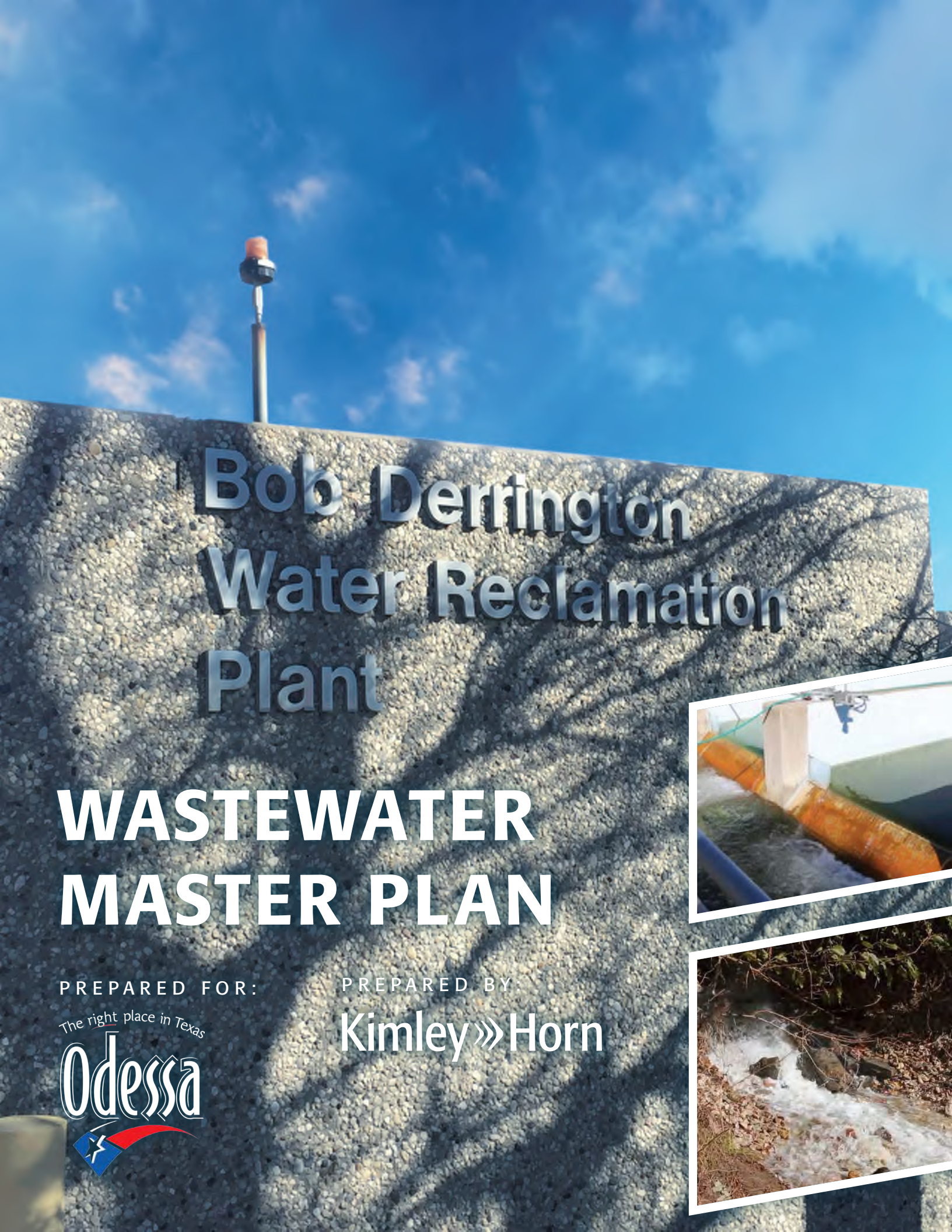

WASTEWATER MASTER PLAN

PREPARED FOR:

The right place in Texas
Odessa

PREPARED BY:

Kimley»Horn

CITY OF ODESSA

2018 WASTEWATER SYSTEM MASTER PLAN

MAY 2019

The right place in Texas

Odessa

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1. EXECUTIVE SUMMARY

This Wastewater System Master Plan present analyses, findings, and recommendations for implementing a plan to meet Odessa's infrastructure needs over the next 25 years. The basis for the anticipated infrastructure improvements is to continue to provide exceptional service to Odessa's existing customers and to meet the demand for new service from the growing population. The growing population is being driven by the expansion of the oil and gas field market in the counties surrounding Odessa.

Population and growth projections were based on meetings with Odessa staff. Historical wastewater usage data from the last five years was also provided by Odessa. Kimley-Horn projected wastewater demand (average day, maximum day, and peak hour) values for the next 25-years. The wastewater system was analyzed using SewerCAD™ modeling software. Eight permanent flow meters were installed by Odessa during the master planning process. Information from these flow meters were utilized to calibrate a dry weather and wet weather model. The calibrated model enabled Kimley-Horn to evaluate the existing wastewater system during the 2-year, 24-hour storm to determine if the system met the design criteria.

Elements of the wastewater system, including treatment, pumping, wet well storage, and the piping were evaluated against established design criteria. Based on this evaluation and current growth projections, Kimley-Horn recommends the following infrastructure improvements over the next 25 years. In addition to the opinion of probable construction costs for each project, a cost with a market scarcity adjustment factor is provided. The market scarcity adjustment factor is to account for inflated construction prices in the Permian Basin due to the lack of contractor availability. To account for this inflation, each project cost has a separate cost projection which includes an inflation factor of 1.5. The projects are divided into three major phases; 5-Year, 10-Year, and 25-Year. Table 1, Table 2, Table 3, and Table 4 summarize the project costs by phase.

1.1 5-Year Capital Improvements Plan Summary

Table 1 – 5-Year Capital Improvements Plan Summary

Project No.	Project Name	Project Cost	Market Scarcity Adjustment (1.5x)
1	LINE P INTERCEPTOR SEGMENT I	$ 20,023,000.00	$ 30,034,500.00
2	LINE Q INTERCEPTOR SEGMENT I	$ 11,746,000.00	$ 17,619,000.00
3	LINE Q INTERCEPTOR SEGMENT II	$ 1,879,000.00	$ 2,818,500.00
4	MISSION BLVD 8-INCH TRUNK MAIN	$ 306,000.00	$ 459,000.00
5	FAUDREE RD 18-INCH TRUNK MAIN	$ 1,087,000.00	$ 1,630,500.00
6	FAUDREE RD 15-INCH NORTH TRUNK MAIN	$ 1,220,000.00	$ 1,830,000.00
7	LINE H INTERCEPTOR SEGMENT I	$ 5,523,000.00	$ 8,284,500.00
8	I-20 BUSINESS 15-INCH TRUNK MAIN EXTENSION	$ 3,633,000.00	$ 5,449,500.00
	5-Year Projects Sub-Total:	$ 45,417,000.00	$ 68,125,500.00

1.2 10-Year Capital Improvements Plan Summary

Table 2 – 10-Year Capital Improvements Plan Summary

Project No.	Project Name	Project Cost	Market Scarcity Adjustment (1.5x)
9	LINE P BASIN SOUTHEAST LIFT STATION, FORCE MAIN, AND RELIEF TRUNK MAIN	$ 5,919,000.00	$ 8,878,500.00
10	FAUDREE RD 15-INCH NORTH TRUNK MAIN EXTENSION	$ 1,118,000.00	$ 1,677,000.00
11	RATLIFF RANCH NORTHEAST 12-INCH TRUNK MAIN	$ 2,359,000.00	$ 3,538,500.00
12	RATLIFF RANCH NORTH 12-INCH TRUNK MAIN	$ 1,092,000.00	$ 1,638,000.00
13	FM 554 NORTHEAST 15-INCH TRUNK MAIN	$ 1,155,000.00	$ 1,732,500.00
14	FM 554 NORTH 15, 12-INCH TRUNK MAIN	$ 1,226,000.00	$ 1,839,000.00
15	WEST I-20 24-INCH TRUNK MAIN	$ 3,722,000.00	$ 5,583,000.00
	10-Year Projects Sub-Total:	$ 16,591,000.00	$ 24,886,500.00

1.3 25-Year Capital Improvements Plan Summary

Table 3 – 25-Year Capital Improvements Plan Summary

Project No.	Project Name	Project Cost	Market Scarcity Adjustment (1.5x)
16	WEST 22ND ST 12-INCH PARALLEL TRUNK MAIN	$ 1,064,000.00	$ 1,596,000.00
17	LINE 12 BASIN LIFT STATION, 24-INCH FORCE MAIN, AND 12-INCH TRUNK MAIN	$ 7,552,000.00	$ 11,328,000.00
18	COMANCHE TRAIL EAST PARK 36-INCH TRUNK	$ 1,634,000.00	$ 2,451,000.00
19	SOUTH GRANT AVE 42-INCH TRUNK MAIN	$ 499,000.00	$ 748,500.00
20	LINE P BASIN NORTHEAST LIFT STATION & 15-INCH FORCE MAIN	$ 4,612,000.00	$ 6,918,000.00
21	LINE H NORTHWEST INTERCEPTOR SEGMENT III	$ 3,436,000.00	$ 5,154,000.00
22	US 385 NORTH 12-INCH TRUNK MAIN	$ 2,733,000.00	$ 4,099,500.00
23	LINE 12 BASIN LIFT STATION 30, 24-INCH TRUNK MAIN	$ 3,963,000.00	$ 5,944,500.00
24	GOLDER AVE 12-INCH TRUNK MAIN	$ 1,606,000.00	$ 2,409,000.00
25	GOLDER AVE AND WEST 87TH ST 21, 15-INCH TRUNK MAIN	$ 2,806,000.00	$ 4,209,000.00
26	SUNSET COUNTRY CLUB 15-INCH TRUNK MAIN	$ 1,308,000.00	$ 1,962,000.00
27	LINE G BASIN LIFT STATION AND 12-INCH FORCE MAIN	$ 2,867,000.00	$ 4,300,500.00
28	LINE G BASIN LIFT STATION 12-INCH TRUNK MAIN	$ 2,127,000.00	$ 3,190,500.00
29	WESTOVER DR 12-INCH PARALLEL TRUNK MAIN	$ 1,670,000.00	$ 2,505,000.00
30	HWY 302 12-INCH TRUNK MAIN	$ 4,071,000.00	$ 6,106,500.00
31	NORTHWEST LOOP 338 12-INCH TRUNK MAIN	$ 2,174,000.00	$ 3,261,000.00
32	I-20 BUSINESS 15, 12-INCH TRUNK MAIN	$ 3,156,000.00	$ 4,734,000.00
33	MOSS RANCH 18-INCH TRUNK MAIN	$ 2,544,000.00	$ 3,816,000.00
34	HENDERSON RANCH 15, 12-INCH TRUNK MAIN	$ 3,816,000.00	$ 5,724,000.00
35	SOUTHWEST BASIN INTERCEPTOR SEGMENT I	$ 6,165,000.00	$ 9,247,500.00
36	SOUTHWEST BASIN INTERCEPTOR SEGMENT II	$ 4,128,000.00	$ 6,192,000.00
37	SOUTHWEST BASIN INTERCEPTOR SEGMENT III	$ 1,689,000.00	$ 2,533,500.00
38	SOUTHWEST BASIN LIFT STATION AND 24-INCH FORCE MAIN	$ 4,645,000.00	$ 6,967,500.00
39	SOUTHWEST BASIN INTERCEPTOR SEGMENT IV	$ 1,887,000.00	$ 2,830,500.00
40	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT I	$ 2,442,000.00	$ 3,663,000.00
41	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT II	$ 4,345,000.00	$ 6,517,500.00

42	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT III	$ 1,342,000.00	$ 2,013,000.00
43	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT IV	$ 635,000.00	$ 952,500.00
44	LONE STAR DR 21-INCH TRUNK MAIN	$ 1,207,000.00	$ 1,810,500.00
45	ANGEL TR 18, 15, 12-INCH TRUNK MAIN	$ 3,305,000.00	$ 4,957,500.00
46	EAST GETTYSBURG ST 15, 12-INCH TRUNK MAIN	$ 3,526,000.00	$ 5,289,000.00
47	MCKINNEY PARK 24-INCH TRUNK MAIN	$ 327,000.00	$ 490,500.00
48	SOUTH JOHN BEN SHEPPARD PARKWAY BLVD 12-INCH TRUNK MAIN	$ 373,000.00	$ 559,500.00
49	LINE P BASIN SOUTHEAST LIFT STATION PHASE II UPGRADE	$ 608,000.00	$ 912,000.00
50	BOB DERRINGTON TREATMENT PLANT UPGRADE TO 17.7 MGD	$ 101,250,000.00	$ 151,875,000.00
	25-Year Projects Sub-Total:	$ 191,512,000.00	$ 287,268,000.00

1.4 Beyond 25-Year Capital Improvements Plan Summary

Table 4 – Beyond 25-Year Capital Improvements Plan Summary

Project No.	Project Name	Project Cost	Market Scarcity Adjustment (1.5x)
51	LINE H INTERCEPTOR SEGMENT I	$ 15,730,000.00	$ 23,595,000.00
52	LINE 12 BASIN LIFT STATION PHASE II UPGRADE	$ 2,160,000.00	$ 3,240,000.00
	25-Year Projects Sub-Total:	$ 17,890,000.00	$ 26,835,000.00

2. INTRODUCTION

The City of Odessa is located within Ector County except for a small portion in Midland County. Odessa is served by Interstate 20, Loop 338, State Highway 385, and State Highway 191. The City of Odessa is a major City in the west Texas area and serves as a hub for the oil and gas fields of the Permian Basin. With the continued expansion of the oil and gas industries, the projected Odessa service area has an opportunity for tremendous additional growth. The expansion of and the rehabilitation of the existing sewer system will be necessary to serve the expanding population and industry.

2.1 Description of Study Area

The scope of this study is through the 25-year planning period, year 2043. Kimley-Horn worked with City staff to determine the 25-year growth boundary, in which all development within the 25-year planning period is anticipated to occur. This boundary was used as the limits for this study. The study area is approximately 83,900 acres (approximately 131 square miles) and includes approximately 30,530 acres (approximately 47.7 square miles) within Odessa's current city limits. Odessa's projected build-out CCN boundary is equivalent to Odessa's 5-mile ETJ line and is equal to 121,500 acres (approximately 189.8 square miles). See Appendix A – Boundary Map for an illustration of Odessa's existing and proposed service areas.

2.2 Objective and Scope of Study

The goal of this study is to develop a strategic plan that allows for Odessa to continue to provide exceptional service to its existing customers, satisfy state requirements, and to allow for the expansion of new developments and industries fueled by the oil and gas markets. The scope of the study was to analyze the existing system for deficiencies and to make recommendations to serve the projected population through the 25-year planning period.

2.3 Wastewater System Definitions

The following terms are used throughout this report. The definitions and acronyms may provide the reader a better understanding of the subtle difference between several of these terms.

Average Day Demand (ADD) - Annual wastewater demand on the system divided by the number of days in a year. The average daily wastewater demand a given wastewater system experiences over a one-day period.
Capital Improvements Plan (CIP) - Recommended improvements to the wastewater collection system based on population and wastewater demand projections through the 25-year planning period.
Demand (Discharge) - Volume of wastewater discharged into the system for a given time period, typically measured in units of Million Gallons Per Day (MGD) or Gallons Per Minute (gpm).
Diurnal Curve – Typically a graph depicting wastewater demand over a 24-hour period with wastewater demand plotted on the y-axis and time plotted on the x-axis.
ETJ - Extra Territorial Jurisdiction
Firm Pumping Capacity - The total pumping capacity that a lift station can deliver with the largest pump out of service.
GPD - Gallons Per Day
MGD - Million Gallons per Day
Peaking Factor - The factor applied to the average day demand to determine the peak flow rate during wet weather conditions.
PSI - pounds per square inch
TCEQ - Texas Commission on Environmental Quality
Total Pumping Capacity - The total pumping capacity that a lift station can deliver.

3. DATA COLLECTION AND LAND USE

3.1 Data Collection

Evaluation of the existing system required collection of physical attributes of the existing wastewater system, historical customer water demands, sub-basin flow meter information, and wastewater treatment plant flow meter information. Odessa staff provided the collection system network in electronic format, available lift station information, and general wastewater system operating procedures. Odessa installed nine permanent basin flow meters as a part of the master planning process. See Appendix I – Flow Meter and Rain Gauge Location Map for the locations of the sub-basin flow meters and rain gauge locations. Odessa staff provided historical customer water demands from Odessa's AMI (advanced metering infrastructure) billing system. The AMI system provided hourly flow readings for each water meter connection in Odessa. Utilizing the data from the AMI system and the existing land use, discussed in the following section, water and wastewater usage magnitude and patterns for different land uses could be established. Odessa already had an existing hydraulic model of the wastewater system; this model was provided to Kimley-Horn as the starting point for analysis.

3.2 Existing Land Use

Kimley-Horn utilized land use information available from the Ector County Appraisal District as the starting point for the existing land use map. The Ector County Appraisal District maintains a database of parcels within Ector County, categorized by land use type. Kimley-Horn worked with Odessa staff to verify and ensure the accuracy of the existing land use data. The majority of the developed service area is single-family residential. The average residential lot is between 0.20 and 0.25 acres. Commercial developments sit along the major thoroughfares and intersections, especially along Interstate 20, Business Interstate 20, Andrews Highway, and Highway 191. The commercial developments are a mix of businesses providing services to local citizens and businesses supporting oil field operations. There are significant tracts of vacant land within the Odessa projected service area, especially on the northeast side of town, that are anticipated to be developed quickly. The existing land use was an important part of understanding the wastewater demand and distribution throughout Odessa. Refer to Appendix B – Existing Land Use Map for an illustration of the existing land use. Table 5 summarizes the existing connections to Odessa's system by land use type.

Table 5 – Existing Land Use Summary

Land Use Type	Acreage (ac)	% of Total
Single Family	5,606	38.9%
Manufactured Housing	105	0.7%
Manufactured Housing / Storage	79	0.5%
Medium Density Residential	3,970	27.5%
High Density Residential	171	1.2%
Commercial	1,081	7.5%
Industrial	562	3.9%
Public / Semi-Public	168	1.2%
University / Campus	423	2.9%
Airport	648	4.5%
Parks and Open Space	0	0.0%
Golf Course	0	0.0%
Total:	14,412	

3.3 Ultimate Land Use

Kimley-Horn worked with Odessa staff to develop the ultimate land use plan. Refer to Appendix C – Ultimate Land Use Map for the ultimate land use plan. The ultimate land use plan supplemented the existing land use plan. The majority of the vacant land in the projected service area is anticipated to develop as residential neighborhoods and it is anticipated that commercial developments will continue to line major thoroughfares. Oil and gas infrastructure is a notable feature of Odessa's projected service area. Furthermore, a notable feature of the existing land use configuration is the integration of oil infrastructure, residencies, and businesses. Therefore, the ultimate land use plan includes a moderate category for each land use type. This assumes that areas with some level of existing oil infrastructure will see development equating to roughly 50% of non-oil related development. For wastewater demand, this would equate to 50% of wastewater demand for a tract of the same size and development type with no oil infrastructure. There are some parcels of land with oil infrastructure so dense that they have been categorized as undevelopable. Table 6 summarizes the breakout of the anticipated land use in Odessa's ultimate projected service area.

Table 6 – Ultimate Land Use Summary

Land Use Type	Acreage (ac)	% of Total
Low Density Residential	39,409	32.4%
Residential - Moderate Oil Activity	20,564	16.9%
Medium Density Residential	1,356	1.1%
High Density Residential	1,065	0.9%
Mixed Use Residential	1,273	1.0%
Mixed Use Non-Residential	296	0.2%
Commercial	20,013	16.5%
Commercial - Moderate Oil Activity	5,752	4.7%
Industrial	5,934	4.9%
Industrial - Moderate Oil Activity	1,152	1.0%
Downtown	252	0.2%
Public/Semi Public	879	0.7%
University/Campus	491	0.4%
Airport	941	0.8%
Parks/Open Space	3,785	3.1%
Golf Course	797	0.7%
Undevelopable/High Oil Activity	1,565	1.3%
Right-of-Way	15,976	13.2%
Total:	121,500	

4. EXISTING INFRASTRUCTURE

Odessa owns and operates approximately 535 miles of gravity wastewater lines, ranging in size from 4-inch to 54-inch. The wastewater system follows the major drainage features, generally from northwest to southeast. Odessa discharges wastewater to the Bob Derrington Water Reclamation Plant located on the southeast side of the City. Odessa also discharges approximately 2.4 MGD to Gulf Coast Waste Disposal Authority (GCWD), located on the south side of the City. Flow to GCWD is diverted using a junction box and weir structure, named the Dixie Diversion Box, located approximately 1,000 feet south of the intersection of South Grant Avenue and Interstate 20. The City is comprised of ten existing wastewater basins, delineated by the location of permanent flow meters installed as a part of the master planning process.

Odessa operates five (5) submersible lift stations. All the submersible lift stations in the City serve localized businesses and neighborhoods except for the Hwy 80 lift station. The Hwy 80 lift station is located on the south side of the intersection of Faudree Road and I-20 Business / Hwy 80. The Hwy 80 lift station serves the Line P sewer basin on the east side of the City. There are additional private submersible lift stations that serve individual homes or businesses that discharge into Odessa's wastewater system.

See Appendix H – Existing Infrastructure for an illustration of the City's existing wastewater facilities. Figure 1 shows the schematic wastewater flow path to the Bob Derrington Water Reclamation Plant.

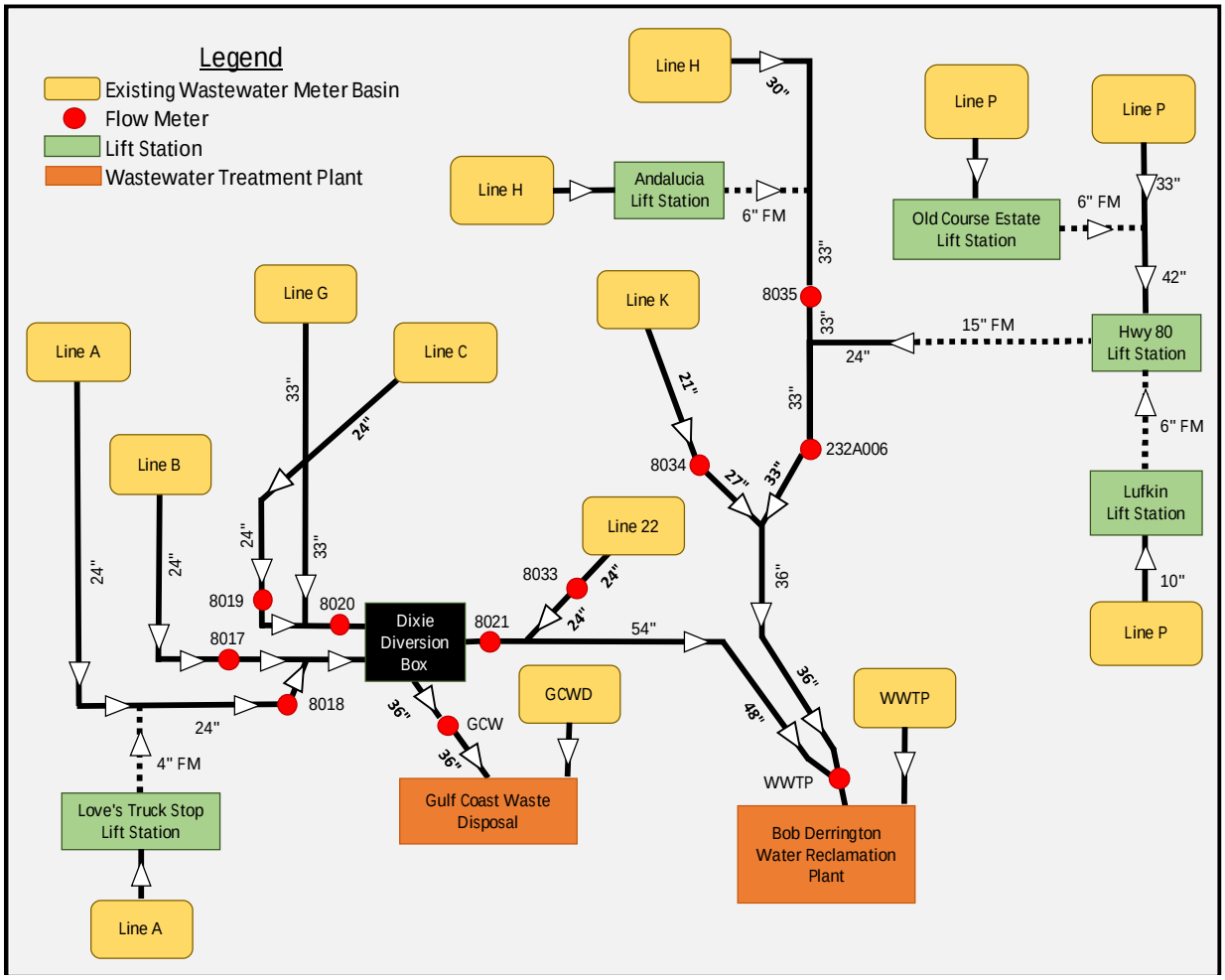


Figure 1: Schematic Wastewater System Diagram

4.1 Wastewater Treatment Plant Capacity

Odessa operates one wastewater treatment plant, the Bob Derrington Water Reclamation Plant. Table 7 summarizes the capacity of the Bob Derrington Water Reclamation Plant.

Table 7 – Wastewater Treatment Plant Capacity

Facility	Average Day Permitted Capacity (MGD)	Peak Flow Permitted Capacity (MGD)
Bob Derrington	12.7	35.1

Figure 2 below shows the influent average dry weather diurnal curve to the wastewater treatment plant.

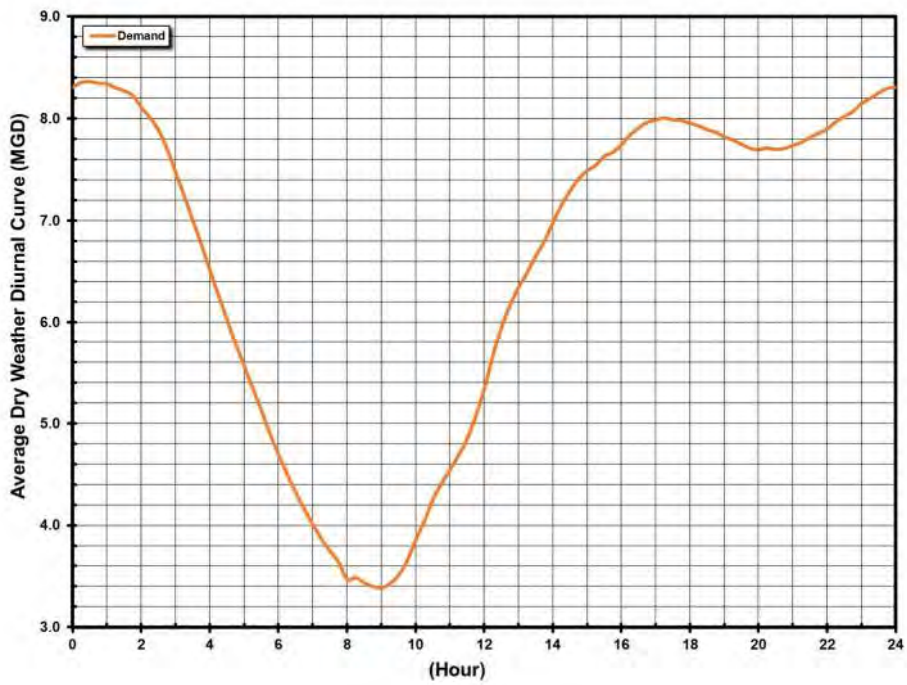


Figure 2 - Wastewater Treatment Plant Average Dry Weather Diurnal Curve

4.2 Gravity Lines

The City currently owns and maintains over 535 miles of wastewater lines that range from 4-inch to 54-inch. Table 8 presents a breakdown of the gravity wastewater lines in the system.

Table 8 – Gravity Wastewater Line Summary

Pipe Diameter (inch)	Linear Footage (LF)	Pipe Diameter (inch)	Linear Footage (LF)
4	6,500	24	108,700
6	1,756,600	27	28,100
8	441,300	30	7,600
10	119,500	33	25,200
12	138,800	36	25,800
15	63,800	42	2,300
18	37,400	48	15,600
20	3,000	54	18,800
21	28,400	Total	2,827,400

There are some sections of 4-inch pipe that still exist within the City. According to TCEQ criteria, the minimum pipe size allowed is 6-inches. The 4-inch sections of pipe should be replaced during the systematic replacement and rehabilitation of the system.

4.3 Lift Station Facilities

Odessa operates and maintains five (5) submersible lift station facilities utilizing force mains ranging in size from 4-inch to 15-inch to transport wastewater to the gravity portion of the system. See Appendix H – Existing Infrastructure and Figure 1 for an illustration of Odessa's existing wastewater facilities. Table 9 summarizes the information for each lift station.

Table 9 – Existing Lift Station Summary

Lift Station	Working Volume of Wet Well (gal)	Force Main Size (in)	Number of Pumps	Lift Station Firm Capacity (gpm)
Hwy 80	4,710	15	3	2,520
Lufkin	1,295	6	2	122
Old Course Estate	220	6	2	277
Andalucía	980	6	2	258
Love's Truck Stop	675	4	2	110

Kimley-Horn performed an inspection and pump performance testing at each lift station. The results of the inspection are available in Appendix G – Lift Station Evaluations. Table 10 summarizes the force mains in the system by diameter.

Table 10 – Force Main Summary

Pipe Diameter (in)	Linear Footage (LF)
4	985
6	11,300
15	10,660
Total	22,945

5. DESIGN CRITERIA

5.1 Texas Commission on Environmental Quality (TCEQ) Design Criteria

The Texas Commission on Environmental Quality (TCEQ) is charged with establishing statewide design criteria for wastewater collection systems. These design criteria are presented and enforced in the Texas Administrative Code under Title 30 – Environmental Quality, Part I, Chapter 217 – Design Criteria for Domestic Wastewater Systems as adopted in December 2015. The following sections contain pertinent excerpts from the TCEQ regulations:

Pipe Design

A collection system must be designed to transport the peak flow from the service area, plus infiltration and inflow. The design must minimize inflow and infiltration. Flow calculations must be included in the engineering report. The flow calculations must include the details of the average flow, the flow peaking factor, and the infiltration and inflow.

§217.53(a)

An owner must ensure that a collection system's capacity is sufficient to serve the estimated future population of the area served by the project, including institutional, industrial, and commercial flows. An owner must ensure that the collection system has capacity to prevent a surcharge. An owner must ensure that a gravity pipe is at least 6.0 inches in diameter.

§217.53(j)

Table 11 – TCEQ Minimum Pipe Slopes

Size of Pipe (in)	*Minimum Slope (%)*	*Maximum Slope (%)*
6	*0.50*	*12.35*
8	*0.33*	*8.40*
10	*0.25*	*6.23*
12	*0.20*	*4.88*
15	*0.15*	*3.62*
18	*0.11*	*2.83*
21	*0.09*	*2.30*
24	*0.08*	*1.93*
27	*0.06*	*1.65*
30	*0.055*	*1.43*
33	*0.05*	*1.26*
36	*0.045*	*1.12*
39	*0.04*	*1.01*
>39	*	*

**For lines larger than 39 inches in diameter, the slope shall be determined by Manning's formula (as shown below) to maintain a minimum velocity greater than 2.0 feet per second when flowing full and a maximum velocity less than 10 feet per second when flowing full.*

§217.53(l)

Lift Station – Wet Well Design

Table 12 – TCEQ Wet Well Requirements

Pump Horsepower (hp)	Minimum Cycle Times (min)
< 50	*6*
50 - 100	*10*
> 100	*15*

Minimum Wet Well Volume shall be based on the following formula:
*V = (T * Q) / (4 * 7.48)*

V = Working Volume (ft^3)
Q = Pump Capacity (GPM)
T = Cycle Time (Minutes)
7.48 = conversion factor in gallons / cubic foot

§217.61 (b)

Lift Station – Pump Design

A lift station must have at least two pumps. The firm pumping capacity of a lift station must handle the peak flow.

§217.61 (c)

Lift Station Force Main Design

A force main must be a minimum of 4.0 inches in diameter, unless it is used in conjunction with a grinder pump station. For a lift station with two pumps, the minimum velocity is 3.0 feet per second with one pump in operation. For a lift station with three or more pumps the minimum velocity in a force main is 2.0 feet per second with only the smallest pump operating at full speed and a minimum flushing velocity of 5.0 feet per second or greater must occur in a force main at least twice daily. The engineering report must certify that a pipeline with

a velocity greater than 6.0 feet per second can withstand high and low negative surge pressures in the event of sudden pump failure.

§217.67 (a)

6. METHODOLOGY

6.1 Wastewater System Modeling Methodology

Odessa provided Kimley-Horn with a SewerCAD® model of the existing wastewater system as the starting point for analysis. Odessa staff provided wastewater system data to be used to verify the existing wastewater model and to add portions of the wastewater system not already in the model.

Pipe data was obtained from GIS and consisted of pipe length, location, diameter, and material. Manhole data consisted of rim elevation, manhole invert, and diameter. The SewerCAD® ModelBuilder tool was utilized to build the wastewater model for portions of the City not already in the model. The physical connectivity of the model was validated to ensure accuracy of connection between pipes and manholes. Manhole rim elevations were assigned to each node using topographic LIDAR of the City using the SewerCAD® TRex tool. Lift station dimensions and operating parameters were obtained from field measurements and pump performance tests performed by Kimley-Horn. The customer specific wastewater discharges were distributed throughout the City using the SewerCAD® LoadBuilder tool, allocating the customer discharges to the nearest node in the model. A diurnal wastewater curve representative of each land use type was applied to the discharges to represent the wastewater discharge throughout a 24-hour period. Resulting hydraulic grade, pipe velocity, wet well variations, and pump operations were analyzed in each development scenario to ensure the system was meeting the established criteria.

6.2 Flow Monitoring

Flow monitoring is a vital component of any wastewater masterplan. Flow monitoring is important for understanding the average dry flows in a system and understanding the system's response to wet weather events. The objective of flow monitoring is to measure extended periods of flow without rainfall for dry weather calibration and to capture several different rainfall events of varying intensity and duration for wet weather calibration. The flow monitoring results are utilized to calibrate the dry weather and wet weather models.

Odessa had one existing flow meter in the system prior to the master planning process, at the entrance to the Bob Derrington Water Reclamation Plant. Additionally, the GCWD maintains their own private meter on the 36-inch line to the GCWD wastewater treatment facility. As a part of the master planning process, the City installed eight (8) additional permanent flow meters. The flow meters are located on the outfalls of Odessa's major sub-basins. The flow meters record data in 15-minutes increments. Data from May 1, 2017 to March 27, 2018 was utilized for dry weather and wet weather model calibration.

Eight rain gauges were utilized for understanding the rainfall distribution across the City during rainfall events. The rain gauges recorded data in 15-minute intervals. See Appendix I – Flow Meter and Rain Gauge Location Map for the locations of the flow meters and rainfall gauges.

6.3 Rainfall Events

Numerous rainfall events were observed during the monitoring period, however only five significant rainfall events were selected for wet weather calibration. Table 13 summarizes the observed rainfall events utilized for calibration. The Atlas of Depth-Duration Frequency of Precipitation Annual Maxima for Texas published by the United States Geological Survey was utilized to determine the storm events.

Table 13 – Rainfall Summary

Date	Duration (hr)	Total Depth (in)	Storm Event
June 26, 2017	3.75	0.96	< 2-Year, 3-Hour
August 1, 2017	11.00	3.22	10-Year, 12-Hour
August 25, 2017	2.50	0.85	< 2-Year, 3-Hour
September 24,	3.75	1.68	2-Year, 3-Hour
September 26,	4.00	0.87	< 2-Year, 3-Hour

6.4 Dry Weather and Wet Weather Flows

Table 14 summarizes the daily dry weather flow, the daily max dry weather flow, and the peak wet weather flow for each rainfall event. The largest rainfall event recorded and consequent wastewater demand on the system was on August 1, 2017. The average dry weather flow to peak wet weather flow peaking factor was more than 4.0 for multiple storm events and multiple meters. Peaking factors more than 4.0 are indicative of excessive amounts of storm water inflow into the system.

