

COMMITTEE OF THE WHOLE MEETING AGENDA
Monday, November 3rd, 2025, 6:00 pm
Eldridge Community Center – 400 S 16th Ave

*****Swearing in of Tracy Northcutt to the Office of City Clerk***

1. Call to Order and Roll Call
2. Approval of Agenda
3. Presentation by Shive Hattery on the Wastewater Master Plan Final Report
4. Adjournment

Next Regular Committee of the Whole Meeting: Monday, December 1st, 2025, at 6:00pm at Eldridge Community Center



Wastewater Master Plan

Final Report

Prepared For:



Date Submitted: October 6, 2025

Shive-Hattery Project Number: 2240020930



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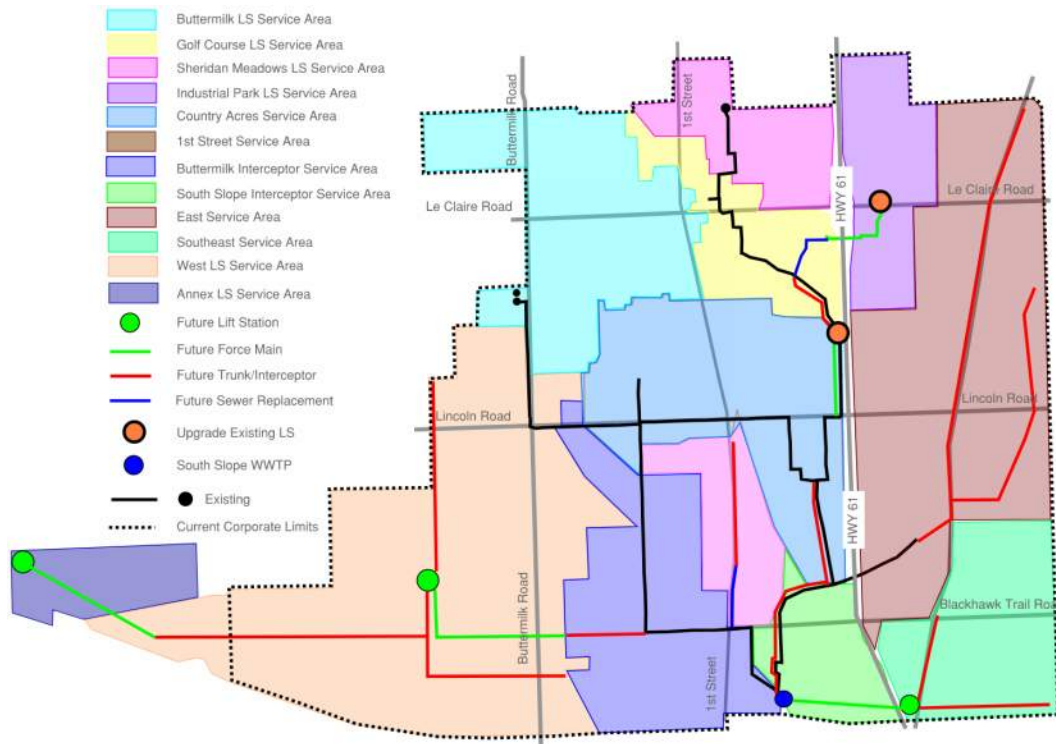
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Exhibits

- Exhibit 4-1: Service Area and Future Flows
- Exhibit 5-1: West Side and Buttermilk
- Exhibit 5-2: West Side Phase 1 and Buttermilk
- Exhibit 5-3: Central and East
- Exhibit 5-4: South Slope WWTP

1.0 Summary

A summary of the Master Plan sewer system over the long-term planning horizon is provided as **Exhibits 5-1, 5-2, and 5-3**. A summary for expanding South Slope WWTP is provided in **Exhibit 5-4**. These exhibits are located at the end of the report. A schematic is shown below for reference.



West Side Drainage Area

The West Side Drainage Area spans over 1,700 acres. It is currently un-sewered and at build-out conditions, represents significant growth for the City of Eldridge. The area also includes land that is being considered for annexation, which is the current interest in the west side. However, this annex area is approximately 2 miles from the existing sewer system.

A phased approach to developing the west side sewer is proposed, with the first phase targeting service for the annex area.

- **Concept:** New gravity sewer, two lift stations and associated force mains to connect the annex area to the City's existing system.
- **Trigger:** Annexation and associated development/growth.
- **Budgetary Cost Option:** \$4.5 million.
- **Time to Implement:** 30 to 40 months from project initiation through construction completion.

Golf Course Lift Station

This existing lift station currently conveys a significant portion of the sewer flows to South Slope WWTP. However, the flow path is not a direct connection. It discharges to the 11th Street Trunk sewer, which in return flows into the Country Acres Interceptor, then into the South Slope Interceptor, and then into Buttermilk Interceptor at the plant site.

City staff report that under high wet weather flows; the existing lift station becomes inundated. As such, it proposed to expand the lift station to the long-term design flow for the station.

- **Concept:**
 - Replace the pumps, associated piping, and electrical power to increase capacity. Also, include SCADA upgrades to capture lift station operations.
 - The larger pumps will also trigger downstream improvements, namely to increase the capacity of the force main, Country Acres Interceptor, and South Slope Interceptor. The existing 11th Street Trunk sewer has sufficient capacity to supporting the Golf Course Lift Station improvements.
 - Considering the area served by these conduits, it is proposed to gain capacity by routing parallel lines to not only cover design flows, but also to introduce some degree of redundancy to the system. Further, parallel lines allow system operations during construction.
- **Trigger:** Current priority/need.
- **Budgetary Cost Option:** \$2.5 million.
 - Golf Course Lift Station and Force Main Improvements: \$1.0 million
 - Country Acres Interceptor Parallel Line: \$0.5 million.
 - South Slope Interceptor Parallel Line: \$1.0 million
- **Time to Implement:** 20 to 30 months from project initiation through construction.

Industrial Park Lift Station

This existing lift station conveys flows from the Industrial Park, across Highway 61, and to the Golf Course Lift Station. From the lift station's force main, flow enters the East Iowa Street Sewer, which in return flows into the Golf Course Trunk Sewer, and then into the Golf Course Lift Station.

The Industrial Park Lift Station has capacity to support some growth in the existing Industrial Park; however, as the park fully develops, it is likely the lift station will need to be expanded. Such expansion will also trigger downstream improvements to provide the carrying capacity for the increased flow.

- **Concept:**
 - Replace pumps and electrical at the existing lift station.
 - Provide new and larger diameter force main, which requires crossing Highway 61.
 - Replace East Iowa Street gravity sewer with larger pipe.
 - Provide a parallel line to the Golf Course Trunk sewer to cover capacity needs as well as introduce a degree of redundancy for this major conduit.
- **Trigger:** Development/Growth
- **Budgetary Cost Opinion:** \$1.8 million
 - Industrial Park Lift Station and Force Main Improvements: \$1.0 million
 - East Iowa Street Sewer Improvements: \$0.4 million

- Golf Course Parallel Trunk Line: \$0.4 million
- **Time to Implement:** 20 to 30 months from project initiation through construction.

East Side Interceptor

This existing interceptor currently conveys flow from the east side of Highway 61. It has the capacity to support a significant amount of growth in the East Side Drainage Area, which spans approximately 1,100 acres and, for the most part, is undeveloped. However, the interceptor will need to be extended further across the drainage area as development occurs in the future.

- **Trigger:** Development/Growth
- **Budgetary Cost Opinion:** \$3.3 million
- **Time to Implement:** Wide range depending on location of development compared to existing trunk line, but on the order of 15 to 24 months from project initiation through construction completion.

Southeast Drainage Area

In the southeast corner of the City is approximately 400 acres that will require a lift station and force main to convey flows across Highway 61 to South Slope WWTP. The area is predominantly undeveloped; however, there is a residential neighborhood that is currently on septic systems. As the area develops in the future, the lift station will be needed as well as trunk lines to collect and convey flows to the lift station.

- **Trigger:** Development/Growth
- **Budgetary Cost Opinion:** \$2.4 million
- **Time to Implement:** Wide range depending on location of development within the service area and degree of phasing. Assuming initial phase includes lift station, force main, and some sewer, on the order of 24 to 36 months from project initiation through construction completion.

South 1st Street Sewer

The existing sewer extends north from Blackhawk Trail Road, serving commercial and industrial development along the street. The sewer will extend to provide sewer service as development continues along 1st Street. The existing sewer can support about 60% growth in its service area but will eventually need to be replaced with a larger sewer.

- **Trigger:** Development/Growth
- **Budgetary Cost Opinion:** \$0.7 million
 - Sewer Extension: \$0.4 million
 - Sewer Replacement: \$0.3 million
- **Time to Implement:** 14 to 20 months from project initiation through construction completion.

Buttermilk Interceptor

This existing interceptor serves approximately 620 acres of land by gravity, which for the most part is currently undeveloped. Additionally, the interceptor conveys flow from the Buttermilk Lift Station to South Slope. It also has capacity to accept the design flows from the West Side Drainage Area – although lift station(s) are needed on the west side to convey flows to the interceptor. Further, certain reaches of the interceptor have capacity that supports alternative routing as the west side develops, if beneficial. Overall, the interceptor is adequately sized to support long-term growth.

Buttermilk Lift Station

The lift stations and associated equalization basins have sufficient capacity for the long-term growth in their service area, which is already over 80% developed.

Sheridan Meadows Lift Station

This lift station service area is for the most part developed but does have room to grow. The lift station is adequately sized for the future design flows of this Master Plan.

South Slope WWTP

Influent Pump Station Expansion

On a peak hour basis, if the Golf Course Lift Station and Phase 1 of the West Lift Station are implemented, the influent pump capacity of the plant will need to be expanded to at least 7.25 mgd, which will also trigger modification or expansion of the existing pretreatment units at South Slope that have a rated capacity of 7.0 mgd. However, there are several alternatives for expanding the influent pumps and pretreatment, some of which depend on the future expansion approaches of the plant.

- **Trigger:** Development/Growth, especially if Golf Course Lift Station Improvements and West Lift Station are implemented.
- **Budgetary Cost Opinion:** \$0.8 to \$2.4 million, depending on which alternative is chosen.
- **Time to Implement:** 20 to 36 months from project initiation through construction completion.

Plant Phased Expansion

The plant currently has reserve capacity to support growth in the system. However, when flows and/or loading will (or has) consistently reached 80% of the plant's rated capacity, the next phase of expansion should be initiated. Plant projects, by most accounts, are complex projects and require several years for planning, permitting, design, and construction. As such, the 80% trigger provides time for expanding the plant while still having capacity to support growth.

The plant has space for adding four additional SBR basins of similar size to the other (larger) basins, which would expand the plant to 3.6 mgd on a max month basis and 4.35 mgd on a max day basis (at 5 cycles). Combined with the existing equalization basin, max day capacity could approach 6.35 mgd or more if the SBRs are cycled at a higher rate. Improvements to pretreatment as well as the solids treatment train would be needed to support the plant capacity.

- **Trigger:** Development/Growth.
- **Budgetary Cost Opinion:** \$11 million.

- **Time to Implement:** 36 to 48 months from project initiation through construction completion.

Continued Plant Expansion

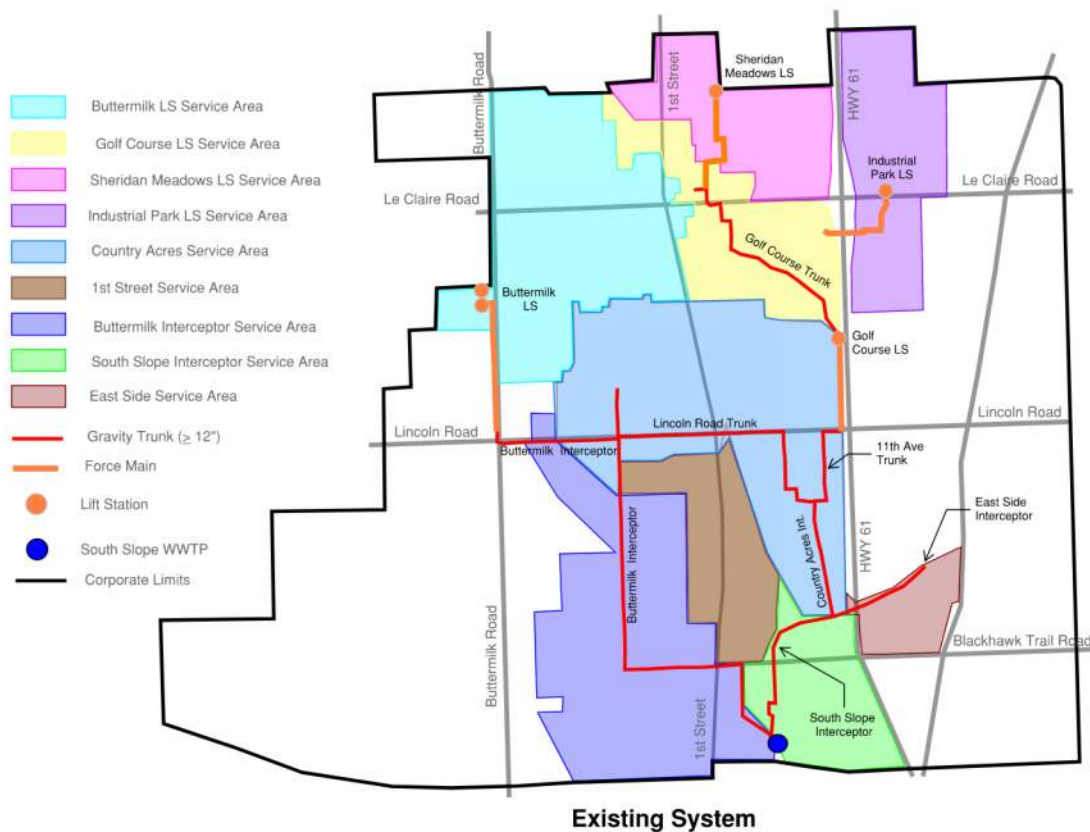
Expanding the plant beyond 3.6 mgd (on a max month basis), as envisioned, would include relocating the equalization basin to the City owned property north of Crow Creek, making real estate available for continued plant expansions on the plant site.

