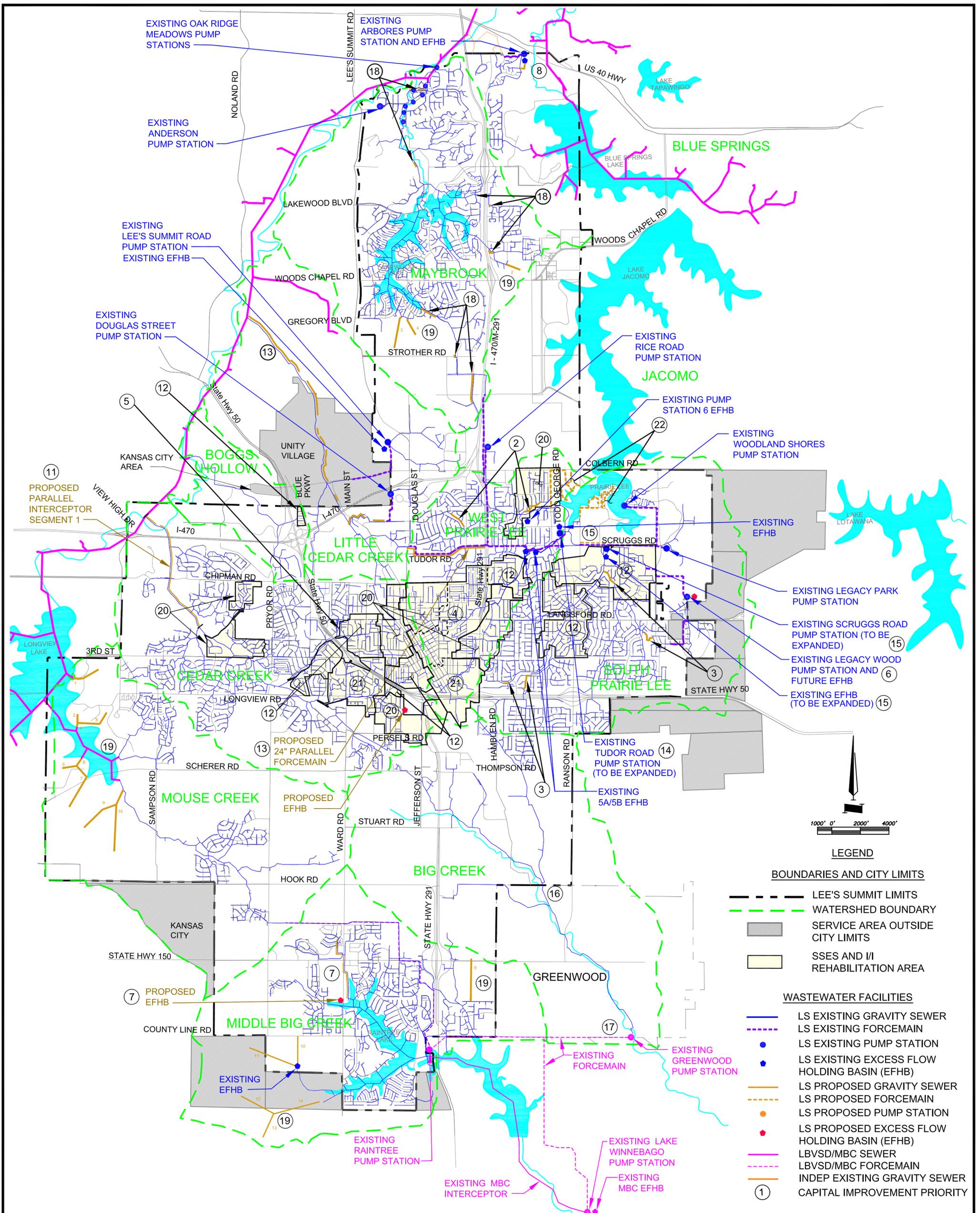
LBVSD ATHERTON
WWTP
Qavg = 52 MGD
Qpeak = 400 MGD

- LEGEND**
- BOUNDARIES AND CITY LIMITS
 - CITY LIMITS
 - LITTLE BLUE VALLEY SEWER DISTRICT BOUNDARY
 - CURRENT MIDDLE BIG CREEK SEWER DISTRICT BOUNDARY
 - WASTEWATER FACILITIES
 - PUMP STATION
 - EXCESS FLOW HOLDING BASIN (EFHB)
 - METER STRUCTURES
 - MAJOR WWTP LOCATIONS
 - LBVSD/MBC INTERCEPTOR PIPING
 - LBVSD/MBC FORCEMAIN PIPING
 - CITY OWNED INTERCEPTOR PIPING
 - CAPITAL IMPROVEMENT PRIORITY



**LITTLE BLUE VALLEY SEWER DISTRICT
PRIORITIZED CAPITAL IMPROVEMENTS
FIGURE 1-1**





**CITY OF LEE'S SUMMIT WASTEWATER MASTER PLAN
PRIORITIZED CAPITAL IMPROVEMENTS
FIGURE 1-2**