Table 14 – Dry Weather and Wet Weather Summary

Meter	Basin	Date	Average Dry Flow (MGD)	Average Max Dry Flow (MGD)	Average Dry Weather Daily Peaking Factor	Peak Wet Weather Flow (MGD)	Wet Weather Peaking Factor
232A006	Line P	6/26/17	1.81	2.16	1.19	7.30	4.03
		8/1/17	1.81	2.16	1.19	12.96	7.16
		8/25/17	1.81	2.16	1.19	3.80	2.10
		8/24/27	1.81	2.16	1.19	5.42	2.99
		8/26/17	1.81	2.16	1.19	8.23	4.55
8017	Line B	6/26/17	2.12	2.47	1.17	3.19	1.50
		8/1/17	2.12	2.47	1.17	10.86	5.12
		8/25/17	2.12	2.47	1.17	2.93	1.38
		8/24/27	2.12	2.47	1.17	2.67	1.26
		8/26/17	2.12	2.47	1.17	2.36	1.11
8018	Line A	6/26/17	0.25	0.30	1.20	1.68	6.72
		8/1/17	0.25	0.30	1.20	1.55	6.20
		8/25/17	0.25	0.30	1.20	0.39	1.56
		8/24/27	0.25	0.30	1.20	0.40	1.60
		8/26/17	0.25	0.30	1.20	0.55	2.20
8019	Line C	6/26/17	1.68	2.11	1.26	2.19	1.30
		8/1/17	1.68	2.11	1.26	4.29	2.55
		8/25/17	1.68	2.11	1.26	4.08	2.43
		8/24/27	1.68	2.11	1.26	4.14	2.46
		8/26/17	1.68	2.11	1.26	2.90	1.73

Table 14 (continued) – Dry Weather and Wet Weather Summary

Meter	Basin	Date	Average Dry Flow (MGD)	Average Max Dry Flow (MGD)	Average Dry Weather Daily Peaking Factor	Peak Wet Weather Flow (MGD)	Wet Weather Peaking Factor
8020	Line G	6/26/17	3.36	3.98	1.18	6.26	1.86
		8/1/17	3.36	3.98	1.18	11.30	3.36
		8/25/17	3.36	3.98	1.18	8.67	2.58
		8/24/27	3.36	3.98	1.18	9.41	2.80
		8/26/17	3.36	3.98	1.18	6.86	2.04
8021	Dixie Box	6/26/17	1.80	2.69	1.49	3.32	1.84
		8/1/17	1.80	2.69	1.49	9.12	5.07
		8/25/17	1.80	2.69	1.49	6.71	3.73
		8/24/27	1.80	2.69	1.49	6.55	3.64
		8/26/17	1.80	2.69	1.49	5.27	2.93
8033	Line 22	6/26/17	0.14	0.17	1.21	0.94	6.71
		8/1/17	0.14	0.17	1.21	1.02	7.29
		8/25/17	0.14	0.17	1.21	0.23	1.64
		8/24/27	0.14	0.17	1.21	0.85	6.07
		8/26/17	0.14	0.17	1.21	0.46	3.29
8034	Line K	6/26/17	2.60	3.16	1.22	3.55	1.37
		8/1/17	2.60	3.16	1.22	5.56	2.14
		8/25/17	2.60	3.16	1.22	4.52	1.74
		8/24/27	2.60	3.16	1.22	4.86	1.87
		8/26/17	2.60	3.16	1.22	4.03	1.55
8035	Line H	6/26/17	0.43	0.49	1.14	1.29	3.00
		8/1/17	0.43	0.49	1.14	6.84	15.91
		8/25/17	0.43	0.49	1.14	0.56	1.30
		8/24/27	0.43	0.49	1.14	2.60	6.05
		8/26/17	0.43	0.49	1.14	1.14	2.65
WWTP	WWTP	6/26/17	6.56	8.36	1.27	10.87	1.66
		8/1/17	6.56	8.36	1.27	23.37	3.56
		8/25/17	6.56	8.36	1.27	14.77	2.25
		8/24/27	6.56	8.36	1.27	15.19	2.32
		8/26/17	6.56	8.36	1.27	14.40	2.20

6.5 Dry Weather Calibration

Flow data from May 1, 2017 to March 27, 2018 was utilized for dry weather model calibration. Flow data from the day of and three days following measurable rainfall were discarded from being included in the dry weather analysis. Additionally, flow data more than two standard deviations above the normal dry weather flow for the same time of day on a weekday or a weekend was also excluded. A dry

weather diurnal curve and dry loading factor, representative of each land use type, was input into the model for each wastewater connection. The dry weather diurnal curves were then factored until the flow in the model approximately matched the measured flow. Table 15 summarizes the dry weather calibration for each sub-basin meter.

Table 15 – Dry Weather Calibration

Meter	Basin	Measured Average Dry Flow (MGD)	Modeled Average Dry Flow (MGD)	Percent Difference
232A006	Line P	1.81	1.83	1.1%
8017	Line B	2.12	2.14	0.9%
8018	Line A	0.25	0.25	0.0%
8019	Line C	1.68	1.68	0.0%
8020	Line G	3.36	3.23	4.0%
8021	Dixie Box	1.80	1.82	1.1%
8033	Line 22	0.14	0.14	0.0%
8034	Line K	2.60	2.60	0.0%
8035	Line H	0.43	0.43	0.0%
WWTP	WWTP	6.56	6.58	0.3%

6.6 Wet Weather Calibration

The RTK hydrograph method was used to model the additional wastewater flows that entered the wastewater system during rainfall events. The RTK hydrograph method applies flow in addition to the average dry wastewater flow to reflect the inflow and infiltration entering the system during the rainfall event. The RTK method is comprised of three different parameters (R, T, K) that are iteratively modified to calibrate the model. R represents the quantity of the water entering the system, T represents the time to peak of the hydrograph, and K represents the ratio of the rising leg of the hydrograph to the receding leg of the hydrograph.

Typically, three unique RTK hydrographs are utilized to model the rainfall event. The first set of R, T, K factors represent rapid inflow of storm water into the system. This is typically from direct storm connections, such as drain or gutter pipes, to the wastewater system. The second set of R, T, K factors represent a combination of inflow and infiltration into the system. The third set of R, T, K factors represent infiltration into the system. Infiltration into a wastewater system can last from several hours to several days as groundwater recedes. See below for additional discussion on inflow and infiltration. Each wastewater basin has unique characteristics that effect inflow and infiltration such as the number of pipes, pipe diameters, pipe age, pipe material, groundwater table, soil type, etc., and consequently each basin will have unique sets of R, T, K factors.

The model was calibrated using the rainfall events summarized in Table 13. Table 16 summarizes the wet weather calibration for each sub-basin meter for the August 1, 2017 rainfall event. The August 1, 2017 rainfall event is important because it is greater than the design storm of 2-year, 24-hour. Using a calibration event greater than the design event is important because the predicted result from the model will be an interpolation of known data points rather than an extrapolation. The model predicted similar results for the rainfall events summarized in Table 13.

Table 16 – Wet Weather Calibration

Meter	Basin	Measured Peak Flow (MGD)	Modeled Peak Flow (MGD)	Percent Difference
232A006	Line P	12.96	13.27	2.4%
8017[1]	Line B	-	-	-
8018	Line A	1.55	1.93	24.5%
8019	Line C	4.29	4.20	2.1%
8020	Line G	11.30	11.94	5.7%
8021	Dixie Box	9.12	9.63	5.6%
8033	Line 22	1.02	1.02	0.0%
8034	Line K	7.02	6.48	8.3%
8035	Line H	6.84	6.62	3.3%
WWTP	WWTP	31.36	26.69	17.5%

[1] Meter 8017 was in an error state and not functioning.

6.7 I/I Discussion

I&I is non-wastewater discharges entering the wastewater system. The most common contributors of I&I are storm water runoff and groundwater. Infiltration is defined as the water entering the collection system and private service lines from the ground, through defective pipe joints, broken pipes, cracks in manhole walls, and bad pipe-to-pipe and pipe-to-manhole connections. Inflow is defined as the water entering the collection system and service lines from direct surface connections such as roof drains, yard drains, holes in manhole covers, etc. I&I flows are almost always responsible for the peak flow rates experienced in wastewater systems. Odessa has peaking factors in excess of 4.0. Peaking factors in excess of 4.0 are indicative of significant I&I inflows into the system.

Sources of I&I are difficult to locate and furthermore are costly to fix, however, there are several advantages of reducing I/I. Reducing I/I has the following advantages:

- Increases available system capacity by decreasing the amount of extraneous flow transported by the collection system.
- Decreases operation and maintenance costs at the wastewater treatment plant.
- Decreases the frequency of lift station pumping, saving on electricity costs and wear and tear on the pumps.
- Revenues remain constant. Therefore, reducing I/I has no effect on revenue generation, it only lowers operational costs.
- Reduces potential for future illegal overflows (overflows are costly to clean up and the TCEQ could levy fines).

Table 17 summarizes the inflow and infiltration for each sub-basin for the August 1, 2017 storm event.

Table 17 – Inflow and Infiltration Summary for August 1, 2017

Meter	Basin	Average Dry Volume (MG)	Measured Volume (MG)	Inflow & Infiltration (MG)	Length of Collection System (LF)	Inflow & Infiltration (GAL/LF)
232A006	Line P	2.75	6.35	3.60	370,400	10
8017[1]	Line B	-	-	-	-	-
8018	Line A	0.49	0.88	0.39	81,500	5
8019 & 8020[2]	Line G	7.06	10.61	3.55	934,956	16
8021[3]	Dixie Box	-	-	-	-	-
8033	Line 22	0.24	0.56	0.32	57,700	6
8034	Line 22	5.21	6.79	1.58	480,700	3
8035	Line K	0.87	2.26	1.39	280,500	5
WWTP	Line H	0.23	1.81	1.58	81,700	19

[1] Meter 8017 was in an error state and not functioning.
[2] Meter 8019 is upstream of Meter 8020. There is one interconnection between Meter 8019 and Meter 8020 wastewater systems. For I&I analysis, calculations have been performed using flow data from Meter 8020 and wastewater infrastructure from Meter 8019 and Meter 8020.
[3] Meter 8021 does not have a unique drainage basin for performing I&I calculations.

6.8 Design Storm

A wet weather event is almost always the greatest flow that the wastewater system will experience. Following calibration of the existing wastewater model, a design storm must be selected to evaluate the existing system for deficiencies and to evaluate future expansions of the system. The selected design storm must provide a reasonable test of the wastewater system to ensure that it can convey wastewater downstream without creating sanitary sewer overflows but also not be unduly conservative. Selecting an unreasonably large design storm can lead to excessively sized infrastructure.

A design storm is defined in terms of the theoretical probability of occurrence on a yearly basis (a 2-year storm will theoretically occur once every two years) and the duration of the storm event. The duration is defined from as little as 30 minutes to 7 days. The United States Geological Survey has published precipitation data for Texas in a publication titled "Atlas of Depth-Duration Frequency of Precipitation Annual Maxima for Texas." This document lists the depth of rainfall during a given duration storm event. Kimley-Horn worked with Odessa staff to select the 2-year, 24-hour storm event as the design storm. The Atlas of Depth-Duration Frequency of Precipitation Annual Maxima for Texas lists the 2-year, 24-hour storm event as 2.18 inches for Odessa.

7. WASTEWATER DEMAND PROJECTIONS

Kimley-Horn worked with Odessa staff to divide Odessa into separate growth areas by percentage through the 25-year planning period. The growth rates are anticipated to be applicable through the entire 25-year planning period. See Appendix D – 25-Year Projected Growth Map for an illustration of the growth areas. Due to the availability of land with relatively few gas or oil drilling pads, Odessa staff anticipate the majority of growth in the 25-year planning period to occur on the north and northeast side of the City. The modern west Texas area has always been tied to the growth or the decline of the oil market. As the oil market rebounds, appetite for growth in west Texas and Odessa swell. Projecting wastewater demand growth in Odessa is equivalent to projecting the oil markets. Therefore, Kimley-

Horn recommends periodically revisiting the growth projections and the wastewater demands in the system to verify that they are comparable to the projected demands, discussed further below. Growth or wastewater demands varying significantly could change the order of recommended capital improvement projects.

Wastewater demand projections can be made using population, number of meter connections, or land use as the basis for projection. Wastewater demands are projected into the future by determining the historical wastewater usage per capita, per connection, or per acre of a land use type and then tying the growth of the wastewater demand projections to the growth of one of these categories. For this report, the land use method was selected as the ideal way to project future wastewater demands.

7.1 Land Use Demand

Land use projections were used to project future wastewater demands. The AMI water billing system provided hourly flow readings for each day in 2016 for each connection in Odessa. Each connection was correlated with its corresponding land use type. With the known land use type and acreage of the corresponding parcel, an average water demand loading factor could be calculated for each parcel by land use type. The average day water consumption calculated within each of the existing sewer basins was compared to the flow measured by the permanent flow meters for the same sewer basin to determine a ratio of water consumption to wastewater demand. An average day wastewater demand factor was created for each land use type by multiplying the water demand loading factors by this calculated ratio. The resulting wastewater demand factors for each sewer basin were used to apply loading to the existing sewer model.

The calculated wastewater loading factors created for each land use type were used to determine wastewater loading factors to apply to undeveloped parcels. Table 18 lists the average day wastewater demand loading factors for each land use type. Moderate loading factors have been established for land that has some level of existing oil infrastructure.

Table 18 – Average Day Wastewater Loading Factors

Land Use Type	Average Day Demand Loading Factors Gal / Acre/ Day
Low Density Residential	980
Residential - Moderate Oil Activity	490
Medium Density Residential	1200
High Density Residential	1250
Mixed Use Residential	1040
Mixed Use Non-Residential	760
Commercial	320
Commercial - Moderate Oil Activity	160
Industrial	110
Industrial - Moderate Oil Activity	55
Downtown	1960
Public/Semi Public	270
University/Campus	230
Airport	70
Parks/Open Space	30
Golf Course	250
Undevelopable/High Oil Activity	0
Right-of-Way	0

7.2 Projected Wastewater Demand

Table 19 summarizes the projected average dry weather demand and Table 20 summarizes the projected peak wet weather demand by sewer basin for the next 25 years. The peak wet weather demands have been calculated using a peaking factor of 4.0 from average dry weather demands. Due to the potential for tremendous growth based on the oil market, Kimley-Horn recommends updating these wastewater demand projections annually, verifying no significant changes.

Table 19 – Average Dry Weather Demand

Wastewater Basin	2018 (MGD)	2023 (MGD)	2028 (MGD)	2043 (MGD)
Line A	0.26	0.37	0.73	0.84
Line B	2.13	2.15	2.17	2.17
Line C	2.95	2.98	3.01	2.85
Line G	0.58	0.59	0.60	0.60
Line H	0.83	0.99	2.61	3.37
Line K	2.72	2.74	2.76	2.76
Line P	1.04	1.26	2.46	2.90
Southwest	0.00	0.00	0.28	0.38
Line 22	0.14	0.14	0.14	0.14

Table 20 – Peak Wet Weather Demand

Wastewater Basin	2018 (MGD)	2023 (MGD)	2028 (MGD)	2043 (MGD)
Line A	1.04	1.48	2.92	3.36
Line B	8.52	8.60	8.68	8.68
Line C	11.80	11.92	12.04	11.40
Line G	2.32	2.36	2.40	2.40
Line H	3.32	3.96	10.44	13.48
Line K	10.88	10.96	11.04	11.04
Line P	4.16	5.04	9.84	11.60
Southwest	0.00	0.00	1.12	1.52
Line 22	0.56	0.56	0.56	0.56

8. EXISTING INFRASTRUCTURE ANALYSIS

8.1 Wastewater Treatment Plant Capacity

The Bob Derrington Water Reclamation Plant is anticipated to be adequate to serve Odessa almost through the entire 25-year planning period. The peak wet weather flow is anticipated to exceed the permitted 2-hour peak flow of 35.1 MGD in year 2043. An upgrade to the wastewater treatment plant is recommended in year 2041. Figure 3 and Figure 4 summarize the projected wastewater flows and improvements to the wastewater treatment plant through year 2043.

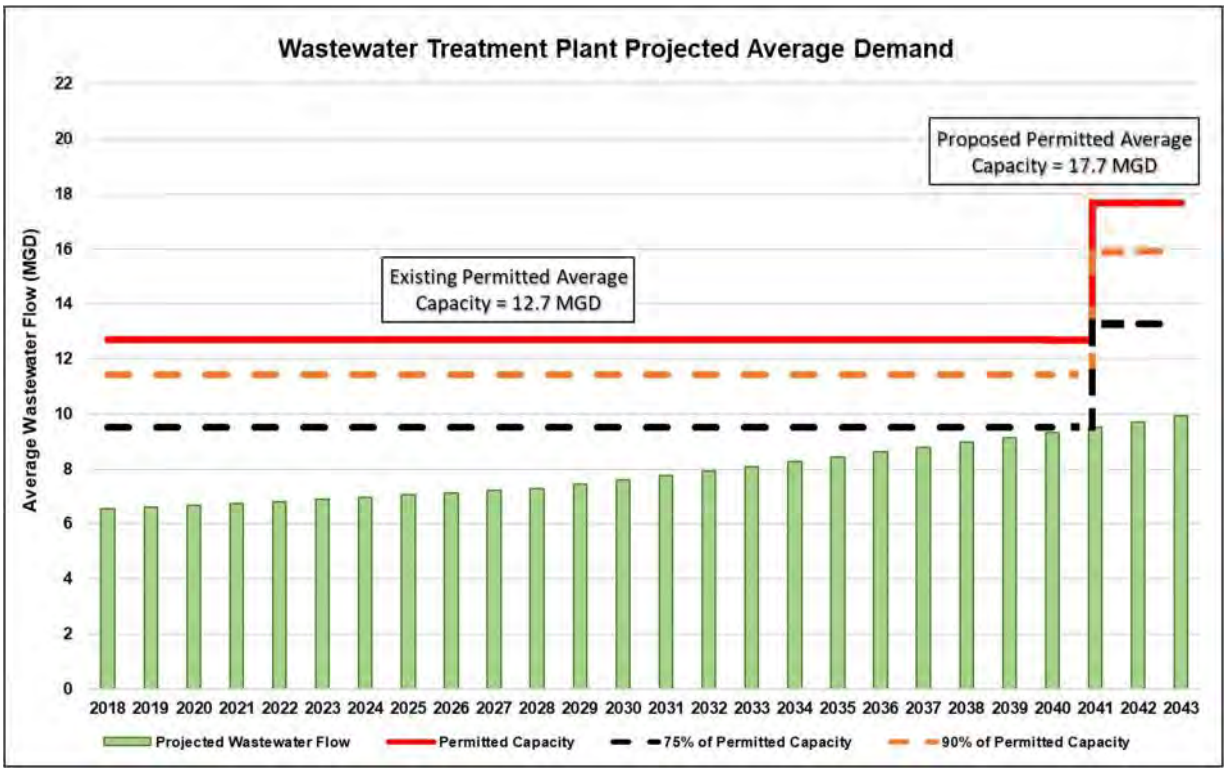


Figure 3 – Wastewater Treatment Plant Projected Average Demand

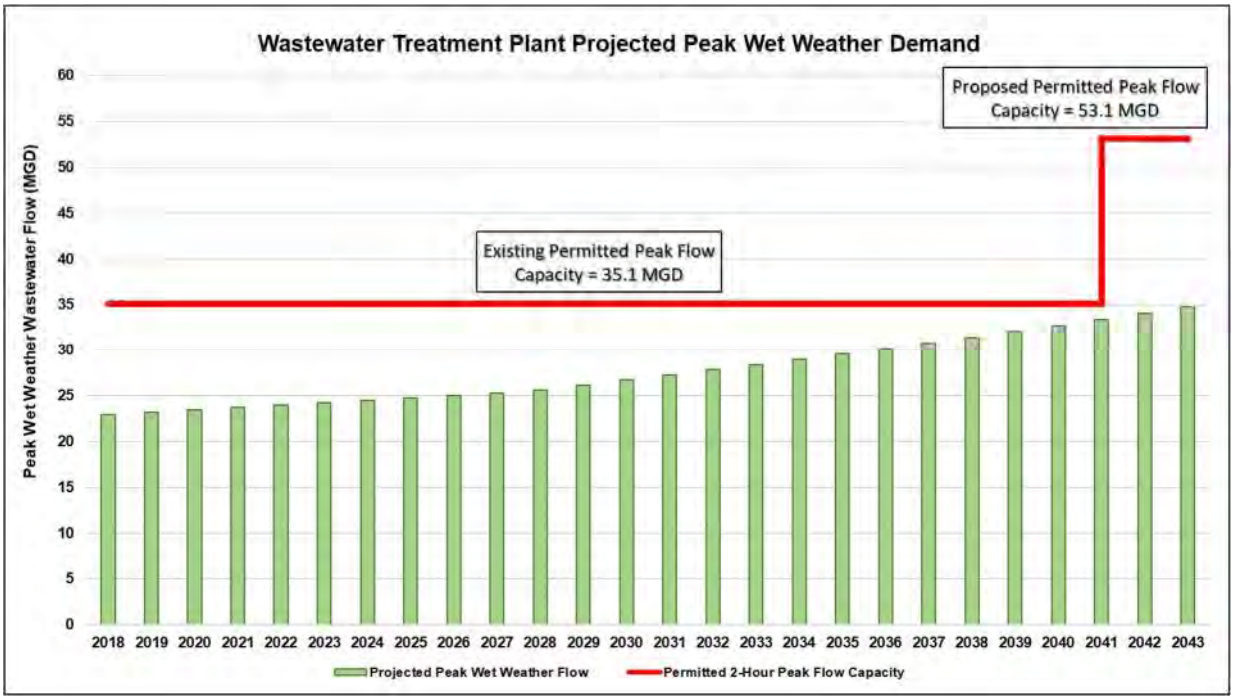


Figure 4 - Wastewater Treatment Plant Projected Peak Wet Weather Demand

8.2 Lift Station Facilities

Of the five existing submersible lift station facilities that Odessa operates, three are anticipated to be abandoned within the 10-year planning period. Table 21 summarizes the projected status of each lift station within the 25-year planning period.

Table 21 – Existing Lift Station Projected Status

Lift Station	Projected Lift Station Status
Hwy 80	Abandon in 5-year planning period
Lufkin	Abandon in 5-year planning period
Old Course Estate	Remain in service through 25-year planning period
Andalucía	Remain in service through 25-year planning period
Love's Truck Stop	Abandon in 10-year planning period

Kimley-Horn performed an inspection and pump performance testing at each lift station. The results of the inspection are available in Appendix G – Lift Station Evaluations. Table 22 summarizes the analysis of and the recommended improvements for each lift station.

Table 22 – Existing Lift Station Analysis Summary and Recommendations

Lift Station	Analysis Summary	Recommendations
Hwy 80	1. Current and voltage imbalance between phases. 2. Severe corrosion of concrete wet well. 3. Air trapped in force main.	1. Repair and recoat concrete wet well coating. 2. Install air vacuum release valves. 3. No other improvements, lift station to be abandoned in 5-year period.
Lufkin	1. Significant oil in wet well and being pumped by pumps. 2. Low wire to water efficiency. 3. Air trapped in force main.	1. Evaluate and prevent source of oil. 2. No other improvements, lift station to be abandoned in 5-year period.
Old Course Estate	1. Lift station in new like condition.	1. No improvements recommended.
Andalucía	1. Pumps are operating inefficiently.	1. Request additional analysis by pump manufacturer.
Love's Truck Stop	1. Pumps are operating inefficiently.	1. Request additional analysis by pump manufacturer.

Each force main was analyzed according to the TCEQ criteria limiting the velocity in the force main to 6 feet per second. Above 6 feet per second, it must be certified that the pipeline can withstand high and low surge pressures in the event of sudden pump failure. The force main was analyzed using the greatest pumping rate that could be expected through the force main. Table 23 summarizes the results of the force main analysis.

Table 23 – Force Main Analysis

Lift Station	Force Main Size (in)	Existing Firm Pump Capacity (gpm)	25-Year Firm Pump Capacity (gpm)	Existing & 25-Year Force Main Velocity (fps)
Hwy 80	15	2,520	To be Abandoned	4.58
Lufkin	6	122	To be Abandoned	1.39
Old Course	6	277	277	3.15
Andalucía	6	258	258	2.93
Love's Truck Stop	4	110	To be Abandoned	2.81

All of the force mains are sized to operate within the given design criteria.

The wet wells at each lift station were analyzed according to the TCEQ criteria. Table 24 summarizes the wet well calculations. Required wet well sizes were calculated based on the horsepower of the existing pumps. It should be noted that wet well volumes shown are the wet well working volume and not the volume of the entire wet well.

Table 24 – Wet Well Analysis

Lift Station	Pump Horsepower Range (hp)	Existing Working Volume of Wet Well (gal)	Existing Required Wet Well Working Volume (gal)	25-Year Required Wet Well Working Volume (gal)
Hwy 80	< 50	4,710	505	To be Abandoned
Lufkin	< 50	1,295	24	To be Abandoned
Old Course	< 50	220	56	56
Andalucía	< 50	980	52	52
Love's Truck Stop	< 50	675	22	To be Abandoned

All of the wet wells meet the given design criteria.

The pumps at each lift station were also analyzed according to the TCEQ criteria, stipulating that each station should have sufficient firm pumping capacity to pump the peak event. Table 25 summarizes the pump capacity calculations.

Table 25 – Pumping Analysis

Lift Station	Existing Firm Pump Capacity (gpm)	Existing Required Firm Pump Capacity (gpm)	25-Year Required Firm Pump Capacity (gpm)
Hwy 80	2,520	2,575	To be Abandoned
Lufkin	122	650	To be Abandoned
Old Course	277	58	63
Andalucía	258	38	38
Love's Truck Stop	110	22	To be Abandoned

The Hwy 80 and Lufkin lift stations do not have sufficient capacity to convey the 2-year, 24-hour storm event. Both lift stations are anticipated to be abandoned within the 5-year planning period with the implementation of the Line P interceptor. Consequently, no improvements are recommended at this time. It is recommended that both lift stations be monitored during wet weather events.

8.3 Gravity Lines

The hydraulic wastewater model was utilized to analyze the existing wastewater system during the 2-year, 24-hour design storm. Several lines, specifically in basins Line C and Line P were found to be surcharging the manholes. These selected gravity lines would continue to surcharge more as the growth in the City continued without improvements. Projects have been proposed in the Capital Improvement Plan to alleviate these hydraulic deficiencies.

9. FUTURE INFRASTRUCTURE ANALYSIS

Future infrastructure was sized to serve the expansion of the City and alleviate existing deficiencies in the wastewater system for the ultimate buildout of the 25-year study area. The intent of the study was to size infrastructure to serve the City at least through the 25-year planning period. Because it is unlikely that infrastructure sized for the 25-year planning period would be easily replaced in the future with infrastructure sized for build-out, Kimley-Horn sized the proposed infrastructure for the ultimate buildout of the basin.

Table 26 summarizes the proposed interceptor linear footage by diameter.

Table 26 - Proposed Interceptor Summary

Diameter (inch)	5-Year	10-Year	25-Year	Beyond 25-Year
8	25,000	13,300	0	0
12	31,400	42,600	234,600	0
15	29,900	18,200	105,500	0
18	17,000	7,500	28,800	0
21	15,800	0	17,100	0
24	8,900	13,300	30,800	0
27	10,600	0	17,900	0
30	0	0	3,600	0
36	13,700	0	2,900	10,900
42	3,400	0	12,400	17,300
48	17,800	0	0	6,900
54	10,500	0	0	0
Total	184,000	94,900	453,600	35,100

Table 27 summarizes the proposed lift stations.

Table 27 - Proposed Buildout Lift Station Summary

Lift Station	Basin	Force Main Size (in)	Number of Pumps	Station Firm Pump Capacity (gpm)	Wetwell Size
Southeast	Line P	18	3	3,500	12' Diameter
Northeast	Line P	15	3	3,500	12' Diameter
Line 12	Line H	12	3	12,600	12' x 12'
Southwest	Southwest	24	4	8,400	12' x 12'

10. CAPITAL IMPROVEMENTS PLAN

From the Master Planning process, a recommended list of Capital improvements has been developed. The Capital Improvements Plan was divided into five sections: 5-Year, 10-Year, 25-Year, Beyond 25-Year Planning Period, and Developer Projects. Projects in the 25-Year planning period and beyond 25-Year planning period may need to be accelerated or deferred depending on the growth rate experienced and appetite for development in certain areas of the City. Developer Projects are projects anticipated to be built and funded by local developers. All improvements are shown in Appendix J – Capital Improvement Plan. Individual project summary sheets and costs have been included in Appendix F – Project Description Sheets and Opinions of Probable Construction Costs. The Capital Improvements Plan has been summarized below. The following opinion of probable costs for each capital project assumes no design completed, based on 2018 dollars, no inflation increases, and does not include any property acquisitions, unless specifically noted.

10.1 5-Year Capital Improvements Plan Projects

Table 28 – 5-Year Capital Improvements Plan Summary

Project No.	Project Name	Project Cost	Market Scarcity Adjustment (1.5x)
1	LINE P INTERCEPTOR SEGMENT I	$ 20,023,000.00	$ 30,034,500.00
2	LINE Q INTERCEPTOR SEGMENT I	$ 11,746,000.00	$ 17,619,000.00
3	LINE Q INTERCEPTOR SEGMENT II	$ 1,879,000.00	$ 2,818,500.00
4	MISSION BLVD 8-INCH TRUNK MAIN	$ 306,000.00	$ 459,000.00
5	FAUDREE RD 18-INCH TRUNK MAIN	$ 1,087,000.00	$ 1,630,500.00
6	FAUDREE RD 15-INCH NORTH TRUNK MAIN	$ 1,220,000.00	$ 1,830,000.00
7	LINE H INTERCEPTOR SEGMENT I	$ 5,523,000.00	$ 8,284,500.00
8	I-20 BUSINESS 15-INCH TRUNK MAIN EXTENSION	$ 3,633,000.00	$ 5,449,500.00
	5-Year Projects Sub-Total:	$ 45,417,000.00	$ 68,125,500.00

#1 – LINE P INTERCEPTOR SEGMENT I

PROJECT COST:	$20,023,000
NOTES:	This project consists of approximately 10,500 LF of 54", 17,900 LF of 48", and 3,500 LF of 42" sewer line from the wastewater treatment plant to the intersection of Faudree Rd and W Highway 80 E.

#2 – LINE Q INTERCEPTOR SEGMENT I

PROJECT COST:	$11,746,000
NOTES:	This project consists of approximately 13,300 LF of 36", 10,700 LF of 27", and 7,100 LF of 21" sewer line from I-20 to HWY 191.

#3 – LINE Q INTERCEPTOR SEGMENT II

PROJECT COST:	$1,879,000
NOTES:	This project consists of approximately 8,500 LF of 18" sewer line just north of HWY 191 along Willow Ln.

#4 – MISSION BLVD 8-INCH TRUNK MAIN

PROJECT COST:	$306,000
NOTES:	This project consists of approximately 400 LF of 8" sewer line across HWY 191.

#5 – FAUDREE RD 18-INCH TRUNK MAIN

PROJECT COST:	$1,087,000
NOTES:	This project consists of approximately 4,500 LF of 18" sewer line along Faudree Rd from P Bar Ranch Rd to the intersection of Faudree Rd and Windchase St.

#6 – FAUDREE RD 15-INCH NORTH TRUNK MAIN

PROJECT COST:	$1,220,000
NOTES:	This project consists of approximately 5,600 LF of 15" sewer line along Faudree Rd from P Bar Ranch Rd to just north of the intersection of Yukon Rd and Faudree Rd.

#7 – LINE H INTERCEPTOR SEGMENT I

PROJECT COST:	$5,523,000
NOTES:	This project consists of approximately 8,900 LF of 24", 8,400 LF of 21", and 4,200 LF of 18" sewer line along Loop 338 from just south of 52nd St to 87th St.

#8 – I-20 BUSINESS 15-INCH TRUNK MAIN EXTENSION

PROJECT COST:	$3,633,000
NOTES:	This project consists of approximately 17,300 of 15" sewer line along W Murphy St.

10.2 10-Year Capital Improvements Plan Projects

Table 29 – 10-Year Capital Improvements Plan Summary

Project No.	Project Name	Project Cost	Market Scarcity Adjustment (1.5x)
9	LINE P BASIN SOUTHEAST LIFT STATION, FORCE MAIN, AND RELIEF TRUNK MAIN	$ 5,919,000.00	$ 8,878,500.00
10	FAUDREE RD 15-INCH NORTH TRUNK MAIN EXTENSION	$ 1,118,000.00	$ 1,677,000.00
11	RATLIFF RANCH NORTHEAST 12-INCH TRUNK MAIN	$ 2,359,000.00	$ 3,538,500.00
12	RATLIFF RANCH NORTH 12-INCH TRUNK MAIN	$ 1,092,000.00	$ 1,638,000.00
13	FM 554 NORTHEAST 15-INCH TRUNK MAIN	$ 1,155,000.00	$ 1,732,500.00
14	FM 554 NORTH 15, 12-INCH TRUNK MAIN	$ 1,226,000.00	$ 1,839,000.00
15	WEST I-20 24-INCH TRUNK MAIN	$ 3,722,000.00	$ 5,583,000.00
	10-Year Projects Sub-Total:	$ 16,591,000.00	$ 24,886,500.00

#9– LINE P BASIN SOUTHEAST LIFT STATION, FORCE MAIN, AND RELIEF TRUNK MAIN

PROJECT COST: $5,919,000
NOTES: This project consists of approximately 7,600 LF of 18" sewer line, 10,300 LF of 12" force main, and a 2.5 MGD lift station.

#10 – FAUDREE RD 15-INCH NORTH TRUNK MAIN EXTENSION

PROJECT COST: $1,118,000
NOTES: This project consists of approximately 5,400 LF of 15" sewer line north of E Yukon Rd.

#11 – RATLIFF RANCH NORTHEAST 12-INCH TRUNK MAIN

PROJECT COST: $2,359,000
NOTES: This project consists of approximately 12,300 LF of 12" sewer line east of FM 554 terminating at Loop 338.

#12 – RATLIFF RANCH NORTH 12-INCH TRUNK MAIN

PROJECT COST: $1,092,000
NOTES: This project consists of approximately 5,900 LF of 12" sewer line east of FM 554.

#13 – FM 554 NORTHEAST 15-INCH TRUNK MAIN

PROJECT COST: $1,155,000
NOTES: This project consists of approximately 5,600 LF of 15" sewer line adjacent to FM 554.

#14 – FM 554 NORTH 15, 12-INCH TRUNK MAIN

PROJECT COST: $1,226,000
NOTES: This project consists of approximately 3,900 LF of 12" and 2,500 LF of 15" sewer line adjacent to FM 554.

#15 – WEST I-20 24-INCH TRUNK MAIN

PROJECT COST: $3,722,000
NOTES: This project consists of approximately 13,300 LF of 24" sewer line south of I-20.

10.3 25-Year Capital Improvements Plan Projects

Table 30 – 25-Year Capital Improvements Plan Summary

Project No.	Project Name	Project Cost	Market Scarcity Adjustment (1.5x)
16	WEST 22ND ST 12-INCH PARALLEL TRUNK MAIN	$ 1,064,000.00	$ 1,596,000.00
17	LINE 12 BASIN LIFT STATION, 24-INCH FORCE MAIN, AND 12-INCH TRUNK MAIN	$ 7,552,000.00	$ 11,328,000.00
18	COMANCHE TRAIL EAST PARK 36-INCH TRUNK	$ 1,634,000.00	$ 2,451,000.00
19	SOUTH GRANT AVE 42-INCH TRUNK MAIN	$ 499,000.00	$ 748,500.00
20	LINE P BASIN NORTHEAST LIFT STATION & 15-INCH FORCE MAIN	$ 4,612,000.00	$ 6,918,000.00
21	LINE H NORTHWEST INTERCEPTOR SEGMENT III	$ 3,436,000.00	$ 5,154,000.00
22	US 385 NORTH 12-INCH TRUNK MAIN	$ 2,733,000.00	$ 4,099,500.00
23	LINE 12 BASIN LIFT STATION 30, 24-INCH TRUNK MAIN	$ 3,963,000.00	$ 5,944,500.00
24	GOLDER AVE 12-INCH TRUNK MAIN	$ 1,606,000.00	$ 2,409,000.00
25	GOLDER AVE AND WEST 87TH ST 21, 15-INCH TRUNK MAIN	$ 2,806,000.00	$ 4,209,000.00
26	SUNSET COUNTRY CLUB 15-INCH TRUNK MAIN	$ 1,308,000.00	$ 1,962,000.00
27	LINE G BASIN LIFT STATION AND 12-INCH FORCE MAIN	$ 2,867,000.00	$ 4,300,500.00
28	LINE G BASIN LIFT STATION 12-INCH TRUNK MAIN	$ 2,127,000.00	$ 3,190,500.00
29	WESTOVER DR 12-INCH PARALLEL TRUNK MAIN	$ 1,670,000.00	$ 2,505,000.00
30	HWY 302 12-INCH TRUNK MAIN	$ 4,071,000.00	$ 6,106,500.00
31	NORTHWEST LOOP 338 12-INCH TRUNK MAIN	$ 2,174,000.00	$ 3,261,000.00
32	I-20 BUSINESS 15, 12-INCH TRUNK MAIN	$ 3,156,000.00	$ 4,734,000.00
33	MOSS RANCH 18-INCH TRUNK MAIN	$ 2,544,000.00	$ 3,816,000.00
34	HENDERSON RANCH 15, 12-INCH TRUNK MAIN	$ 3,816,000.00	$ 5,724,000.00

35	SOUTHWEST BASIN INTERCEPTOR SEGMENT I	$ 6,165,000.00	$ 9,247,500.00
36	SOUTHWEST BASIN INTERCEPTOR SEGMENT II	$ 4,128,000.00	$ 6,192,000.00
37	SOUTHWEST BASIN INTERCEPTOR SEGMENT III	$ 1,689,000.00	$ 2,533,500.00
38	SOUTHWEST BASIN LIFT STATION AND 24-INCH FORCE MAIN	$ 4,645,000.00	$ 6,967,500.00
39	SOUTHWEST BASIN INTERCEPTOR SEGMENT IV	$ 1,887,000.00	$ 2,830,500.00
40	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT I	$ 2,442,000.00	$ 3,663,000.00
41	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT II	$ 4,345,000.00	$ 6,517,500.00
42	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT III	$ 1,342,000.00	$ 2,013,000.00
43	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT IV	$ 635,000.00	$ 952,500.00
44	LONE STAR DR 21-INCH TRUNK MAIN	$ 1,207,000.00	$ 1,810,500.00
45	ANGEL TR 18, 15, 12-INCH TRUNK MAIN	$ 3,305,000.00	$ 4,957,500.00
46	EAST GETTYSBURG ST 15, 12-INCH TRUNK MAIN	$ 3,526,000.00	$ 5,289,000.00
47	MCKINNEY PARK 24-INCH TRUNK MAIN	$ 327,000.00	$ 490,500.00
48	SOUTH JOHN BEN SHEPPARD PARKWAY BLVD 12-INCH TRUNK MAIN	$ 373,000.00	$ 559,500.00
49	LINE P BASIN SOUTHEAST LIFT STATION PHASE II UPGRADE	$ 608,000.00	$ 912,000.00
50	BOB DERRINGTON TREATMENT PLANT UPGRADE TO 17.7 MGD	$ 101,250,000.00	$ 151,875,000.00
	25-Year Projects Sub-Total:	$ 191,512,000.00	$ 287,268,000.00

#16 – WEST 22ND ST 12-INCH PARALLEL TRUNK MAIN

PROJECT COST: $1,064,000

NOTES: This project consists of approximately 5,100 LF of 12" sewer line from the intersection of W 17th St and Alameda Ave to the intersection of W 22nd St and FM 1882.