2.0 Existing System

For this analysis, the City of Eldridge's existing wastewater system was evaluated based on the following major components:

- South Slope WWTP
- Collection System
 - Nine (9) drainage basins
 - Four (4) lift stations
 - Seven (7) major gravity conveyance mains

The existing system is schematically shown below and discussed in the following sections.



Terminology

Terminology and definitions of the different categories are based on IDNR Design Standards, and include:

- Average Dry Weather (ADW) Flows: The daily average flow when groundwater is at or near normal and runoff is not occurring. The period of measurement extends up to 30-days.
- Average Wet Weather (AWW) Flow: The daily average flow for the wettest 30 consecutive days. This is also referred to as Max Month.
- Maximum Wet Weather (MWW) Flow: The total maximum flow received during any 24 hour period. This also referred to as Max Day.
- Peak Hour Wet Weather Flow (PHWW): The total maximum flow received during one hour when the groundwater is high, runoff is occurring, and domestic, commercial, and industrial flow are at their peak.

South Slope WWTP

South Slope WWTP is a sequencing batch reactor (SBR) process. Design flow data for the South Slope WWTP was obtained from the 2018 improvements project. More specifically, capacity criteria for the plant is from Schedule G of the IDNR Construction Permit as well the current NPDES discharge permit. The construction permit assumed a design year of 2035 and a design population of 9,600. This compares to Eldridge's current population of 6,846, based on the 2023 US Census estimate.

Design Flows

Design flows for the plant include:

Parameter	Design Flow (mgd)
ADW	1.1
AWW (Max Month)	2.4
MWW (Max Day)	4.0
PHWW	5.18

Incoming sewer flow at the South Slope WWTP is pumped to treatment or to an existing 2-million-gallon equalization basin. The WWTP currently has two influent pump stations:

- One lift station has two chopper pumps, each rated for 1,175 gpm at 67 feet total dynamic head.
- One pump station has two chopper pumps, each rated for 1,350 gpm at 73 feet total dynamic head.

Depending on the combination of pumps operating, the firm capacity is between 5.18 mgd and 5.62 mgd.

Design Loadings

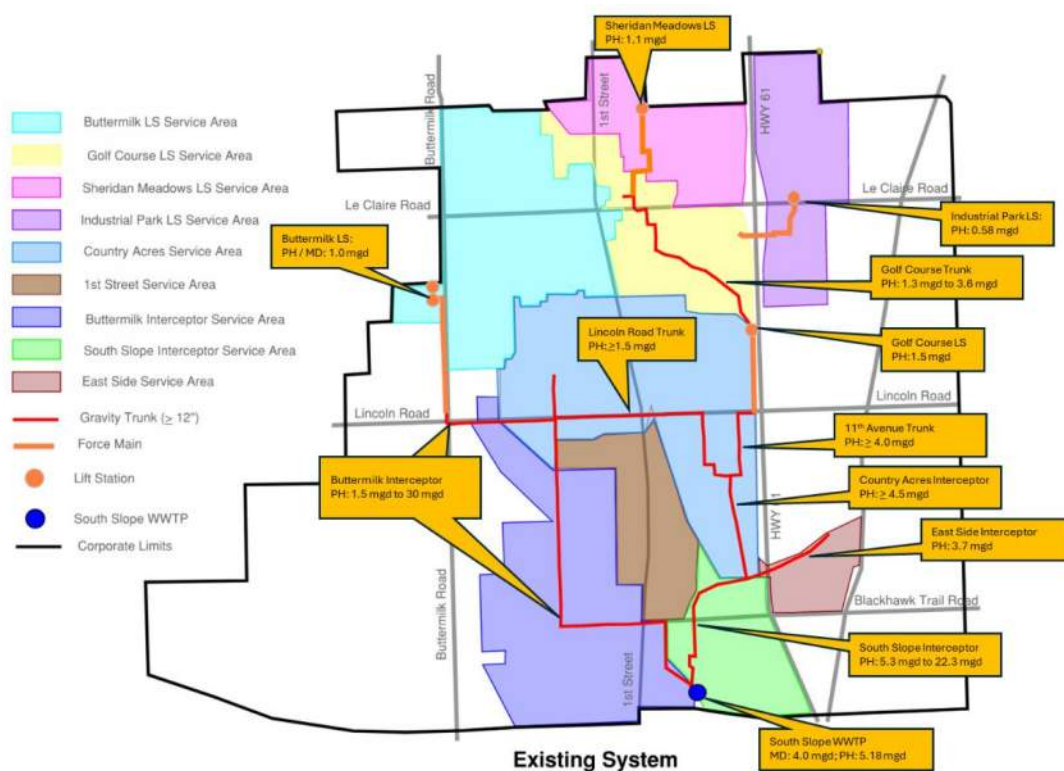
Design loadings for the plant include:

Parameter	Design Loadings	
	Max Month (ppd)	Max Day (ppd)
BOD5	2,784	5,472
TSS	3,936	5,952
TKN	480	768

Collection System

A schematic summary of the collection system capacity showing lift stations and respective service areas; gravity sewer mains (12-inches and greater), and the WWTP capacity is provided below. For the purpose of this master plan, twelve (12) key areas of the existing collection system were evaluated for capacity, as discussed in the following sections. Overall:

- The design basis for the collection system is peak hour flows.
- For existing pipe, carrying capacity assumes $\frac{3}{4}$ -full pipe flow, as older pipes were likely designed for this target.
- For lift stations, the firm capacity (with one pump in stand-by) is considered.



Lift Stations

A summary of the lift station rated capacity is provided in the following table. Rated capacity considers redundancy and therefore is based on one pump in standby. Each lift station is further discussed in the following sections.

Lift Station	Rated Capacity (mgd)
Buttermilk	1.0
Sheridan Meadows	1.1
Industrial Park	0.58
Golf Course	1.5

Buttermilk Lift Station

The 2018 improvements project converted Buttermilk Lagoon into an equalization basin and provided a new lift station to convey flows to South Slope WWTP. The lift station is a duplex, submersible pump station on variable speed drives with a firm capacity of 1.0 mgd (694 gpm) for conveying flows to South Slope WWTP.

For flows above 1.0 mgd, there is second pump station with a capacity upwards of 3.8 mgd to transfer peak flows to the equalization basins. The equalization basins have a total capacity of approximately 22 million gallons.

Beyond the rated capacity of the lift station, the construction permit had a design basis of conveying flows upwards of the max month flow (0.86 mgd) to South Slope WWTP, with higher flows being equalized.

The lift station essentially serves the northwest part of town, and conveys flows to South Slope WWTP through a 10-inch FM that discharges into the upper reach of the Buttermilk Interceptor. The tie-in is at a manhole along Buttermilk Road, north of W. Lincoln Road. The Buttermilk Gravity Interceptor is 15-inches at this location.

Sheridan Meadows Lift Station

Sheridan Meadows is submersible, duplex lift station with 40 hp pumps on variable speed drives. The firm capacity of the lift station is approximately 1.1 mgd (800 gpm).

The lift station is located south of Sheridan Meadows Park, and pumps to the gravity sewer in the vicinity of East Franklin Street and N Fourth Avenue. The gravity sewer is 12-inch at this location and ultimately conveys flows to the Golf Course Lift Station.

Industrial Park

The Industrial Park Lift Station is located along LeClaire Road, east of Highway 61. It is a duplex, submersible pump station with constant speed drives. The pumps are 7.5 horsepower and convey sewer flows through a 6-inch force main across Highway 61. The force main connects to the gravity sewer at a manhole with 8-inch sewer on Iowa Street. The gravity sewer conveys water to the Golf Course Lift Station. The rated firm capacity of the station is approximately 0.58 mgd (400 gpm).

Golf Course Lift Station

In general, the Golf Course Lift Station serves the north central portion of town, as well as receives flows from Sheridan Meadows and Industrial Park Lift Stations. It is a submersible, duplex lift station with 40 horsepower pumps on variable speed drives. The firm capacity of the lift station is approximately 1.5 mgd (1,050 gpm).

The Lift Station is located on the east side of Rustic Ridge Golf Course, and conveys flows through an 8-inch FM to the gravity system serving South Slope WWTP. The discharge point is a manhole along Lincoln Road, just west of Highway 61. The gravity line is a 15-inch sewer at this location and ultimately conveys flow to the South Slope Interceptor.

Major Sewer Mains

Major Sewer Mains are generally described in the following sections along with their carrying capacity.

Buttermilk Interceptor

The interceptor includes mains ranging in size from 15-inch at the upper reach (near Lincoln Road) to 36-inch at the lower reach (near Blackhawk trails Road to South Slope WWTP). It is designed to convey flows from Buttermilk Lift Station as well as flows from the western part of town as it develops. Development is anticipated to include gravity sewer as well as new lift station(s) at the western outreach of town.

In addition to the above, the interceptor accepts flows from Sotuh 1st Street Sewer service area and at the WWTP, accept flows from the South Slope Interceptor. Further, the Lincoln Road Trunk line has a relief sewer connecting to the interceptor.

Buttermilk Interceptor

Pipe Size	Slope	Carrying Capacity (mgd)	Comment
15-inch	0.20%	1.5	At BM Lift Station Force Main
15-inch	1.10%	3.4	
18-inch	0.30% (+)	3.4 (+)	
21-inch	0.27% (+)	4.8 (+)	
24-inch	0.20% (+)	6.0 (+)	
36-inch	0.20% (+)	17.6 (+)	
36-inch	0.65% (+)	31.7 (+)	At South Slope WWTP

Golf Course Trunk Line

This trunk line accepts flows from its service area, as well as, the Sheridan Meadows Lift Station and the Industrial Park Lift Station. Flows are conveyed to the Golf Course Lift Station that pumps to the 11th Avenue Trunk Line, and ultimately to the WWTP via the Country Acres and South Slope Interceptors.

The Golf Course Trunk line includes:

- North of LeClaire Road, the trunk line is a 10-inch and 12-inch. The line is a 12-inch where it receives flow from the Sheridan Meadows Lift Station force main (at Manhole C4-15), and the start of the focus for the Master Plan.
- The trunk line transitions to a 15-inch south of Iowa Street.
- The trunk line receives flow from the Industrial Park Lift Station via the 8-inch East Iowa Street Sewer (at Manhole 6-25). The trunk line is 15-inch at this manhole and for the immediate segment downstream (approximately 310 liner feet).
- The trunk line then transitions to an 18-inch pipe as it continues to the Golf Course Lift Station.
- Carrying capacity of the trunk line is summarized below.

Golf Course Trunk Line

Pipe Size	Slope	Carrying Capacity (mgd)	Comment
12-inch	0.23% (+)	1.0 (+)	
15-inch	0.22% (+)	1.8 (+)	Upstream of MH 6-25
15-inch	0.35%	2.3	Downstream of MH 6-25
18-inch	0.23%	3.0	

11th Avenue Trunk Line

The 11th Avenue Trunk sewer is a 15-inch line that ties into the Country Acres Interceptor along South 11th Street. In general, the trunk sewer continues northward along 11th Avenue, serving houses along the way, to Lincoln Road. At Lincoln Road, the sewer turns eastward and connects to the Golf Course Lift Station force main. The rated capacity and design flow for this trunk main is summarized below.

11th Avenue Trunk Line

Pipe Size	Slope	Carrying Capacity (mgd)
15-inch	1.10% (+)	4.0 (+)

Lincoln Road Trunk Line

The Lincoln Road Trunk sewer is predominantly a 15-inch pipeline that connects to Country Acres Interceptor near South 11th Avenue. From the connection, the trunk sewer generally runs northward behind the houses on 9th Avenue towards Lincoln Road, where it then turns westward along Lincoln Road to 5th Street. At 5th Street, the trunk line turns northward and then transitions to 10-inch and 8-inch sewer. Also at 5th Street, the trunk sewer has an “overflow” relief tie-in to the Buttermilk Interceptor.

The Lincoln Road Trunk sewer collects and conveys most of the gravity flow within the Country Acres Service Area. For the purpose of this Master Plan, focus is on the 15-inch trunk main.

Lincoln Road Trunk Line

Pipe Size	Slope	Carrying Capacity (mgd)
15-inch	0.15% (+)	1.5 (+)

County Acres Interceptor

The Country Acres Interceptor collects and conveys sewer flows from the Lincoln Road Trunk and 11th Avenue Trunk sewers into the South Slope Interceptor. At the connection to the trunk mains, it is a 15-inch pipeline that then transitions to an 18-inch pipeline. The rated capacity and design flow for this interceptor is summarized below.

Country Acres Interceptor

Pipe Size	Assumed Slope	Carrying Capacity (mgd)	Design Flow (mgd)
15-inch	1.37%	4.5	5.7

East Side Interceptor

The East Side Drainage Area is currently served by a 21-inch sewer, which connects to the South Slope Interceptor on the west side of Highway 61 – at Manhole D12-40, which is also the connection point of the Country Acres Interceptor. From Manhole D12-40, the East Side Interceptor crosses Highway 61 and extends approximately 1,700 feet into the drainage basin.

A summary of the existing East Side Interceptor is provided below.

East Side Interceptor

Pipe Size	Slope	Carrying Capacity (mgd)
21-inch	0.16%	3.7

South Slope Interceptor

This existing sewer main ranges in size from 24-inch to 27-inch and, overall, conveys flows from the:

- Sheridan Meadows Lift Station
- Industrial Park Lift Station
- Golf Course Lift Station
- East Side Interceptor
- The south-central part of town

At the WWTP, the main connects to the Buttermilk Interceptor. Carrying capacity of South Slope Interceptor is summarized below.

South Slope Interceptor

Pipe Size	Slope	Carrying Capacity (mgd)	Comment
24-inch	0.16% (+)	5.3 (+)	
27-inch	0.12%	6.3	
27-inch	1.5%	22.3	At WWTP

Current Sewer Rates

In general, sewer rates are billed monthly based on water usage:

- \$0.91/100 gallons for up to 90,000 gallons used per month;
- \$0.79/100 gallons over 90,000 gallons per month;
- Or, \$40.55 per month minimum.