#17 – LINE 12 BASIN LIFT STATION, 24-INCH FORCE MAIN, AND 12-INCH TRUNK MAIN

PROJECT COST: $7,552,000

NOTES: This project consists of approximately 3,800 LF of 12" sewer line, 11,300 LF of 24" force main, and a 6 MGD lift station.

#18 – COMANCHE TRAIL EAST PARK 36-INCH TRUNK MAIN

PROJECT COST: $1,634,000

NOTES: This project consists of approximately 2,800 LF of 36" sewer line from McKinney Park to S Grant Ave.

#19 – SOUTH GRANT AVE 42-INCH TRUNK MAIN

PROJECT COST: $499,000

NOTES: This project consists of approximately 250 LF of 42" sewer line across S Grant Ave.

#20 – LINE P BASIN NORTHEAST LIFT STATION & 15-INCH FORCE MAIN

PROJECT COST:	$4,612,000
NOTES:	This project consists of approximately 11,400 LF of 15" force main and a 5 MGD lift station.

#21 – LINE H NORTHWEST INTERCEPTOR SEGMENT III

PROJECT COST:	$3,436,000
NOTES:	This project consists of approximately 15,500 LF of 15" sewer line from the intersection of Andrews Hwy and Loop 338 to the intersection of E 87th St and Loop 338.

#22 – US 385 NORTH 12-INCH TRUNK MAIN

PROJECT COST:	$2,733,000
NOTES:	This project consists of approximately 15,100 LF of 12" sewer line from just north of the intersection of E Cottonwood Rd and US 385 to the intersection of Loop 338 and US 385.

#23 – LINE 12 BASIN LIFT STATION 30, 24-INCH TRUNK MAIN

PROJECT COST:	$3,963,000
NOTES:	This project consists of approximately 8,700 LF of 24" and 3,700 LF of 30" sewer line from the intersection of N Golden Ave and Alabama St to the intersection of Ft Worth Ave and E 61st St.

#24 – GOLDER AVE 12-INCH TRUNK MAIN

PROJECT COST:	$1,606,000
NOTES:	This project consists of approximately 4,600 LF of 12" sewer line from the intersection of W 65th St and Golden Ave to the intersection of W 61st St and Andrews Hwy.

#25 – GOLDER AVE AND WEST 87TH ST 21, 15-INCH TRUNK MAIN

PROJECT COST:	$2,806,000
NOTES:	This project consists of approximately 7,100 LF of 21" and 2,400 LF of 15" sewer line from the intersection of County Rd 1882 and W 87th St to the intersection of N Golden Ave and Alabama St.

#26 – SUNSET COUNTRY CLUB 15-INCH TRUNK MAIN

PROJECT COST:	$1,308,000
NOTES:	This project consists of approximately 5,600 LF of 15" sewer line from east of N County Road West to east of the intersection of Claymoor Dr and W 87th St.

#27 – LINE G BASIN LIFT STATION AND 12-INCH FORCE MAIN

PROJECT COST:	$2,867,000
NOTES:	This project consists of approximately 2,400 LF of 12" force main and a 3 MGD lift station.

#28 – LINE G BASIN LIFT STATION 12-INCH TRUNK MAIN

PROJECT COST:	$2,127,000
NOTES:	This project consists of approximately 9,400 LF of 12" sewer line from the intersection of N County Rd W and W 65th St to the intersection of N Rasco Ave and W 43rd St.

#29 – WESTOVER DR 12-INCH PARALLEL TRUNK MAIN

PROJECT COST:	$1,670,000
NOTES:	This project consists of approximately 6,500 LF of 12" sewer line from just south of the intersection of Kermit Hwy and Flint Ave to just north of Wal-Mart Ct.

#30 – HWY 302 12-INCH TRUNK MAIN

PROJECT COST:	$4,071,000
NOTES:	This project consists of approximately 19,300 LF of 12" sewer line along Hwy 302.

#31 – NORTHWEST LOOP 338 12-INCH TRUNK MAIN

PROJECT COST:	$2,174,000
NOTES:	This project consists of approximately 10,000 LF of 12" sewer line from the intersection of Loop 338 and W Yukon Rd to the intersection of W 42nd St and Pacific Blvd.

#32 – I-20 BUSINESS 15, 12-INCH TRUNK MAIN EXTENSION

PROJECT COST:	$3,156,000
NOTES:	This project consists of approximately 5,900 LF of 15" sewer line and 10,700 LF of 12" sewer line adjacent to I-20.

#33 – MOSS RANCH 18-INCH TRUNK MAIN

PROJECT COST:	$2,544,000
NOTES:	This project consists of approximately 11,300 LF of 18" south of I-20 along Bell St.

#34 – HENDERSON RANCH 15, 12-INCH TRUNK MAIN

PROJECT COST:	$3,816,000
NOTES:	This project consists of approximately 10,800 LF of 15" sewer line and 8,600 LF of 12" sewer line south of I-20.

#35 – SOUTHWEST BASIN INTERCEPTOR SEGMENT I

PROJECT COST:	$6,165,000
NOTES:	This project consists of approximately 12,200 LF of 42" sewer line from Loop 338 to just east of S County Rd 1325.

#36 – SOUTHWEST BASIN INTERCEPTOR SEGMENT II

PROJECT COST:	$4,128,000
NOTES:	This project consists of approximately 4,300 LF of 27" sewer line, 5,500 LF of 24" sewer line, and 5,400 LF 21" sewer line from S Dixie Blvd to Loop 338.

#37 – SOUTHWEST BASIN INTERCEPTOR SEGMENT III

PROJECT COST:	$1,689,000
NOTES:	This project consists of approximately 7,300 LF of 18" sewer line from S Dixie Blvd to Highway 385.

#38 – SOUTHWEST BASIN LIFT STATION AND 24-INCH FORCE MAIN

PROJECT COST:	$4,645,000
NOTES:	This project consists of approximately 4,300 LF of 24" force main and a 12 MGD lift station adjacent to E Loop 338.

#39 – SOUTHWEST BASIN INTERCEPTOR SEGMENT IV

PROJECT COST:	$1,887,000
NOTES:	This project consists of approximately 3,700 LF of 15" and 6,200 LF of 12" sewer line from just west of Fulton Dr to S Grant Ave.

#40 – SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT I

PROJECT COST:	$2,442,000
NOTES:	This project consists of approximately 7,900 LF of 27" sewer line along the southwest edge of N Loop 338.

#41 – SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT II

PROJECT COST:	$4,345,000
NOTES:	This project consists of approximately 5,800 LF of 27" sewer line, 5,500 LF of 21" sewer line, and 5,300 LF of 18" sewer line along Loop 338 from S Hwy 385 to S Dixie Blvd.

#42 – SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT III

PROJECT COST:	$1,342,000
NOTES:	This project consists of approximately 6,600 LF of 15" sewer line adjacent to Loop 338.

#43 – SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT IV

PROJECT COST:	$635,000
NOTES:	This project consists of approximately 3,400 LF of 12" sewer line along Loop 338.

#44 – LONE STAR DR 21-INCH TRUNK MAIN

PROJECT COST:	$1,207,000
NOTES:	This project consists of approximately 4,700 LF of 21" sewer line along S Dixie Blvd from Loop 338 to Angel Trail.

#45 – ANGEL TR 18, 15, 12-INCH TRUNK MAIN

PROJECT COST:	$3,305,000
NOTES:	This project consists of approximately 5,000 LF of 18", 5,500 LF of 15" sewer line, and 5,100 LF of 12" sewer line along Angel Trail east of S Dixie Blvd.

#46 – EAST GETTYSBURG ST 15, 12-INCH TRUNK MAIN

PROJECT COST: $3,526,000
NOTES: This project consists of approximately 7,500 LF of 15" sewer line and 10,100 LF of 12" sewer line north of Heritage Street and tying in at the intercetion of Angel Trail and S Dixie Blvd.

#47 – MCKINNEY PARK 24-INCH TRUNK MAIN

PROJECT COST: $327,000
NOTES: This project consists of approximately 1,100 LF of 24" sewer line adjacent to I-20.

#48 – SOUTH JOHN BEN SHEPPARD PARKWAY BLVD 12-INCH TRUNK MAIN

PROJECT COST: $373,000
NOTES: This project consists of approximately 300 LF of 12" sewer line across John Ben Shepperd Pkwy.

#49 – LINE P BASIN SOUTHEAST LIFT STATION PHASE II UPGRADE

PROJECT COST: $608,000
NOTES: This project consists of the upgrade of the Line P Basin lift station to a capacity of 5 MGD.

#50 – BOB DERRINGTON TREATMENT PLANT UPGRADE TO 17.7 MGD

PROJECT COST: $101,250,000.00
NOTES: This project consists of the upgrade of the existing treatment plant to a capacity of 17.7 MGD.

10.4 Beyond 25-Year Capital Improvements Plan Projects

Table 31 – Beyond 25-Year Capital Improvements Plan Summary

Project No.	Project Name	Project Cost	Market Scarcity Adjustment (1.5x)
51	LINE H INTERCEPTOR SEGMENT I	$ 15,730,000.00	$ 23,595,000.00
52	LINE 12 BASIN LIFT STATION PHASE II UPGRADE	$ 2,160,000.00	$ 3,240,000.00
	25-Year Projects Sub-Total:	$ 17,890,000.00	$ 26,835,000.00

#51 – LINE H INTERCEPTOR SEGMENT I

PROJECT COST: $15,730,000
NOTES: This project consists of approximately 15,200 LF of 42", 10,000 LF of 36" and 6,900 LF of 48" sewer line from just south of the intersection of E 52nd St and N Loop 338 to just east of the Ector/ Midland County Line.

#52 – LINE 12 BASIN LIFT STATION PHASE II UPGRADE

PROJECT COST: $2,160,000

NOTES: This project consists of the upgrade of the Line 12 Basin lift station to a capacity of 18 MGD.

11. REHABILITATION PLAN

From the Master Planning process, a recommended list of collection line replacement projects has been developed. These improvements were created to replace all the existing Asbestos-Cement (AC) pipe in the system. The individual rehabilitation projects were created by grouping sewer lines based on location and pipe size. All improvements are shown in Appendix K – Wastewater Rehabilitation Plan. The project costs are summarized in Table 28. The following opinion of probable costs for each capital project assumes no design completed, based on 2018 dollars, no inflation increases, and does not include any property acquisitions, unless specifically noted.

Table 32 – Rehabilitation Plan Cost Summary

Project No.	Project Name	LF of Pipe Replacement	Project Cost	Market Scarcity Adjustment (1.5x)
1	Line K and C Basin Sewer Lines	700	$192,000	$288,000
2	42nd Street Sewer Lines	900	$226,000	$339,000
3	Carolyn Drive Sewer Lines	700	$192,000	$288,000
4	Orchard Drive Sewer Lines	1,100	$286,000	$429,000
5	Lotteman and Ellis Drive Sewer Lines	800	$209,000	$313,500
6	N. Washington Street Sewer Lines	300	$115,000	$172,500
7	W. 31st Street Sewer Lines	1,300	$303,000	$454,500
8	N. Gobler Avenue Sewer Lines	700	$200,000	$300,000
9	W. University Boulevard Sewer Lines	1,000	$234,000	$351,000
10	Line B and G Sewer Basin Sewer Lines	2,000	$419,000	$628,500
11	S. Crane Avenue Sewer Lines	2,600	$567,000	$850,500
12	S. Grandview Avenue Sewer Lines	1,300	$295,000	$442,500
		Sewer Rehabilitation Projects Total:	$3,238,000	$4,857,000

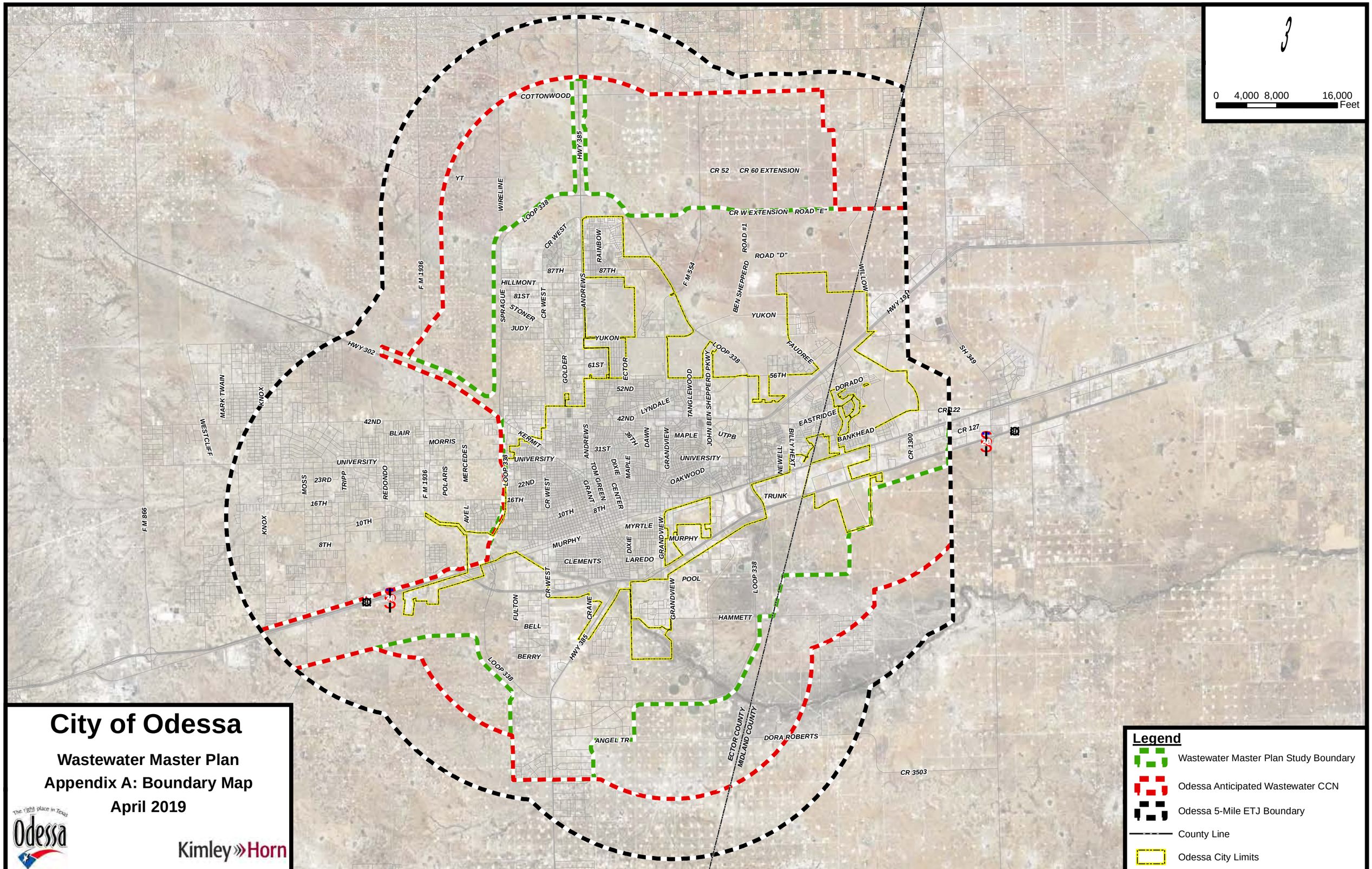
12. WATER AND WASTEWATER PRO FORMA

The Water and Wastewater Pro Forma included in this Masterplan provides a high-level overview. This analysis started with the FY 2019 Budget and used industry standards for inflating operational and capital costs at the category level in each department. The projects included in both the water and sewer master plans were used to project potential debt issuances. Project funding was assumed to be 100% debt for this review. Debt financing costs assumed 30-year bonds with 3.43% interest, which is the Moody's AA Long Maturity rate as published in Mergent's Municipal & Government News Report as of January 2019. The Pro Forma is intended to give decision makers and the general reader a sense of total revenue increases that may be required to complete the Masterplan projects and continue to operate within targeted financial metrics. This should not be relied upon for annual utility rate increases or future customer cost projections. The City is currently undergoing a formal Cost of Service and Rate Design Study that will better define rate adjustments needed in the next five years. The Water and Wastewater Pro Forma is available in Appendix E – Water and Wastewater Pro Forma.

13. APPENDICES

Appendix A – Boundary Map
Appendix B – Existing Land Use Map
Appendix C – Ultimate Land Use Map
Appendix D – 25-Year Projected Growth Map
Appendix E – Water and Wastewater Pro Forma
Appendix F – Project Description Sheets and Opinions of Probable Construction Costs
Appendix G – Lift Station Evaluations
Appendix H – Existing Infrastructure
Appendix I – Flow Meter and Rain Gauge Location Map
Appendix J - Capital Improvement Plan
Appendix K – Wastewater Rehabilitation Plan

Appendix A – Boundary Map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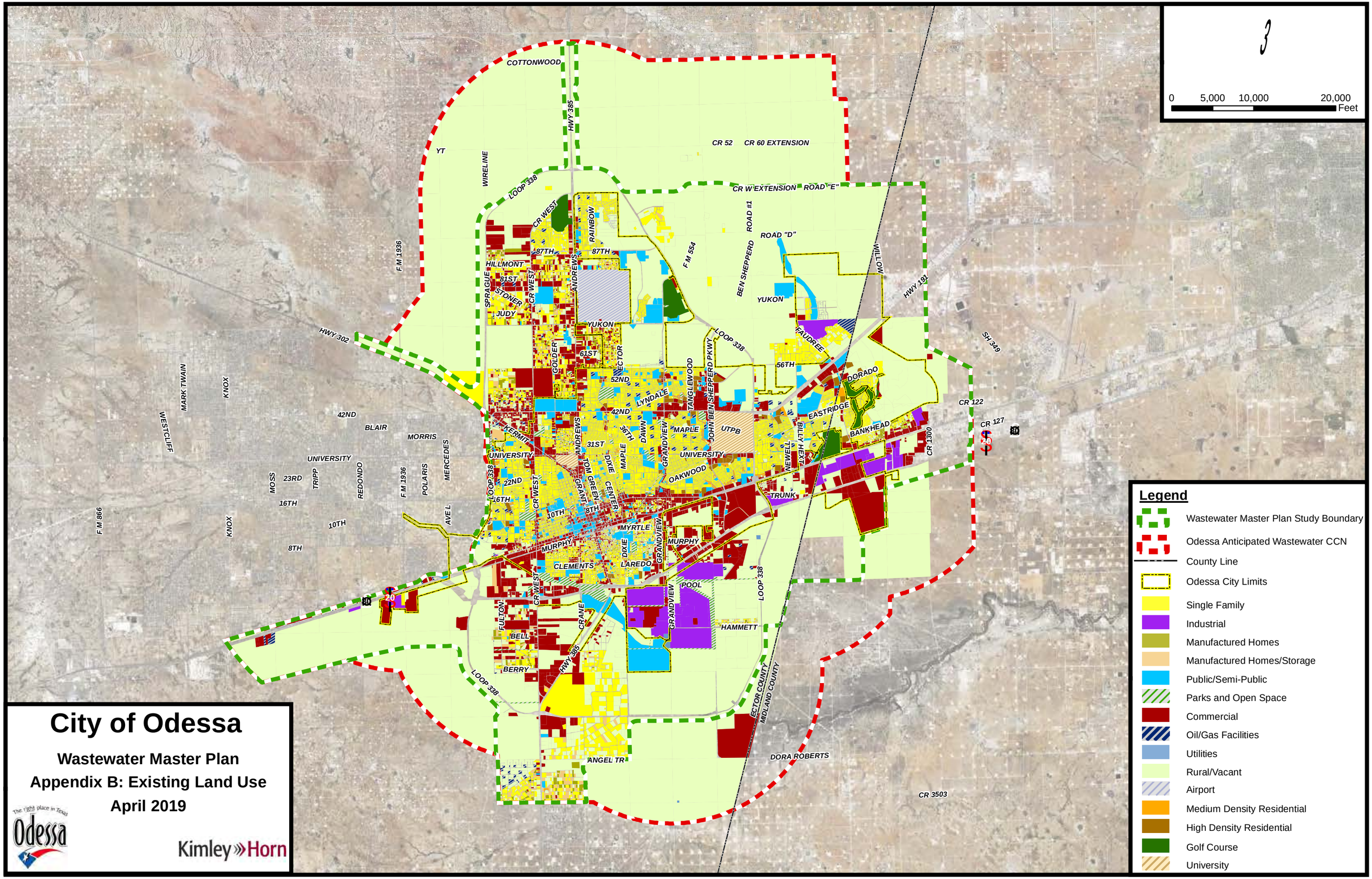
YT
WIRELINE
HWY 385
LOOP 338
CR 52
CR 60 EXTENSION
CR W EXTENSION
ROAD "E"
ROAD "D"
ROAD #1
CR WEST
RAINBOW
87TH
HILLMONT
81ST
STONER
JUDY
SPRAGUE
ANDREWS
F M 1936
F M 554
BEN SHEPPERD
YUKON
WILLOW
HWY 191
HWY 302
GOLDER
61ST
ECTOR
52ND
LOOP 338
FAUDREE
56TH
SH 349
DORADO
MARK TWAIN
KNOX
WESTCLIFF
42ND
BLAIR
MORRIS
LYNDALE
TANGLEWOOD
JOHN BEN SHEPPERD PKWY
EASTRIDGE
BANKHEAD
CR 122
CR 127
KERMIT
UNIVERSITY
31ST
36TH
DAWN
GRANDVIEW
MAPLE
UTPB
BILLY HEXT
NEWELL
CR 1300
MOSS
23RD
TRIPP
REDONDO
POLARIS
MERCEDES
LOOP 338
22ND
16TH
TOM GREEN
GRANT
DIXIE
CENTER
OAKWOOD
TRUNK
F M 866
10TH
8TH
AVEL
MYRTLE
MURPHY
CLEMENTS
LAREDO
POOL
LOOP 338
FULTON
CRANE
HAMMETT
BELL
BERRY
HWY 385
ANGEL TR
ECTOR COUNTY
MIDLAND COUNTY
DORA ROBERTS
CR 3503
City of Odessa
Wastewater Master Plan
Appendix A: Boundary Map
April 2019
The right place in Texas
Odessa
Kimley»Horn
Legend
Wastewater Master Plan Study Boundary
Odessa Anticipated Wastewater CCN
Odessa 5-Mile ETJ Boundary
County Line
Odessa City Limits

Appendix B – Existing Land Use Map



City of Odessa

Wastewater Master Plan

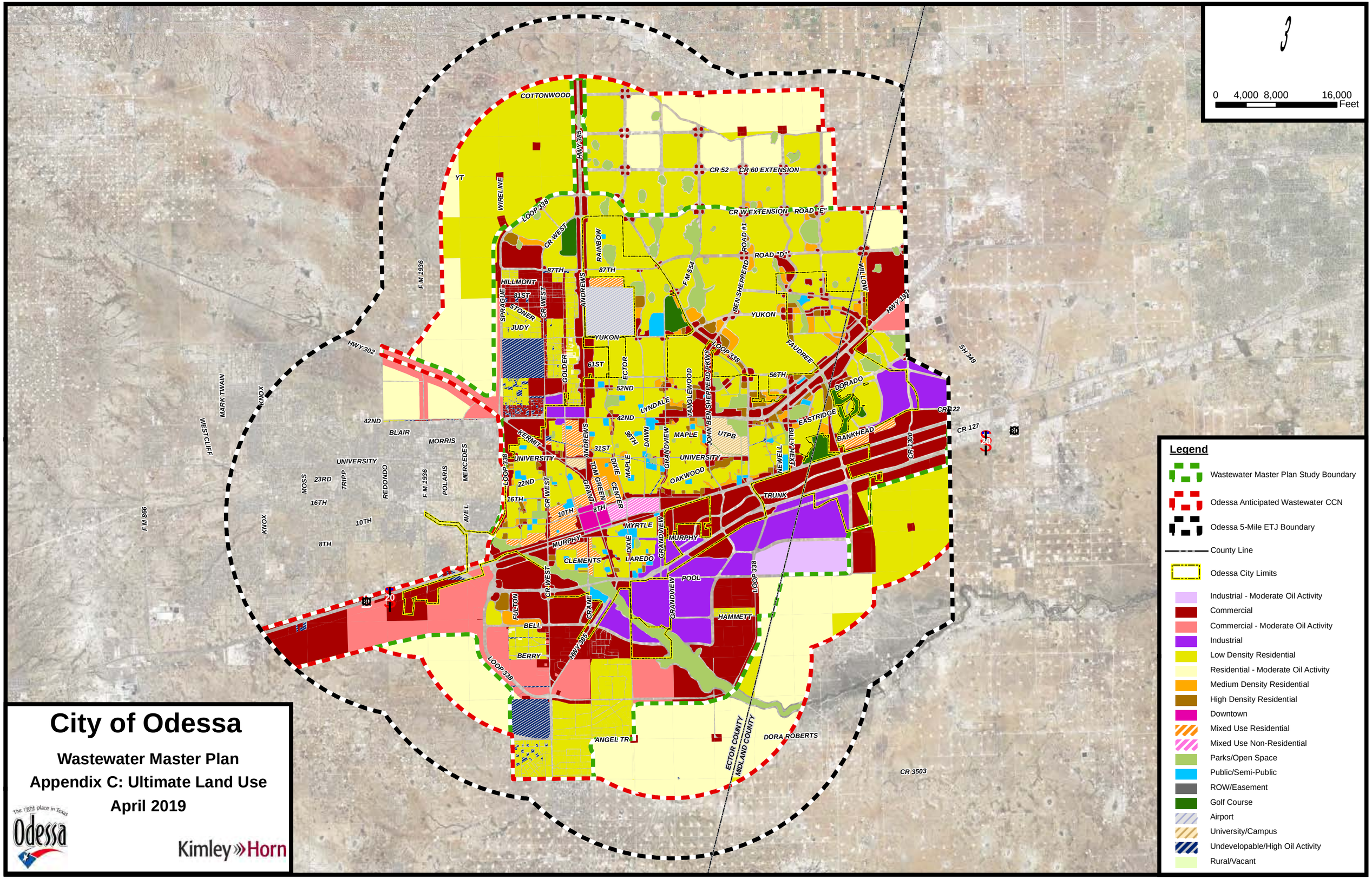
Appendix B: Existing Land Use

April 2019

The right place in Texas Odessa

Kimley»Horn

Appendix C – Ultimate Land Use Map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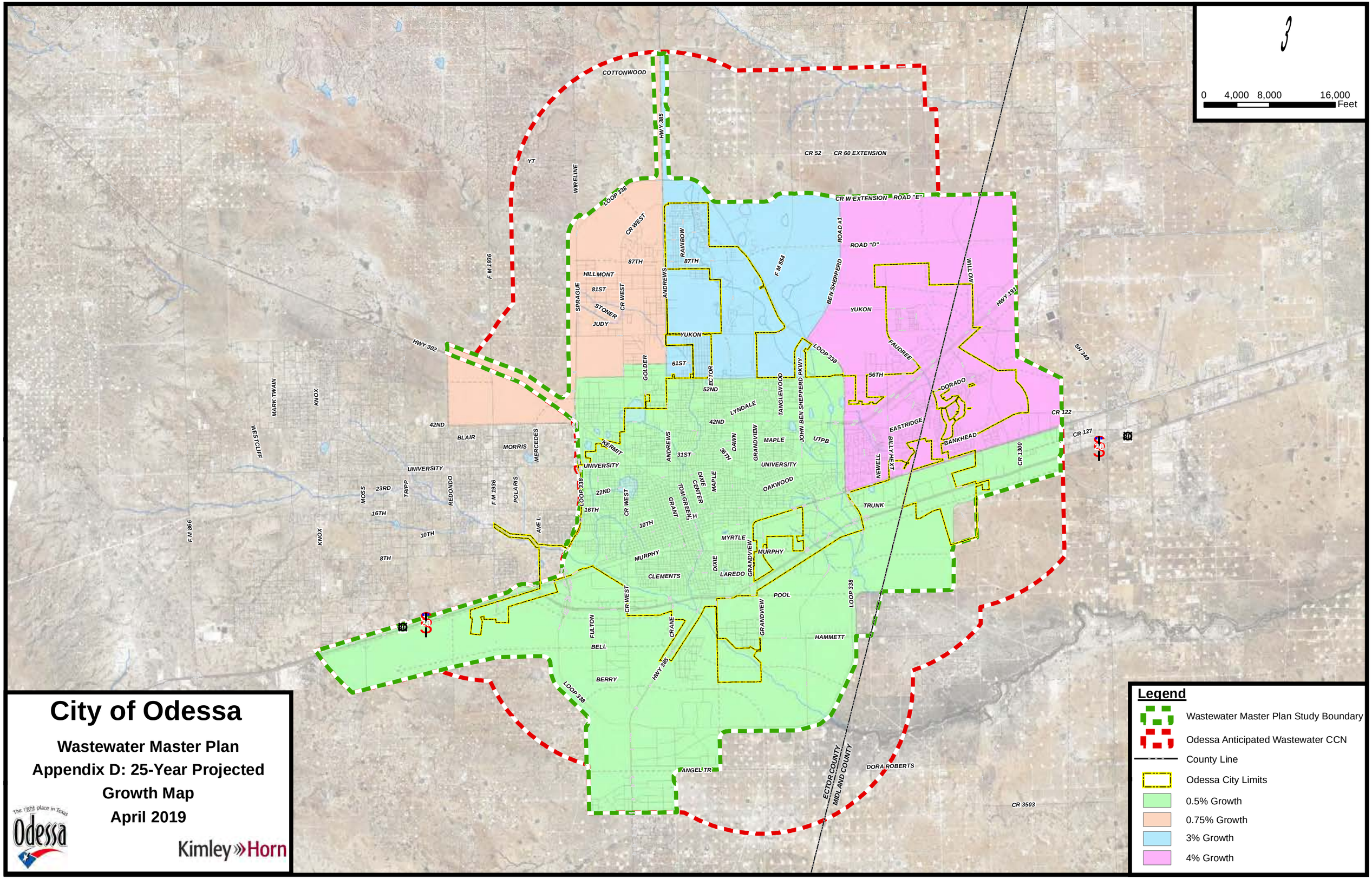
0 4,000 8,000 16,000
Feet
COTTONWOOD
CR 52
CR 60 EXTENSION
CR W EXTENSION
ROAD "E"
ROAD "D"
ROAD #1
BEN SHEPPERD
WILLOW
HWY 191
YT
WIRELINE
LOOP 338
CR WEST
RAINBOW
87TH
HILLMONT
81ST
SPRAGUE
STONER
JUDY
ANDREWS
F M 554
YUKON
FAUDREE
HWY 302
SH 349
61ST
ECTOR
GOLDEN
52ND
LYNDALE
TANGLEWOOD
JOHN BEN SHEPPERD PKWY
56TH
DORADO
EASTRIDGE
BANKHEAD
CR 122
CR 127
42ND
BLAIR
MORRIS
MARK TWAIN
KNOX
WESTCLIFF
KERMIT
UNIVERSITY
31ST
36TH
DAWN
GRANDVIEW
MAPLE
UTPB
BILLY HIGHTOWER
NEWELL
CR 1300
MOSS
23RD
TRIPP
REDONDO
F M 1936
POLARIS
MERCEDES
22ND
TOM GREEN
DIXIE
CENTER
OAKWOOD
TRUNK
16TH
10TH
8TH
AVEL
F M 866
GRANT
MYRTLE
MURPHY
CLEMENTS
LAREDO
POOL
FULTON
BELL
BERRY
HWY 385
HAMMETT
ANGEL TR
ECTOR COUNTY
MIDLAND COUNTY
DORA ROBERTS
CR 3503
20
30
Legend
Wastewater Master Plan Study Boundary
Odessa Anticipated Wastewater CCN
Odessa 5-Mile ETJ Boundary
County Line
Odessa City Limits
Industrial - Moderate Oil Activity
Commercial
Commercial - Moderate Oil Activity
Industrial
Low Density Residential
Residential - Moderate Oil Activity
Medium Density Residential
High Density Residential
Downtown
Mixed Use Residential
Mixed Use Non-Residential
Parks/Open Space
Public/Semi-Public
ROW/Easement
Golf Course
Airport
University/Campus
Undevelopable/High Oil Activity
Rural/Vacant
City of Odessa
Wastewater Master Plan
Appendix C: Ultimate Land Use
April 2019
The right place in Texas
Odessa
Kimley»Horn

Appendix D – 25-Year Projected Growth Map



City of Odessa

Wastewater Master Plan

Appendix D: 25-Year Projected Growth Map

April 2019

The right place in Texas Odessa

Kimley»Horn

Appendix E – Water and Wastewater Pro Forma

City of Odessa, TX
Financial Forecasting Total Pro Forma Model
Water and Sewer Fund - Includes Water Master Plan and Sewer Master Plan

	Total Budget 2019	Total Projected 2020	Total Projected 2021	Total Projected 2022	Total Projected 2023
Percent Revenue Increase		7.4%	3.9%	4.8%	4.7%
Average Residential 3/4" Monthly Bill	$ 56.57	$ 60.73	$ 63.07	$ 66.08	$ 69.22
Assumed Usage - 5,000 Gallons	*Inc/(Dec) $ Yr Over Yr*	*4.16*	*2.34*	*3.01*	*3.14*
Includes energy surcharge of $0.1133 per 1,000 gallons					
Revenues					
Rate Revenues	$ 49,100,393	$ 52,208,750	$ 54,743,214	$ 57,354,977	$ 60,076,734
Non-Rate Revenues	11,407,430	11,410,682	11,413,974	11,417,306	11,420,678
Total Revenues	**$ 60,507,823**	**$ 63,619,433**	**$ 66,157,188**	**$ 68,772,283**	**$ 71,497,412**
Expenses					
Billing and Collection	$ 3,039,128	$ 3,143,101	$ 3,250,734	$ 3,362,161	$ 3,477,517
Utility Administration	1,324,150	1,371,420	1,420,411	1,471,187	1,523,813
Water Distribution	2,539,418	2,627,167	2,718,033	2,812,128	2,909,570
Water Treatment Plant	2,971,894	3,061,516	3,153,933	3,249,235	3,347,515
Bob Derrington Water Reclamation Plant	3,724,256	3,841,728	3,963,038	4,088,315	4,217,696
Wastewater Collection	1,718,401	1,776,380	1,836,366	1,898,430	1,962,647
Laboratory Services	1,420,057	1,469,978	1,521,691	1,575,261	1,630,756
Utility GIS	287,883	298,381	309,268	320,559	332,268
Repair and Replacement	947,829	972,919	998,673	1,025,109	1,052,245
Non-Departmental Expenditures	18,162,388	18,387,389	18,618,384	18,855,531	19,098,996
Participation in Line Extensions	200,000	206,197	212,587	219,174	225,966
Water Purchase Expenditures	17,361,119	17,820,686	18,292,418	18,776,637	19,273,674
Gulf Coast Expenditures	250,000	256,618	263,411	270,383	277,541
Debt Service	6,561,300	7,606,306	8,705,888	9,839,611	11,036,016
Total Expenses	**$ 60,507,823**	**$ 62,839,786**	**$ 65,264,835**	**$ 67,763,723**	**$ 70,366,220**
Excess (deficiency) of revenues	**$ -**	**$ 779,646**	**$ 892,354**	**$ 1,008,560**	**$ 1,131,192**
Fund Balance					
Beginning Fund Balance	25,711,295	25,711,295	26,490,941	27,383,295	28,391,855
Ending Fund Balance	**$ 25,711,295**	**$ 26,490,941**	**$ 27,383,295**	**$ 28,391,855**	**$ 29,523,047**
Inc/(Dec) Year over Year	*$ -*	*$ 779,646*	*$ 892,354*	*$ 1,008,560*	*$ 1,131,192*
Daily Operating Expense	**$ 165,775**	**$ 172,164**	**$ 178,808**	**$ 185,654**	**$ 192,784**
Days Cash on Hand	**155**	**154**	**153**	**153**	**153**
90 Days Operating Target	*90*	*90*	*90*	*90*	*90*
Debt Service Coverage					
Operating Revenues	$ 60,507,823	$ 63,619,433	$ 66,157,188	$ 68,772,283	$ 71,497,412
Operating Expenses	$ 53,946,523	$ 55,233,480	$ 56,558,947	$ 57,924,112	$ 59,330,205
Net Revenues Available for Debt Service	**$ 6,561,300**	**$ 8,385,952**	**$ 9,598,242**	**$ 10,848,171**	**$ 12,167,207**
Annual Debt Service	**$ 6,561,300**	**$ 7,606,306**	**$ 8,705,888**	**$ 9,839,611**	**$ 11,036,016**
Debt Coverage Ratio	**1.00**	**1.10**	**1.10**	**1.10**	**1.10**
Target Debt Coverage Ratio	*1.10*	*1.10*	*1.10*	*1.10*	*1.10*

Notes:

$9.7M Pioneer Contract Recognized in Non-Rate Revenues and Non-Departmental Expenditures.