3.0 Current Reserve Capacity***Current Flows***

Current flows, and in the case of South Slope WWTP, loadings, were evaluated based on available data provided by the City, which included:

- January 2021 through December 2024 South Slope WWTP monthly operating reports (MORs).
- January 2022 through December 2024 flow data that included Buttermilk and Industrial Park Lift Stations.

For other areas of system, current flows were estimated based on combination of house/development counts, land use, and calculating the differences from known flows at South Slope, Buttermilk, and Industrial Park Lift Station.

Reserve Capacity Summary

Overall, the existing system has capacity to support 1.0 to 1.7 mgd of growth beyond recent trends, which is in terms of max month and max day flows and assumed normal strength wastewater. These are defined by the reserve capacity available at South Slope WWTP. Although this capacity is available at South Slope, utilizing about half of this available capacity should trigger initiating plant improvements

to allow continued growth during the time it takes to bring expanded plant capacity online (typically 3 to 4 years).

Beyond the WWTP capacity, certain service areas have governing factors:

Golf Course Lift Station

- The lift station has limited, if any, reserve capacity as it struggles to keep up with current peak wet weather flows.
- The Golf Course Lift Station is a governing factor for its service area, and return a governing factor for Sheridan Meadows and Industrial Park, as ultimately it receives flows from these areas.
- The Country Acres Interceptor and South Slope Interceptor are governing factors, as the lift station discharges into these pipelines. Upgrades to the lift station will trigger improvements to these pipelines.
- As the services areas become fully developed and/or as the Industrial Lift Station is expanded, improvements to the Golf Course Trunk line will be warranted; however, it appears to be capable of supporting some growth.

South Slope Interceptor

- Although the Golf Course Lift Station capacity needs appear to be the priority driver, growth on the east side of highway 61 could also trigger improvements to South Slope Interceptor.
- The East Side Interceptor has capacity to support a relatively significant amount of growth; however, it conveys flows to the South Slope Interceptor.

Industrial Park Lift Station

- Based on planned use, there is more growth potential in the Industrial Park than the lift station can support. However, the lift station can support upwards of 0.25 mgd of growth over the immediate horizon, on a peak hour basis.
- Expansion of the Industrial Park Lift Station will trigger improvements to the East Iowa Street Sewer as well as the Golf Course Trunk Line.

Other Lift Stations and Gravity Mains

Overall, the following have reserve capacity to support significant growth in their respective services areas:

- Buttermilk Lift Station
- Buttermilk Interceptor
- East Side Interceptor
- Sheridan Meadows Lift Station
- Lincoln Road Trunk
- 11th Avenue Trunk

South Slope WWTP

The table below summarizes current flows and loadings based on January 2021 through December 2024 monthly operating reports. The current flow is compared to the rated capacity of the plant to determine the reserve capacity at South Slope WWTP. Flow is recorded every day, whereas influent water quality parameters are sampled twice a week or in some cases once a month. Inevitably with a data set this size and different frequency of monitoring, there are outliers. To help account for this at a master planning level, the reported values in the table are:

- Average Wet Weather (AWW) Flow is the 90th percentile of all the data, reported in a rounded-up number.
- Maximum Wet Weather (MWW) Flow is the 99th percentile of all the data, reported in a rounded-up number.

	Flow (mgd)	BOD (ppd)	TSS (ppd)	TKN (ppd)
Max Month (AWW)				
Rated Capacity	2.4	2,784	3,936	480
Current	1.4	1,700	2,300	230
Reserve Capacity	1.0	1,084	1,636	250
	42%	39%	42%	52%
Max Day (MWW)				
Rated Capacity	4.0	5,472	5,952	768
Current	2.3	2,300	4,300	306
Reserve Capacity	1.7	3,172	1,652	462
	43%	58%	28%	60%
Note: Max Day Rated Capacity Flow Rate includes diverting flow to EQ. On a max day basis, the SBRs can process 2.9 mgd at 5 cycles; and 3.5 mgd on 6 cycles.				

The above is at face value and can be accommodated with the existing plant; however, plant improvements can take 3 to 4 years from project initiation to construction completion and start-up, based on planning, funding, environmental reviews, design, permitting, bidding, contract award, and construction. This considered, it is fairly typical to initiate plant improvements once the incoming flows and/or loadings will regularly reach 80% of the plant's rated capacity. As such, plant improvements would be triggered based on the following:

	Flow (mgd)	BOD (ppd)	TSS (ppd)	TKN (ppd)
Max Month (AWW)				
Rated Capacity	2.4	2,784	3,936	480
Current	1.4	1,700	2,300	230
Improvements Trigger	1.9	2,227	3,149	384
Growth Until Trigger	0.5	527	849	154
Max Day (MWW)				
Rated Capacity	4.0	5,472	5,952	768
Current	2.3	2,300	4,300	300
Improvements Trigger	3.2	4,378	4,762	614
Growth Until Trigger	0.9	2,088	462	314
Note: Max Day Rated Capacity Flow Rate includes diverting flow to EQ. On a Max Day basis, the SBRs can process 2.9 mgd at 5 cycles; and 3.5 mgd on 6 cycles.				

Buttermilk Lift Station and Gravity Interceptor

From available data, current flows are within the capacity of the lift station. For example, the design of the latest improvements anticipated sending upwards of 0.86 mgd on a max month basis from Buttermilk to South Slope. From the flows record, the highest max month of record has been approximately 0.60 mgd, and the overall average has been 0.31 mgd.

However, it appears Buttermilk is operated to maximize flows being conveyed to South Slope, and not necessarily maximize equalization. For example, the max day flow of record occurred on April 7, 2023 where the lift station pumped approximately 1.1 mgd to South Slope. However, it appears a net of approximately 82 thousand gallons was returned from equalization on that day as well. It does not appear flow was sent to equalization or returned for the eight days leading up to that event. As another

example, 2024 had the most flows through equalization, and data shows only 4.4 million gallons was diverted to equalization and 7.8 million gallons was returned from equalization, in total for the year. The max day flow sent to South Slope in 2024 was 0.84 mgd. This is not a concern, per say, as there is capacity to operate in this scheme. However, it is mentioned as the data, at face value, skews the view of reserve capacity.

With the above in mind, additional evaluation was provided to estimate reserve capacity. The results are presented below in terms of:

- Total capacity represents the combined capacity of the wet weather lift station (3.8 mgd capacity that pumps to equalization) and Buttermilk Lift Station (1.0 mgd capacity that pumps to South Slope).
- Peak hour flow to the facility is estimated to be twice the max day of record.
- Pumping to South Slope assumes the peak flow, after equalization, is equal to the 99 percentile of all the flow data.

Buttermilk Lift Station	Max Day/Peak Hour (mgd)	
	Total	To South Slope
Rated Capacity	4.8	1.0
Current	2.2	0.78
Reserve Capacity	2.6	0.22
	54%	22%

Currently, the gravity interceptor predominantly receives flow from the lift station. As such, reserve capacity nominally ranges from 50% (at the upper most reach) to well over 80% of the rated interceptor capacity (along the mid and lower reaches).

The Buttermilk Lift Station and Interceptor have sufficient capacity for future design flows of this Master Plan.

Industrial Park Lift Station

The average day flow and maximum day flow of record for the Industrial Park Lift Station was 0.032 mgd and 0.164 mgd, respectively. Flow data is in thousand gallons per day; as such, peak hour flow is not captured. Peak hour flow is estimated at twice the max day flow.

Industrial Park Lift Station	Peak Hour (mgd)
Rated Capacity	0.58
Current	0.33
Reserve Capacity	0.25
	43%

Noteworthy, the Industrial Park Lift Station discharges into the East Iowa Street Sewer, which is an 8-inch sewer. For the most part, the sewer carrying capacity is sufficient to cover the flows from the Industrial Park Lift Station. However, one segment (about 260 linear feet) appears to be at a minimum slope. If this is the case, this segment does not fully support the rated capacity of the Industrial Park Lift Station. However, segments of the pipe, both upstream and downstream, appear to be at higher slopes, and have capacity. In any event, if the Industrial Park Lift Station is expanded for future flows, this pipeline will also need improvements.

Other Lift Stations and Gravity Mains

Flow data for the other lift stations as well as sewer mains was not available. On an overall annual basis, about one-third of flow treated at South Slope is from Buttermilk Lift Station, leaving two-thirds from the other areas of town.

As previously mentioned, the collection system needs to have capacity to handle peak hour flows. Peak hour flows are not typically captured in data of normal operations and/or across the system, which is typical for most collection systems.

In any event, the service areas and flows were evaluated to provide a rough estimate of existing reserve capacity, primarily for the sake of discussion as well provide some insight for more immediate development plans

In the next section of the master plan, future flows will be projected based on land use, anticipated development, and compared to the rated capacity of the asset to help guide capital improvement planning.

Golf Course Lift Station

The other areas of town include the Industrial Park and Sheridan Meadows Lift Stations, which in return pumps into the Golf Course Lift Station service area. The Golf Course Lift Station also serves additional areas that gravity flows to the station. The Golf Course Lift Station combines these flows and pumps into the 11th Street Trunk sewer, which in return flows into the Country Acres Interceptor, then into the South Slope Interceptor, and then into Buttermilk Interceptor at the plant site.

City staff reports that under high wet weather flows; the existing Golf Course Lift Station becomes inundated, even with both pumps running. On this basis, the lift station does not have reserve capacity for future growth.

For the trunk mains and interceptors receiving flow from the Golf Course Lift Station:

- **11th Avenue Trunk Line:** Appears to have capacity for future build-out flows and therefore has reserve capacity.
- **Country Acres Interceptor:** This line conveys flow from Lincoln Road Trunk Main as well as the Golf Course Lift Station. With a carrying capacity of 4.5 mgd or more, it appears to have reserve capacity to support some growth. However, it will need improvements when Golf Course Lift Station is expanded.
- **South Slope Interceptor:** The upper reaches of this interceptor may have reserve capacity; however, its capacity will need to be expanded when Golf Course Lift Station is expanded and/or as the East Side Service Area is further developed. The lower reach of the interceptor (at the WWTP) has sufficient capacity for future design flows.

East Side Interceptor

The East Side Interceptor conveys flows across Highway 61 to the South Slope Interceptor. The 21-inch pipe was installed with the intent of supporting future growth on the east side of Highway 61. The pipe has a carrying capacity of approximately 3.7 mgd, of which maybe 10% is currently being used. As such, it has reserve capacity to support relatively significant amount of growth on that side of the highway.

Sheridan Meadows Lift Station

The exiting rated capacity of this lift station appears to be sufficient to cover the future design flows in it's service area.

4.0 Future Design Flows

The purpose of this section is to summarize the long-term, future flows for the City. Drainage basins are evaluated across the City that were coupled with the 2021 Land Use Plan to project build-out flows.

Terminology

Terminology and definitions of the different categories are based on IDNR Design Standards, and include:

- Average Dry Weather (ADW) Flows: The daily average flow when groundwater is at or near normal and runoff is not occurring. The period of measurement extends up to 30-days.
- Average Wet Weather (AWW) Flow: The daily average flow for the wettest 30 consecutive days. This is also referred to as Max Month.
- Maximum Wet Weather (MWW) Flow: The total maximum flow received during any 24 hour period. This also referred to as Max Day.
- Peak Hour Wet Weather Flow (PHWW): The total maximum flow received during one hour when the groundwater is high, runoff is occurring, and domestic, commercial, and industrial flow are at their peak.

Future Flows

To further evaluate existing capacity, future “build-out” flows were projected across the City. Such projections were based on land area, 2021 Proposed Land Use Map, and IDNR and SUDAS guidance for design flows, including the following:

- Residential
 - Single Family Development: 10 people per acre.
 - Medium Density Multi-Family Development: 15 people per acre
 - High-Density Multi-Family Development: 30 people per acre
 - Nominal per capita flow: 100 gallons per person per day
 - Peak Hour Flow: Calculated based on nominal flow multiplied by a peaking factor, which is calculated based on the population served.
- Office, Institutional, Commercial, and Light Industrial
 - Peak Hour Flow: 5,000 gallons per day per acre.
- Heavy Industry:
 - Peak Hour Flows: 10,000 gallons per day per acre.

For the peak hour design flows per area (such as office, industry, etc.), IDNR and SUDAS note that a peaking factor is included, but do not define the value. For this master plan, we assumed the peak hour to average flow ratio is 4.5 to 1. For example, we assumed Heavy Industry average (or nominal) flow to be 2,222 gallons per acre (peak hour flow of 10,000 gallons per acre divided by 4.5).

In general, flow projections further assume the following ratios based on the historic flow records for South Slope WWTP. An exception was incorporated for Buttermilk Lift Station and Service Area, as the flow records indicated a different trend. Buttermilk Lift Station Service Area is over 85% developed, but includes older parts of town with higher infiltration and inflow. Additionally, equalization of peak flows at Buttermilk is considered. Other than this exception, the following factors were used:

- Max Month to Average Day (or nominal) Flow of 1.23.
- Max Month Flow to Max Day Flow of 1.94.

The above was paired with identifying sewer basins in the areas of the City that are not currently sewered. The identification of sewer service areas included a preliminary evaluation of areas that likely can be served by gravity and areas that will require lift stations.

The results of the analysis are summarized in the table below, and in **Exhibit 4-1** at the end of this section.