Actual rate increases may vary. The City is currently undergoing a Cost of Service Study to determine actual rate increases.

City of Odessa, TX
Financial Forecasting Total Pro Forma Model
Water and Sewer Fund - Includes Water Master Plan and Sewer Master Plan

	Total Projected 2024	Total Projected 2025	Total Projected 2026	Total Projected 2027	Total Projected 2028
Percent Revenue Increase	4.7%	3.8%	3.8%	3.7%	0.0%
Average Residential 3/4" Monthly Bill	$ 72.46	$ 75.20	$ 78.02	$ 80.94	$ 80.94
Assumed Usage - 5,000 Gallons	*3.25*	*2.73*	*2.82*	*2.92*	-
Includes energy surcharge of $0.1133 per 1,000 gallons					
Revenues					
Rate Revenues	$ 62,894,563	$ 65,267,362	$ 67,718,457	$ 70,255,668	$ 70,255,668
Non-Rate Revenues	11,424,092	11,427,547	11,431,044	11,434,583	11,438,166
Total Revenues	**$ 74,318,654**	**$ 76,694,908**	**$ 79,149,501**	**$ 81,690,251**	**$ 81,693,834**
Expenses					
Billing and Collection	$ 3,596,945	$ 3,720,593	$ 3,848,611	$ 3,981,159	$ 4,118,401
Utility Administration	1,578,359	1,634,895	1,693,495	1,754,236	1,817,196
Water Distribution	3,010,481	3,114,985	3,223,216	3,335,307	3,451,401
Water Treatment Plant	3,448,870	3,553,398	3,661,204	3,772,393	3,887,076
Bob Derrington Water Reclamation Plant	4,351,317	4,489,324	4,631,864	4,779,092	4,931,167
Wastewater Collection	2,029,091	2,097,843	2,168,983	2,242,598	2,318,775
Laboratory Services	1,688,246	1,747,805	1,809,508	1,873,433	1,939,662
Utility GIS	344,412	357,007	370,070	383,618	397,669
Repair and Replacement	1,080,099	1,108,690	1,138,038	1,168,163	1,199,086
Non-Departmental Expenditures	19,348,948	19,605,559	19,869,007	20,139,476	20,417,153
Participation in Line Extensions	232,968	240,187	247,630	255,303	263,214
Water Purchase Expenditures	19,783,869	20,307,568	20,845,131	21,396,923	21,963,322
Gulf Coast Expenditures	284,888	292,429	300,170	308,116	316,272
Debt Service	12,281,326	13,083,561	13,916,167	14,784,974	9,133,869
Total Expenses	**$ 73,059,818**	**$ 75,353,844**	**$ 77,723,094**	**$ 80,174,791**	**$ 76,154,262**
Excess (deficiency) of revenues	**$ 1,258,836**	**$ 1,341,065**	**$ 1,426,407**	**$ 1,515,460**	**$ 5,539,572**
Fund Balance					
Beginning Fund Balance	29,523,047	30,781,883	32,122,948	33,549,355	35,064,814
Ending Fund Balance	**$ 30,781,883**	**$ 32,122,948**	**$ 33,549,355**	**$ 35,064,814**	**$ 40,604,387**
Inc/(Dec) Year over Year	*$ 1,258,836*	*$ 1,341,065*	*$ 1,426,407*	*$ 1,515,460*	*$ 5,539,572*
Daily Operating Expense	**$ 200,164**	**$ 206,449**	**$ 212,940**	**$ 219,657**	**$ 208,642**
Days Cash on Hand	**154**	**156**	**158**	**160**	**195**
90 Days Operating Target	*90*	*90*	*90*	*90*	*90*
Debt Service Coverage					
Operating Revenues	$ 74,318,654	$ 76,694,908	$ 79,149,501	$ 81,690,251	$ 81,693,834
Operating Expenses	$ 60,778,492	$ 62,270,283	$ 63,806,927	$ 65,389,817	$ 67,020,393
Net Revenues Available for Debt Service	**$ 13,540,162**	**$ 14,424,626**	**$ 15,342,574**	**$ 16,300,434**	**$ 14,673,441**
Annual Debt Service	**$ 12,281,326**	**$ 13,083,561**	**$ 13,916,167**	**$ 14,784,974**	**$ 9,133,869**
Debt Coverage Ratio	**1.10**	**1.10**	**1.10**	**1.10**	**1.61**
Target Debt Coverage Ratio	*1.10*	*1.10*	*1.10*	*1.10*	*1.10*

Notes:

$9.7M Pioneer Contract Recognized in Non-Rate Revenues and Non-Departmental Expenditures.

Actual rate increases may vary. The City is currently undergoing a Cost of Service Study to determine actual rate increases.

City of Odessa, TX
Financial Forecasting Total Pro Forma Model
Water and Sewer Fund - Includes Water Master Plan and Sewer Master Plan

	Total Projected 2029	Total Projected 2030	Total Projected 2031	Total Projected 2032	Total Projected 2033
Percent Revenue Increase	0.0%	3.8%	6.5%	6.3%	6.1%
Average Residential 3/4" Monthly Bill	$ 80.94	$ 84.01	$ 89.44	$ 95.03	$ 100.80
Assumed Usage - 5,000 Gallons	-	*3.07*	*5.43*	*5.59*	*5.76*
Includes energy surcharge of $0.1133 per 1,000 gallons					
Revenues					
Rate Revenues	$ 70,255,668	$ 72,920,461	$ 77,630,304	$ 82,484,347	$ 87,487,052
Non-Rate Revenues	11,441,793	11,445,232	11,448,711	11,452,229	11,455,787
Total Revenues	**$ 81,697,461**	**$ 84,365,693**	**$ 89,079,015**	**$ 93,936,576**	**$ 98,942,839**
Expenses					
Billing and Collection	$ 4,260,507	$ 4,405,492	$ 4,555,534	$ 4,710,813	$ 4,871,517
Utility Administration	1,882,459	1,949,013	2,017,960	2,089,386	2,163,383
Water Distribution	3,571,642	3,694,292	3,821,253	3,952,680	4,088,734
Water Treatment Plant	4,005,365	4,126,386	4,251,176	4,379,857	4,512,555
Bob Derrington Water Reclamation Plant	5,088,255	5,248,801	5,414,576	5,585,753	5,762,515
Wastewater Collection	2,397,605	2,478,156	2,561,475	2,647,657	2,736,803
Laboratory Services	2,008,279	2,078,312	2,150,830	2,225,923	2,303,683
Utility GIS	412,243	427,095	442,489	458,445	474,985
Repair and Replacement	1,230,827	1,263,408	1,296,852	1,331,181	1,366,419
Non-Departmental Expenditures	20,702,229	20,994,827	21,295,221	21,603,617	21,920,232
Participation in Line Extensions	271,371	279,780	288,449	297,388	306,603
Water Purchase Expenditures	22,544,714	23,141,496	23,754,075	24,382,870	25,028,310
Gulf Coast Expenditures	324,644	333,237	342,059	351,113	360,407
Debt Service	10,082,173	12,648,887	15,317,068	18,067,929	20,904,031
Total Expenses	**$ 78,782,312**	**$ 83,069,182**	**$ 87,509,016**	**$ 92,084,614**	**$ 96,800,176**
Excess (deficiency) of revenues	**$ 2,915,149**	**$ 1,296,511**	**$ 1,569,999**	**$ 1,851,963**	**$ 2,142,663**
Fund Balance					
Beginning Fund Balance	40,604,387	43,519,535	44,816,046	46,386,046	48,238,008
Ending Fund Balance	**$ 43,519,535**	**$ 44,816,046**	**$ 46,386,046**	**$ 48,238,008**	**$ 50,380,672**
Inc/(Dec) Year over Year	*$ 2,915,149*	*$ 1,296,511*	*$ 1,569,999*	*$ 1,851,963*	*$ 2,142,663*
Daily Operating Expense	**$ 215,842**	**$ 227,587**	**$ 239,751**	**$ 252,287**	**$ 265,206**
Days Cash on Hand	**202**	**197**	**193**	**191**	**190**
90 Days Operating Target	*90*	*90*	*90*	*90*	*90*
Debt Service Coverage					
Operating Revenues	$ 81,697,461	$ 84,365,693	$ 89,079,015	$ 93,936,576	$ 98,942,839
Operating Expenses	$ 68,700,138	$ 70,420,295	$ 72,191,947	$ 74,016,685	$ 75,896,145
Net Revenues Available for Debt Service	**$ 12,997,322**	**$ 13,945,398**	**$ 16,887,068**	**$ 19,919,891**	**$ 23,046,694**
Annual Debt Service	**$ 10,082,173**	**$ 12,648,887**	**$ 15,317,068**	**$ 18,067,929**	**$ 20,904,031**
Debt Coverage Ratio	**1.29**	**1.10**	**1.10**	**1.10**	**1.10**
Target Debt Coverage Ratio	*1.10*	*1.10*	*1.10*	*1.10*	*1.10*

Notes:

$9.7M Pioneer Contract Recognized in Non-Rate Revenues and Non-Departmental Expenditures.

Actual rate increases may vary. The City is currently undergoing a Cost of Service Study to determine actual rate increases.

City of Odessa, TX
Financial Forecasting Total Pro Forma Model
Water and Sewer Fund - Includes Water Master Plan and Sewer Master Plan

	Total Projected 2034	Total Projected 2035	Total Projected 2036	Total Projected 2037	Total Projected 2038
Percent Revenue Increase	5.9%	5.7%	5.6%	5.5%	5.3%
Average Residential 3/4" Monthly Bill	$ 106.74	$ 112.86	$ 119.17	$ 125.67	$ 132.38
Assumed Usage - 5,000 Gallons	*5.94*	*6.12*	*6.31*	*6.50*	*6.70*
Includes energy surcharge of $0.1133 per 1,000 gallons					
Revenues					
Rate Revenues	$ 92,643,021	$ 97,957,000	$ 103,433,885	$ 109,078,723	$ 114,896,723
Non-Rate Revenues	11,459,386	11,463,027	11,466,708	11,470,432	11,474,198
Total Revenues	**$ 104,102,407**	**$ 109,420,026**	**$ 114,900,593**	**$ 120,549,155**	**$ 126,370,921**
Expenses					
Billing and Collection	$ 5,037,838	$ 5,209,976	$ 5,388,140	$ 5,572,544	$ 5,763,411
Utility Administration	2,240,042	2,319,462	2,401,743	2,486,990	2,575,311
Water Distribution	4,229,578	4,375,387	4,526,338	4,682,615	4,844,410
Water Treatment Plant	4,649,400	4,790,523	4,936,065	5,086,167	5,240,977
Bob Derrington Water Reclamation Plant	5,945,049	6,133,550	6,328,218	6,529,261	6,736,894
Wastewater Collection	2,829,018	2,924,408	3,023,084	3,125,164	3,230,765
Laboratory Services	2,384,207	2,467,594	2,553,948	2,643,376	2,735,988
Utility GIS	492,129	509,900	528,321	547,415	567,209
Repair and Replacement	1,402,589	1,439,717	1,477,828	1,516,948	1,557,103
Non-Departmental Expenditures	22,245,282	22,578,996	22,921,602	23,273,340	23,634,454
Participation in Line Extensions	316,104	325,899	335,998	346,409	357,143
Water Purchase Expenditures	25,690,835	26,370,898	27,068,963	27,785,507	28,521,018
Gulf Coast Expenditures	369,948	379,741	389,793	400,111	410,702
Debt Service	23,828,016	26,842,608	29,950,614	33,154,928	36,458,535
Total Expenses	**$ 101,660,036**	**$ 106,668,659**	**$ 111,830,655**	**$ 117,150,775**	**$ 122,633,921**
Excess (deficiency) of revenues	**$ 2,442,372**	**$ 2,751,367**	**$ 3,069,938**	**$ 3,398,380**	**$ 3,737,000**
Fund Balance					
Beginning Fund Balance	50,380,672	52,823,043	55,574,411	58,644,348	62,042,729
Ending Fund Balance	**$ 52,823,043**	**$ 55,574,411**	**$ 58,644,348**	**$ 62,042,729**	**$ 65,779,728**
Inc/(Dec) Year over Year	*$ 2,442,372*	*$ 2,751,367*	*$ 3,069,938*	*$ 3,398,380*	*$ 3,737,000*
Daily Operating Expense	**$ 278,521**	**$ 292,243**	**$ 306,385**	**$ 320,961**	**$ 335,983**
Days Cash on Hand	**190**	**190**	**191**	**193**	**196**
90 Days Operating Target	*90*	*90*	*90*	*90*	*90*
Debt Service Coverage					
Operating Revenues	$ 104,102,407	$ 109,420,026	$ 114,900,593	$ 120,549,155	$ 126,370,921
Operating Expenses	$ 77,832,019	$ 79,826,051	$ 81,880,041	$ 83,995,847	$ 86,175,386
Net Revenues Available for Debt Service	**$ 26,270,388**	**$ 29,593,975**	**$ 33,020,551**	**$ 36,553,308**	**$ 40,195,535**
Annual Debt Service	**$ 23,828,016**	**$ 26,842,608**	**$ 29,950,614**	**$ 33,154,928**	**$ 36,458,535**
Debt Coverage Ratio	**1.10**	**1.10**	**1.10**	**1.10**	**1.10**
Target Debt Coverage Ratio	*1.10*	*1.10*	*1.10*	*1.10*	*1.10*

Notes:

$9.7M Pioneer Contract Recognized in Non-Rate Revenues and Non-Departmental Expenditures.

Actual rate increases may vary. The City is currently undergoing a Cost of Service Study to determine actual rate increases.

City of Odessa, TX
Financial Forecasting Total Pro Forma Model
Water and Sewer Fund - Includes Water Master Plan and Sewer Master Plan

	Total Projected 2039	Total Projected 2040	Total Projected 2041	Total Projected 2042	Total Projected 2043
Percent Revenue Increase	5.2%	5.1%	5.0%	4.9%	4.8%
Average Residential 3/4" Monthly Bill	$ 139.28	$ 146.39	$ 153.70	$ 161.24	$ 169.02
Assumed Usage - 5,000 Gallons	*6.91*	*7.10*	*7.32*	*7.54*	*7.77*
Includes energy surcharge of $0.1133 per 1,000 gallons					
Revenues					
Rate Revenues	$ 120,893,253	$ 127,056,173	$ 133,407,535	$ 139,953,155	$ 146,699,031
Non-Rate Revenues	11,478,007	11,481,547	11,485,125	11,488,740	11,492,393
Total Revenues	**$ 132,371,260**	**$ 138,537,720**	**$ 144,892,660**	**$ 151,441,895**	**$ 158,191,423**
Expenses					
Billing and Collection	$ 5,960,972	$ 6,161,690	$ 6,369,307	$ 6,584,065	$ 6,806,212
Utility Administration	2,666,817	2,759,711	2,855,884	2,955,454	3,058,542
Water Distribution	5,011,922	5,182,051	5,358,068	5,540,180	5,728,602
Water Treatment Plant	5,400,647	5,563,597	5,731,598	5,904,809	6,083,399
Bob Derrington Water Reclamation Plant	6,951,340	7,169,814	7,395,344	7,628,163	7,868,512
Wastewater Collection	3,340,012	3,451,240	3,566,241	3,685,145	3,808,086
Laboratory Services	2,831,899	2,929,375	3,030,255	3,134,659	3,242,710
Utility GIS	587,728	608,536	630,090	652,415	675,539
Repair and Replacement	1,598,321	1,640,630	1,684,059	1,728,638	1,774,397
Non-Departmental Expenditures	24,005,193	24,385,681	24,776,306	25,177,339	25,589,058
Participation in Line Extensions	368,210	379,620	391,384	403,512	416,015
Water Purchase Expenditures	29,275,999	30,050,965	30,846,446	31,662,983	32,501,135
Gulf Coast Expenditures	421,574	432,734	444,189	455,947	468,016
Debt Service	39,864,512	43,376,031	46,996,362	50,728,877	54,577,053
Total Expenses	**$ 128,285,147**	**$ 134,091,677**	**$ 140,075,533**	**$ 146,242,185**	**$ 152,597,275**
Excess (deficiency) of revenues	**$ 4,086,112**	**$ 4,446,043**	**$ 4,817,127**	**$ 5,199,710**	**$ 5,594,148**
Fund Balance					
Beginning Fund Balance	65,779,728	69,865,841	74,311,884	79,129,011	84,328,721
Ending Fund Balance	**$ 69,865,841**	**$ 74,311,884**	**$ 79,129,011**	**$ 84,328,721**	**$ 89,922,869**
Inc/(Dec) Year over Year	*$ 4,086,112*	*$ 4,446,043*	*$ 4,817,127*	*$ 5,199,710*	*$ 5,594,148*
Daily Operating Expense	**$ 351,466**	**$ 367,374**	**$ 383,769**	**$ 400,664**	**$ 418,075**
Days Cash on Hand	**199**	**202**	**206**	**210**	**215**
90 Days Operating Target	*90*	*90*	*90*	*90*	*90*
Debt Service Coverage					
Operating Revenues	$ 132,371,260	$ 138,537,720	$ 144,892,660	$ 151,441,895	$ 158,191,423
Operating Expenses	$ 88,420,635	$ 90,715,646	$ 93,079,171	$ 95,513,308	$ 98,020,222
Net Revenues Available for Debt Service	**$ 43,950,624**	**$ 47,822,074**	**$ 51,813,489**	**$ 55,928,587**	**$ 60,171,201**
Annual Debt Service	**$ 39,864,512**	**$ 43,376,031**	**$ 46,996,362**	**$ 50,728,877**	**$ 54,577,053**
Debt Coverage Ratio	**1.10**	**1.10**	**1.10**	**1.10**	**1.10**
Target Debt Coverage Ratio	*1.10*	*1.10*	*1.10*	*1.10*	*1.10*

Notes:

$9.7M Pioneer Contract Recognized in Non-Rate Revenues and Non-Departmental Expenditures.

Actual rate increases may vary. The City is currently undergoing a Cost of Service Study to determine actual rate increases.

Introduction

NewGen Strategies and Solution, LLC (NewGen) has compiled the following information regarding a variety of funding opportunities and resources the City may consider as it determines the best approach to funding major capital needs. Much of the information provided below has been gathered from other sources including the "Certified Government Finance Officer Study Guide for Debt Administration", TWICC.org, and TWDB.Texas.gov. We have only touched upon the surface of these options, but more detail is available from each source directly. You can also reach out to NewGen for any other specific questions, and we will be glad to assist the City or discuss options with the City's Financial Advisor.

Types of Funding Options

Bonds

Bonds are a form of long-term debt (typically 20 years or longer) a City uses for major capital infrastructure. Debt is often used because cash funding major projects is cost-prohibitive for current rate payers. Instead, debt payments that will be spread out over many years reduce the annual cash required from rates. Another often cited benefit of spreading payments out over time is that both the current and future residents benefit and also pay over the useful life of the asset. This concept is referred to as intergenerational equity. The three most common types of bonds issued by City's are detailed below.

Bonds with a Tax Pledge

General Obligation (GO) bonds and Certificates of Obligation (CO) are two forms of municipal debt secured by an unconditional credit guarantee. Both GO bonds and CO bonds are backed by the full faith and credit of the City; thus, the institution possesses the power to levy a property tax in order to meet the financial obligations of the debt. The primary difference between GO's and CO's is procedural, involving the methods of approval. GO bonds require general voter approval through an election, while CO bonds do not require voter approval. Instead of pre-approval through a bond election, CO's require a Notice of Intent, which must be approved by City Council and a period of time for the general public to review and potentially petition against the CO prior to committing the City to additional debt. If, during this public notice period, five percent (5%) or more of the registered voters petition the CO, the issuance would be subject to a public vote. After the public notice period has expired without the protest of sufficient petitioners, the City Council may take action to approve the sale of bonds.

In our experience, GO's are typically used for Roads, Facilities, Parks and other "quality of life" and quality of place" decisions. In the case of public safety and other legal requirements, such as providing continuous and adequate water and wastewater, City's more often rely on CO's. When funding enterprise fund activities, it is also common to see a pledge of user-fee or dedicated enterprise fund revenues in addition to taxing authority. For example, a water utility could pledge water revenues as well as the tax-backing of the City as security for its bonds. This pledge or revenues is usually referred to as self-supporting debt and City's rarely assess any additional property taxes to support these bond payments. Even though City's do not regularly use taxes for self-supporting debt, the fact that the City has pledged its ability to tax lowers risk to bond holders. In exchange for reduced risk, CO's usually have lower interest costs than revenue-only bonds.

Bonds without a Tax Pledge

Revenue bonds, unlike GO and CO bonds, are secured by a pledge of only system user revenues. As such revenue bonds are not backed by the taxing power of the governing entity. Generally, interest rates for revenue bonds sell anywhere from 0.05% - 0.25% higher than GOs and COs. As additional security on revenue bonds, many bond pledge agreements require annual revenues to exceed the cost to operate and cost of annual debt. This "debt service coverage" (DSC) is usually anywhere from 1.1 to 1.25 of the issuances and any related debt. DSC may have other stipulations and may be required by certain bond covenant language to be calculated differently.

In two simplified examples below, DSC is calculated as total revenues minus the cost of operations over the annual debt payments. In these examples, only the annual revenue changes. The major takeaway from this is that a higher debt service coverage requirement will cause annual rate or user fee revenues to exceed annual cash needs.

Breakeven System Revenues Not Meeting 1.10 DSC Coverage Requirement

Utility Expenses		
Operations and Maintenance (O&M)	$	1,000,000
Debt Payments (P&I)		1,000,000
Total Utility Expenses	$	2,000,000
Total Revenues	$	2,000,000
Less O&M Expenses		- 1,000,000
Revenues Available for DSC	$	1,000,000
Debt Service Coverage		1.00
		(1,000,000/1,000,000) = 1.00

Revenues Available Meeting 1.10 DSC Coverage Requirement

Utility Expenses		
Operations and Maintenance (O&M)	$	1,000,000
Debt Payments (P&I)		1,000,000
Total Utility Expenses	$	2,000,000
Total Revenues	$	2,100,000
Less O&M Expenses		- 1,000,000
Revenues Available for DSC	$	1,100,000
Debt Service Coverage		1.10
		(1,100,000/1,000,000) = 1.10

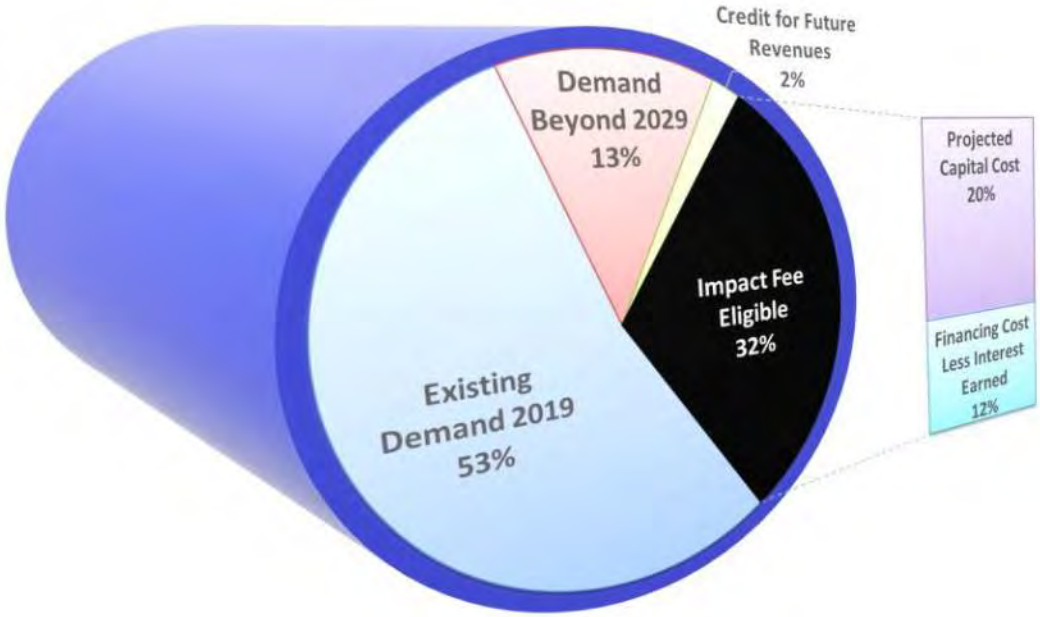
Impact Fees

Impact fees are growing increasingly common around the State of Texas, and this fee is frequently espoused by communities under the principle that "growth should pay for growth." Impact fees are a

state-approved mechanism that allows municipalities to recover part of infrastructure costs specifically associated with future development. Impact fees are governed by Chapter 395 of the Texas Local Government Code (LGC). LGC §395.001 defines impact fees as, "a charge or assessment imposed by a political subdivision against new development in order to generate revenue for funding or recouping the costs of capital improvements or facility expansions necessitated by and attributable to the new development." Impact fees cannot be used for the following purposes:

- Capital Improvement Projects NOT Identified in the Impact Fee CIP
- Operations and Maintenance Costs
- Improvements Associated with Existing Deficiencies
- Administrative and Operational Costs of the City
- Non-Impact Fee CIP Debt Service

Impact fees can be imposed on areas of the Extraterritorial Jurisdiction (ETJ) for Water and Wastewater Utilities. School districts are exempt from impact fees unless the School Board consents by entering into contractual agreement. The LGC statute spells out specific steps for adopting impact fees. To summarize the major steps, a City must have Land Use Assumptions and an Impact Fee-specific CIP not to exceed a period of ten years sealed by an engineer. By design, impact fees were not designed to recover 100% of the costs to construct new capital. In fact, Chapter 395 requires a plan for awarding either a credit for the portion of utility service revenues generated by new connections during the program's ten-year period that are used for payment of improvements that are included in the Impact Fee CIP. As an alternative, a credit equal to 50% of the total cost may be used.
As the diagram depicting a cutaway of a pipe illustrates, impact fees can only be based on growth demands within the ten-year period (Projected Capital and Financing Cost within the black pie area). For many major infrastructure improvements, the line size will support existing customers, customers in the next ten years and also future growth expected after the ten-year period. The engineer completing the Land Use Assumptions will make this determination for each project in the Impact Fee CIP, which will serve as the basis for costs eligible in the impact fee determination.



Impact fees are used as an effective tool to help fund capital improvement plans, while effectively accommodating growth. To shift part of the burden of funding capital costs from existing ratepayers, impact fees provide a means of fulfilling cash funding or debt service. Impact fees require some administration effort through segregated accounting, participation of a committee (often the Planning and Zoning Committee serves this role) and periodic review and updates. Residential impact fees are most often paid by the development community and are included in the price of a new home, which is often between 2 to 4 percent (2%-4%) of the total home price.

Other Funding Options

There are a number of other sources for potential revenues to offset utility capital costs. While the Bonds and Impact Fees are the primary tools used around Texas, we have provided a quick list of other options for a City or partnering organizations to help fund needed utility infrastructure.

- Type B Economic Development Corporation (EDC)
- Municipal Development District (MDD)
- Public Improvement District (PID) Assessments
- Tax Increment Reinvestment Zone (TIRZ or sometime TIF)
- Regional Cooperation for Cost Sharing

State Funding Programs

There are many funding programs available to utilities to help meet certain quality and affordability standards. Many of these programs are federally funded (or have federal matching dollars) and are administered by state organizations. Most common in Texas are funding options coordinated through the Texas Water Development Board (TWDB), which is the focus of our state funding summary below. TWDB maintains a wide array of resources to assist with the financing of supply, infrastructure, and development projects for water and wastewater. Since the Board began its work in 1957, more than 5,909 financial engagements and $27.6 billion of funds have been disbursed. The TWDB finances water and wastewater projects through affordable loans and grant programs throughout the entire state.

Application Process

The application (form TWDB-0148) required for the loan and grant resources can be accessed online. The application uses an extensive review of the applicant, including finance, legal, engineering, environmental, planning, and water conservation. There are no application fees; however, an origination fee may be assessed upon loan closing depending on the program selected. To provide more accessible assistance during the application process, the TWDB provides a project implementation staff. Projects listed on the Statewide Intended Use Plans receive priority funding consideration. The staff is organized into six regional teams, including a manager who will serve as the primary contact during the application process. Most programs fall into one of two major categories as outlined below.

General Obligation Loan Programs

Texas Water Development Fund – Water & Wastewater

The Water Development Fund (DFund) supports water and wastewater projects through a state-funded loan program. The DFund, however, does not receive any federal subsidies and does not offer grants. The borrowing rate is contingent on current market conditions and is aligns closely with TWDB's cost to borrow.

Economically Distressed Area Program – Water & Wastewater

The Economically Distressed Area Program (EDAP) supports projects that assist economically distressed areas where water or sewer facilities are not available or if respective systems do not adhere to the state's requirements. Initially funded by GO bonds, the EDAP supports water and wastewater projects in the form of grants and loans. Eligibility is determined through an application and ranking process.

General Obligation Loan Program Costs

Types of Funds	*Terms*	*Market Rate*	*TWDB Rate*	*Variance*
Development Fund (Tax Exempt)	20	3.63%	3.37%	0.26%
Development Fund (Tax Exempt)	30	4.09%	3.91%	0.18%
Development Fund (Taxable)	20	4.62%	3.81%	0.81%
EDAP (Tax Exempt)	20	3.63%	N/A	N/A
Agricultural Loans (Taxable)	7	3.86%	2.56%	1.30%
Rural Water Assistance Fund)	40	N/A	4.42%	N/A

Source: Texas Water Development Board – Interest Rates.

The rates listed above are updated as of March 1, 2019.
Loan origination fees range between 1.75% to 2.25% of principal depending on program specifics.

State Revolving Fund Programs

State Water Implementation Fund for Texas – Water

The State Water Implementation Fund for Texas (SWIFT) assists communities to generate and improve water supplies at affordable costs and offers an extensive list of loans, terms, and deferment options to support a variety of initiatives encompassed within the State Water Plan.

Clean Water State Revolving Fund - Wastewater

The Clean Water State Revolving Fund (CWSRF) is a financial assistance program that provides low-cost financing for a wide array of wastewater infrastructure projects. Within the CWSRF, the Environmental Protection Agency (EPA) delivers grant funds to state-level CWSRF loan programs, including Puerto Rico.

Drinking Water State Revolving Fund - Water

The Drinking Water State Revolving Fund (DWSRF) aids states and water systems to successfully accomplish the objectives of the Safe Drinking Water Act (SDWA). As funding is adequately distributed by Congress for the DWSRF, the EPA then provides grants to each state as determined by the results of the Drinking Water Infrastructure Needs Survey and Assessment.

State Revolving Fund Program Costs

Types of Funds	*Terms*	*Market Rate*	*TWDB Rate*	*Variance*
Clean Water SRF Non-Equivalency (AA)	20	2.79%	1.49%	1.30%
Clean Water SRF Equivalency (AA)	20	2.79%	1.14%	1.65%

Drinking Water SRF (AA)	20	2.79%	1.44%	1.35%
Clean Water SRF Non-Equivalency (AA)	30	3.04%	1.74%	1.30%
Clean Water SRF Equivalency (AA)	30	3.04%	1.39%	1.65%
Drinking Water SRF (AA)	30	3.04%	1.69%	1.35%

Source: Texas Water Development Board – Interest Rates.

The rates listed above are updated as of March 1, 2019.
Loan origination fees range between 1.75% to 2.25% of principal depending on program specifics.

TWDB Loan Conditions Matrix – Extracted from TWDB Resource Guides

http://www.twdb.texas.gov

Conditions of Financial Assistance				
Financial Assistance Programs:	Eligible Applicants	Security Instruments:	Typical Pledges Include:	Length of Loans:
State Water Implementation Fund for Texas (SWIFT) -Water	- Political Subdivisions - Water Supply Corporations	- Bonds - Loan Agreement - Master Agreement	- System Revenue - Contract Revenue - Ad Valorem Tax - Tax and Revenue Pledge	- 20 to 30 years - 34 years for Board Participation
Clear Water State Revolving Fund (CWSRF) - Wastewater	- Political Subdivisions - Private Entities (Nonpoint Source Projects Only)	- Bonds - Loan Agreement	- System Revenue - Contract Revenue - Ad Valorem Tax - Tax and Revenue Pledge	- 20 to 30 years
Drinking Water State Revolving Fund (DWSRF) - Water	- Political Subdivisions - Water Supply Corporations - Investor Owned Utilities	- Bonds - Loan Agreement	- System Revenue - Contract Revenue - Ad Valorem Tax - Tax and Revenue Pledge	- 20 to 30 years
Economically Distressed Areas Program (EDAP) - Water & Wastewater	- Entities with Adopted Model Subdisivion Rules - Political Subdivisions - Water Supply Corporations	- Bonds - Loan Agreement	- System Revenue - Contract Revenue - Ad Valorem Tax - Tax and Revenue Pledge	- 20 years
Rural Water Assistance Fund (RWAF) - Water & Wastewater	- Political Subdivisions - Water Supply Corporations	- Bonds - Loan Agreement	- System Revenue - Contract Revenue - Ad Valorem Tax - Tax and Revenue Pledge	- 20 to 40 years
State Participation Program - Water & Wastewater	- Political Subdivisions - Water Supply Corporations - Project must be included in adopted State Water Plan /	- Master Agreement (includes responsibilities, duties and liabilities of each party, and provisions for a defined source	- System Revenue - Contract Revenue - Ad Valorem Tax - Tax and Revenue Pledge	- up to 34 years
Texas Water Development Fund (DFUND) - Water, Wastewater, & Flood Control	- Political Subdivisions (including non-profits) - Water Supply Corporations	- Bonds - Loan Agreement	- System Revenue - Contract Revenue - Ad Valorem Tax - Tax and Revenue Pledge	- varies

Sources

1. Financial Assistance. (n.d.). Retrieved March 7, 2019, from http://www.twdb.texas.gov/financial/index.asp
2. Resources - Funding. (n.d.). Retrieved March 7, 2019, from http://www.twicc.org/resources/funding.asp
3. London, B., & Hughes, J. (2017). Certified Government Finance Officer Program Study Guide for Debt Administration. Retrieved March 7, 2019.