Area	Design Population	Peak Hour (mgd)	Max Day (mgd)	Max Month (mgd)	Average Day (mgd)
Sheridan Meadows Lift Station					
Service Area	1,290	1.1	0.40	0.23	0.19
Industrial Park Lift Station					
Service Area		1.3	0.70	0.36	0.29
Golf Course Lift Station					
Service Area	1,390	1.2	0.50	0.30	0.25
Sheridan Meadows Lift Station	1,290	1.1	0.40	0.23	0.19
Industrial Park Lift Station		1.3	0.70	0.36	0.29
<i>Subtotal</i>	<i>2,680</i>	<i>3.6</i>	<i>1.6</i>	<i>0.90</i>	<i>0.73</i>
East Side Interceptor					
Service Area	12,900	5.6	3.3	2.0	1.6
Country Acres					
Service Area	6,240	2.1	0.90	0.72	0.59
Golf Course Lift Station	2,680	3.6	1.6	0.90	0.73
<i>Subtotal</i>	<i>8,920</i>	<i>5.7</i>	<i>2.5</i>	<i>1.6</i>	<i>1.3</i>
South Slope Interceptor					
Service Area		1.3	0.70	0.36	0.29
Country Acres Interceptor	8,920	5.7	2.5	1.6	1.3
East Side Interceptor	12,900	5.6	3.3	2.0	1.6
<i>Subtotal</i>	<i>21,820</i>	<i>12.6</i>	<i>6.5</i>	<i>4.0</i>	<i>3.2</i>
Annex Lift Station					
Service Area	179	0.90	0.39	0.24	0.20
West Side Lift Station					
Service Area	7,247	9.3	3.7	2.3	1.9
Annex Area (gravity)	104	1.0	0.45	0.28	0.23
Annex Lift Station	179	0.90	0.39	0.24	0.20
<i>Subtotal</i>	<i>7,530</i>	<i>11.2</i>	<i>4.6</i>	<i>2.9</i>	<i>2.3</i>
Buttermilk Lift Station					
Service Area	5,670	2.5	1.1	0.71	0.40
<i>Subtotal</i>	<i>5,670</i>	<i>2.5</i>	<i>1.1</i>	<i>0.71</i>	<i>0.40</i>

Area	Design Population	Peak Hour (mgd)	Max Day (mgd)	Max Month (mgd)	Average Day (mgd)
Buttermilk Interceptor					
Service Area	2,720	4.5	1.8	0.96	0.92
S 1st Street	980	0.9	0.30	0.20	0.17
Buttermilk Lift Station	5,670	1.0	1.0	0.85	0.40
West Side Lift Station	7,530	11.2	4.6	2.9	2.3
<i>Subtotal</i>	<i>16,900</i>	<i>17.6</i>	<i>5.6</i>	<i>3.7</i>	<i>2.7</i>
South Slope WWTP					
South Slope Interceptor	21,820	12.6	6.5	4.0	3.2
Buttermilk Interceptor	16,900	17.6	5.6	3.7	2.7
Southeast LS Service Area	3,330	1.7	0.86	0.54	0.44
Total	42,050	31.9	12.9	8.3	6.4

Projections Check

As check on the long-term, “build-out” projections, a general comparison to current trends is provided below. There are some differences, which is expected as the mix of development between current and “build-out” is also different – particularly with industrial flows. But it appears the projections are reasonable.

Current

- Population: 6,846
- South Slope Current Flows
 - Average: 0.96 mgd
 - Max Month: 1.4 mgd
 - Max Day: 2.3 mgd
- Unit Flow on a Per Capita Basis (gallons per day per person):
 - Average: 140
 - Max Month: 208
 - Max Day: 332

Build-Out Projections:

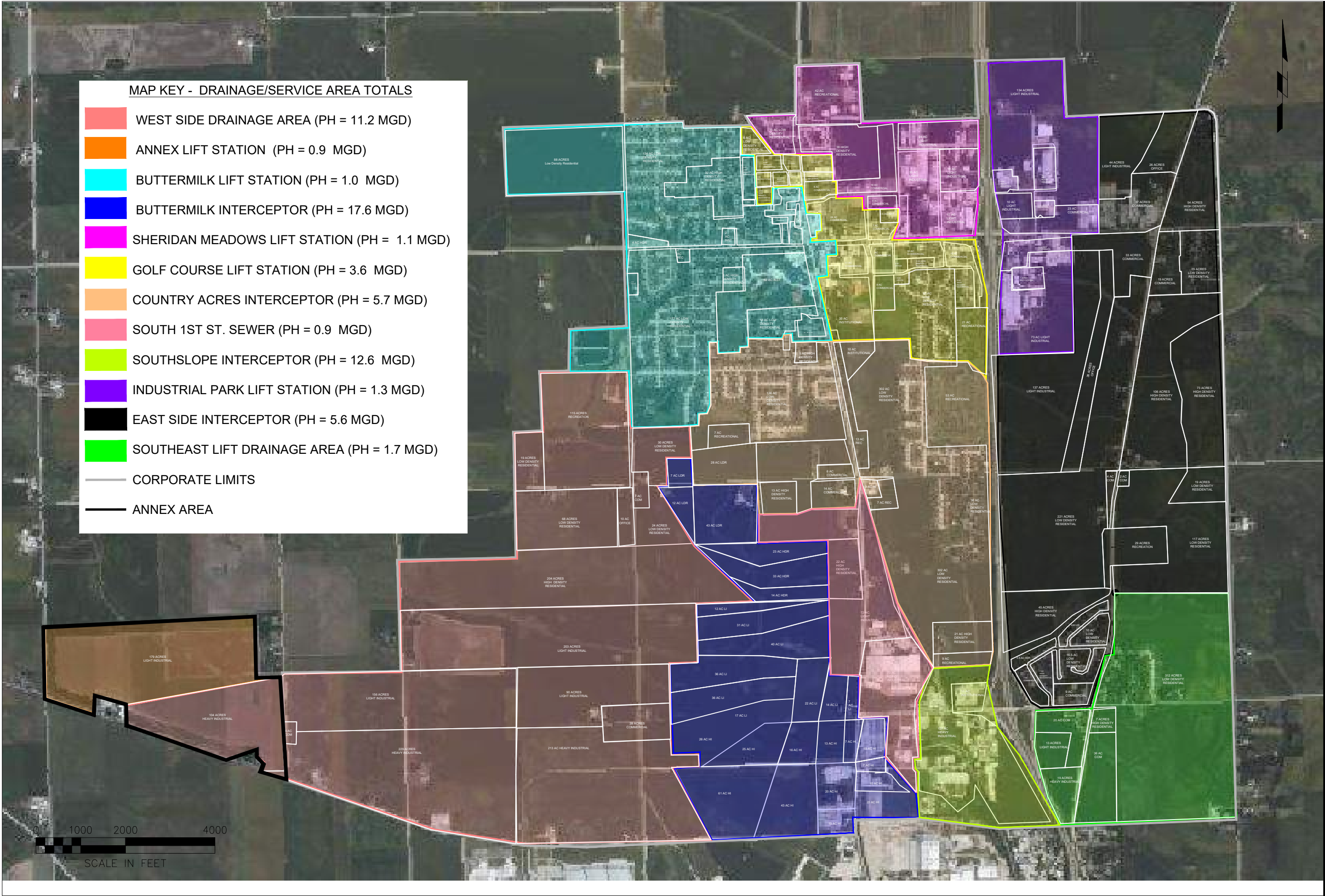
- Population: 42,050
- Design Flows
 - Average: 6.4 mgd
 - Max Month: 8.3 mgd
 - Max Day: 12.9 mgd
- Unit Flow on a Per Capita Basis (gallons per day per person):
 - Average: 151
 - Max Month: 197
 - Max Day: 307

Initial Conclusions

From the “build-out” projections, some initial conclusions have been drawn, mainly for the collection system. Collection system assets have a long service life (50 plus years). As such, comparing the collections system assets to “build-out” capacity is appropriate.

- **Sheridan Meadows Lift Station:** Appears to have sufficient capacity to support future growth in its service area.
- **Industrial Park Lift Station:** The lift station has capacity to support some growth in its service area; however, it will eventually need to be upgraded as the area is built out. Expanding the lift station will also trigger improvements to the East Iowa Street Sewer and Golf Course Interceptor.
- **Golf Course Lift Station:** As previously discussed, this lift station conveys flows from Sheridan Meadows and Industrial Park Lift Stations as well as gravity flow for a portion of town. On a max month or potentially max day flow basis, the station can support growth, but on a peak hour basis, it is undersized for current flows. Peak hour flows is a governing criterion, as such, improvements are a current need. Improvements to Country Acres and South Slope Interceptors will be needed in parallel with expanding the Golf Course Lift Station.
- **Country Acres and South Slope Interceptor:** These interceptors currently are a major conveyance route, essentially the conduit for the north central and eastern parts of town. Additional capacity, likely through a parallel interceptors, will be needed to support the Golf Course Lift Station as well as continued development in the other service areas.
- **East Side Interceptor:** A significant portion of future development east of Highway 61 can be supported by gravity flow and the existing trunk main can be extended to provide service. However, as the area approaches approximately 70% full build-out, improvements will be needed.
- **Southeast Side:** The southeastern most reach of the City, a lift station will be needed for sewer service.
- **Buttermilk Lift Station:** Appears to have sufficient capacity to support future growth within its service area.
- **Buttermilk Interceptor:** Has sufficient capacity support its service area, South 1st Sewer, and growth on the western part of town.
- **West Side Lift Station:** The West Side Lift station, as envisioned, will collect flows from the West Side Service area and convey flows to the Buttermilk Interceptor. The Buttermilk Interceptor has capacity to potentially add another lift station, if beneficial to development; however, that will provide additional pump stations to maintain. As such, the concept of one West Side Lift Station is preferred.
- **West Annex Area:** An area potentially being considered for annexation essentially has two drainage areas. One area can flow by gravity to the proposed West Side Lift Station. The other area will require a lift station for sewer service, which in return will also convey flows to the West Side Lift Station.

The next section of this master plan evaluates potential locations, sizing, and triggers for providing the upgrades discussed above.



MAP KEY - DRAINAGE/SERVICE AREA TOTALS

- WEST SIDE DRAINAGE AREA (PH = 11.2 MGD)
- ANNEX LIFT STATION (PH = 0.9 MGD)
- BUTTERMILK LIFT STATION (PH = 1.0 MGD)
- BUTTERMILK INTERCEPTOR (PH = 17.6 MGD)
- SHERIDAN MEADOWS LIFT STATION (PH = 1.1 MGD)
- GOLF COURSE LIFT STATION (PH = 3.6 MGD)
- COUNTRY ACRES INTERCEPTOR (PH = 5.7 MGD)
- SOUTH 1ST ST. SEWER (PH = 0.9 MGD)
- SOUTHSLOPE INTERCEPTOR (PH = 12.6 MGD)
- INDUSTRIAL PARK LIFT STATION (PH = 1.3 MGD)
- EAST SIDE INTERCEPTOR (PH = 5.6 MGD)
- SOUTHEAST LIFT DRAINAGE AREA (PH = 1.7 MGD)
- CORPORATE LIMITS
- ANNEX AREA

CITY OF ELDRIDGE SEWER MASTER PLAN

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CITY OF ELDRIDGE		2240020930	
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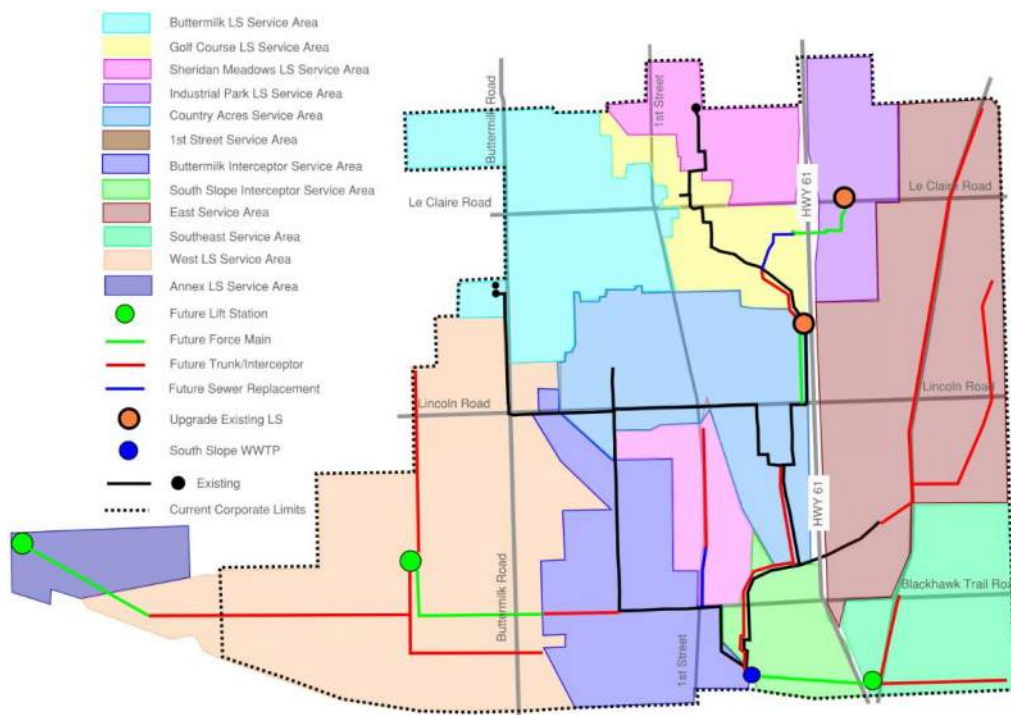
LAND USE

Exhibit 4-1

5.0 Plan Development

For this analysis, the City of Eldridge's wastewater system was evaluated based on the following major components:

- West Drainage Area
- Buttermilk Interceptor Service Area
- Golf Course Lift Station Service Area
- Industrial Park Lift Station
- Country Acres Interceptor Service Area
- East Side Drainage Area
- Southeast Drainage Area
- South Slope Interceptor Service Area
- South 1st Street Sewer Service Area
- Buttermilk Lift Station Service Area
- Sheridan Meadows Lift Station
- South Slope WWTP



Methodology

In general, planning level concepts for d sewer service include:

- Design flows are based on planned use and associated development densities, unit flows, and similar criteria, as presented in the flow analysis memo.
- Concepts for extending services to currently undeveloped areas include a schematic level routing of major sewer trunks and generalized locations of lift stations.
- For trunk sewers and interceptors:
 - Pipe diameters are nominal.