Appendix F – Project Description Sheets and Opinions of Probable Construction Costs

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

Project No.	Project Name	Project Cost	Market Scarcity Adjustment (1.5x)
5 Year Projects			
1	LINE P INTERCEPTOR SEGMENT I	$ 20,023,000.00	$ 30,034,500.00
2	LINE Q INTERCEPTOR SEGMENT I	$ 11,746,000.00	$ 17,619,000.00
3	LINE Q INTERCEPTOR SEGMENT II	$ 1,879,000.00	$ 2,818,500.00
4	MISSION BLVD 8-INCH TRUNK MAIN	$ 306,000.00	$ 459,000.00
5	FAUDREE RD 18-INCH TRUNK MAIN	$ 1,087,000.00	$ 1,630,500.00
6	FAUDREE RD 15-INCH NORTH TRUNK MAIN	$ 1,220,000.00	$ 1,830,000.00
7	LINE H INTERCEPTOR SEGMENT I	$ 5,523,000.00	$ 8,284,500.00
8	I-20 BUSINESS 15-INCH TRUNK MAIN EXTENSION	$ 3,633,000.00	$ 5,449,500.00
	5-Year Projects Sub-Total:	$ 45,417,000.00	$ 68,125,500.00
10 Year Projects			
9	LINE P BASIN SOUTHEAST LIFT STATION, FORCE MAIN, AND RELIEF TRUNK MAIN	$ 5,919,000.00	$ 8,878,500.00
10	FAUDREE RD 15-INCH NORTH TRUNK MAIN EXTENSION	$ 1,118,000.00	$ 1,677,000.00
11	RATLIFF RANCH NORTHEAST 12-INCH TRUNK MAIN	$ 2,359,000.00	$ 3,538,500.00
12	RATLIFF RANCH NORTH 12-INCH TRUNK MAIN	$ 1,092,000.00	$ 1,638,000.00
13	FM 554 NORTHEAST 15-INCH TRUNK MAIN	$ 1,155,000.00	$ 1,732,500.00
14	FM 554 NORTH 15, 12-INCH TRUNK MAIN	$ 1,226,000.00	$ 1,839,000.00
15	WEST I-20 24-INCH TRUNK MAIN	$ 3,722,000.00	$ 5,583,000.00
	10-Year Projects Sub-Total:	$ 16,591,000.00	$ 24,886,500.00

Project No.	Project Name	Project Cost	Market Scarcity Adjustment (1.5x)
25 Year Projects			
16	WEST 22ND ST 12-INCH PARALLEL TRUNK MAIN	$ 1,064,000.00	$ 1,596,000.00
17	LINE 12 BASIN LIFT STATION, 24-INCH FORCE MAIN, AND 12-INCH TRUNK MAIN	$ 7,552,000.00	$ 11,328,000.00
18	COMANCHE TRAIL EAST PARK 36-INCH TRUNK MAIN	$ 1,634,000.00	$ 2,451,000.00
19	SOUTH GRANT AVE 42-INCH TRUNK MAIN	$ 499,000.00	$ 748,500.00
20	LINE P BASIN NORTHEAST LIFT STATION & 15-INCH FORCE MAIN	$ 4,612,000.00	$ 6,918,000.00
21	LINE H NORTHWEST INTERCEPTOR SEGMENT III	$ 3,436,000.00	$ 5,154,000.00
22	US 385 NORTH 12-INCH TRUNK MAIN	$ 2,733,000.00	$ 4,099,500.00
23	LINE 12 BASIN LIFT STATION 30, 24-INCH TRUNK MAIN	$ 3,963,000.00	$ 5,944,500.00
24	GOLDER AVE 12-INCH TRUNK MAIN	$ 1,606,000.00	$ 2,409,000.00
25	GOLDER AVE AND WEST 87TH ST 21, 15-INCH TRUNK MAIN	$ 2,806,000.00	$ 4,209,000.00
26	SUNSET COUNTRY CLUB 15-INCH TRUNK MAIN	$ 1,308,000.00	$ 1,962,000.00
27	LINE G BASIN LIFT STATION AND 12-INCH FORCE MAIN	$ 2,867,000.00	$ 4,300,500.00
28	LINE G BASIN LIFT STATION 12-INCH TRUNK MAIN	$ 2,127,000.00	$ 3,190,500.00
29	WESTOVER DR 12-INCH PARALLEL TRUNK MAIN	$ 1,670,000.00	$ 2,505,000.00
30	HWY 302 12-INCH TRUNK MAIN	$ 4,071,000.00	$ 6,106,500.00
31	NORTHWEST LOOP 338 12-INCH TRUNK MAIN	$ 2,174,000.00	$ 3,261,000.00
32	I-20 BUSINESS 15, 12-INCH TRUNK MAIN EXTENSION	$ 3,156,000.00	$ 4,734,000.00
33	MOSS RANCH 18-INCH TRUNK MAIN	$ 2,544,000.00	$ 3,816,000.00
34	HENDERSON RANCH 15, 12-INCH TRUNK MAIN	$ 3,816,000.00	$ 5,724,000.00
35	SOUTHWEST BASIN INTERCEPTOR SEGMENT I	$ 6,165,000.00	$ 9,247,500.00
36	SOUTHWEST BASIN INTERCEPTOR SEGMENT II	$ 4,128,000.00	$ 6,192,000.00
37	SOUTHWEST BASIN INTERCEPTOR SEGMENT III	$ 1,689,000.00	$ 2,533,500.00
38	SOUTHWEST BASIN LIFT STATION AND 24-INCH FORCE MAIN	$ 4,645,000.00	$ 6,967,500.00
39	SOUTHWEST BASIN INTERCEPTOR SEGMENT IV	$ 1,887,000.00	$ 2,830,500.00
40	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT I	$ 2,442,000.00	$ 3,663,000.00
41	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT II	$ 4,345,000.00	$ 6,517,500.00
42	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT III	$ 1,342,000.00	$ 2,013,000.00
43	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT IV	$ 635,000.00	$ 952,500.00
44	LONE STAR DR 21-INCH TRUNK MAIN	$ 1,207,000.00	$ 1,810,500.00
45	ANGEL TR 18, 15, 12-INCH TRUNK MAIN	$ 3,305,000.00	$ 4,957,500.00
46	EAST GETTYSBURG ST 15, 12-INCH TRUNK MAIN	$ 3,526,000.00	$ 5,289,000.00
47	MCKINNEY PARK 24-INCH TRUNK MAIN	$ 327,000.00	$ 490,500.00
48	SOUTH JOHN BEN SHEPPARD PARKWAY BLVD 12-INCH TRUNK MAIN	$ 373,000.00	$ 559,500.00
49	LINE P BASIN SOUTHEAST LIFT STATION PHASE II UPGRADE	$ 608,000.00	$ 912,000.00
50	BOB DERRINGTON TREATMENT PLANT UPGRADE TO 17.7 MGD	$ 101,250,000.00	$ 151,875,000.00
	25-Year Projects Sub-Total:	**$ 191,512,000.00**	**$ 287,268,000.00**
Beyond 25 Year Projects			
51	LINE H INTERCEPTOR SEGMENT I	$ 15,730,000.00	$ 23,595,000.00
52	LINE 12 BASIN LIFT STATION PHASE II UPGRADE	$ 2,160,000.00	$ 3,240,000.00
	25-Year Projects Sub-Total:	**$ 17,890,000.00**	**$ 26,835,000.00**
	Projects Grand-Total:	**$ 271,410,000.00**	**$ 407,115,000.00**

Basis for Cost Projection:

- ☑ No Design Completed
- ☐ Preliminary Design
- ☐ Final Design

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 5,050 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

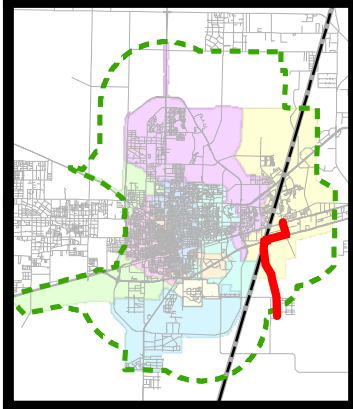
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

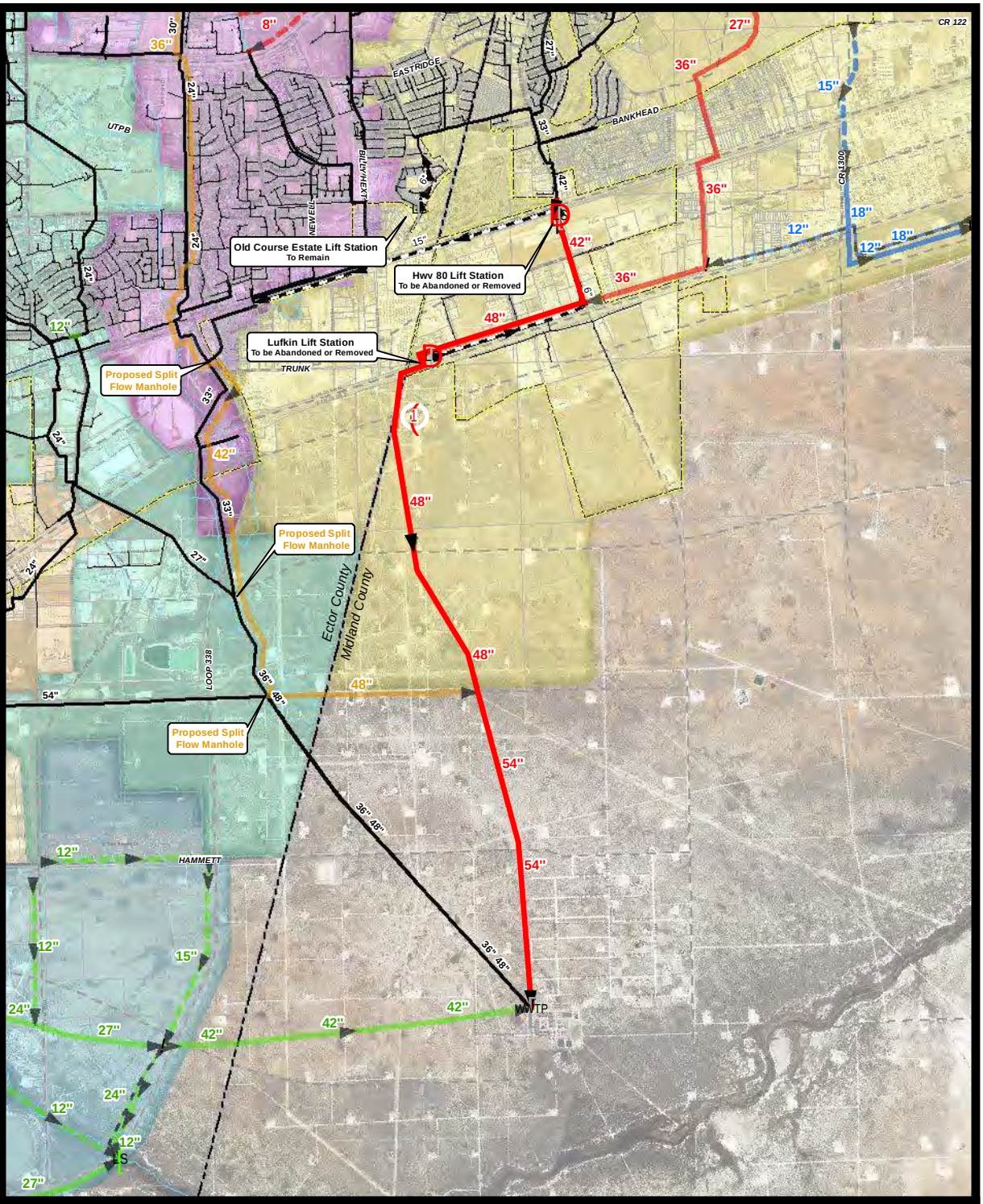
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 5-Year

Project Description: This project consists of approximately 10,500 LF of 54", 17,900 LF of 48", and 3,500 LF of 42" sewer line from the wastewater treatment plant to the intersection of Faudree Rd and W Highway 80 E.

Recommendation Comments: This project provides conveyance from the to be abandoned Hwy 80 Lift Station to the Bob Derrington Wastewater Treatment Plant. This project will allow for the Hwy 80 and Lufkin lift stations to be abandoned.

Project Cost: $20,023,000.00

Project Name: LINE P INTERCEPTOR SEGMENT I

Kimley-Horn & Associates, Inc.				Opinion of Probable Construction Cost	
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#1	LINE P INTERCEPTOR SEGMENT I				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$420,000.00	$420,000
2	Traffic Control	1	LS	$280,000.00	$280,000
3	Erosion Control	1	LS	$140,000.00	$140,000
4	54" Fiberglass Sanitary Sewer	10,400	LF	$400.00	$4,160,000
5	48" Fiberglass Sanitary Sewer	17,400	LF	$350.00	$6,090,000
6	42" Fiberglass Sanitary Sewer	2,700	LF	$300.00	$810,000
7	84" Bore with Steel Casing	100	LF	$1,500.00	$150,000
8	72" Bore with Steel Casing	500	LF	$1,250.00	$625,000
9	64" Bore with Steel Casing	800	LF	$1,000.00	$800,000
10	Sewer Line Trench Safety	30,500	LF	$3.00	$91,500
11	6' Standard Concrete Manhole	64	EA	$13,000.00	$829,400
12	Hydromulch Repair	67,800	SY	$2.00	$135,600
13	Allowance	1	LS	$300,000.00	$300,000

Basis for Cost Projection:			
☑ No Design Completed	Subtotal:		$14,831,500
☐ Preliminary Design	Conting. (%,+/-)	20%	$ 2,966,775
☐ Final Design	Professional Services (%,+/-)	15%	$ 2,224,725
	Total:		**$20,023,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 5,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

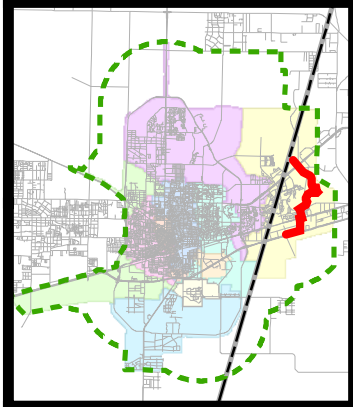
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

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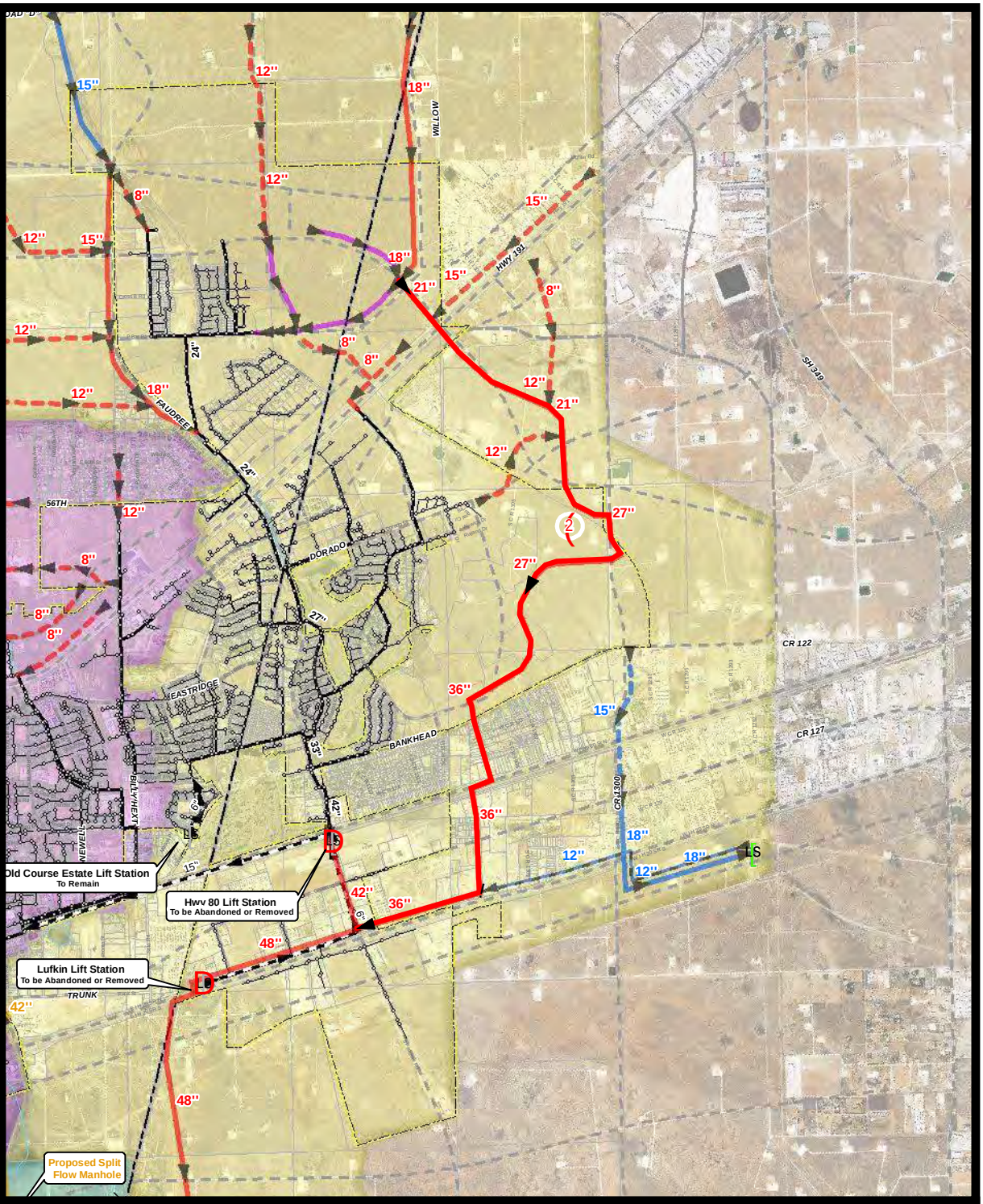


Phase: 5-Year

Project Description: This project consists of approximately 13,300 LF of 36", 10,700 LF of 27", and 7,100 LF of 21" sewer line from I-20 to HWY 191.

Recommendation Comments: This project will allow for additional growth on the east side of the City in the Line P basin. This project is being driven by demand for development in the Line P Basin.

Project Cost: $11,746,000.00

Project Name: LINE Q INTERCEPTOR SEGMENT I

Kimley-Horn & Associates, Inc.				Opinion of Probable Construction Cost	
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#2	LINE Q INTERCEPTOR SEGMENT I				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$240,000.00	$240,000
2	Traffic Control	1	LS	$160,000.00	$160,000
3	Erosion Control	1	LS	$160,000.00	$160,000
4	36" Fiberglass Sanitary Sewer	13,300	LF	$250.00	$3,325,000
5	27" SDR-26 PVC Sanitary Sewer	10,700	LF	$180.00	$1,926,000
6	21" SDR-26 PVC Sanitary Sewer	7,100	LF	$140.00	$994,000
7	54" Bore with Steel Casing	500	LF	$850.00	$425,000
8	36" Bore with Steel Casing	500	LF	$600.00	$300,000
9	Sewer Line Trench Safety	31,100	LF	$3.00	$93,300
10	6' Standard Concrete Manhole	49	EA	$13,000.00	$637,000
11	5' Standard Concrete Manhole	15	EA	$8,000.00	$121,600
12	Hydromulch Repair	69,200	SY	$2.00	$138,400
13	Allowance	1	LS	$180,000.00	$180,000
	Basis for Cost Projection:	Subtotal:			$8,700,300
☑	No Design Completed	Conting. (%,+/-)		20%	$ 1,740,655
☐	Preliminary Design	Professional Services (%,+/-)		15%	$ 1,305,045
☐	Final Design	**Total:**			**$11,746,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

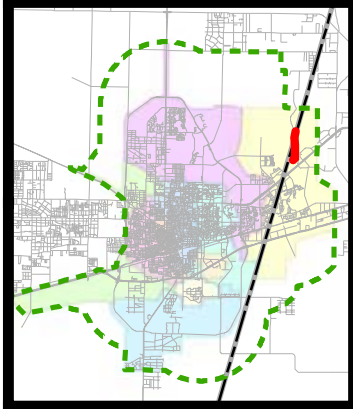
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

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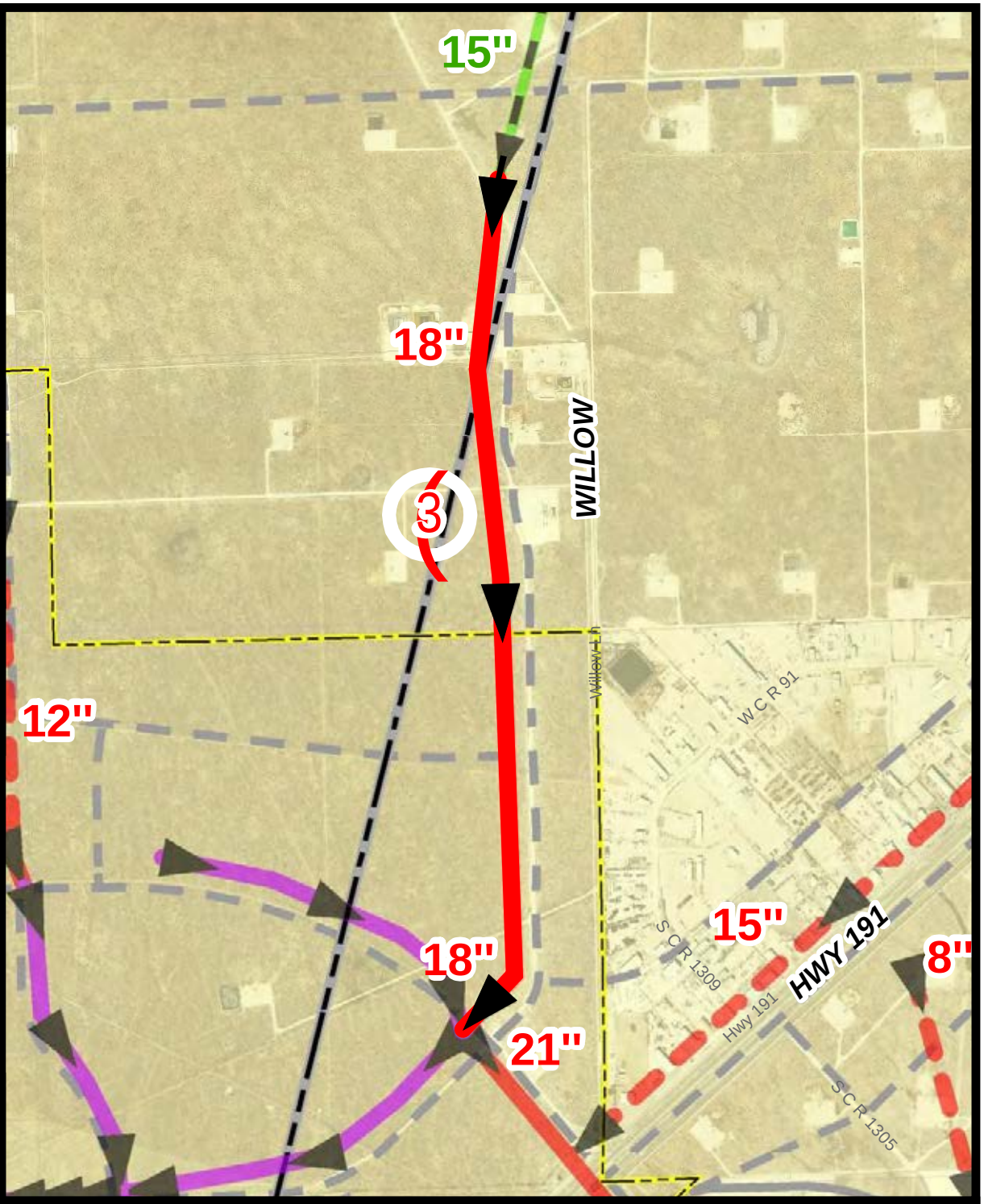


Phase: 5-Year

Project Description: This project consists of approximately 8,500 LF of 18" sewer line just north of HWY 191 along Willow Ln.

Recommendation Comments: This project will allow for additional growth on the east side of the City in the Line P basin. This project is being driven by demand for development in the Line P Basin.

Project Cost: $1,879,000.00

Project Name: LINE Q INTERCEPTOR SEGMENT II

Kimley-Horn & Associates, Inc.					Opinion of Probable Construction Cost
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#3	LINE Q INTERCEPTOR SEGMENT II				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$40,000.00	$40,000
2	Traffic Control	1	LS	$30,000.00	$30,000
3	Erosion Control	1	LS	$30,000.00	$30,000
4	18" SDR-26 PVC Sanitary Sewer	8,500	LF	$125.00	$1,062,500
5	Sewer Line Trench Safety	8,500	LF	$3.00	$25,500
6	5' Standard Concrete Manhole	17	EA	$8,000.00	$136,000
7	Hydromulch Repair	18,900	SY	$2.00	$37,800
8	Allowance	1	LS	$30,000.00	$30,000
	Basis for Cost Projection:	Subtotal:			$1,391,800
☑	No Design Completed	Conting. (%,+/-)		20%	$ 278,430
☐	Preliminary Design	Professional Services (%,+/-)		15%	$ 208,770
☐	Final Design	**Total:**			**$1,879,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

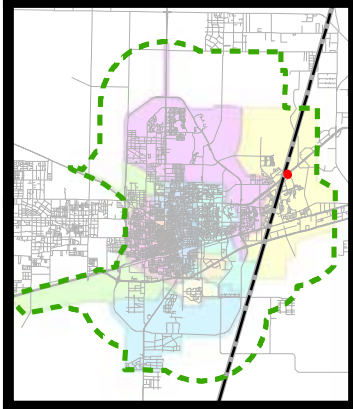
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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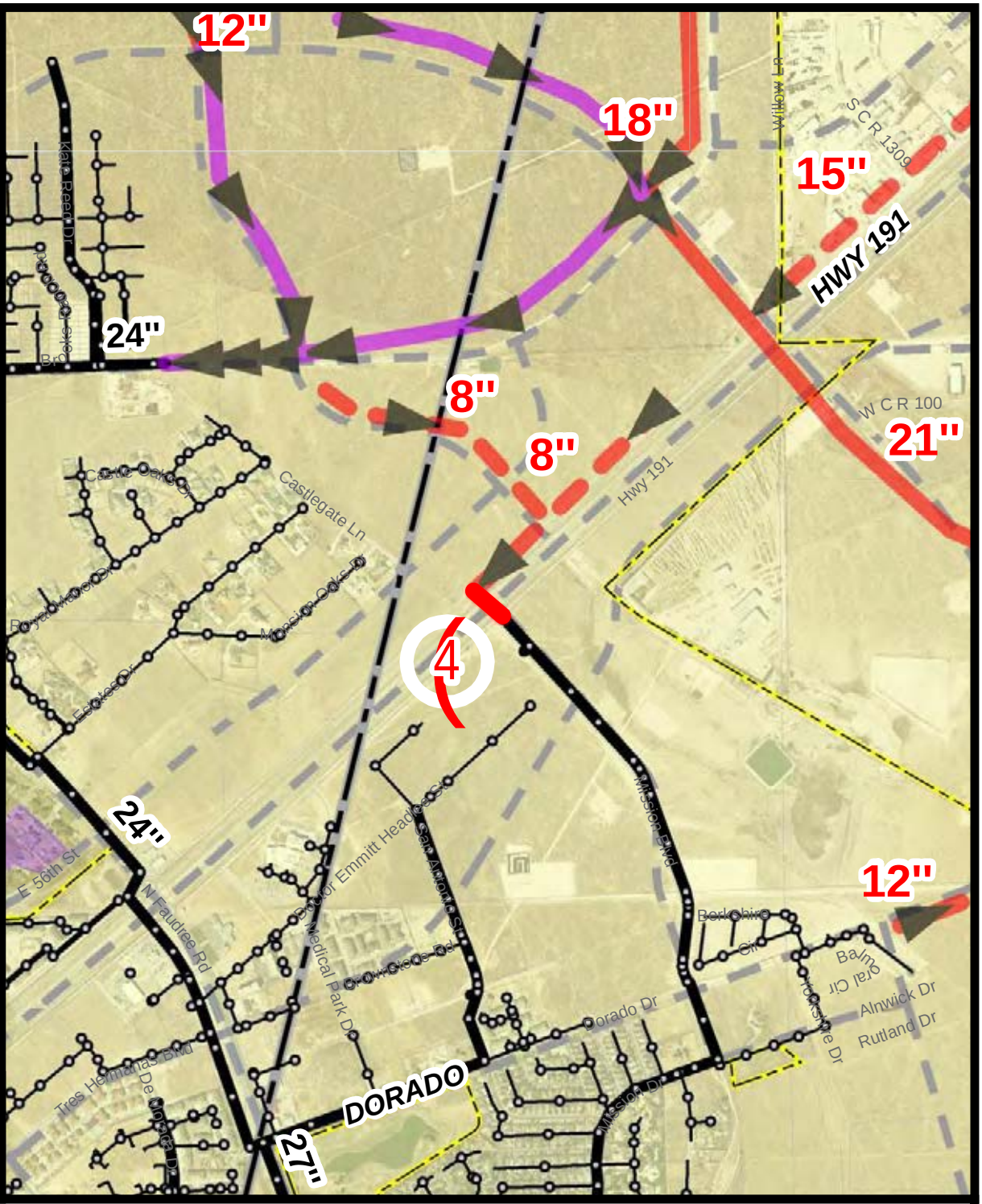


Phase: 5-Year

Project Description: This project consists of approximately 400 LF of 8" sewer line across HWY 191.

Recommendation Comments: This project provides a connection by bore for future development on the north side of Hwy 191 to the existing wastewater system.

Project Cost: $306,000.00

Project Name: MISSION BLVD 8-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.					Opinion of Probable Construction Cost
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#4	MISSION BLVD 8-INCH TRUNK MAIN				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	16" Bore with Steel Casing	400	LF	$450.00	$180,000
5	5' Standard Concrete Manhole	1	EA	$8,000.00	$6,400
6	Allowance	1	LS	$10,000.00	$10,000
	Basis for Cost Projection:	Subtotal:			$226,400
☑	No Design Completed	Conting. (%,+/-)		20%	$ 45,640
☐	Preliminary Design	Professional Services (%,+/-)		15%	$ 33,960
☐	Final Design	**Total:**			**$306,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

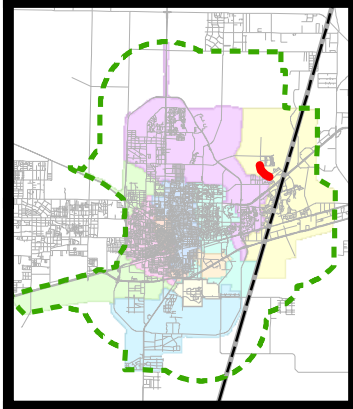
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

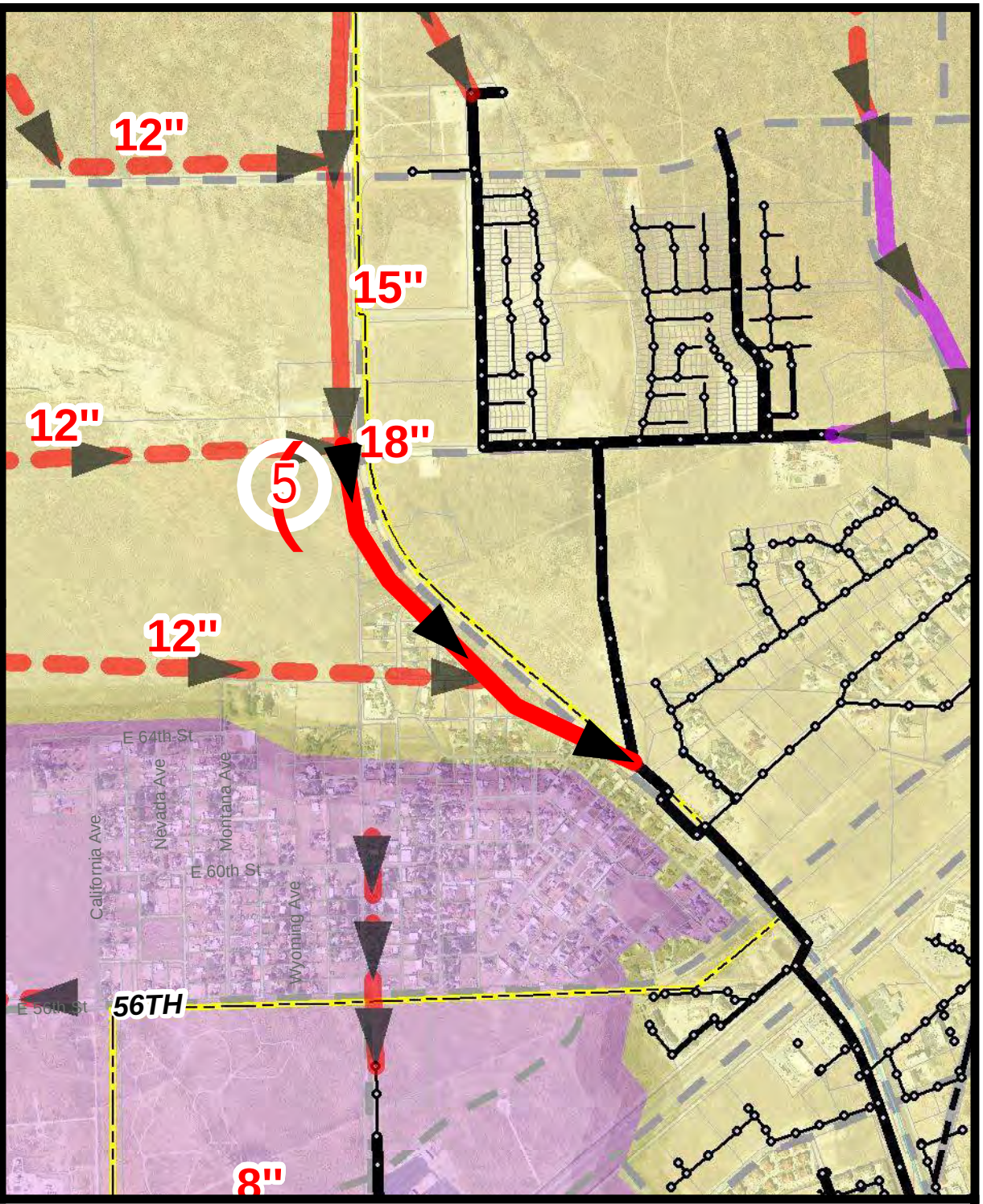
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 5-Year

Project Description: This project consists of approximately 4,500 LF of 18" sewer line along Faudree Rd from P Bar Ranch Rd to the intersection of Faudree Rd and Windchase St.

Recommendation Comments: This project provides conveyance for future development on the west and north side of Line P to the existing wastewater system along Faudree Rd. This project is being driven by demand for development in the Line P Basin.