- For existing pipe, the carrying capacity assumes $\frac{3}{4}$ -full pipe, as older pipes were likely designed for this target.
- For proposed new piping, the rated capacity is based on flowing $\frac{2}{3}$ -full for 15-inch diameter and smaller pipe, and $\frac{3}{4}$ -full for larger diameter pipe, per most recent IDNR standards.
- For proposed new piping up to 21-inch, the minimum allowable slopes required by IDNR is assumed. For larger sewers (over 21-inch), the minimum allowable slope is less than 0.1%; however, a slope of 0.1%, in general, is assumed. Minimum allowable slopes are based on achieving a certain flushing velocity (2 feet per second), and as such, the assumption for larger pipe is more conservative in reaching flushing velocity as areas develop.
- In some cases where the rated capacity of a main is within a few percent of the design flow; a slightly steeper slope (greater than 0.1%) is assumed. These cases are noted in the provided tables.
- Greater slopes may be available depending on terrain, actual sewer routing, grading and other factors that can change as the area is actually developed. As such, smaller pipe sizes may be feasible with the design of certain segments. However, the overall capacity should be maintained, at a minimum.
- For upgrading existing sewers, proposed piping is assumed to have the same slope (or minimum allowable) as the existing pipeline.
- For opinions of cost:
 - Budgetary costs include a mark-up of 30% for contingencies and 15% for contractor overhead and profit.
 - Allowances are provided for mobilization, surface restoration, other utility impacts, traffic control, permanent and temporary easements, and similar factors.
- For Implementation Timelines. From project initiation through planning, design, permitting, bidding, construction, and start-up. However, the schedule depends on a host of factors, including:
 - Land acquisition needs, which in return depends on the location of the proposed sanitary sewer components, existing right-of-ways, and the depth of the proposed mains effecting the project limits. These variables will change the degree of temporary easement and permanent acquisition needs. The timeline for acquisition may vary depending on if appraisals are required, or if Compensation Estimates can be used.
 - Funding source and requirements, such as if an environmental review will be needed, findings, and if mitigation is needed.
 - Utility coordination as well as coordination with streets and other infrastructure.
 - Permitting requirements and processes, which at a minimum would be IDNR review but could also include other state and federal permits, such as Iowa DOT highway crossing permits as well as wetlands and/or flood plain permits.
 - Number of bid packages and construction awards and contracting.
 - Construction timeline, which can depend on labor availability, supply chain strength, weather, and overall scope of construction.

West Side Drainage Area

General

The West Side Drainage Area spans roughly 1,700 acres. The planned land use breakdown of the drainage area is provided in the table below. Included in this drainage area is roughly 280 acres of land currently outside of the City's limits. This area is referred to as the "Annex" area due to the potential for annexing the land into the City, pending development interest and City approval. The assumed land use for the Annex area is industrial.

Land Use	Area (acres)	
	Current City Limits	Annex Area
Low Density Residential	141	
High Density Residential	204	
Commercial	49	
Office	10	
Light Industry	628	179
Heavy Industry	546	104
Recreational	115	
Total	1,693	283

Long-Term (Build-Out) Design Flows

- West Side Drainage Area = 11.2 mgd
 - West Side = 9.3 mgd
 - Annex Gravity = 1.0 mgd
 - Annex Lift Station = 0.9 mgd

Sewer Concept

Concepts for sewer service as the West Side drainage area develops are shown in **Exhibit 5-1**.

Based on the concepts for sewer development in the West Side Drainage Area, two lift stations have been proposed. One centrally located lift station (West Lift Station) will receive gravity flow from the larger portion of the service area and pump to the Buttermilk Interceptor. The West Lift Station has conceptually been located in a low area (elevation wise) between 15th Avenue and Buttermilk Road. The lift station will pump flows through a force main to a point that it can transition to gravity flow to the existing Buttermilk Interceptor. A trunk main (West Side Connector) is proposed from the gravity connection to the Buttermilk Interceptor. In concept, it is an extension of the 36-inch Buttermilk Interceptor westward to the limits of its gravity service area. As such, the West Side Connector will collect and convey flows in the surrounding service area(s) as well as from the West Side Force Main.

Based on the concept for the West Lift Station, a proposed trunk main (West Main #1) will collect and convey flows, in general terms, west of the lift station and should be able to serve a portion of the Annex Area.

A second lift station (Annex Lift Station) will be required to transport flow from the far West reach of the Annex area to a point where it can connect to the West Main #1 and flow via gravity to the West Lift Station.

A second major trunk main (West Main #2), will collect and convey flows from the area north of the proposed West Lift Station. This area can extend to E Lincoln Road, and in general, bound to the north and east by the Buttermilk Lift Station and Buttermilk Interceptor Service Areas.

A third major trunk main (West Main #3) has been conceptualized to capture flows in the southern area of the drainage basin and convey flows to West Lift Station. As conceived for the purpose of this report, this main will connect to West Main #1 for the final segment to the lift station.

Sizing and relevant parameters for these major sewer features are summarized below.

- West Main #1

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)	Design Flow (mgd)
18-inch	0.12%	1,660	2.1	1.9
24-inch	0.10%	2,700	4.2	3.2
27-inch	0.10%	2,470	5.7	5.0
30-inch	0.12%	1,380	8.4	7.8

- West Main #2

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)	Design Flow (mgd)
12-inch	0.22%	2,750	0.8	0.6
24-inch	0.10%	2,300	4.2	3.4

- West Main #3

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)	Design Flow (mgd)
21-inch	0.10%	2,500	2.9	2.7

- West Side Connector

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)	Design Flow (mgd)
36-inch	0.10%	2,100	12.4	11.2

- West Lift Station and Force Main

- Duplex, Variable Speed
- Rated Capacity = 7,710 gpm
- Invert Depth = 25 ft
- Total Depth = Approx. 34 ft
- Force Main Nominal Size = 24 in
- Force Main Length = 4,620 ft

- Annex Lift Station and Force Main

- Duplex, Variable Speed
- Rated Capacity = 625 gpm
- Invert Depth = 20 ft
- Total Depth = Approx. 27 ft
- Force Main Nominal Size = 8 in
- Force Main Length = 3,800 ft

Phasing Concept

The full build-out scenario of the West Side Drainage Area represents significant growth in the City. It is reasonable that such growth will occur in phases and likely over the long-term horizon. The current interest in the area is the industrial park(s). One such interest is extending an industrial park north of Slopertown Road in the area that is just outside of the Eldridge's Corporate Limits. As previously mentioned, this area has some potential to be annexed into the City. However, the area is approximately 2 miles from the nearest sewer and additional improvements (such as roads and other utilities) would be needed. Nevertheless, the first phase of development into the West Side Drainage Area considers serving the Annex area:

- Targeting design capacity equivalent to the design flow for the Annex Area, plus approximately 10% of that flow.
- The concept above includes a design peak hour flow of 2.1 mgd for growth in the Annex area and/or within the City's current limits. Infrastructure is proposed to serve this design flow as the initial phase.
- The concept includes the basic conveyance of sewer flow as the full build out scenario – namely the West Main #1 as well as West Side Lift Station and associated force mains. However, these would be initial steps for the truncated design flow (as compared to full build out).
- It also includes the Annex Lift Station, although a portion (about half) of the Annex area could be served by the West Main #1 and West Lift Station. As such, some additional phasing may be available within the Annex Area.
- The West Side Connector is also needed, which would receive flow from the West Lift Station as well as extend gravity service further into the Buttermilk Interceptor Drainage Area. A phased approach for this connector is included.
- As the initial growth comes to fruition, additional improvements such as other trunk lines, parallel pipelines, and upgraded West Side Lift Station will be needed. However, the initial phase serves the area and could be a catalyst to spur additional growth, which in return, could support additional infrastructure investment.
- Further, actual development, especially in industrial and commercial development, can vary widely from the design unit flows. As one example, the difference between the IDNR design unit flows for light industry and heavy industry is a factor of two (2), but sewer generated is more driven by the specifics of the industry in lieu of the category. Overall, the general thought is that IDNR design unit flows are relatively conservative, except for specific cases of industrial uses. In addition to flow rates, organic, suspended solids, and other loading factors would need to be considered. In any event, the initial phase would also allow growth while collecting data on actual sewage generated, with the hopes that it might serve more development than the baseline scenario.

Sizing and relevant parameters for the initial phase discussed above is shown in **Exhibit 5-2** and summarized below.

- West Main #1: Initial Phase

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)	Design Flow (mgd)
18-inch	0.12%	8,200	2.1	2.1

- West Connector: Initial Phase

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)	Design Flow (mgd)
21-inch	0.20%	2,100	4.2	2.4

- West Lift Station and Force Main: Initial Phase
 - Duplex, Variable Speed
 - Rated Capacity = 1,500 gpm
 - Wetwell Diameter: 12 ft
 - Invert Depth = 25 ft
 - Total Depth = Approx. 34 ft
 - Force Main Nominal Size = 12 in
 - Force Main Length = 4,620 ft
- Annex Lift Station and Force Main
 - Duplex, Variable Speed
 - Rated Capacity = 625 gpm
 - Wetwell Diameter: 8 ft
 - Invert Depth = 20 ft
 - Total Depth = Approx. 27 ft
 - Force Main Nominal Size = 8 in
 - Force Main Length = 3,800 ft

Budgetary Opinion of Cost

- Budgetary opinion of cost for the West Side Drainage Area Initial Phase is: \$4.5 million.

Buttermilk Interceptor Service Area

General

The existing Buttermilk Interceptor currently receives flow from the Buttermilk Lift Station, South 1st Street Sewer as well as the Lincoln Road Trunk sewer has a relief sewer connecting to the interceptor. The interceptor is also designed to accept flows from the West Side Drainage Area and at the WWTP, accept flows from the South Slope Interceptor.

In addition to the above, the Buttermilk Interceptor also has its own gravity area. The land use breakdown of this gravity area is provided in the table below.

Land Use	Area (acres)
Low Density Residential	62
High Density Residential	70
Commercial	0
Office	0
Light Industry	215
Heavy Industry	277
Institutional	0
Recreation	0
Total	624

The Buttermilk Lift Station service area is predominantly developed, whereas the 1st Avenue is partially developed and the West Side Drainage Area as well as the gravity area of the Buttermilk Interceptor is predominantly undeveloped (as of 2025).

The Buttermilk Interceptor conveys flows to the South Slope WWTP. The interceptor is a 36-inch pipe at the connection to South Slope WWTP and gradually transitions to a 24-inch, 21-inch, and then to a 18-inch for the majority of the upper reach. At its most upstream reach, it's a 15-inch pipeline and connects to the Buttermilk Lift Station force main. The Interceptor is shown in **Exhibit 5-2**.

Long-Term (Build-Out) Design Flows

- Buttermilk Interceptor Service Area: 17.6 mgd
 - Buttermilk Interceptor Gravity = 4.5 mgd
 - Buttermilk Lift Station = 1.0 mgd
 - South 1st Street Sewer = 0.9 mgd
 - West Side Lift Station = 11.2 mgd
- At Connection to South Slope WWTP = 30.2 mgd
 - Buttermilk Interceptor Service Area = 17.6 mgd
 - South Slope Interceptor = 12.6 mgd

Existing Buttermilk Interceptor

A summary of the various pipeline reaches is shown in **Exhibit 5-2** and provided below.

Nominal Pipe Size	Slope	Rated Capacity (mgd)	Design Flow (mgd)	Comment
15-inch	0.20%	1.5	1.0	At BM Lift Station Force Main
15-inch	1.10%	3.4	1.3	
18-inch	0.30% (+)	3.4 (+)	2.0	
21-inch	0.27% (+)	4.8 (+)	2.6	
24-inch	0.20% (+)	6.0 (+)	3.1	
36-inch	0.20% (+)	17.6 (+)	17.6	
36-inch	0.65% (+)	31.7 (+)	30.2	At South Slope WWTP

Sewer Concept

The Buttermilk Interceptor permitted capacity appears to be sufficient for the long-term design flows of this Master Plan.

Noteworthy, the upper reach of Buttermilk Interceptor, as originally designed, provided capacity to accept flows from a potential lift station in the northern part of the West Side Drainage Area. As such, there is potential to serve the northern area of the West Side Drainage Area with a lift station, should that be beneficial to development. However, this would be an additional lift station to the proposed West Side Lift Station (as well as the Annex Lift Station).

Another note is that capacity in the Buttermilk Interceptor also allows for adjustment in the boundary with other service areas that are shown in this Master Plan. For example, there is currently some residential development along West Lincoln Road and South 5th Street that has connected to the Buttermilk Interceptor. As such, a portion of this area is being incorporated into the Buttermilk Interceptor Service Area.

Golf Course Lift Station Service Area

General

The Golf Course Lift Station receives flow from the Sheridan Meadows Lift Station, the Industrial Park Lift Station, and roughly 230 acres of surrounding area, which is mostly developed. The planned land use of the Golf Course Lift Station gravity service area is summarized in the table below.

Land Use	Area (acres)
Low Density Residential	79
High Density Residential	20
Commercial	83
Office	4
Light Industry	8
Heavy Industry	-
Institutional	28
Recreation	2
Total	234

The lift station currently pumps flow through an 8-inch force main to the 11th Avenue Trunk sewer in the Country Acres Service Area, and ultimately, to the South Slope WWTP.

Long-Term (Build-Out) Design Flows

- Golf Course Service Area = 3.6 mgd
 - Sheridan Meadows = 1.1 mgd
 - Industrial Park Lift Station = 1.3 mgd
 - Golf Course Lift Station Gravity Service Area = 1.2 mgd

Golf Course Lift Station

The Golf Course Lift Station has a current rated capacity of approximately 1.5 mgd (1,050 gpm). Flow records for the lift station were not readily available; however, the City reported that during high wet weather events, the lift station can become inundated. To help address this issue as well as plan for the future, it is proposed to increase the capacity of the lift station to the full build-out flow capacity of 3.6 mgd (2,500 gpm).