Project Cost: $1,087,000.00

Project Name: FAUDREE RD 18-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#5 FAUDREE RD 18-INCH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$30,000.00	$30,000
2	Traffic Control	1	LS	$20,000.00	$20,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	18" SDR-26 PVC Sanitary Sewer	4,400	LF	$125.00	$550,000
5	30" Bore with Steel Casing	100	LF	$600.00	$60,000
6	Sewer Line Trench Safety	4,400	LF	$3.00	$13,200
7	5' Standard Concrete Manhole	9	EA	$8,000.00	$72,000
8	Hydromulch Repair	9,800	SY	$2.00	$19,600
9	Allowance	1	LS	$20,000.00	$20,000

Basis for Cost Projection:			
	Subtotal:		$804,800
☑ No Design Completed	Conting. (%,+/-)	20%	$ 161,480
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 120,720
☐ Final Design	**Total:**		**$1,087,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

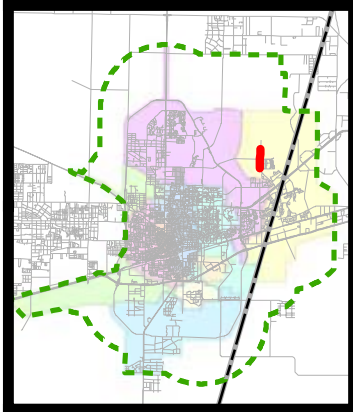
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

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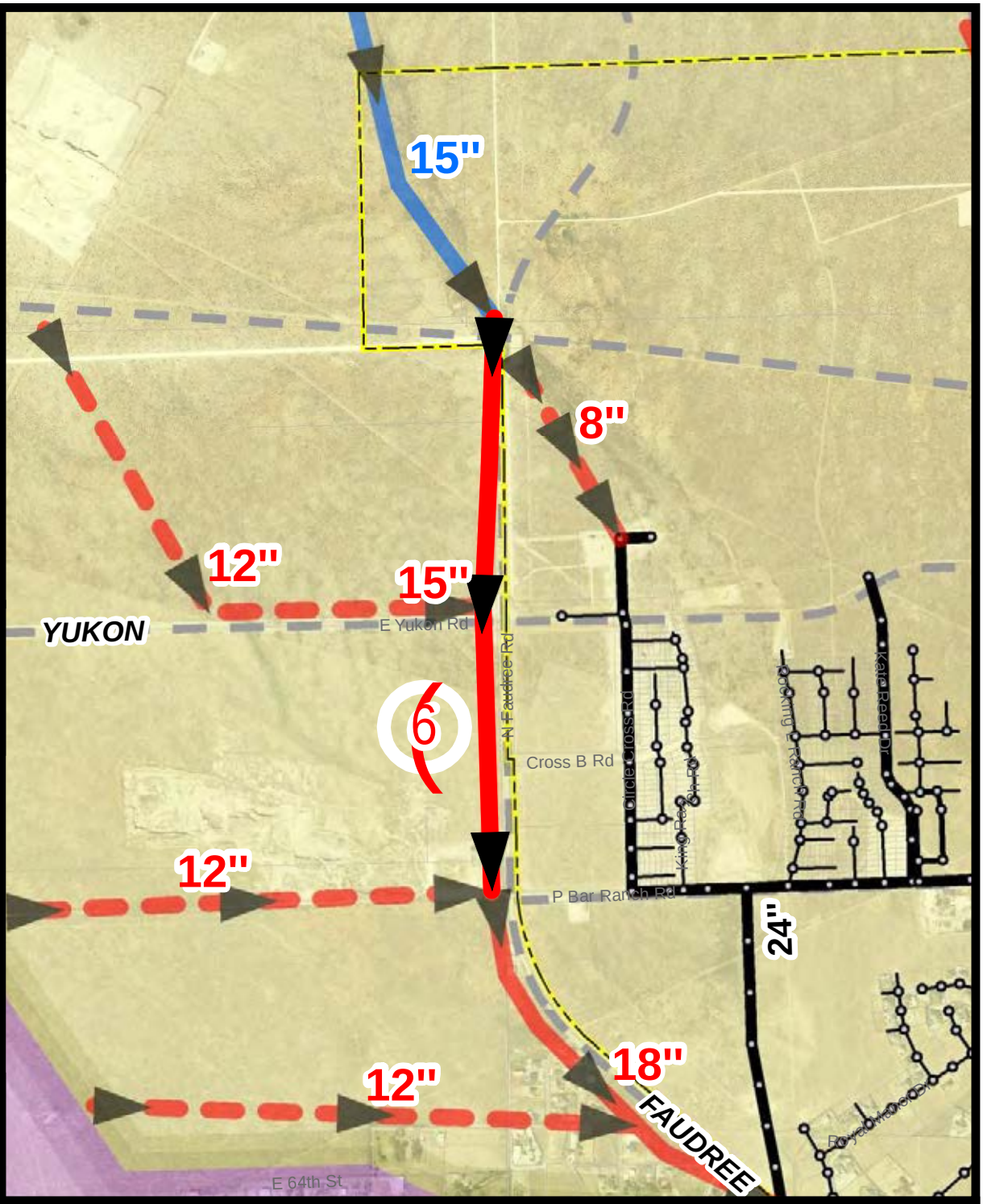


Phase: 5-Year

Project Description: This project consists of approximately 5,600 LF of 15" sewer line along Faudree Rd from P Bar Ranch Rd to just north of the intersection of Yukon Rd and Faudree Rd.

Recommendation Comments: This project provides conveyance for future development on the west and north side of Line P to the existing wastewater system along Faudree Rd. This project is being driven by demand for development in the Line P Basin.

Project Cost: $1,220,000.00

Project Name: FAUDREE RD 15-INCH NORTH TRUNK MAIN

6

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#6 FAUDREE RD 15-INCH NORTH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$30,000.00	$30,000
2	Traffic Control	1	LS	$20,000.00	$20,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	15" SDR-26 PVC Sanitary Sewer	5,500	LF	$115.00	$632,500
5	24" Bore with Steel Casing	100	LF	$500.00	$50,000
6	Sewer Line Trench Safety	5,500	LF	$3.00	$16,500
7	5' Standard Concrete Manhole	11	EA	$8,000.00	$89,600
8	Hydromulch Repair	12,300	SY	$2.00	$24,600
9	Allowance	1	LS	$20,000.00	$20,000

Basis for Cost Projection:			
	Subtotal:		$903,200
☑ No Design Completed	Conting. (%,+/-)	20%	$ 181,320
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 135,480
☐ Final Design	**Total:**		**$1,220,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 3,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

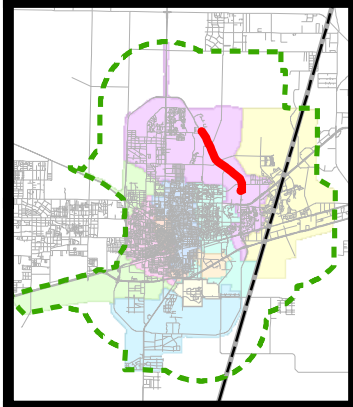
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

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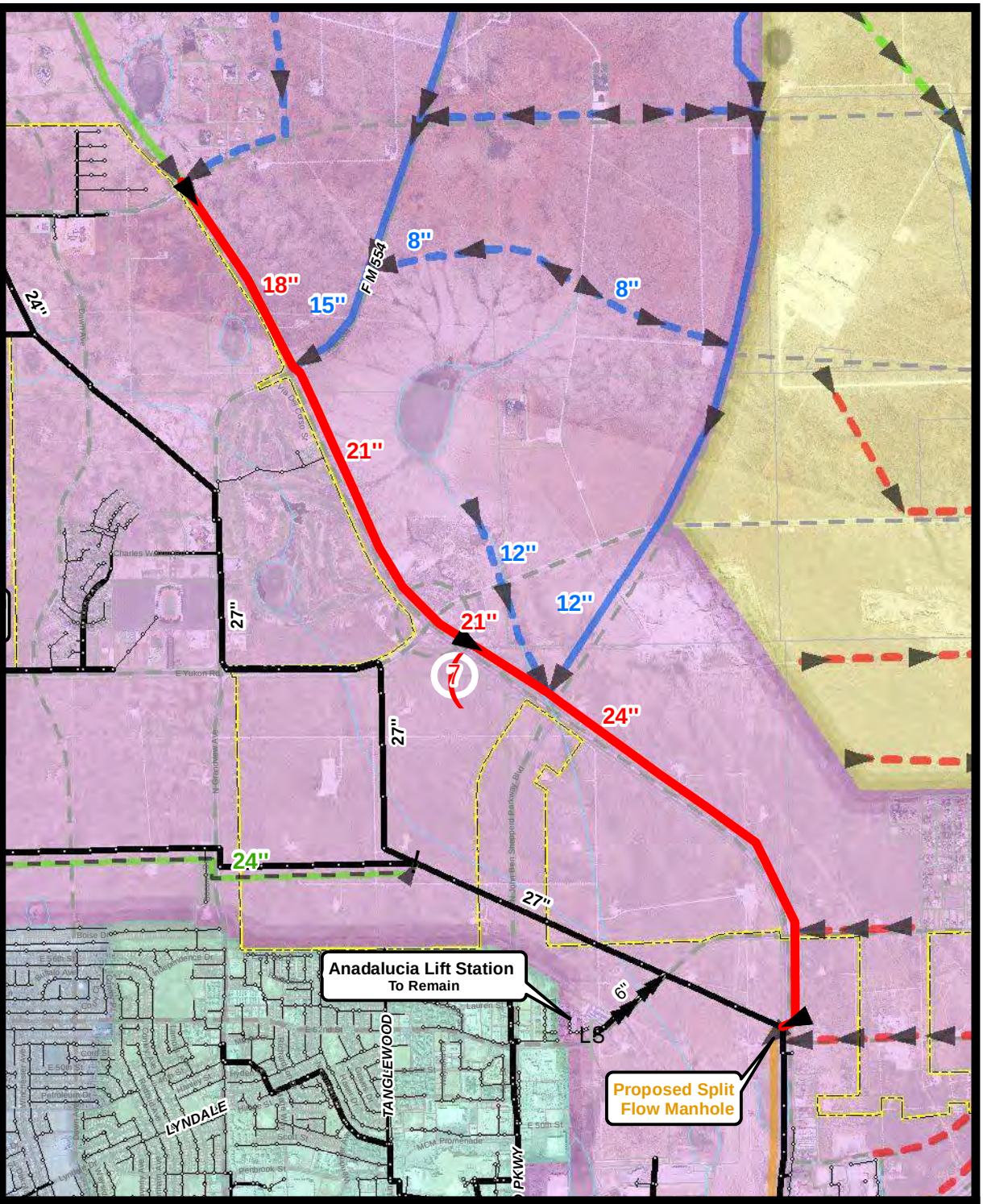


Phase: 5-Year

Project Description: This project consists of approximately 8,900 LF of 24", 8,400 LF of 21", and 4,200 LF of 18" sewer line along Loop 338 from just south of 52nd St to 87th St.

Recommendation Comments: This project provides conveyance from the northeast portion of the Line H basin along Loop 338 to the existing wastewater system. This project is being driven by demand for development on the east side of the Line H basin.

Project Cost: $5,523,000.00

Project Name: LINE H INTERCEPTOR SEGMENT I

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#7	LINE H INTERCEPTOR SEGMENT I		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$120,000.00	$120,000
2	Traffic Control	1	LS	$80,000.00	$80,000
3	Erosion Control	1	LS	$40,000.00	$40,000
4	24" SDR-26 PVC Sanitary Sewer	8,700	LF	$160.00	$1,392,000
5	21" SDR-26 PVC Sanitary Sewer	8,300	LF	$140.00	$1,162,000
6	18" SDR-26 PVC Sanitary Sewer	4,200	LF	$125.00	$525,000
7	36" Bore with Steel Casing	300	LF	$600.00	$180,000
8	Sewer Line Trench Safety	21,200	LF	$3.00	$63,600
9	5' Standard Concrete Manhole	43	EA	$8,000.00	$344,000
10	Hydromulch Repair	47,200	SY	$2.00	$94,400
11	Allowance	1	LS	$90,000.00	$90,000

Basis for Cost Projection:			
	Subtotal:		$4,091,000
☑ No Design Completed	Conting. (%,+/-)	20%	$ 818,350
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 613,650
☐ Final Design	**Total:**		**$5,523,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 3,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

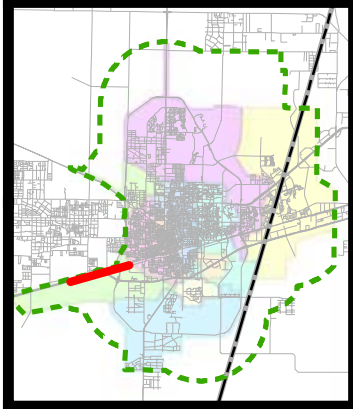
Proposed Trunk Main

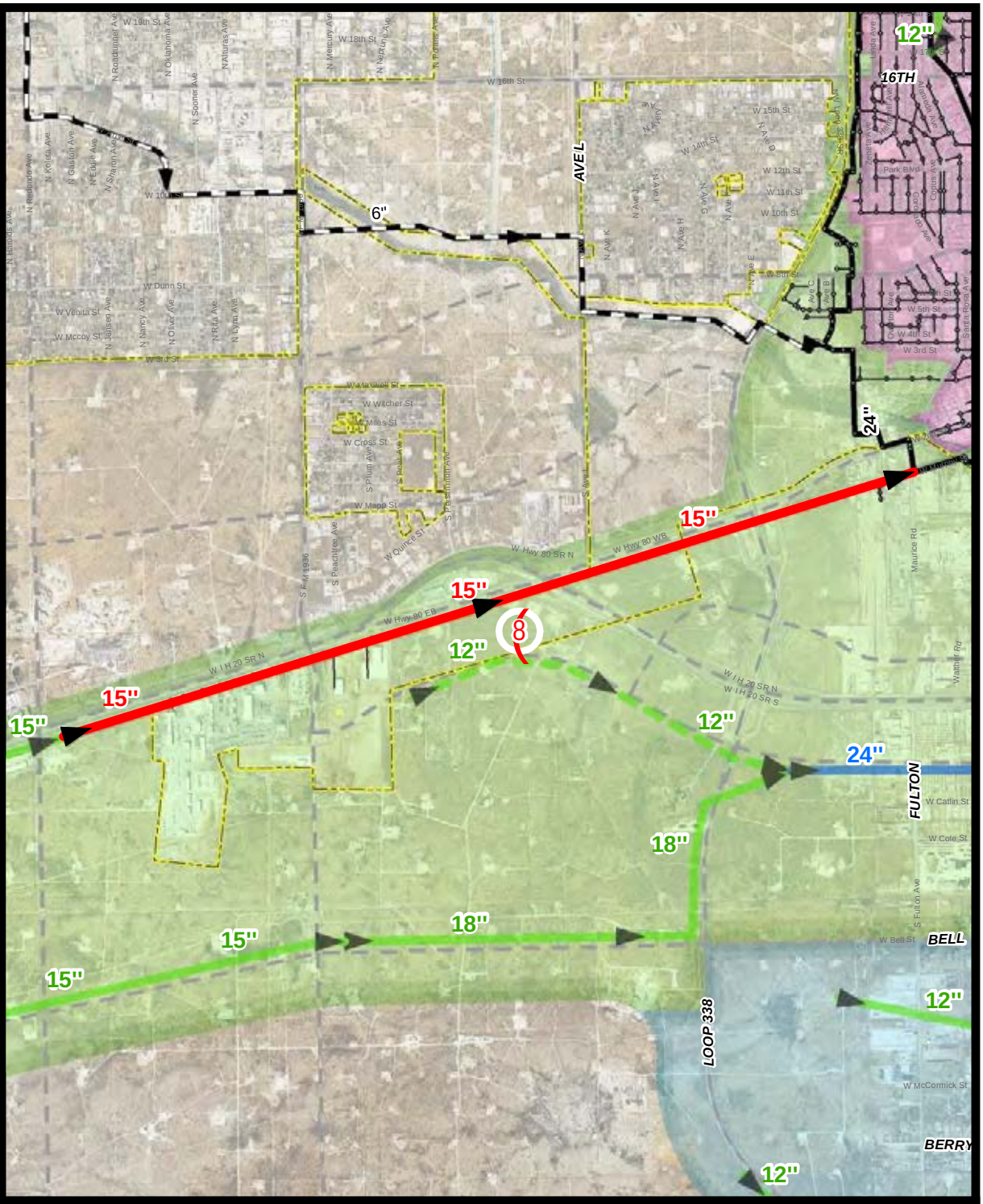
Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD





Kimley»Horn

April 2019

Phase: 5-Year

Project Description: This project consists of approximately 17,300 of 15" sewer line along W Murphy St.

Recommendation Comments: This project provides conveyance from the southeast portion of the Line A basin along Interstate I-20 to the existing wastewater system. This project is being driven by demand for development along the frontage of Interstate 20.

Project Cost: $3,633,000.00

Project Name: I-20 BUSINESS 15-INCH TRUNK MAIN EXTENSION

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#8 I-20 BUSINESS 15-INCH TRUNK MAIN EXTENSION

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$80,000.00	$80,000
2	Traffic Control	1	LS	$50,000.00	$50,000
3	Erosion Control	1	LS	$30,000.00	$30,000
4	15" SDR-26 PVC Sanitary Sewer	17,100	LF	$115.00	$1,966,500
5	24" Bore with Steel Casing	200	LF	$500.00	$100,000
6	Sewer Line Trench Safety	17,100	LF	$3.00	$51,300
7	5' Standard Concrete Manhole	35	EA	$8,000.00	$276,800
8	Hydromulch Repair	38,000	SY	$2.00	$76,000
9	Allowance	1	LS	$60,000.00	$60,000

Basis for Cost Projection:			
	Subtotal:		$2,690,600
☑ No Design Completed	Conting. (%,+/-)	20%	$ 538,810
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 403,590
☐ Final Design	**Total:**		**$3,633,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 2,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

Proposed Trunk Main

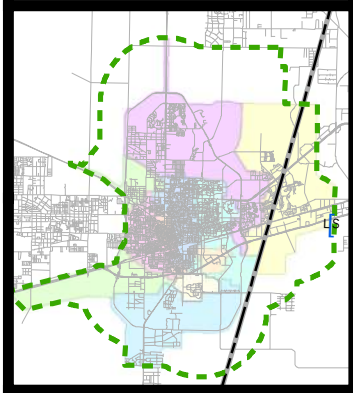
Proposed Lift Station

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019

Phase: 10-Year

Project Description: This project consists of approximately 7,600 LF of 18" sewer line, 10,300 LF of 12" force main, and a 2.5 MGD lift station.

Recommendation Comments: This project serves a localized topographic low point in the wastewatwer system. This project provides conveyance from the east portion of the Line P basin to the proposed Line Q interceptor. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $5,919,000

Project Name: LINE P BASIN SOUTHEAST LIFT STATION, FORCE MAIN, AND RELIEF TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#9	LINE P BASIN SOUTHEAST LIFT STATION, FORCE MAIN, AND RELIEF TRUNK MAIN		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$130,000	$130,000
2	Traffic Control	1	LS	$90,000	$90,000
3	Erosion Control	1	LS	$50,000	$50,000
4	Allowance	1	LS	$90,000	$90,000
5	18" SDR-26 PVC Sanitary Sewer	7,100	LF	$125.00	$887,500
6	30" Bore with Steel Casing	500	LF	$600.00	$300,000
7	Sewer Line Trench Safety	17,400	LF	$3.00	$52,200
8	5' Standard Concrete Manhole	14	EA	$8,000.00	$113,600
				Gravity Main Total	**$1,713,300**
Force Main					
9	12" Force Main	10,300	LF	$100.00	$1,030,000
10	2" Sewer Air Release Valve & Vault	2	EA	$10,000	$20,000
				Force Main Total	**$1,050,000**
Lift Station					
11	Submersible Pumps (1,750 gpm @ 100')	2	EA	$150,000	$300,000
12	12' Diameter Fiberglass Manhole	1	EA	$150,000	$150,000
13	12" Header and Outlet Piping	100	LF	$120	$12,000
14	12" Check Valves	2	EA	$15,000	$30,000
15	Excavation	1,000	CY	$20	$20,000
16	Excavation Protection	1	LS	$100,000	$100,000
17	Flowable Fill	200	CY	$65	$13,000
18	Electrical	1	LS	$500,000	$500,000
19	Instrumentation/SCADA	1	LS	$50,000	$50,000
20	Miscellaneous Materials	1	LS	$50,000	$50,000
21	8" MAG Meter & Vault	1	LS	$25,000	$25,000
	Site Work				
22	6" Water Pipe (Flushing Line)	500	LF	$250	$125,000
23	Site Grading	1	LS	$50,000	$50,000
24	Site Flatwork	1	LS	$50,000	$50,000
25	Fence	1,000	LF	$40	$40,000
26	Motorized Gate	1	LS	$20,000	$20,000
27	Fire Hydrant	1	EA	$3,500	$3,500
28	Gate Valve	1	EA	$1,500	$1,500
29	Trench Safety	500	LF	$2	$1,000
30	8" Concrete Driveway	1,000	SY	$80	$80,000
				Lift Station Total	**$1,621,000**

Basis for Cost Projection:			
☑ No Design Completed	Subtotal:		$4,384,300
☐ Preliminary Design	Conting. (%,+/-)	20%	$ 877,055
☐ Final Design	Professional Services (%,+/-)	15%	$ 657,645
	Total:		**$5,919,000**

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1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

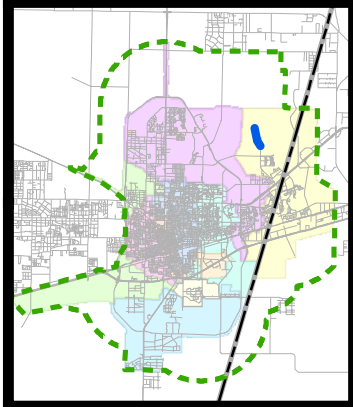
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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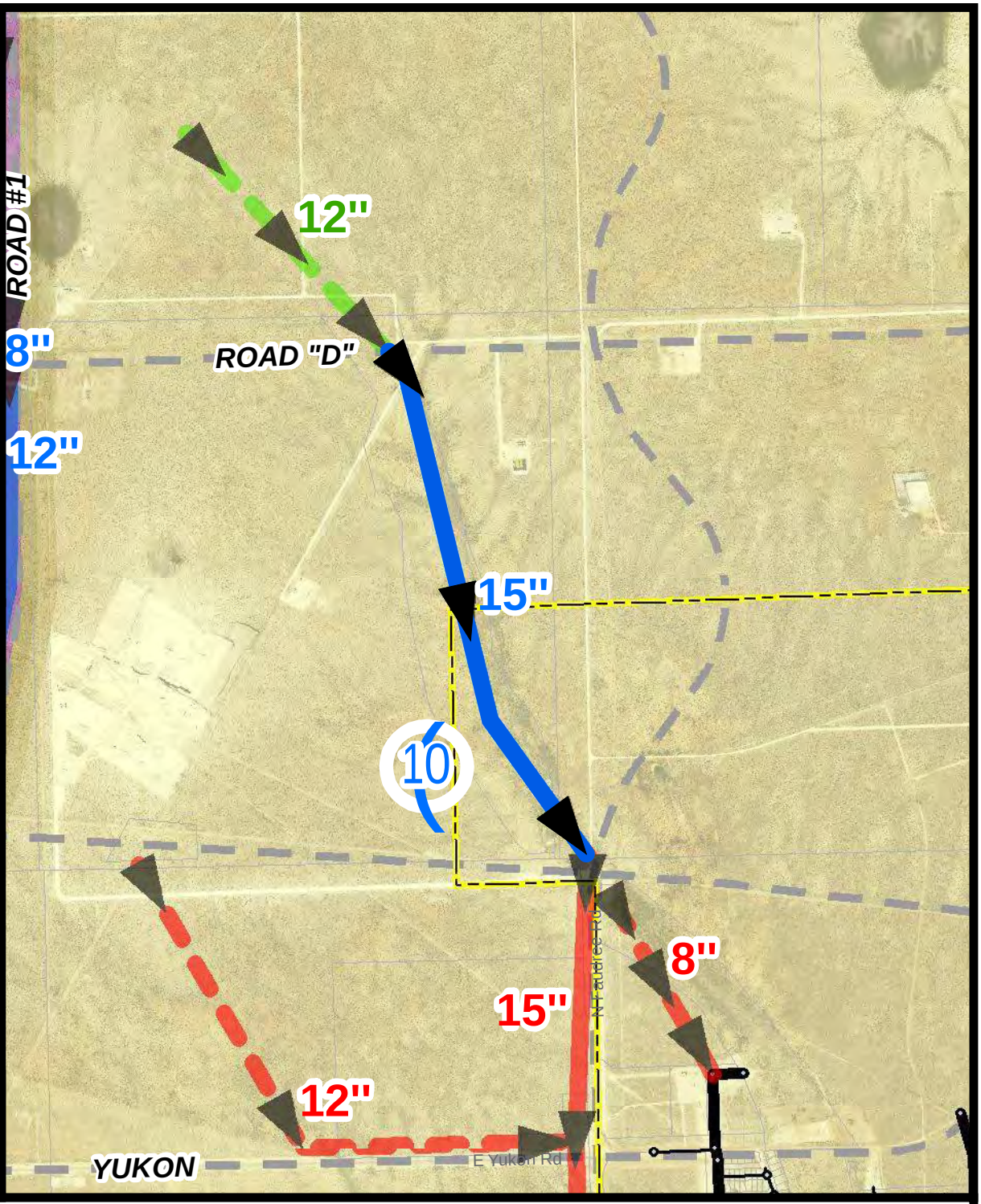


Phase: 10-Year

Project Description: This project consists of approximately 5,400 LF of 15" sewer line north of E Yukon Rd.

Recommendation Comments: This project provides conveyance for the future development in the northwest portion of the Line P basin. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $1,118,000.00

Project Name: FAUDREE RD 15-INCH NORTH TRUNK MAIN EXTENSION

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#10 FAUDREE RD 15-INCH NORTH TRUNK MAIN EXTENSION

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$30,000.00	$30,000
2	Traffic Control	1	LS	$20,000.00	$20,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	15" SDR-26 PVC Sanitary Sewer	5,400	LF	$115.00	$621,000
5	Sewer Line Trench Safety	5,400	LF	$3.00	$16,200
6	5' Standard Concrete Manhole	11	EA	$8,000.00	$86,400
7	Hydromulch Repair	12,000	SY	$2.00	$24,000
8	Allowance	1	LS	$20,000.00	$20,000

Basis for Cost Projection:			
	Subtotal:		$827,600
☑ No Design Completed	Conting. (%,+/-)	20%	$ 166,260
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 124,140
☐ Final Design	**Total:**		**$1,118,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 3,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

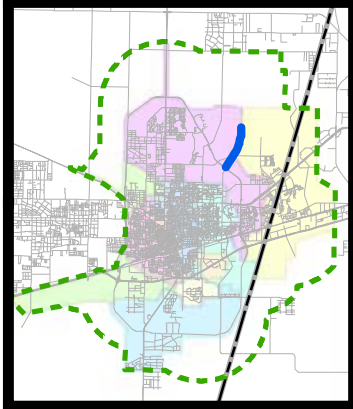
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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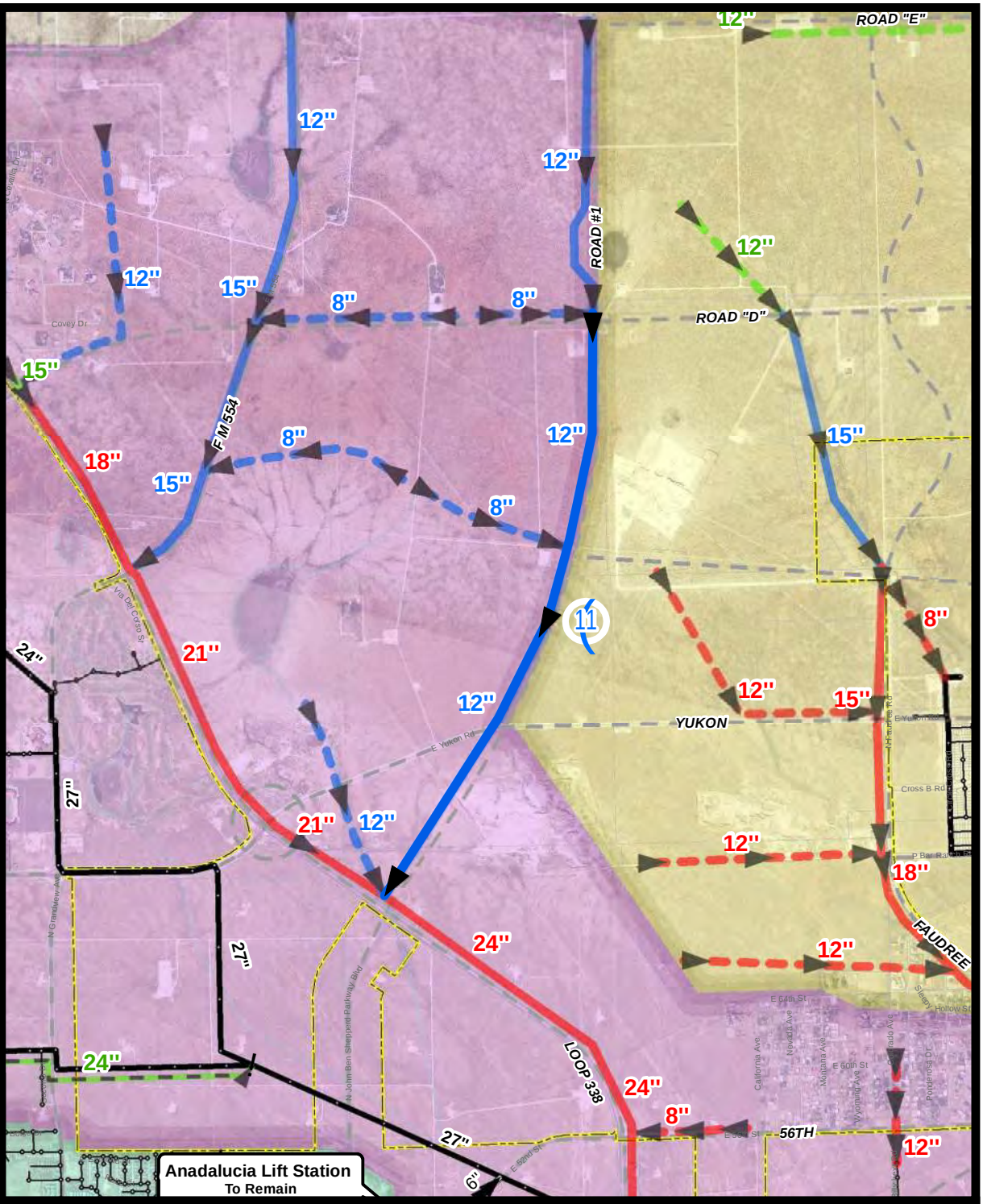


Phase: 10-Year

Project Description: This project consists of approximately 12,300 LF of 12" sewer line east of FM 554 terminating at Loop 338.

Recommendation Comments: This project provides conveyance for the future development near Ratliff Ranch to the proposed Line H interceptor. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $2,359,000.00

Project Name: RATLIFF RANCH NORTHEAST 12-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#11 RATLIFF RANCH NORTHEAST 12-INCH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$50,000.00	$50,000
2	Traffic Control	1	LS	$40,000.00	$40,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	12" SDR-26 PVC Sanitary Sewer	12,100	LF	$100.00	$1,210,000
5	24" Bore with Steel Casing	200	LF	$500.00	$100,000
6	Sewer Line Trench Safety	12,100	LF	$3.00	$36,300
7	5' Standard Concrete Manhole	25	EA	$8,000.00	$196,800
8	Hydromulch Repair	26,900	SY	$2.00	$53,800
9	Allowance	1	LS	$40,000.00	$40,000

Basis for Cost Projection:			
	Subtotal:		$1,746,900
☑ No Design Completed	Conting. (%,+/-)	20%	$ 350,065
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 262,035
☐ Final Design	**Total:**		**$2,359,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

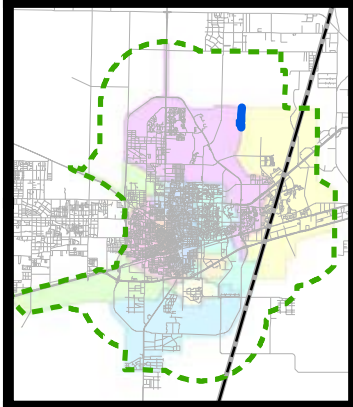
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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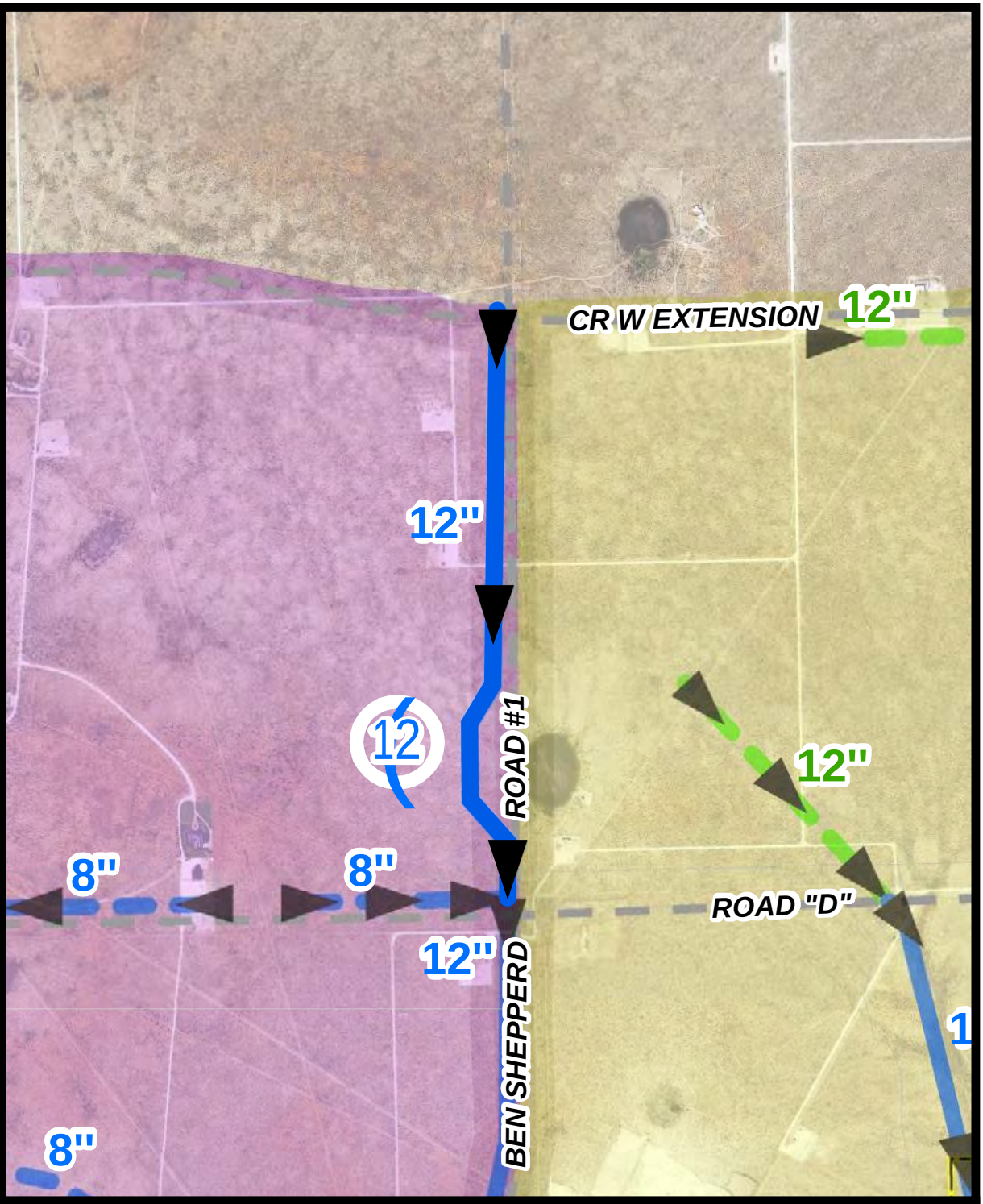


Phase: 10-Year

Project Description: This project consists of approximately 5,900 LF of 12" sewer line east of FM 554.

Recommendation Comments: This project provides conveyance for the future development near Ratliff Ranch to the proposed Line H interceptor. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $1,092,000.00

Project Name: RATLIFF RANCH NORTH 12-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#12 RATLIFF RANCH NORTH 12-INCH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$30,000.00	$30,000
2	Traffic Control	1	LS	$20,000.00	$20,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	12" SDR-26 PVC Sanitary Sewer	5,900	LF	$100.00	$590,000
5	Sewer Line Trench Safety	5,900	LF	$3.00	$17,700
6	5' Standard Concrete Manhole	12	EA	$8,000.00	$94,400
7	Hydromulch Repair	13,200	SY	$2.00	$26,400
8	Allowance	1	LS	$20,000.00	$20,000

Basis for Cost Projection:			
	Subtotal:		$808,500
☑ No Design Completed	Conting. (%,+/-)	20%	$ 162,225
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 121,275
☐ Final Design	**Total:**		**$1,092,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

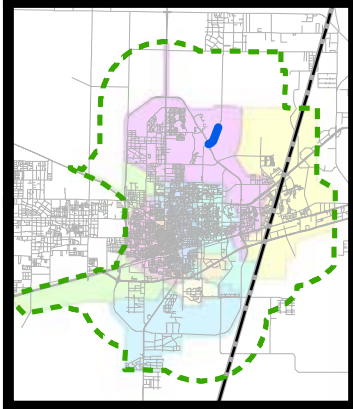
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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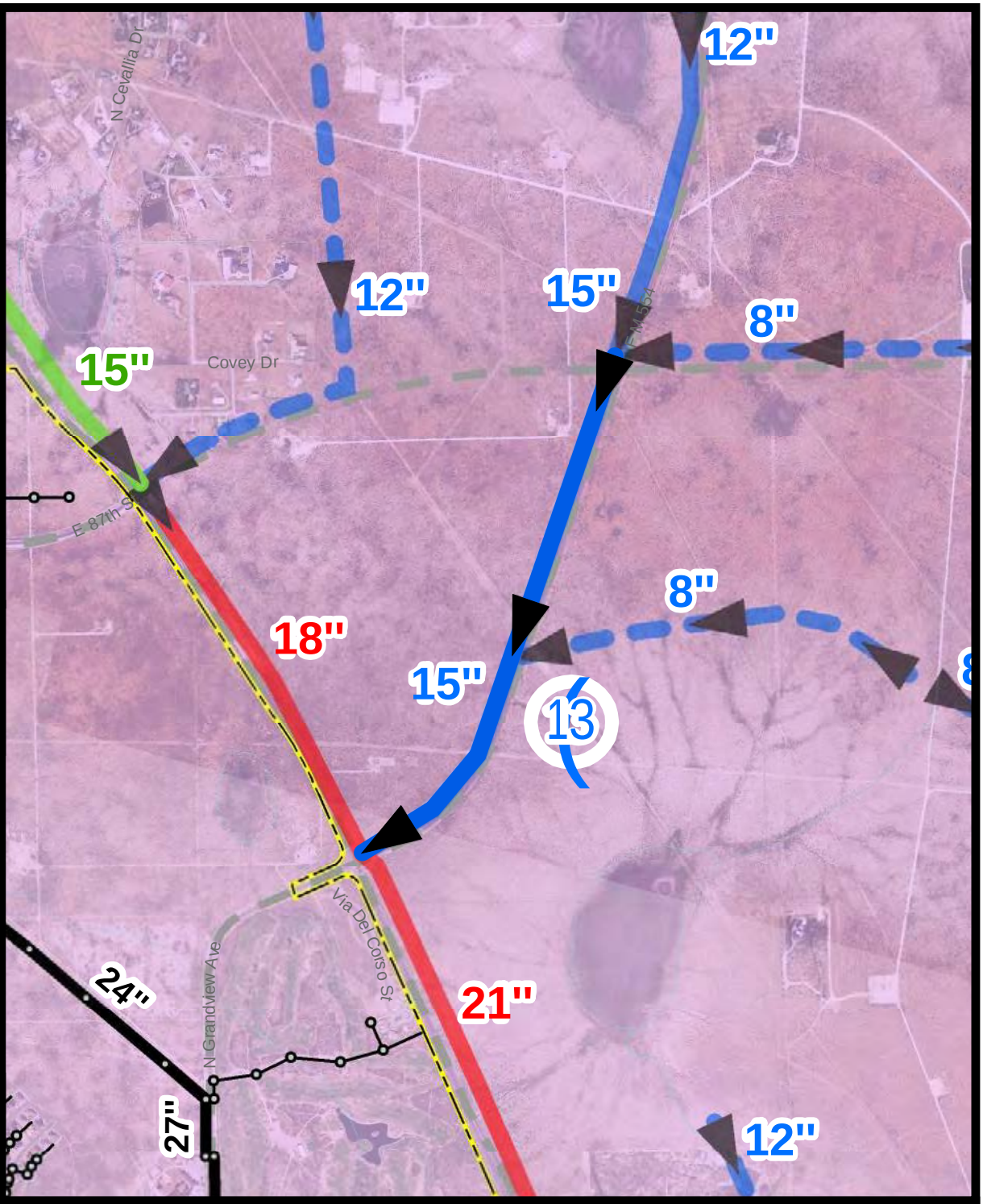

Phase: 10-Year

Project Description: This project consists of approximately 5,600 LF of 15" sewer line adjacent to FM 554.

Recommendation Comments: This project provides conveyance for the future development near Ratliff Ranch to the proposed Line H interceptor. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $1,155,000.00

Project Name: FM 554 NORTHEAST 15-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.					Opinion of Probable Construction Cost
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#13	FM 554 NORTHEAST 15-INCH TRUNK MAIN				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$30,000.00	$30,000
2	Traffic Control	1	LS	$20,000.00	$20,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	15" SDR-26 PVC Sanitary Sewer	5,600	LF	$115.00	$644,000
5	Sewer Line Trench Safety	5,600	LF	$3.00	$16,800
6	5' Standard Concrete Manhole	11	EA	$8,000.00	$89,600
7	Hydromulch Repair	12,500	SY	$2.00	$25,000
8	Allowance	1	LS	$20,000.00	$20,000
	Basis for Cost Projection:	Subtotal:			$855,400
☑	No Design Completed	Conting. (%,+/-)		20%	$ 171,290
☐	Preliminary Design	Professional Services (%,+/-)		15%	$ 128,310
☐	Final Design	**Total:**			**$1,155,000**

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1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

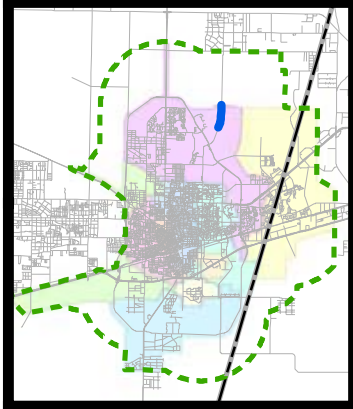
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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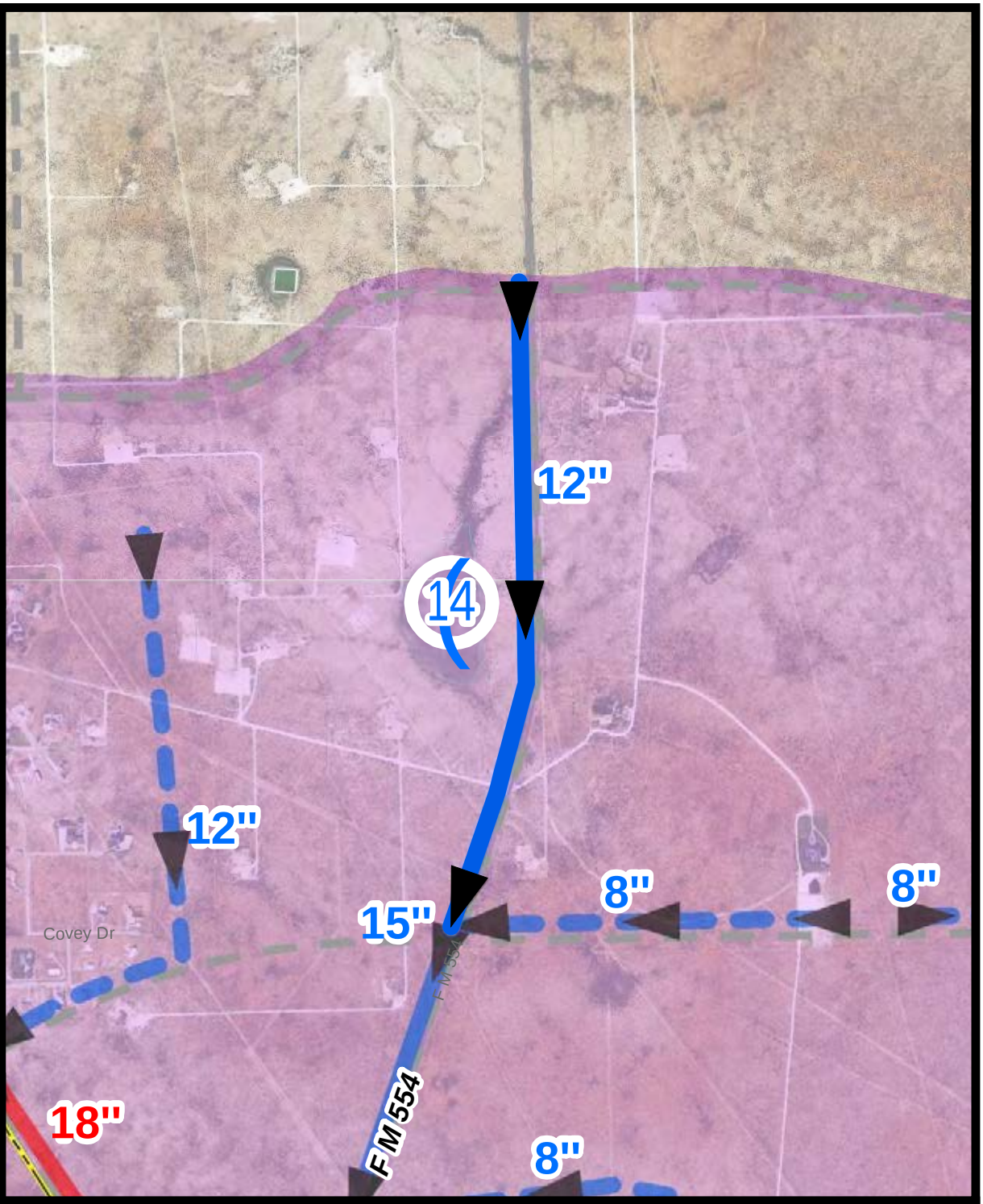

Phase: 10-Year

Project Description: This project consists of approximately 3,900 LF of 12" and 2,500 LF of 15" sewer line adjacent to FM 554.

Recommendation Comments: This project provides conveyance for the future development near Ratliff Ranch to the proposed Line H interceptor. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $1,226,000.00

Project Name: FM 554 NORTH 15, 12-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#14	FM 554 NORTH 15, 12-INCH TRUNK MAIN		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$30,000.00	$30,000
2	Traffic Control	1	LS	$20,000.00	$20,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	15" SDR-26 PVC Sanitary Sewer	2,500	LF	$115.00	$287,500
5	12" SDR-26 PVC Sanitary Sewer	3,900	LF	$100.00	$390,000
6	Sewer Line Trench Safety	6,400	LF	$3.00	$19,200
7	5' Standard Concrete Manhole	13	EA	$8,000.00	$102,400
8	Hydromulch Repair	14,300	SY	$2.00	$28,600
9	Allowance	1	LS	$20,000.00	$20,000

Basis for Cost Projection:			
	Subtotal:		$907,700
☑ No Design Completed	Conting. (%,+/-)	20%	$ 182,145
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 136,155
☐ Final Design	**Total:**		**$1,226,000**

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1 inch = 3,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

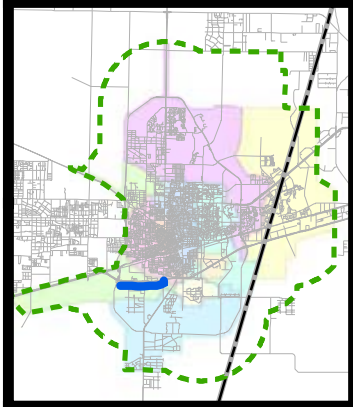
Proposed Trunk Main

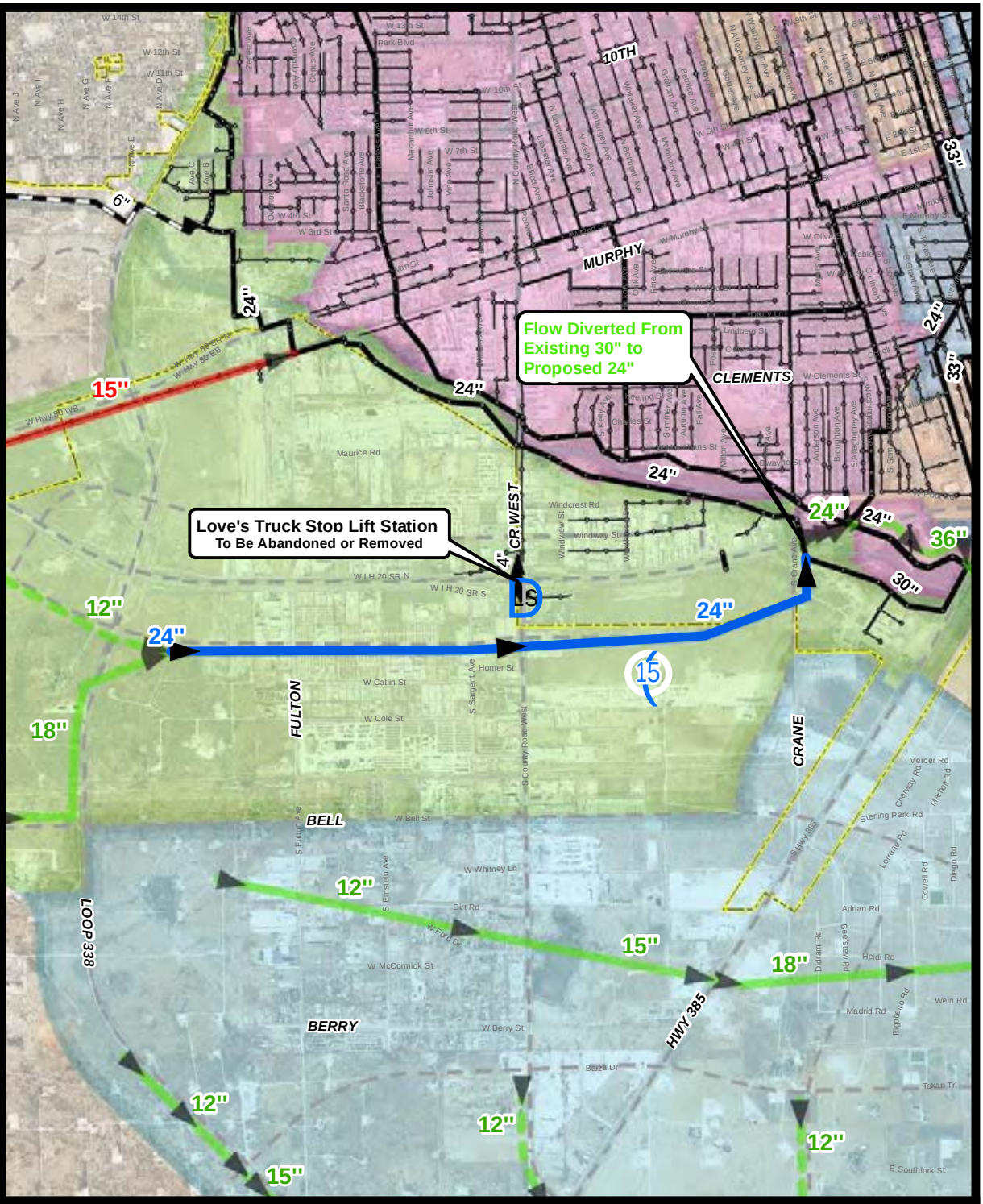
Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD





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Phase: 10-Year

Project Description: This project consists of approximately 13,300 LF of 24" sewer line south of I-20.

Recommendation Comments: This project provides conveyance for future development in the Line A basin to the existing wastewater system. This project will allow for the Love's Truck Stop lift station to be abandoned. This project is anticipated to be driven by demand from prospect

Project Cost: $3,722,000.00

Project Name: WEST I-20 24-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#15	WEST I-20 24-INCH TRUNK MAIN		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$80,000.00	$80,000
2	Traffic Control	1	LS	$60,000.00	$60,000
3	Erosion Control	1	LS	$30,000.00	$30,000
4	24" SDR-26 PVC Sanitary Sewer	13,100	LF	$160.00	$2,096,000
5	36" Bore with Steel Casing	200	LF	$600.00	$120,000
6	Sewer Line Trench Safety	13,100	LF	$3.00	$39,300
7	5' Standard Concrete Manhole	27	EA	$8,000.00	$212,800
8	Hydromulch Repair	29,200	SY	$2.00	$58,400
9	Allowance	1	LS	$60,000.00	$60,000

Basis for Cost Projection:			
	Subtotal:		$2,756,500
☑ No Design Completed	Conting. (%,+/-)	20%	$ 552,025
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 413,475
☐ Final Design	**Total:**		**$3,722,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

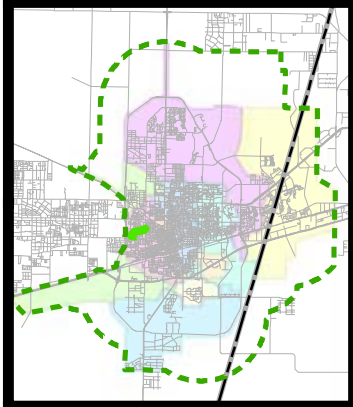
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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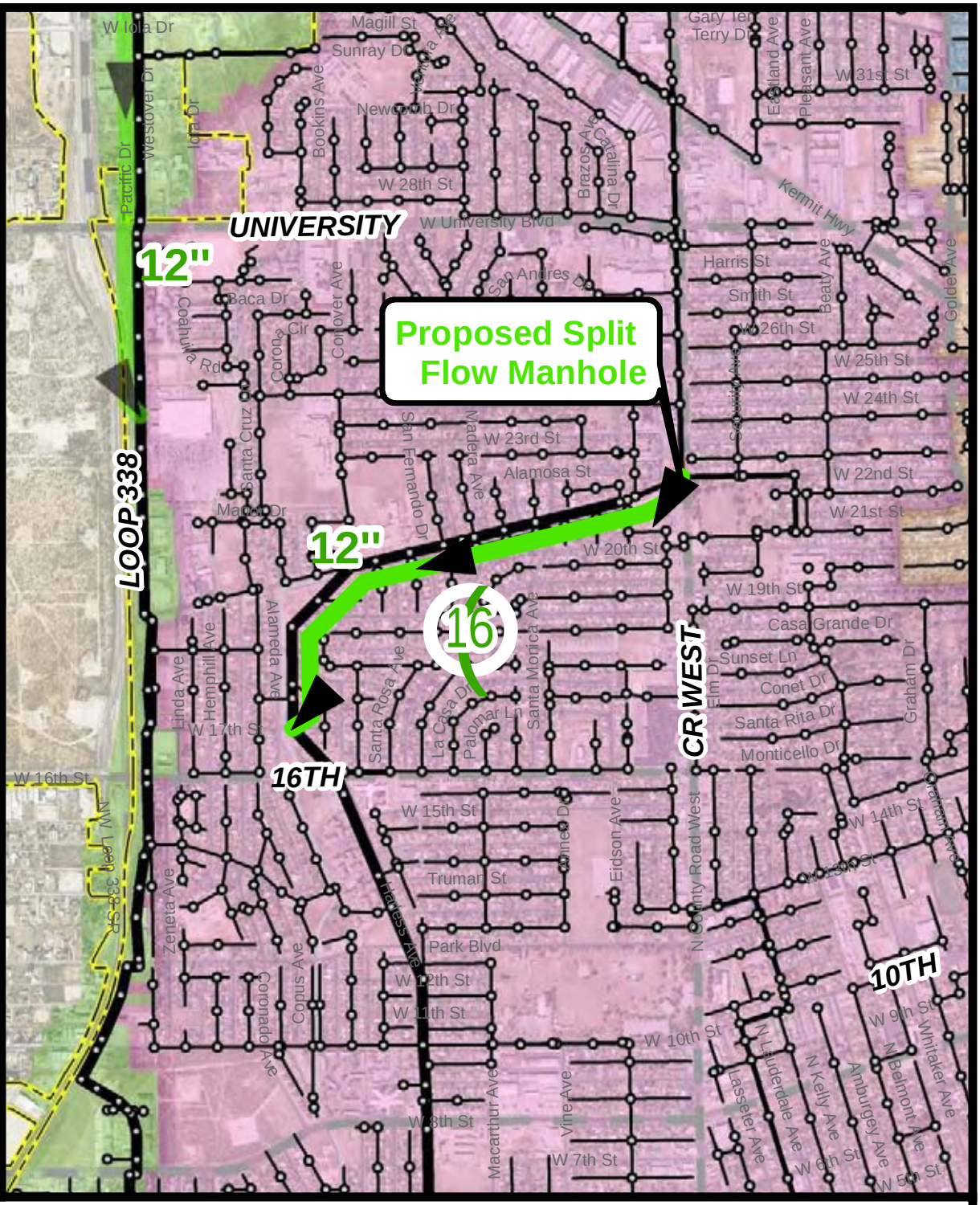

Phase: 25-Year

Project Description: This project consists of approximately 5,100 LF of 12" sewer line from the intersection of W 17th St and Alameda Ave to the intersection of W 22nd St and FM 1882.

Recommendation Comments: This project provides relief to the existing interceptor by splitting the flow with the proposed parallel interceptor. The project will be necessary if capacity issues are observed in the upstream system or sanitary sewer overflows are observed near or up

Project Cost: $1,064,000.00

Project Name: WEST 22ND ST 12-INCH PARALLEL TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#16 WEST 22ND ST 12-INCH PARALLEL TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$30,000.00	$30,000
2	Traffic Control	1	LS	$20,000.00	$20,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	12" SDR-26 PVC Sanitary Sewer	4,900	LF	$100.00	$490,000
5	24" Bore with Steel Casing	200	LF	$500.00	$100,000
6	Sewer Line Trench Safety	4,900	LF	$3.00	$14,700
7	5' Standard Concrete Manhole	10	EA	$8,000.00	$81,600
8	Hydromulch Repair	10,900	SY	$2.00	$21,800
9	Allowance	1	LS	$20,000.00	$20,000

Basis for Cost Projection:			
	Subtotal:		$788,100
☑ No Design Completed	Conting. (%,+/-)	20%	$ 157,685
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 118,215
☐ Final Design	**Total:**		**$1,064,000**

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1 inch = 2,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

Proposed Trunk Main

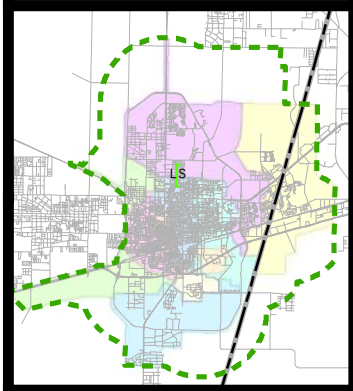
Proposed Lift Station

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

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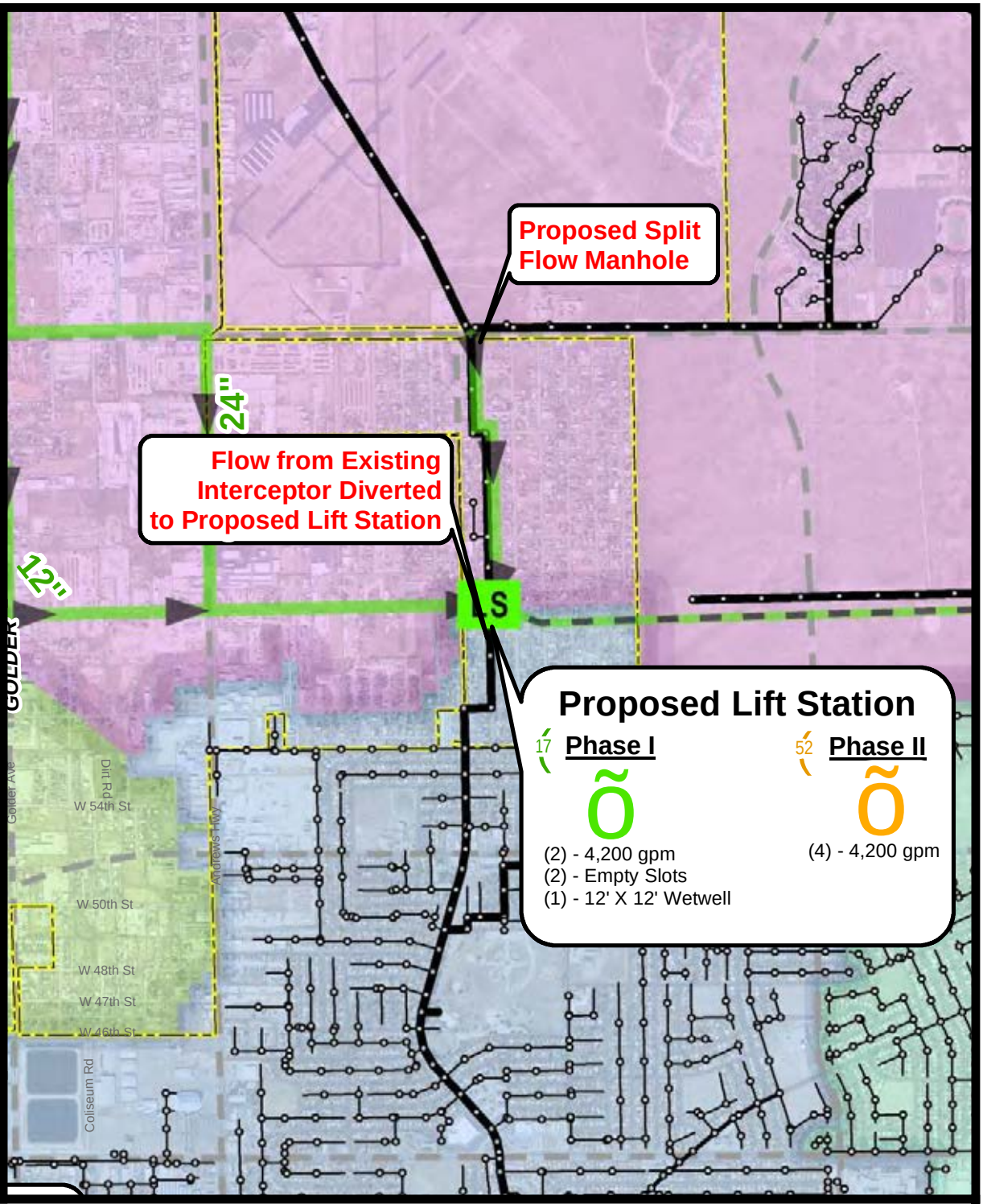

Phase: 25-Year

Project Description: This project consists of approximately 3,800 LF of 12" sewer line, 11,300 LF of 24" force main, and a 6 MGD lift station.

Recommendation Comments: This project removes flow from lines entering the Line C basin and pumps the flow to the Line H interceptor along Loop 338. This project will eliminate deficiencies in the existing system in the Line C basin.

Project Cost: $7,552,000

Project Name: LINE 12 BASIN LIFT STATION, 24-INCH FORCE MAIN, AND 12-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#17 LINE 12 BASIN LIFT STATION, 24-INCH FORCE MAIN, AND 12-INCH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$160,000	$160,000
2	Traffic Control	1	LS	$110,000	$110,000
3	Erosion Control	1	LS	$60,000	$60,000
4	12" SDR-26 PVC Sanitary Sewer	3,800	LF	$100	$380,000
5	5' Standard Concrete Manhole	8	EA	$8,000	$60,800
6	Sewer Line Trench Safety	15,100	SY	$3	$45,300
7	Allowance	1	LS	$110,000	$110,000
				Gravity Main Total	**$926,100**
Force Main					
8	24" Force Main	11,300	LF	$200	$2,260,000
9	24" Bore with Steel Casing	300	LF	$500	$150,000
10	2" Sewer Air Release Valve & Vault	2	EA	$10,000	$20,000
				Force Main Total	**$2,430,000**
Lift Station					
11	Submersible Pumps (4,200 gpm @ 55')	2	EA	$400,000	$800,000
12	12' x 12' Concrete Wetwell	1	EA	$250,000	$250,000
13	12" Header and Outlet Piping	100	LF	$120	$12,000
14	12" Check Valves	2	EA	$15,000	$30,000
15	Excavation	1,500	CY	$20	$30,000
16	Excavation Protection	1	LS	$100,000	$100,000
17	Flowable Fill	300	CY	$65	$19,500
18	Electrical	1	LS	$500,000	$500,000
19	Instrumentation/SCADA	1	LS	$50,000	$50,000
20	Miscellaneous Materials	1	LS	$50,000	$50,000
21	8" MAG Meter & Vault	1	LS	$25,000	$25,000
22	Site Work				
23	6" Water Pipe (Flushing Line)	500	LF	$250	$125,000
24	Site Grading	1	LS	$50,000	$50,000
25	Site Flatwork	1	LS	$50,000	$50,000
26	Fence	1,000	LF	$40	$40,000
27	Motorized Gate	1	LS	$20,000	$20,000
28	Fire Hydrant	1	EA	$3,500	$3,500
29	Gate Valve	1	EA	$1,500	$1,500
30	Trench Safety	500	LF	$2	$1,000
31	8" Concrete Driveway	1,000	SY	$80	$80,000
				Lift Station Total	**$2,237,500**

Basis for Cost Projection:			
☑ No Design Completed	Subtotal:		$5,593,600
☐ Preliminary Design	Conting. (%,+/-)	20%	$ 1,119,360
☐ Final Design	Professional Services (%,+/-)	15%	$ 839,040
	Total:		**$7,552,000**

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1 inch = 1,500 feet

LEGEND:

- Wastewater Master Plan Boundary

5 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

10 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

25 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

Beyond 25 Year Projects

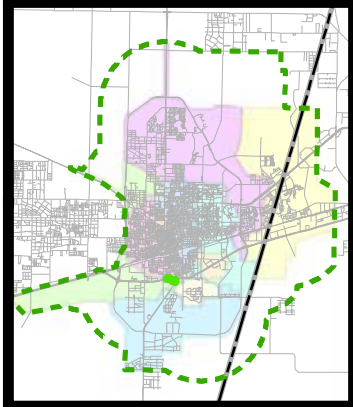
- Proposed Trunk Main

Developer Projects

- Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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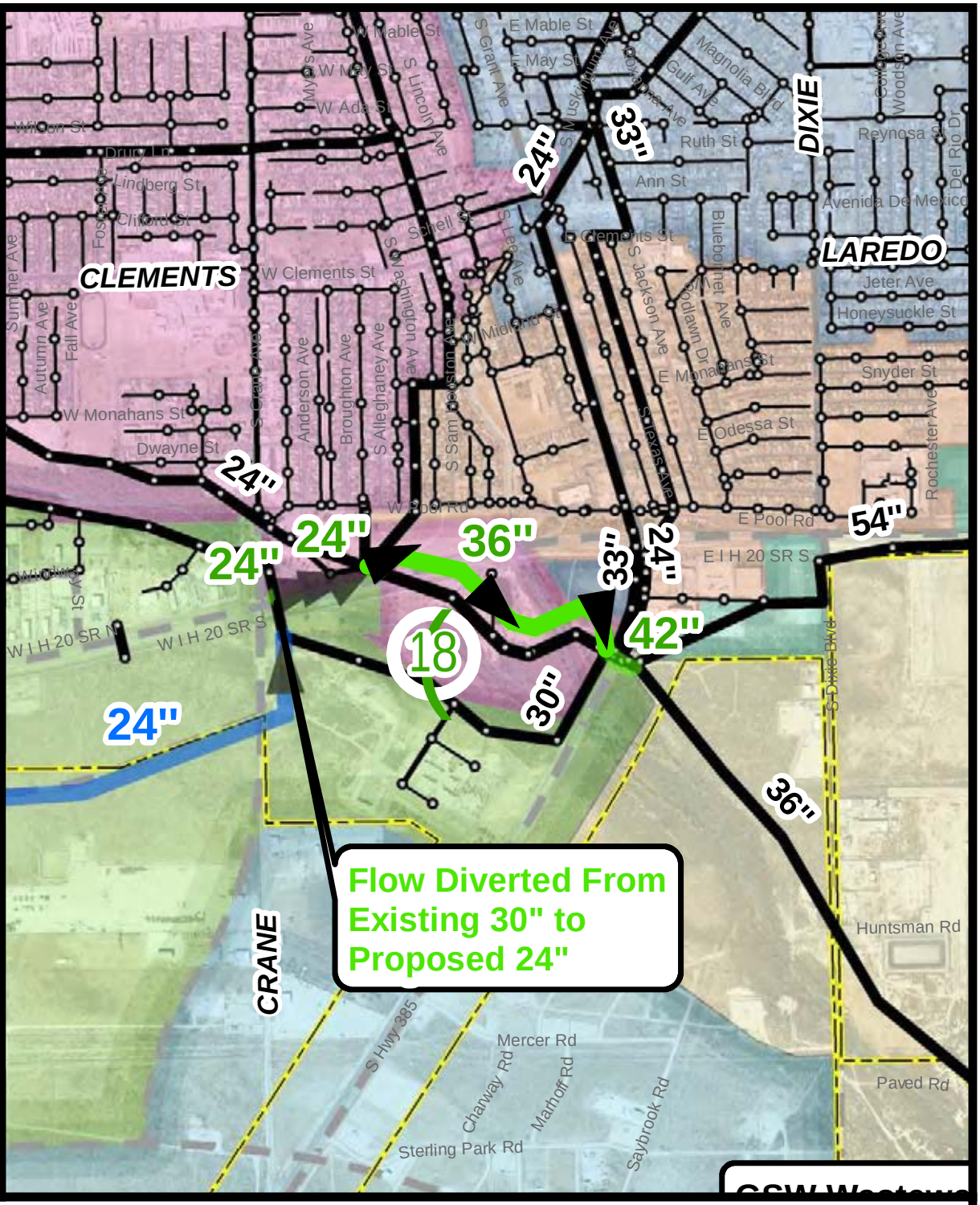

Phase: 25-Year

Project Description: This project consists of approximately 2,800 LF of 36" sewer line from McKinney Park to S Grant Ave.

Recommendation Comments: This project relieves anticipated deficiencies in the existing parallel 24-inch interceptor lines. The project will be necessary if capacity issues are observed in the upstream system or sanitary sewer overflows are observed near or upstream of this line

Project Cost: $1,634,000.00

Project Name: COMANCHE TRAIL EAST PARK 36-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#18 COMANCHE TRAIL EAST PARK 36-INCH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$40,000.00	$40,000
2	Traffic Control	1	LS	$30,000.00	$30,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	36" Fiberglass Sanitary Sewer	2,300	LF	$250.00	$575,000
5	54" Bore with Steel Casing	500	LF	$850.00	$425,000
6	Sewer Line Trench Safety	2,300	LF	$3.00	$6,900
7	6' Standard Concrete Manhole	6	EA	$13,000.00	$72,800
8	Hydromulch Repair	5,200	SY	$2.00	$10,400
9	Allowance	1	LS	$30,000.00	$30,000

Basis for Cost Projection:			
	Subtotal:		$1,210,100
☑ No Design Completed	Conting. (%,+/-)	20%	$ 242,385
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 181,515
☐ Final Design	**Total:**		**$1,634,000**

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1 inch = 1,500 feet

LEGEND:

- Wastewater Master Plan Boundary

5 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

10 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

25 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

Beyond 25 Year Projects

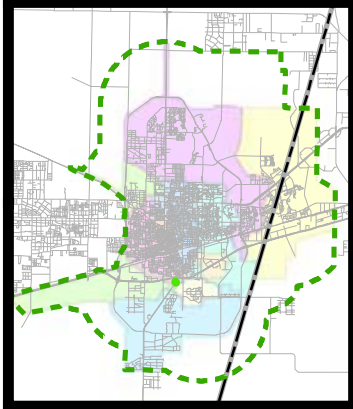
- Proposed Trunk Main

Developer Projects

- Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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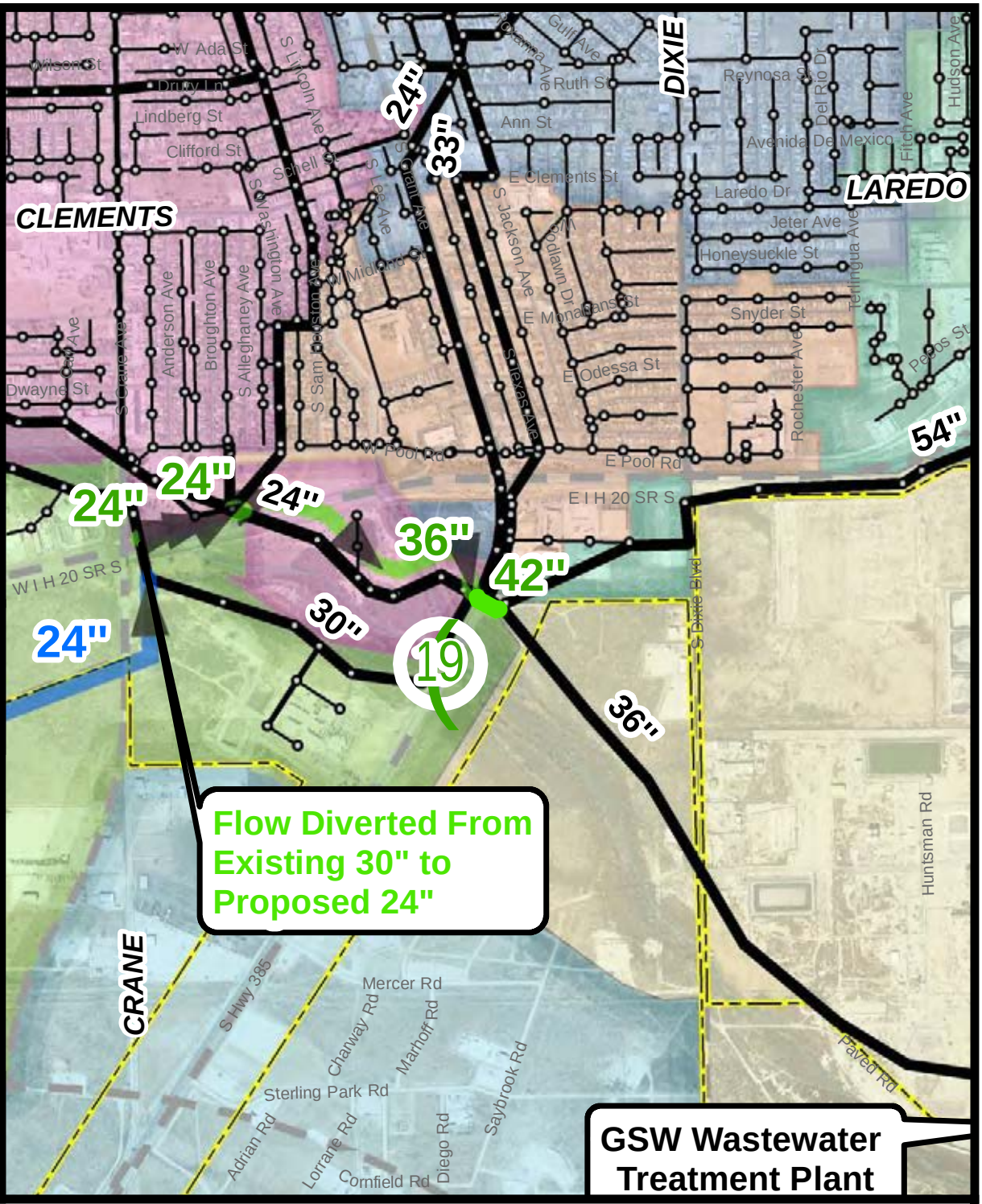

Phase: 25-Year

Project Description: This project consists of approximately 250 LF of 42" sewer line across S Grant Ave.