From a review of available information on the lift station:

- Duplex lift station, variable speed
- Wetwell Diameter: 8 ft
- Invert Depth: 12 feet
- Overall Depth: 30.25 ft
- Lead Pump Range: 6.25 ft
- Lag Pump Range: 6.25 ft
- Has a grinder

It does seem the wetwell can support the proposed upgrades, which would include:

- Replace the existing 40 hp pumps with 90 hp units at a design point of 2,500 gpm and approximately 85 feet of head.
- Replace the 8-inch lift station piping with 12 inch pipe and valves.
- Upsize the force main, as discussed below.
- Check capacity of grinder and replace, if needed.

- Replace variable speed drives and upsize the electrical and standby generator, as needed for larger horsepower pumps.
- SCADA improvements to capture flow rates and upgrade controls, as needed.

The existing 8-inch force main does not have sufficient capacity to support the larger pumps. As such, the force main will need to be upsized for additional capacity. The concept for this upgrade is to route a parallel 10-inch force main, which increases capacity, provides some level of redundancy, and allows the continued use of the lift station during construction of the force main. When age and condition of the existing 8-inch force main dictates, it could then be replaced with a 10-inch line.

The force main ties-into the 11th Avenue Sewer, which has capacity for the additional flow. However, the 11th Avenue Sewer connects to the Country Acres Trunk Line, which will need improvements to support the additional flow from the Golf Course Lift Station as well as its service area. This is further discussed in the Country Acres Trunk Line later in this report.

Golf Course Trunk Line

Flows are conveyed to the lift station via the existing Golf Course Trunk Line, which is summarized below:

- North of LeClaire Road, the trunk line is a 10-inch and 12-inch. The line is a 12-inch where it receives flow from the Sheridan Meadows Lift Station force main (at Manhole C4-15), and the start of the focus for the Master Plan.
- The trunk line transitions to a 15-inch south of Iowa Street.
- The trunk line receives flow from the Industrial Park Lift Station via the East Iowa Street Sewer (at Manhole 6-25). The trunk line is 15-inch at this manhole and for the immediate segment downstream (approximately 310 linear feet).
- The trunk line then transitions to an 18-inch pipe as it continues to the Golf Course Lift Station.
- Carrying capacity of the trunk line is summarized below.

Golf Course Trunk Line

Nominal Pipe Size	Slope	Carrying Capacity (mgd)	Design Flow (mgd)	Comment
12-inch	0.23% (+)	1.0 (+)	1.3	
15-inch	0.22% (+)	1.8 (+)	1.6	Upstream of MH 6-25
15-inch	0.35%	2.3	3.6	Downstream of MH 6-25
18-inch	0.23%	3.0	3.6	

According to design flow estimations, the trunk line is slightly undersized:

- There are few segments of the 12-inch (approximately 900 linear feet) with a carrying capacity below the design flow rate. However, the gravity service area is predominantly developed. Further, the Sheridan Meadows Lift Station appears to have capacity for its service area, including future growth, at its current capacity. As such, this appears to be an existing condition and although some growth will occur, future flows will likely be similar to current conditions. Improvements are not proposed, unless there are current issues to address.
- Upstream of Manhole 6-25, it appears the 15-inch pipe segments have carrying capacity for the design flow rates.
- Downstream of Manhole 6-25, the 15-inch pipe segment (approximately 310 linear feet) will need additional capacity for the design flow rates. This segment carries essentially all the flow to the lift station; and therefore, is a critical conduit.

- The 18-inch pipe is undersized for the design flows by approximately 20%. Similar to the above, it is a critical conduit as it carries all the flow to the lift station.

The Golf Course Lift Station has a stub-out for an additional 15-inch sewer connection. As proposed, a parallel 15-inch sewer line will be routed from Manhole 6-25 to the Golf Course Lift Station. With the improvement, the combined capacity of the lower reach of the Golf Course Trunk Line will be approximately 4.2 mgd. The trigger for this improvement will likely be when the Industrial Park Lift Station is expanded.

Golf Course Trunk Parallel Line

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)
15-inch	0.35%	310	1.9
	0.23%	1,700	1.6

East Iowa Street Sewer

The existing East Iowa Street Sewer accepts flows from the Industrial Park Lift Station force main as well as provides gravity services to residential houses within the Golf Course Service Area. For the purposes of this Master Plan, the sewer is summarized below:

- An 8-inch sewer along East Iowa Street.
- At 9th Avenue, the sewer collects more gravity flow and continues south as an 8-inch sewer, and serving houses along the way.
- The sewer transitions to a 10-inch sewer and connects to Manhole 6-25.

The rated capacity for the East Iowa Street Sewer is summarized in the table below.

East Iowa Street Sewer

Nominal Pipe Size	Slope	Carrying Capacity (mgd)	Design Flow (mgd)
8-inch	0.41% (+)	0.46 (+)	1.3
10-inch	0.49% (+)	0.91 (+)	1.3
10-inch	3.4%	2.4	1.4

As the Industrial Park service area continues to develop and the lift station is expanded (as discussed in the Industrial Park Service Area Section of this report), the sewer line will need additional capacity, except for the last segment of 10-inch piping. Given the location of the sewer line, it is assumed the existing sewer will be upsized to a larger diameter, either through pipe bursting or open cut and replacement. Assuming similar slopes as existing, the proposed larger diameter sewer is summarized below.

East Iowa Street Sewer Replacement

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)	Design Flow (mgd)
15-inch	0.41% (+)	1,500	2.9 (+)	1.4

Budgetary Opinion of Cost

- Golf Course Lift Station and Force Main Improvements: \$1.0 million
- Golf Course Parallel Trunk Line: \$0.4 million

- East Iowa Street Sewer Improvements: \$0.4 million

Industrial Park Lift Station Service Area

General

Industrial Park Lift Station receives flow via gravity from roughly 281 acres of surrounding area. This water is then pumped to the Golf Course Lift Station Service Area. The land use breakdown of this lift stations service area is provided in the table below.

Land Use	Area (acres)
Low Density Residential	0
High Density Residential	0
Commercial	37
Office	0
Light Industry	217
Heavy Industry	20
Institutional	7
Recreational	0
Total	281

Long-Term (Build-Out) Design Flows

- Industrial Park = 1.3 mgd

Existing Lift Station

The Industrial Park Lift Station is located along LeClaire Road, east of Highway 61. It is a duplex, submersible pump station with constant speed drives. The pumps are 7.5 horsepower and convey sewer flows through a 6-inch force main across Highway 61. The force main connects to the gravity sewer at a manhole with 8-inch sewer on Iowa Street. The gravity sewer conveys water to the Golf Course Lift Station. The rated firm capacity of the station is approximately 0.58 mgd (400 gpm)

Sewer Concept

The lift station can support upwards of 0.25 mgd of growth in the area. However, as development in the Industrial Park continues, the lift station will need to be upgraded to support full build out flows. As proposed, the capacity improvements will match the design flow of 1.3 mgd (920 gpm).

From a review of available information on the lift station:

- Duplex lift station, variable speed
- Wetwell Diameter: 8 ft
- Lowest Invert Depth: 18.5 feet
- Overall Depth: 26 ft
- Lead Pump Range: 1.58 ft
- Lag Pump Range: 1.5 ft

The wetwell appears to be capable of supporting the proposed upgrades, which would include:

- Replace the existing 7.5 hp pumps with 20 hp units at a design point of 920 gpm and approximately 48 feet of head.
- Upsize the force main, as discussed below.

- Replace variable speed drives and upsize the electrical and standby generator, as needed for larger horsepower pumps.
- SCADA improvements, as needed.

The existing force main is an 8-inch pipeline at the lift station and then transitions to a 6-inch pipeline across the highway and to the connection on East Iowa Street. The 6-inch pipeline does not have sufficient carrying capacity for the full design flows, and although the 8-inch could have capacity, the headloss drives higher horsepower pumps. Further, the age of the 6-inch pipeline is not known, but is over 25 years, as it was existing when the lift station was replaced in 1999. As such, it is proposed to route a new 10-inch force main from the Industrial Park Lift Station to the connection on East Iowa Street.

This upgrade will trigger additional improvements to the Golf Course Trunk and East Iowa Street Sewer, as mentioned in the Golf Course Service Area discussion of this report, as well as improvements to the Country Acres Interceptor, as discussed in the next section.

Budgetary Opinion of Cost

- Industrial Park Lift Station and Force Main Improvements: \$1.0 million

Country Acres Service Area

General

The Country Acres main line receives flow from the Golf Course Lift Station as well as gravity flow from roughly 670 acres within its service basin and transports this flow to the South Slope Interceptor. The land use breakdown of gravity flow area is provided in the table below.

Land Use	Area (acres)
Low Density Residential	507
High Density Residential	39
Commercial	20
Office	0
Light Industry	0
Heavy Industry	3
Institutional	10
Recreation	89
Total	668

Key pipes within the Country Acre service area include the Lincoln Road Trunk sewer, the 11th Avenue Trunk sewer, and the Country Acres Interceptor. These pipes are shown in **Exhibit 5-3**.

Design Flow

- Country Acres Total = 5.7 mgd
 - Country Acres Gravity = 2.1 mgd
 - Lincoln Road Trunk Sewer = 1.5
 - 11th Avenue Trunk Sewer (gravity) = 0.1 mgd
 - Country Acres (gravity) = 0.5 mgd
 - Golf Course Lift Station = 3.6 mgd

11th Avenue Trunk

The 11th Avenue Trunk sewer is a 15-inch line that ties into the Country Acres Interceptor along South 11th Street. In general, the trunk sewer continues northward along 11th Avenue, serving houses along the way, to Lincoln Road. At Lincoln Road, the sewer turns eastward and connects to the Golf Course Lift Station force main. The rated capacity and design flow for this trunk main is summarized below.

11th Avenue Trunk

Nominal Pipe Size	Slope	Carrying Capacity (mgd)	Design Flow (mgd)
15-inch	1.10% (+)	4.0 (+)	3.7

The 11th Avenue Trunk sewer should have capacity for future flows, including expanding the capacity of the Golf Course Lift Station.

Lincoln Road Trunk

The Lincoln Road Trunk sewer is predominantly a 15-inch pipeline that connects to Country Acres Interceptor near South 11th Avenue. From the connection, the trunk sewer generally runs northward behind the houses on 9th Avenue towards Lincoln Road, where it then turns westward along Lincoln Road to 5th Street. At 5th Street, the trunk line turns northward and then transitions to 10-inch and 8-inch sewer. Also at 5th Street, the trunk sewer has an “overflow” relief tie-in to the Buttermilk Interceptor.

The Lincoln Road Trunk sewer collects and conveys most of the gravity flow within the Country Acres Service Area. For the purpose of this Master Plan, focus is on the 15-inch trunk main.

Lincoln Road Sewer

Nominal Pipe Size	Slope	Carrying Capacity (mgd)	Design Flow (mgd)
15-inch	0.15% (+)	1.5 (+)	1.5

It appears the Lincoln Road Trunk sewer has the carrying capacity to support future flows.

County Acres Interceptor

The Country Acres Interceptor collects and conveys sewer flows from the Lincoln Road Trunk and 11th Avenue Trunk sewers into the South Slope Interceptor. At the connection to the trunk mains, it is a 15-inch pipeline that then transitions to an 18-inch pipeline. The rated capacity and design flow for this line is summarized below.

Country Acres Interceptor

Nominal Pipe Size	Slope	Carrying Capacity (mgd)	Design Flow (mgd)
15-inch	1.37%	4.5	5.7
18-inch	0.57% (+)	4.7 (+)	

The carrying capacity of the Country Acres Interceptor is not sufficient to cover future flows. Additionally, when the Golf Course Lift Station is expanded to 3.6 mgd, it will consume approximately 80% of the Country Acres carrying capacity. Further, this interceptor is a critical conduit, as it conveys a significant amount of flow generated within the City – all flows from Country Acres, Golf Course Lift Station, Sheridan Meadows, and Industrial Park services areas. As such, a parallel 15-inch pipeline is proposed to not only cover future design flows but to also introduce some redundancy into this line.

Country Acres Interceptor – Parallel Line

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)
15-inch	0.57% (+)	2,700	2.5 (+)

The combined parallel interceptor capacity will be at least 7.2 mgd, equivalent to approximately 125% of the design flow.

Budgetary Opinion of Cost

- Country Acres Interceptor Parallel Line: \$0.5 million.

East Side Drainage Area

General

The East Side Drainage Area references the drainage basin east of Highway 61 and spans roughly 1,100 acres. Of the total area in the drainage basin, approximately 60 acres is currently developed as multifamily homes, single family homes, and institutional/commercial. The planned land use of the drainage area is provided in the table below.

Land Use	Area (acres)
Low Density Residential	419
High Density Residential	291
Commercial	111
Office	64
Light Industry	181
Heavy Industry	-
Recreation	29
Total	1,094

Existing East Side Interceptor

The East Side Drainage Area is currently served by a 21-inch sewer, which connects to the South Slope Interceptor on the west side of Highway 61 – at Manhole D12-40, which is also the connection point of the Country Acres Interceptor. From Manhole D12-40, the East Side Interceptor crosses Highway 61 and extends approximately 1,700 feet into the drainage basin.

A summary of the existing East Side Interceptor is provided below.

Existing East Side Interceptor

Nominal Pipe Size	Slope	Carrying Capacity (mgd)	Design Flow (mgd)
21-inch	0.16%	3.7	5.6

The existing East Side Interceptor carrying capacity is below the build-out design flow. However, it can support approximately two-thirds of the total build out. This represents a relatively significant amount of growth for the City – equivalent to a population increase of 10,600 people. As such, the existing interceptor can support growth over a relatively long planning horizon.

Long-Term (Build-Out) Design Flows

- East Side Drainage Area = 5.6 mgd

- Developed = 0.4 mgd
- Undeveloped = 5.2 mgd

Sewer Concept

As the area develops, it is envisioned that the existing East Side Interceptor will continue to be extended northward along Crow Creek and/or Veteran Way. As proposed, the main line will be extended for the future flow, and will transition from 24-inch to 15-inch pipeline at the upper reach. A branch of 15-inch and 10-inch sewer will also be extended on the east side of Crow Creek to support growth on that side of the creek. Concepts for sewer service as the East Side drainage area develops are shown in **Exhibit 5-3** and summarized below:

- East Main #1

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)	Design Flow (mgd)
15-inch	0.15%	2,800	1.3	1.0
18-inch	0.12%	1,600	2.1	1.4
21-inch	0.10%	2,700	3.0	2.6
24-inch	0.16%	5,000	5.3	5.3

- East Main #2

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)	Design Flow (mgd)
10-inch	0.28%	3,000	0.6	0.3
15-inch	0.22%	4,700	1.3	1.0

Budgetary Opinion of Cost

- Budgetary opinion of cost for the East Side Drainage Area is: \$3.3 million.

Southeast Drainage Area

General

In the southeastern corner of the City is an area of approximately 400 acres that will require two trunk lines, a lift station, and force main to collect and convey flows across Highway 61 and to South Slope WWTP. A portion of the area is already developed as single family residential; however, this development includes septic systems as sewer service is currently not available. A breakdown of the planned land use for this drainage area is provided below.

Land Use	Area (acres)
Low Density Residential	312
High Density Residential	7
Commercial	56
Office	-
Light Industry	13
Heavy Industry	19
Recreation	-
Total	407

Long-Term (Build-Out) Design Flows

- Southeast Drainage Area = 1.7 mgd

Sewer Concept

Concepts for sewer service as the Southeast Drainage Area develops are shown in **Exhibit 5-3**.

To accommodate future flows generated in the Southeast Drainage area, two major trunk mains (Southeast Main #1 and Southeast Main #2) are proposed to collect and convey flows to the Southeast Lift Station. From the lift station, flows will be pumped across Highway 61 and connect to the South Slope WWTP.

Sizing and relevant parameters for these major sewer features are summarized below.

- Southeast Main #1

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)	Design Flow (mgd)
12-inch	0.22%	5,000	0.8	0.6

- Southeast Main #2

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)	Design Flow (mgd)
15-inch	0.15%	3,600	1.3	1.1

- East Lift Station #1 and Force Main
 - Rated Capacity = 1,160 gpm
 - Invert Depth = 15 ft
 - Force Main Size = 12 in
 - Nominal Force Main Length = 3,000 ft

Budgetary Opinion of Cost

- The budgetary opinion of cost for the Southeast Drainage Area is: \$2.4 million.

South Slope Interceptor Service Area

General

The South Slope Interceptor main line receives gravity flow from the Country Acres Interceptor, the East Side Interceptor, as well as roughly 340 acres of surrounding area. This flow is directed to the South Slope WWTP via the Buttermilk Interceptor at the plant site. The land use breakdown of the gravity service area is provided in the table below.

Land Use	Area (acres)
Low Density Residential	32
High Density Residential	22
Commercial	0
Office	0
Light Industry	72
Heavy Industry	203

Recreational	0
Total	340

Long-Term (Build-Out) Design Flows

- South Slope Interceptor Total = 12.6 mgd
 - South Slope Interceptor Gravity = 1.3 mgd
 - Country Acres Interceptor = 5.7 mgd
 - East Side Interceptor = 5.6 mgd

Existing South Slope Interceptor

The South Slope Interceptor is shown in **Exhibit 5-3**. The rated capacity and design flow for this line are summarized in the table below.

South Slope Interceptor

Nominal Pipe Size	Slope	Carrying Capacity (mgd)	Design Flow (mgd)	Comment
24-inch	0.16% (+)	5.3 (+)	11.3	
27-inch	0.12%	6.3	12.6	
27-inch	1.5%	22.3	12.6	At WWTP

Sewer Concept

The South Slope Interceptor is a critical conduit, essentially carrying all the flow from central and eastern Eldridge. As development takes place in the central and east side of town, additional flow will be allocated to the South Slope Interceptor. In the near term, the Golf Course Lift Station, when expanded, will consume about two-thirds of the interceptor's capacity in the upper reach, and over half in the mid-reach. As such, it is recommended a parallel 30-inch line be provided north of Trails Road (from Manhole D13-5 to Manhole D12-40) to the connection with Country Acres and East Side Interceptor. The combined capacity of the parallel lines will be at least 14.7 mgd and cover the design flows by approximately 116%.

South Slope Interceptor – Parallel Line

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)
30-inch	0.12% (+)	3,500	8.4 (+)

Budgetary Opinion of Cost

- South Slope Interceptor Parallel Line: \$1.0 million

South 1st Street Sewer Service Area

General

The South 1st Street Sewer receives gravity flow 200 acres of surrounding area. This flow is directed to the Buttermilk Interceptor. The land use breakdown of the drainage area is provided in the table below.

Land Use	Area (acres)
Low Density Residential	32
High Density Residential	22
Commercial	0
Office	0
Light Industry	72
Heavy Industry	73
Recreational	-
Total	199

Noteworthy, of the land use summarized above, most of the area originally planned to be Heavy Industry, has been developed as commercial or light industrial.

Existing South 1st Street Sewer

The South 1st Street Interceptor is an 8-inch line, which connects to the Buttermilk interceptor at Blackhawk Trail Road, and extends northward, serving industrial and commercial development along the street. The rated capacity and design flow for this sewer is summarized in the table below.

South 1st Street Sewer

Nominal Pipe Size	Slope	Carrying Capacity (mgd)	Design Flow (mgd)
8-inch	0.58% (+)	0.54 (+)	0.9

The carrying capacity noted above is for approximately 250 liner feet. Other segments appear to have steeper slopes, and carrying capacity closer to 0.7 mgd or more. In any event, the current sewer covers approximately 60% of the design flow. As the area continues to develop and approaches build-out, the existing sewer will likely need to be replaced with a larger pipe.

Design Flow

- South 1st Street Sewer Total = 0.9 mgd

Sewer Concept

The South 1st Street Sewer is shown in **Exhibit 5-3**. As the service area continues to develop, the sewer should be extended with 10-inch and 8-inch piping, and as mentioned above, the existing sewer segment will likely need be replaced with a 12-inch line.

South 1st Street Sewer Future Extensions

Nominal Pipe Size	Assumed Slope	Nominal Length (ft)	Rated Capacity (mgd)	Design Flow (mgd)
8-inch	0.40%	700	0.4	0.1
10-inch	0.28%	1,800	0.6	0.6
12-inch	0.58%	2,200	1.4	0.9

Budgetary Opinion of Cost

- Sewer Extension: \$0.4 million
- Sewer Replacement: \$0.3 million

Buttermilk Lift Station Service Area

General

Buttermilk Lift Station service area encompasses roughly 550 acres of land, which is predominantly developed. The land use breakdown of this lift stations service area is provided in the table below.

Land Use	Area (acres)
Low Density Residential	423
High Density Residential	48
Commercial	10
Office	3
Light Industry	4
Heavy Industry	-
Institutional	64
Recreational	3
Total	555

Long-Term (Build-Out) Design Flows

- Gravity to Buttermilk Lift Station = 2.5 mgd
- Lift Station to Buttermilk Interceptor = 1.0 mgd

Existing Lift Station

The 2018 improvements project converted Buttermilk Lagoon into an equalization basin and provided a new lift station to convey flows to South Slope WWTP. The lift station is a duplex, submersible pump station on variable speed drives with a firm capacity of 1.0 mgd (694 gpm) for conveying flows to South Slope WWTP.

For flows above 1.0 mgd, there is second pump station with a capacity upwards of 3.8 mgd to transfer peak flows to the equalization basins. The equalization basins have a total capacity of approximately 22 million gallons.

Beyond the rated capacity of the lift station, the construction permit had a design basis of conveying flows upwards of the max month flow (0.86 mgd) to South Slope WWTP, with higher flows being equalized.

The lift station essentially serves the northwest part of town, and conveys flows to South Slope WWTP through a 10-inch FM that discharges into the upper reach of the Buttermilk Interceptor. The tie-in is at a manhole along Buttermilk Road, north of W. Lincoln Road. The Buttermilk Interceptor is 15-inches at this location.

The Buttermilk Lift Station(s) have adequate capacity to handle the future design flows of this Master Plan.

Sheridan Meadows Lift Station Service Area

General

Sheridan Meadows Lift Station receives flow via gravity from roughly 200 acres of surrounding area. This water is then pumped to the Golf Course Lift Station Service Area. The land use breakdown of this lift stations service area is provided in the table below.

Land Use	Area (acres)
Low Density Residential	15
High Density Residential	38
Commercial	28
Office	0
Light Industry	94
Heavy Industry	0
Institutional	0
Recreational	42
Total	217

Long-Term (Build-Out) Design Flows

- Gravity to Sheridan Meadows = 1.1 mgd

Existing Lift Station

Sheridan Meadows Lift Station is submersible, duplex lift station with 40 hp pumps. The firm capacity of the lift station is approximately 1.1 mgd (800 gpm).

The lift station is located south of Sheridan Meadows Park, and pumps to the Golf Course Trunk sewer in the vicinity of East Franklin Street and N 4th Avenue (at Manhole C4-15). The gravity sewer is 12-inch at this location and ultimately conveys flows to the Golf Course Lift Station.

The lift station should have capacity to handle the future design flows of this Master Plan.

South Slope WWTP

General

Incoming sewer flow at the South Slope WWTP is pumped to treatment or to an existing 2-million-gallon equalization basin. The WWTP currently has two influent pump stations:

- One lift station has two chopper pumps, each rated for 1,175 gpm at 67 feet total dynamic head.
- One pump station has two chopper pumps, each rated for 1,350 gpm at 73 feet total dynamic head.

Depending on the combination of pumps operating, the firm capacity of the lift stations is between 5.18 mgd and 5.62 mgd.

The above compares to the long-term, full “build-out” peak hour flow of 30.5 mgd. Such a flow is for full build-out of the City, based on planned land use, and design criteria associated with the land use. Growth and development will inevitably occur over time, and can reasonably be assumed to occur over a multi-year (if not decades) horizon. Phasing the WWTP, including influent pumps, is appropriate to keep up with demand, but not oversize to point the plant is too under-utilized, inefficient, and equipment such as pumps reach the end of their service life before needing their capacity.

Reserve Capacity

As presented in Section 3, a summary of South Slopes WWTP capacity, current flows, and reserve capacity (as of 2025) is provided below.

	Flow (mgd)	BOD (ppd)	TSS (ppd)	TKN (ppd)
Max Month (AWW)				
Rated Capacity	2.4	2,784	3,936	480
Current	1.4	1,700	2,300	230
Reserve Capacity	1.0	1,084	1,636	250
	42%	39%	42%	52%
Max Day (MWW)				
Rated Capacity	4.0	5,472	5,952	768
Current	2.3	2,300	4,300	306
Reserve Capacity	1.7	3,172	1,652	462
	43%	58%	28%	60%
Note: Max Day Rated Capacity Flow Rate includes diverting flow to EQ. On a max day basis, the SBRs can process 2.9 mgd at 5 cycles; and 3.5 mgd on 6 cycles.				

As of 2025, South Slope WWTP can support growth of 1.0 mgd on a max month basis, or 1.7 mgd on a max day basis, depending on reasonable strength wastewater. For higher strength wastewater, which can be associated with industrial development, loading can be the limiting factor, in lieu of flow rates.

The above reserve capacity is available for growth. But as discussed in Section 3, it is typical to initiate plant improvements when flows and/or loadings will regularly hit 80% of the permitted capacity. This approach provides time for planning, design, permitting, and construction of plant improvements, which can take several years to complete, while still allowing for continued growth during the duration.

Influent Pump Station Expansion

On a Peak Hour basis, if the Golf Course Lift Station and Phase 1 of the West Lift Station are implemented, the influent pump capacity of the plant will need to be expanded to at least 7.25 mgd. However, consideration should also be given to future plant expansion (discussed in the following section), and potential alternatives for the pumping station at South Slope:

- Potentially sizing the expanded pump station(s) to 8.0 mgd in anticipating the next phased expansion of the plant, and modifying the existing pretreatment units or divert untreated flow to equalization.
- Potentially combine the two influent pump stations into one new pump station with expanded capacity and space for future improvements (beyond the next phased expansion).
- Potentially provide a new pump station north of Crow Creek on City property, which has previously been considered for new flow equalization basin(s). This would limit creek crossing and place the pump station near the future equalization basin(s).
- Providing new lift station north of Crow Creek as discussed above plus new pretreatment.

Budgetary Opinion of Cost

- Influent Pump Station Improvements: \$0.8 to \$2.4 million, depending on alternative approach chosen.

Plant Expansion

As shown on **Exhibit 5-4**, the existing SBR treatment train at the plant has space for adding four additional SBR basins of similar size as the other (larger) basins. Such an addition would add 1.2 mgd of capacity on a max month basis and 1.45 mgd on a max day basis (at 5 cycles). Combined, the plant would have a capacity of:

South Slope Capacity With Phased Expansion

Capacity	5-Cycles (mgd)	6-Cycles (mgd)
Max Month	3.60	-
Max Day	4.35	5.25
Max Day w/ Existing EQ	6.35	7.25

In addition to the new SBR basins, expansion to pretreatment as well as sludge digestion would be needed support the expanded plant capacity.

Budgetary Opinion of Cost

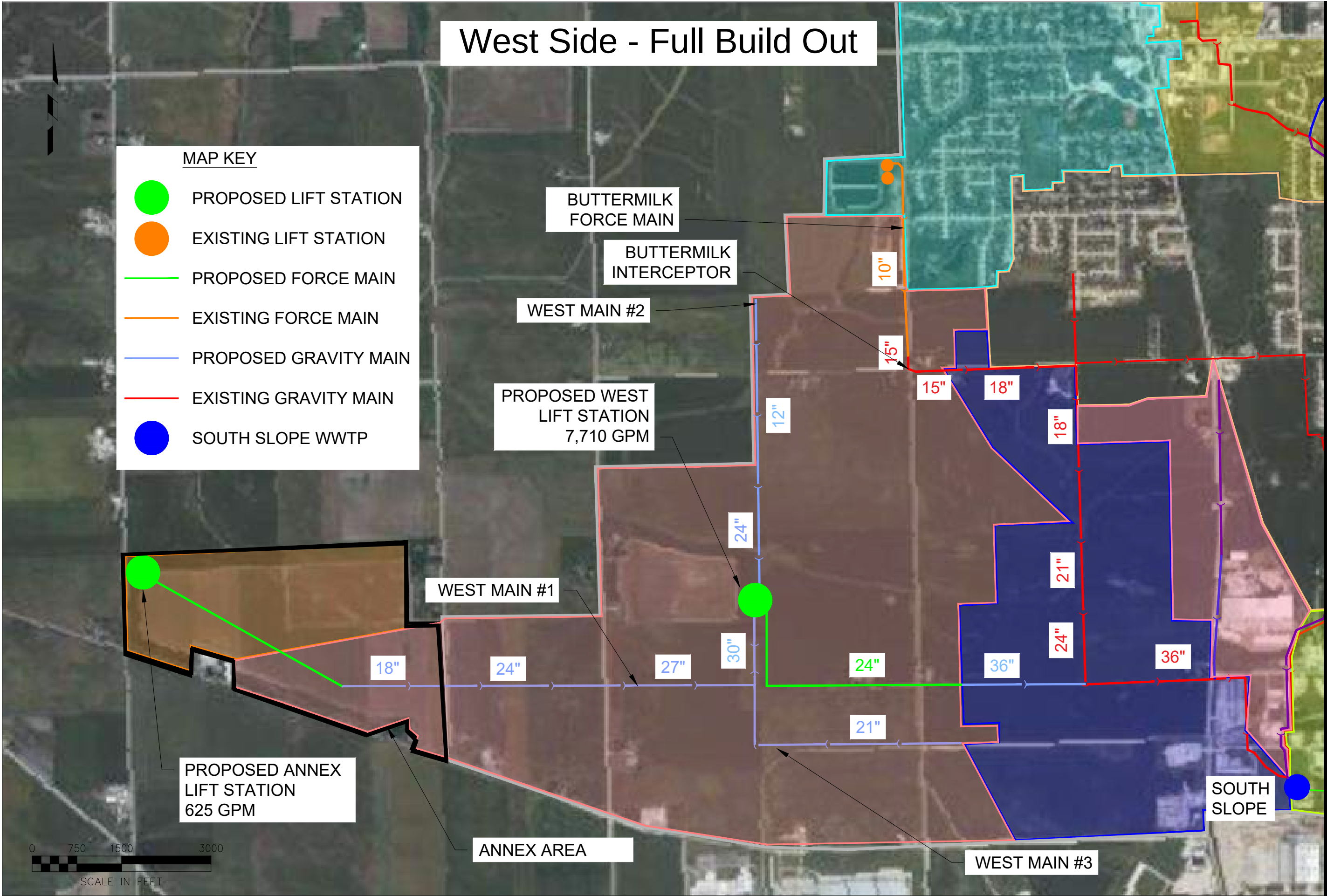
- South Slope WWTP Phased Expansion to 3.6 mgd: \$11 million

Follow-On Expansion

The previous concept for expanding South Slope WWTP beyond 3.6 mgd (max month basis), was to provide equalization storage on City owned property north of Crow Creek and along Trails Road. The real estate currently utilized by the existing 2 million gallon storage basin would then be available for additional liquid and solids treatment trains and expanding the plant capacity.

As previously mentioned, it may be appropriate to consider this approach when making improvements to influent pumping and pretreatment expansions. In general, pumping and pretreatment could be provided north of Crow Creek, setting the stage for capacity and pretreatment prior to the new equalization basins as well as limit creek crossings. However, there are other alternatives, and the influent pumping and pretreatment could be provided on the existing plant site.

Overall, expansion would include influent pumping, pretreatment, biological treatment, disinfection as well as solids thickening, digestion, dewatering, and storage. Coupled with these improvements would be primary power, standby power, SCADA and controls, utilities, and site improvements.



West Side - Full Build Out

- MAP KEY**
- PROPOSED LIFT STATION
 - EXISTING LIFT STATION
 - PROPOSED FORCE MAIN
 - EXISTING FORCE MAIN
 - PROPOSED GRAVITY MAIN
 - EXISTING GRAVITY MAIN
 - SOUTH SLOPE WWTP

BUTTERMILK
FORCE MAIN

BUTTERMILK
INTERCEPTOR

WEST MAIN #2

PROPOSED WEST
LIFT STATION
7,710 GPM

WEST MAIN #1

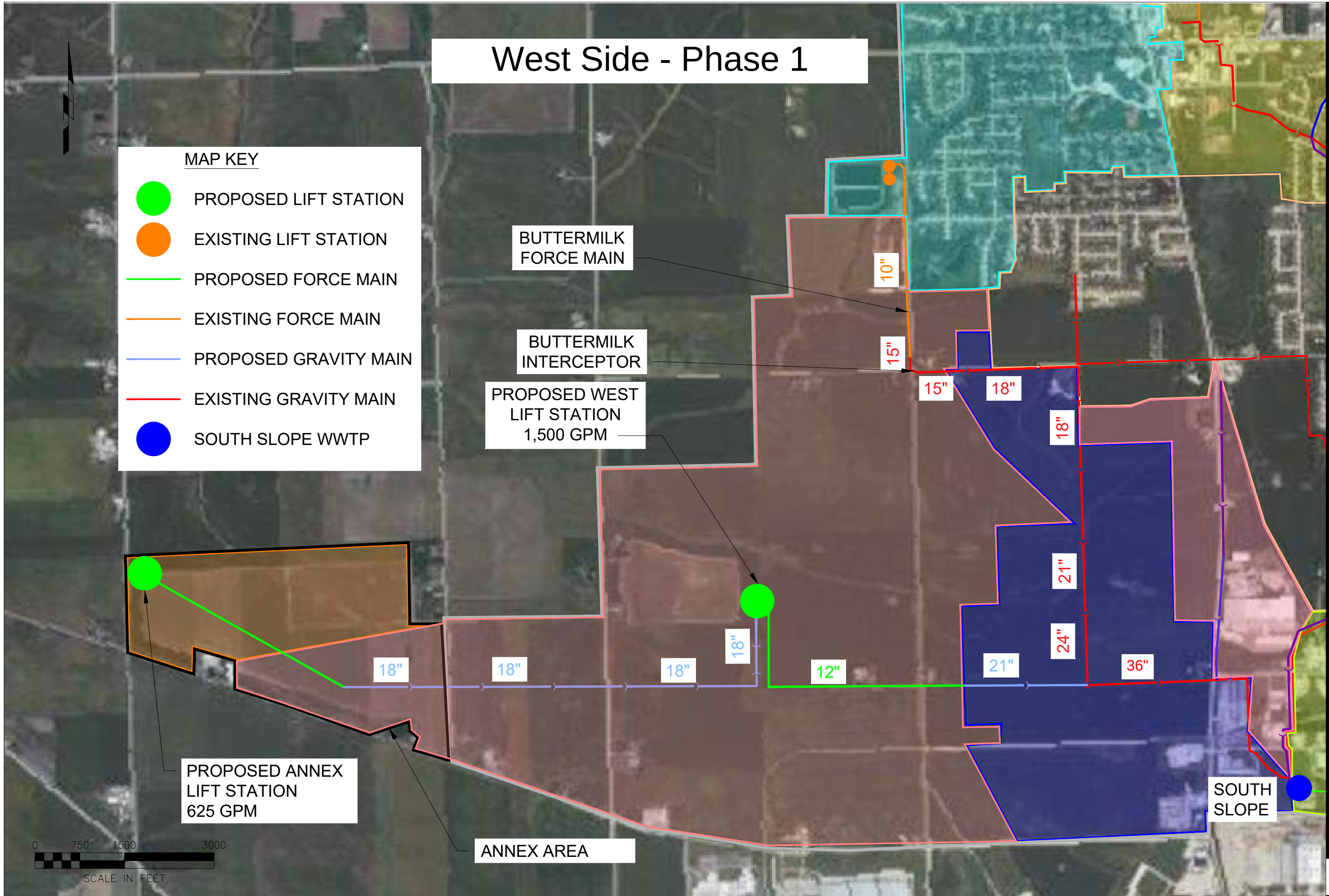
PROPOSED ANNEX
LIFT STATION
625 GPM

ANNEX AREA

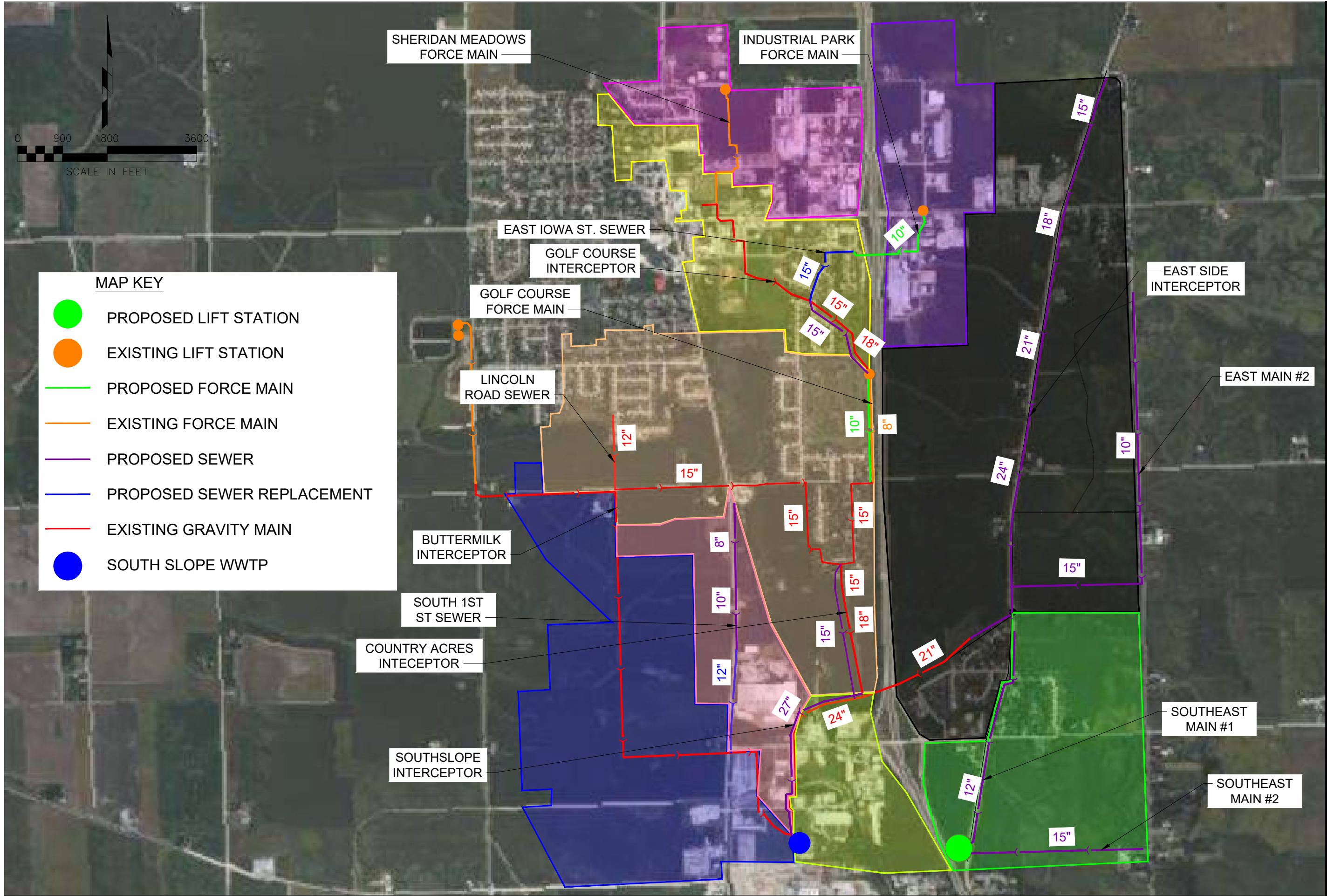
SOUTH
SLOPE

WEST MAIN #3

CITY OF ELDRIDGE SEWER MASTER PLAN			
CITY OF ELDRIDGE			
DATE	07/14/2025	SCALE	---
DRAWN BY	MAA	FIELD BOOK	---
APPROVED BY	SDO	REVISION	---



DATE	07/14/2025	SCALE	FIELD BOOK
DRAWN BY	MAA	SDO	REVISION
APPROVED BY			



CITY OF ELDRIDGE SEWER MASTER PLAN

SHIVE-HATTERY
ARCHITECTURE+ENGINEERING

800.798.0313 | SHIVE-HATTERY.COM

2240020930

CENTRAL/EAST SIDE

Exhibit 5-3

DATE	07/14/2025	SCALE	MAA	FIELD BOOK
DRAWN BY	SDO	REVISION		
APPROVED BY				

Influent Pump Station Improvements and Potentially Relocate North of Crow Creek

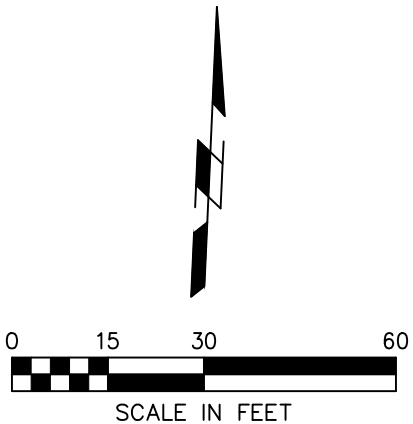
Pretreatment Improvements Potentially Relocate On Site or north of Crow Creek

New Digester or Potentially Replace Existing Digester(s) with Larger Tank(s)

Peak Hour Expansion

Phased Expansion to 3.6 mgd (Max Month Basis)

Phased Expansion Beyond 3.6 mgd (Max Month Basis)



Future Liquid and Solids Treatment

EQUALIZATION BASIN

Relocate Equalization north of Crow Creek on City Owned Property

Future SBRS

NOTE:
CONFIRM ALL EXISTING SANITARY SEWER
INVERTS PRIOR TO CONSTRUCTING
PROPOSED SANITARY SEWER PIPING AND
MANHOLES.