Recommendation Comments: This project relieves anticipated deficiencies in the interceptor lines across South Grant Avenue entering the Dixie diversion box.

Project Cost: $499,000.00

Project Name: SOUTH GRANT AVE 42-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#19	SOUTH GRANT AVE 42-INCH TRUNK MAIN		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	42" Fiberglass Sanitary Sewer	100	LF	$300.00	$30,000
5	64" Bore with Steel Casing	150	LF	$1,000.00	$150,000
6	Sewer Line Trench Safety	100	LF	$3.00	$300
7	6' Standard Concrete Manhole	5	EA	$13,000.00	$58,500
8	Hydromulch Repair	300	SY	$2.00	$600
9	Allowance	1	LS	$100,000.00	$100,000

Basis for Cost Projection:			
	Subtotal:		$369,400
☑ No Design Completed	Conting. (%,+/-)	20%	$ 74,190
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 55,410
☐ Final Design	**Total:**		**$499,000**

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1 inch = 2,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

Proposed Trunk Main

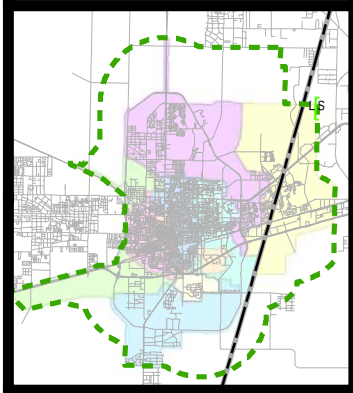
Proposed Lift Station

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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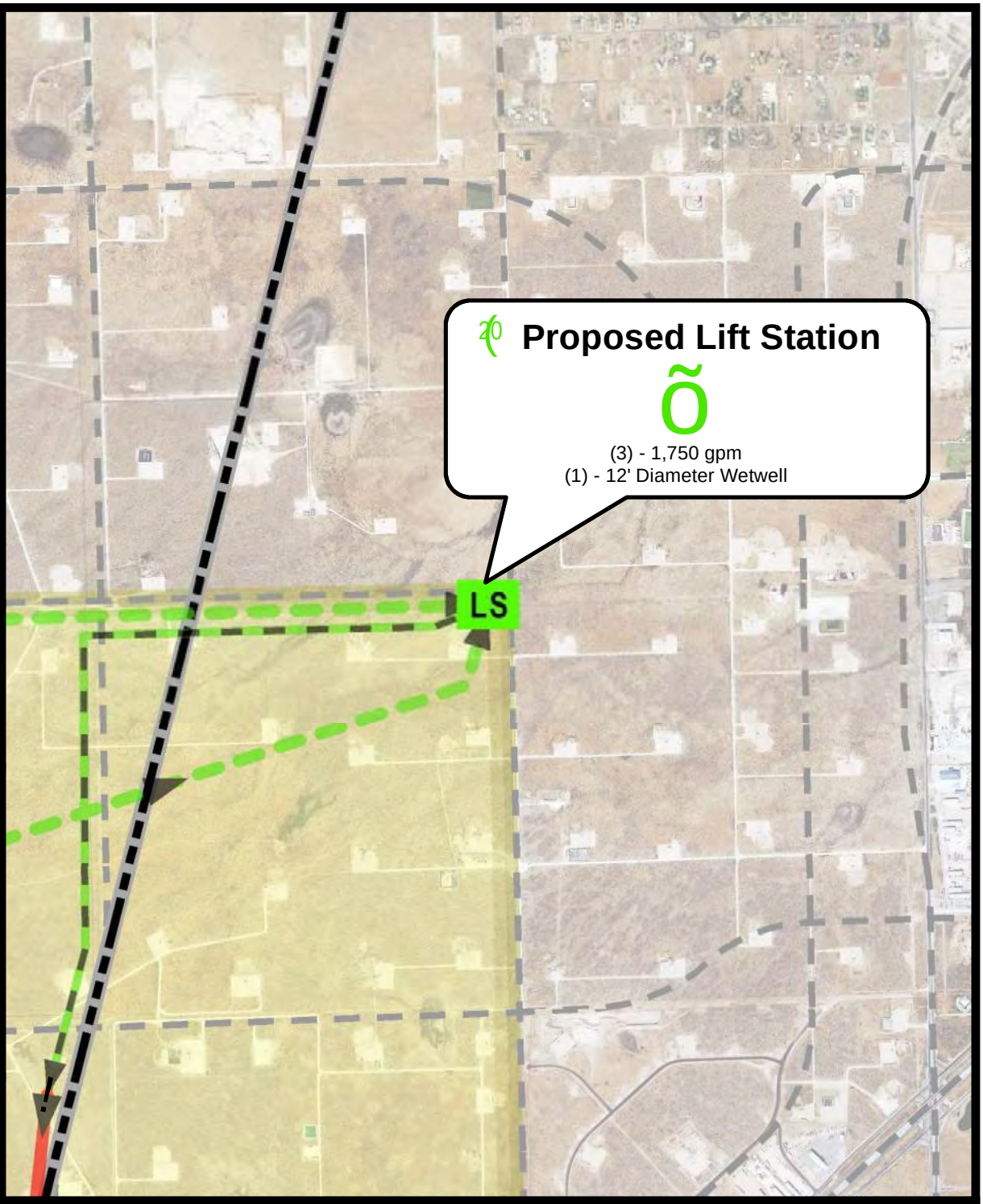

Phase: 25-Year

Project Description: This project consists of approximately 11,400 LF of 15" force main and a 5 MGD lift station.

Recommendation Comments: This project serves a localized topographic low point in the wastewatwer system. This project provides conveyance from the northeast portion of the Line P basin to the proposed Line Q interceptor.

Project Cost: $4,612,000

Project Name: LINE P BASIN NORTHEAST LIFT STATION & 15-INCH FORCE MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#20	LINE P BASIN NORTHEAST LIFT STATION & 15-INCH FORCE MAIN		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$100,000	$100,000
2	Traffic Control	1	LS	$70,000	$70,000
3	Erosion Control	1	LS	$40,000	$40,000
4	Allowance	1	LS	$70,000	$70,000
Force Main					
5	15" Force Main	11,400	LF	$115.00	$1,311,000
6	Sewer Line Trench Safety	11,400	LF	$3.00	$34,200
7	2" Sewer Air Release Valve & Vault	2	EA	$10,000	$20,000
				Force Main Total	**$1,365,200**
Lift Station					
8	Submersible Pumps (1,750 gpm @ 100')	3	EA	$150,000	$450,000
9	12' Diameter Fiberglass Manhole	1	EA	$150,000	$150,000
10	12" Header and Outlet Piping	100	LF	$120	$12,000
11	12" Check Valves	2	EA	$15,000	$30,000
12	Excavation	1,000	CY	$20	$20,000
13	Excavation Protection	1	LS	$100,000	$100,000
14	Flowable Fill	200	CY	$65	$13,000
15	Electrical	1	LS	$500,000	$500,000
16	Instrumentation/SCADA	1	LS	$50,000	$50,000
17	Miscellaneous Materials	1	LS	$50,000	$50,000
18	8" MAG Meter & Vault	1	LS	$25,000	$25,000
19	Site Work				
20	6" Water Pipe (Flushing Line)	500	LF	$250	$125,000
21	Site Grading	1	LS	$50,000	$50,000
22	Site Flatwork	1	LS	$50,000	$50,000
23	Fence	1,000	LF	$40	$40,000
24	Motorized Gate	1	LS	$20,000	$20,000
25	Fire Hydrant	1	EA	$3,500	$3,500
26	Gate Valve	1	EA	$1,500	$1,500
27	Trench Safety	500	LF	$2	$1,000
28	8" Concrete Driveway	1,000	SY	$80	$80,000
				Lift Station Total	**$1,771,000**

Basis for Cost Projection:			
☑ No Design Completed	Subtotal:		$3,416,200
☐ Preliminary Design	Conting. (%,+/-)	20%	$ 683,370
☐ Final Design	Professional Services (%,+/-)	15%	$ 512,430
	Total:		**$4,612,000**

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1 inch = 3,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

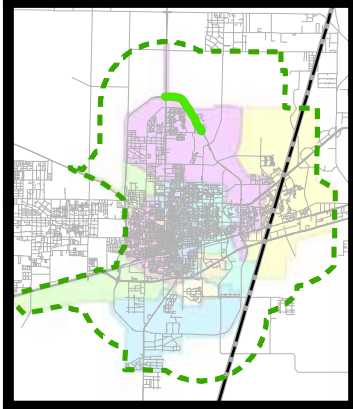
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22, Line H, Line A, Line K, Line B, Line P, Line C, Southwest, Line G, GCWD



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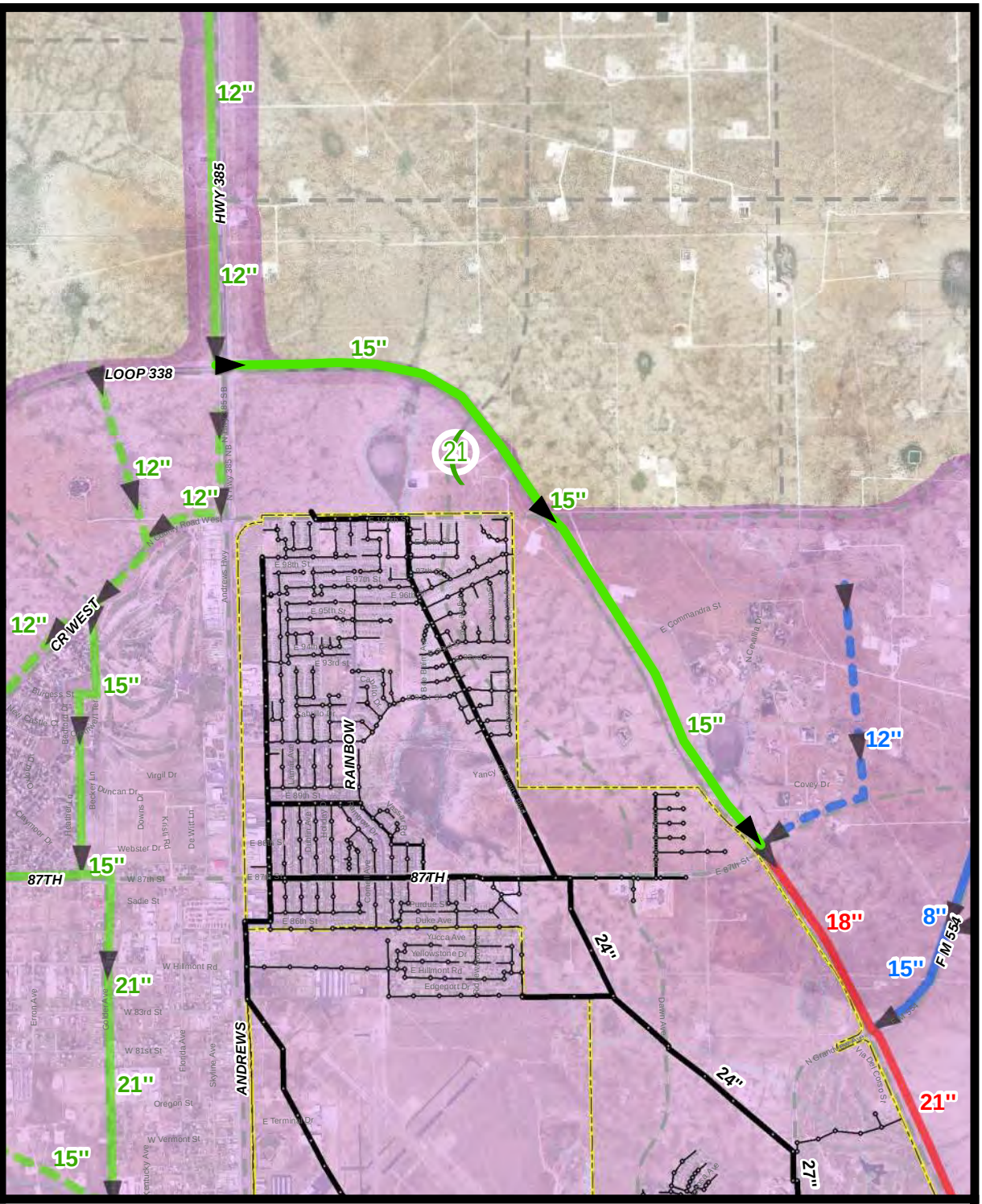


Phase: 25-Year

Project Description: This project consists of approximately 15,500 LF of 15" sewer line from the intersection of Andrews Hwy and Loop 338 to the intersection of E 87th St and Loop 338.

Recommendation Comments: This project provides conveyance from the north portion of the Line H basin along Loop 338 to the existing wastewater system.

Project Cost: $3,436,000.00

Project Name: LINE H NORTHWEST INTERCEPTOR SEGMENT III

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#21 LINE H NORTHWEST INTERCEPTOR SEGMENT III

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$80,000.00	$80,000
2	Traffic Control	1	LS	$50,000.00	$50,000
3	Erosion Control	1	LS	$30,000.00	$30,000
4	15" SDR-26 PVC Sanitary Sewer	15,000	LF	$115.00	$1,725,000
5	24" Bore with Steel Casing	500	LF	$500.00	$250,000
6	Sewer Line Trench Safety	15,000	LF	$3.00	$45,000
7	5' Standard Concrete Manhole	31	EA	$8,000.00	$248,000
8	Hydromulch Repair	33,400	SY	$2.00	$66,800
9	Allowance	1	LS	$50,000.00	$50,000

Basis for Cost Projection:			
	Subtotal:		$2,544,800
☑ No Design Completed	Conting. (%,+/-)	20%	$ 509,480
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 381,720
☐ Final Design	**Total:**		**$3,436,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 3,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

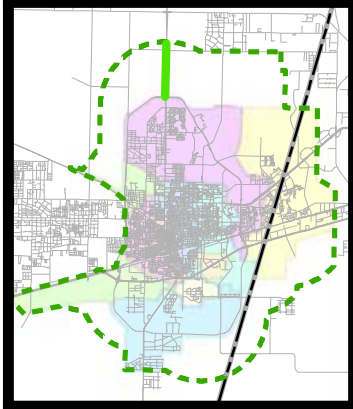
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

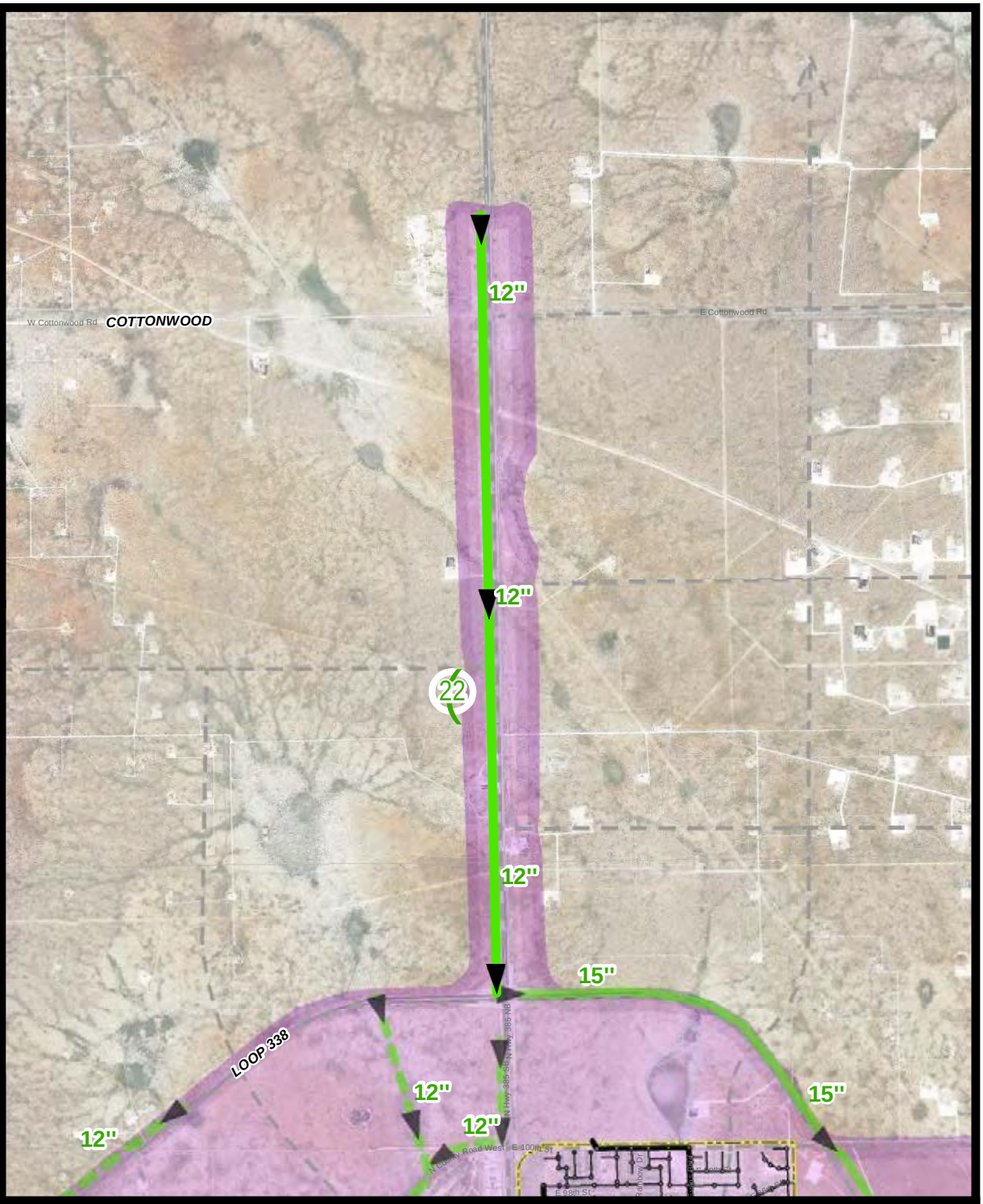
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 25-Year

Project Description: This project consists of approximately 15,100 LF of 12" sewer line from just north of the intersection of E Cottonwood Rd and US 385 to the intersection of Loop 338 and US 385.

Recommendation Comments: This project provides conveyance from the north portion of the Line H basin along the frontage of Hwy 385 to the existing wastewater system. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $2,733,000.00

Project Name: US 385 NORTH 12-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#22	US 385 NORTH 12-INCH TRUNK MAIN		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$60,000.00	$60,000
2	Traffic Control	1	LS	$40,000.00	$40,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	12" SDR-26 PVC Sanitary Sewer	15,100	LF	$100.00	$1,510,000
5	Sewer Line Trench Safety	15,100	LF	$3.00	$45,300
6	5' Standard Concrete Manhole	30	EA	$8,000.00	$241,600
7	Hydromulch Repair	33,600	SY	$2.00	$67,200
8	Allowance	1	LS	$40,000.00	$40,000

Basis for Cost Projection:			
	Subtotal:		$2,024,100
☑ No Design Completed	Conting. (%,+/-)	20%	$ 405,285
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 303,615
☐ Final Design	**Total:**		**$2,733,000**

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1 inch = 3,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

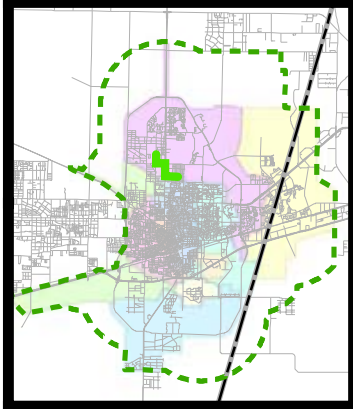
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

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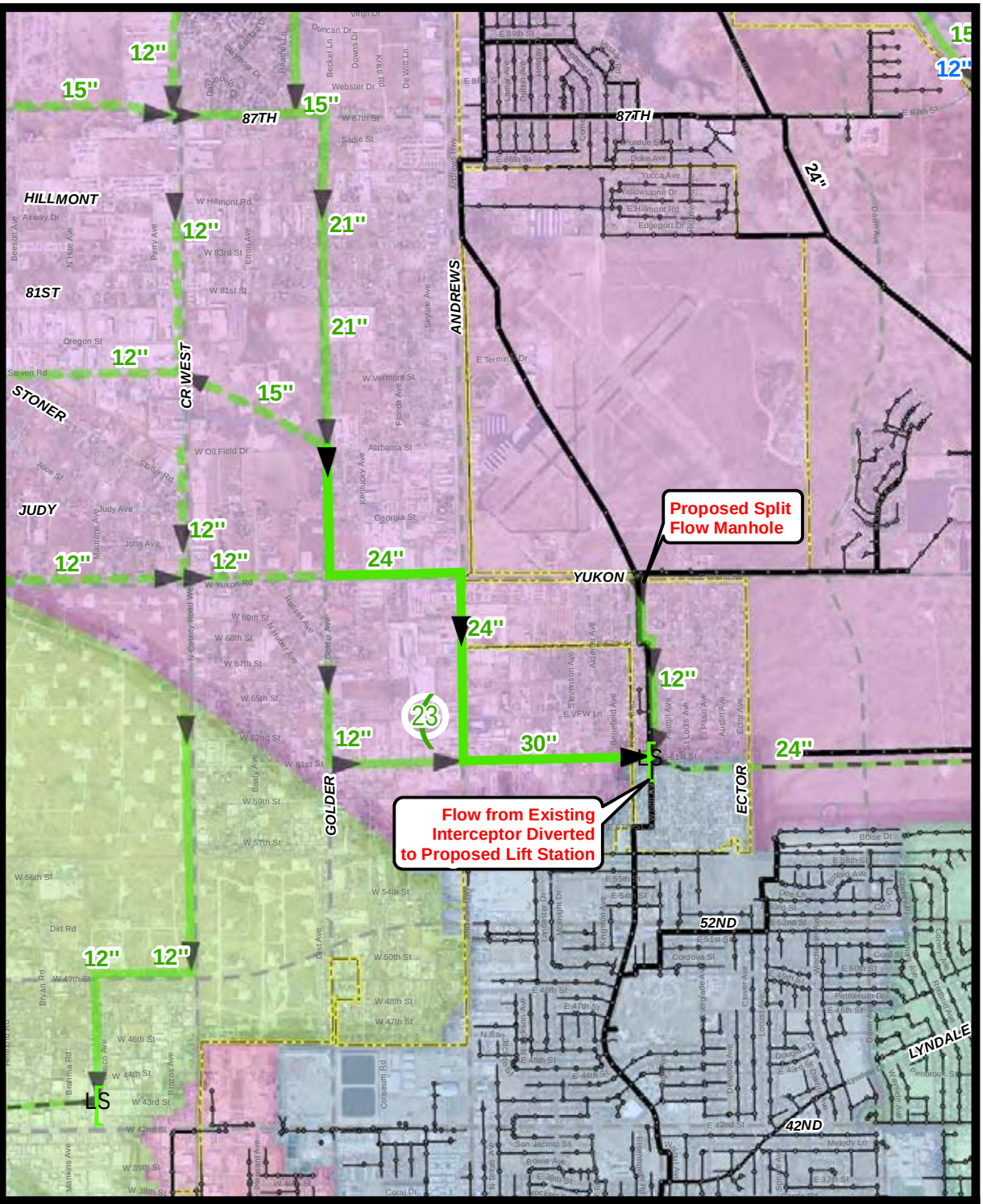


Phase: 25-Year

Project Description: This project consists of approximately 8,700 LF of 24" and 3,700 LF of 30" sewer line from the intersection of N Golden Ave and Alabama St to the intersection of Ft Worth Ave and E 61st St.

Recommendation Comments: This project provides conveyance capacity from the Line 12 basin lift station to the west portion of the Line H basin. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $3,963,000.00

Project Name: LINE 12 BASIN LIFT STATION 30, 24-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#23 LINE 12 BASIN LIFT STATION 30, 24-INCH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$90,000.00	$90,000
2	Traffic Control	1	LS	$60,000.00	$60,000
3	Erosion Control	1	LS	$30,000.00	$30,000
4	30" Fiberglass Sanitary Sewer	3,500	LF	$225.00	$787,500
5	24" SDR-26 PVC Sanitary Sewer	8,500	LF	$160.00	$1,360,000
6	42" Bore with Steel Casing	200	LF	$700.00	$140,000
7	36" Bore with Steel Casing	200	LF	$600.00	$120,000
8	Sewer Line Trench Safety	12,000	LF	$3.00	$36,000
9	5' Standard Concrete Manhole	25	EA	$8,000.00	$198,400
10	Hydromulch Repair	26,700	SY	$2.00	$53,400
11	Allowance	1	LS	$60,000.00	$60,000

Basis for Cost Projection:			
	Subtotal:		$2,935,300
☑ No Design Completed	Conting. (%,+/-)	20%	$ 587,405
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 440,295
☐ Final Design	**Total:**		**$3,963,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

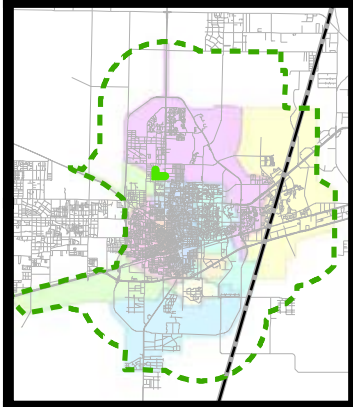
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

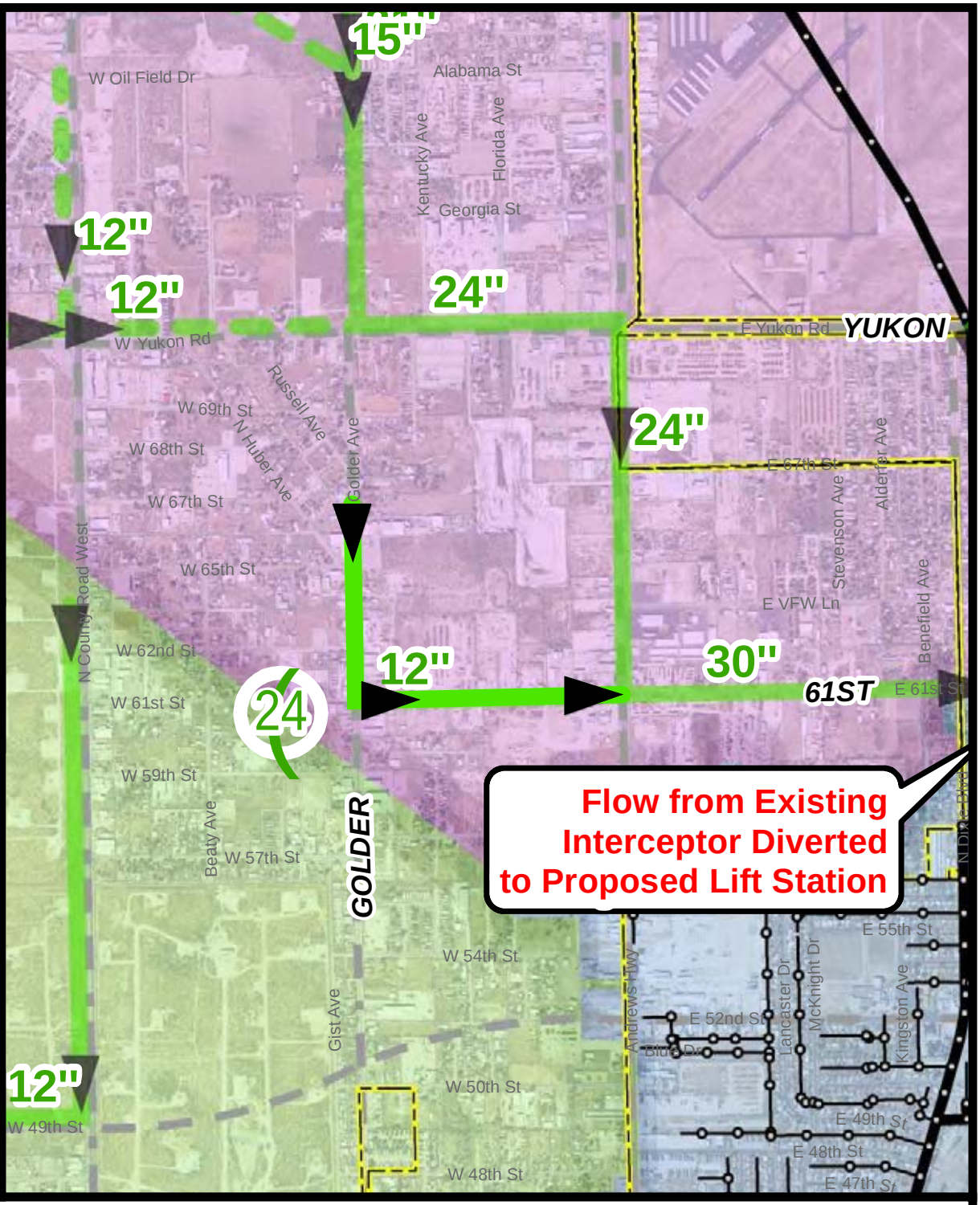
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 25-Year

Project Description: This project consists of approximately 4,600 LF of 12" sewer line from the intersection of W 65th St and Golden Ave to the intersection of W 61st St and Andrews Hwy.

Recommendation Comments: This project provides conveyance capacity from the Line 12 basin lift station to the west portion of the Line H basin. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $1,606,000.00

Project Name: GOLDER AVE 12-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.					Opinion of Probable Construction Cost
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#24	GOLDER AVE 12-INCH TRUNK MAIN				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$40,000.00	$40,000
2	Traffic Control	1	LS	$30,000.00	$30,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	12" SDR-26 PVC Sanitary Sewer	3,800	LF	$100.00	$380,000
5	24" Bore with Steel Casing	800	LF	$500.00	$400,000
6	Sewer Line Trench Safety	3,800	LF	$3.00	$11,400
7	5' Standard Concrete Manhole	9	EA	$8,000.00	$73,600
8	Asphalt Pavement Repair	3,400	SY	$60.00	$204,000
9	Allowance	1	LS	$30,000.00	$30,000

Basis for Cost Projection:			
	Subtotal:		$1,189,000
☑ No Design Completed	Conting. (%,+/-)	20%	$ 238,650
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 178,350
☐ Final Design	**Total:**		**$1,606,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

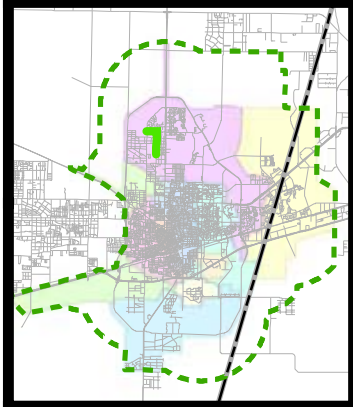
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

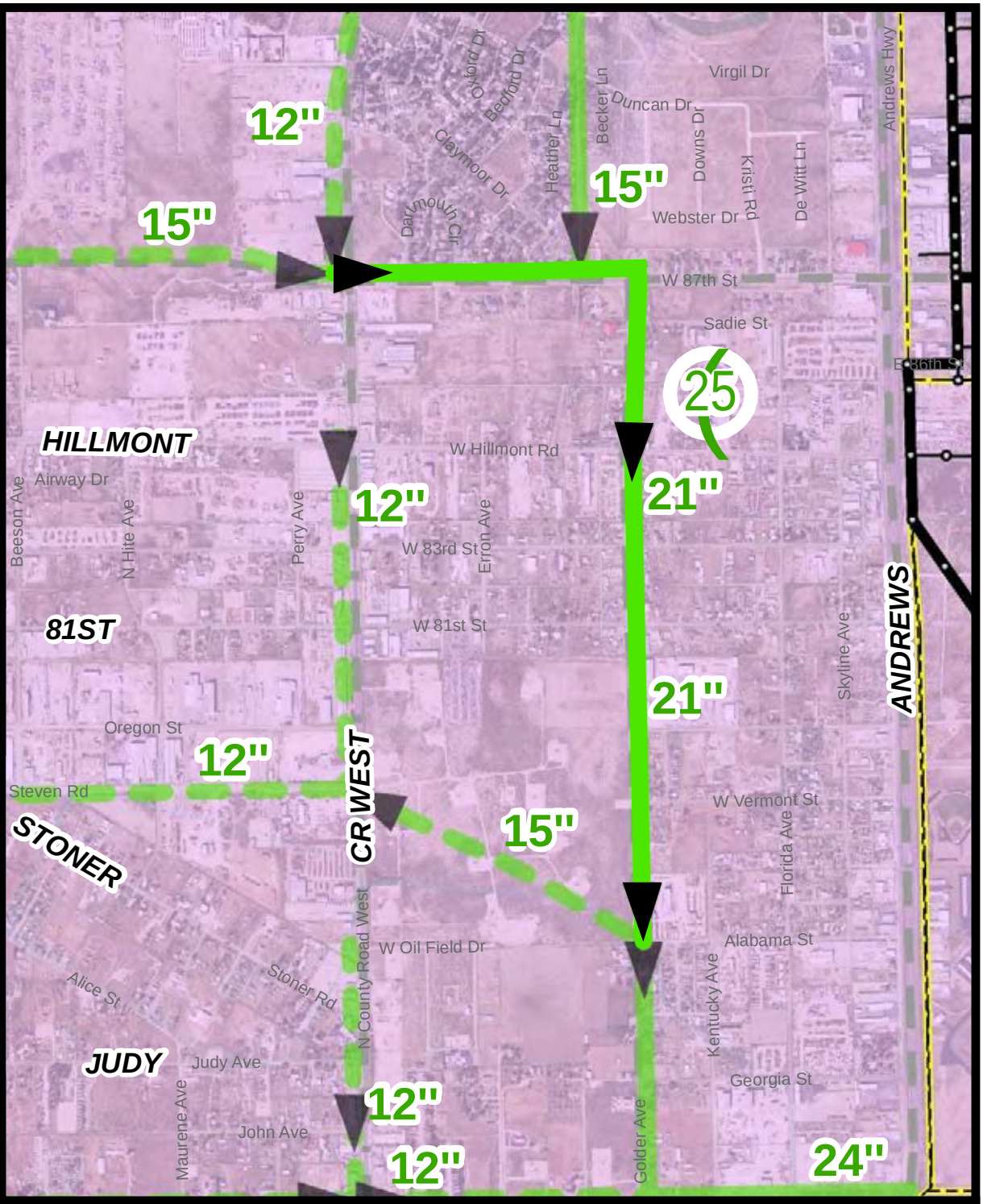
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 25-Year

Project Description: This project consists of approximately 7,100 LF of 21" and 2,400 LF of 15" sewer line from the intersection of County Rd 1882 and W 87th St to the intersection of N Golden Ave and Alabama St.

Recommendation Comments: This project provides conveyance capacity from the Line 12 basin lift station to the west portion of the Line H basin. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $2,806,000.00

Project Name: GOLDER AVE AND WEST 87TH ST 21, 15-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#25 GOLDER AVE AND WEST 87TH ST 21, 15-INCH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$60,000.00	$60,000
2	Traffic Control	1	LS	$40,000.00	$40,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	21" SDR-26 PVC Sanitary Sewer	6,600	LF	$140.00	$924,000
5	15" SDR-26 PVC Sanitary Sewer	1,900	LF	$115.00	$218,500
6	36" Bore with Steel Casing	500	LF	$600.00	$300,000
7	24" Bore with Steel Casing	500	LF	$500.00	$250,000
8	Sewer Line Trench Safety	8,500	LF	$3.00	$25,500
9	5' Standard Concrete Manhole	19	EA	$8,000.00	$152,000
10	Hydromulch Repair	18,900	SY	$2.00	$37,800
11	Allowance	1	LS	$50,000.00	$50,000

Basis for Cost Projection:			
	Subtotal:		$2,077,800
☑ No Design Completed	Conting. (%,+/-)	20%	$ 416,530
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 311,670
☐ Final Design	**Total:**		**$2,806,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

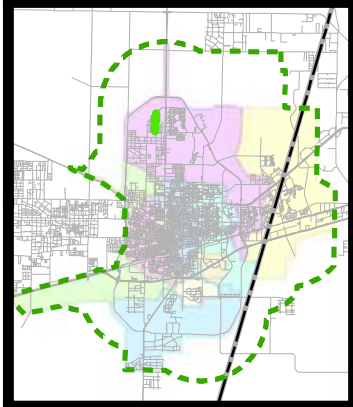
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

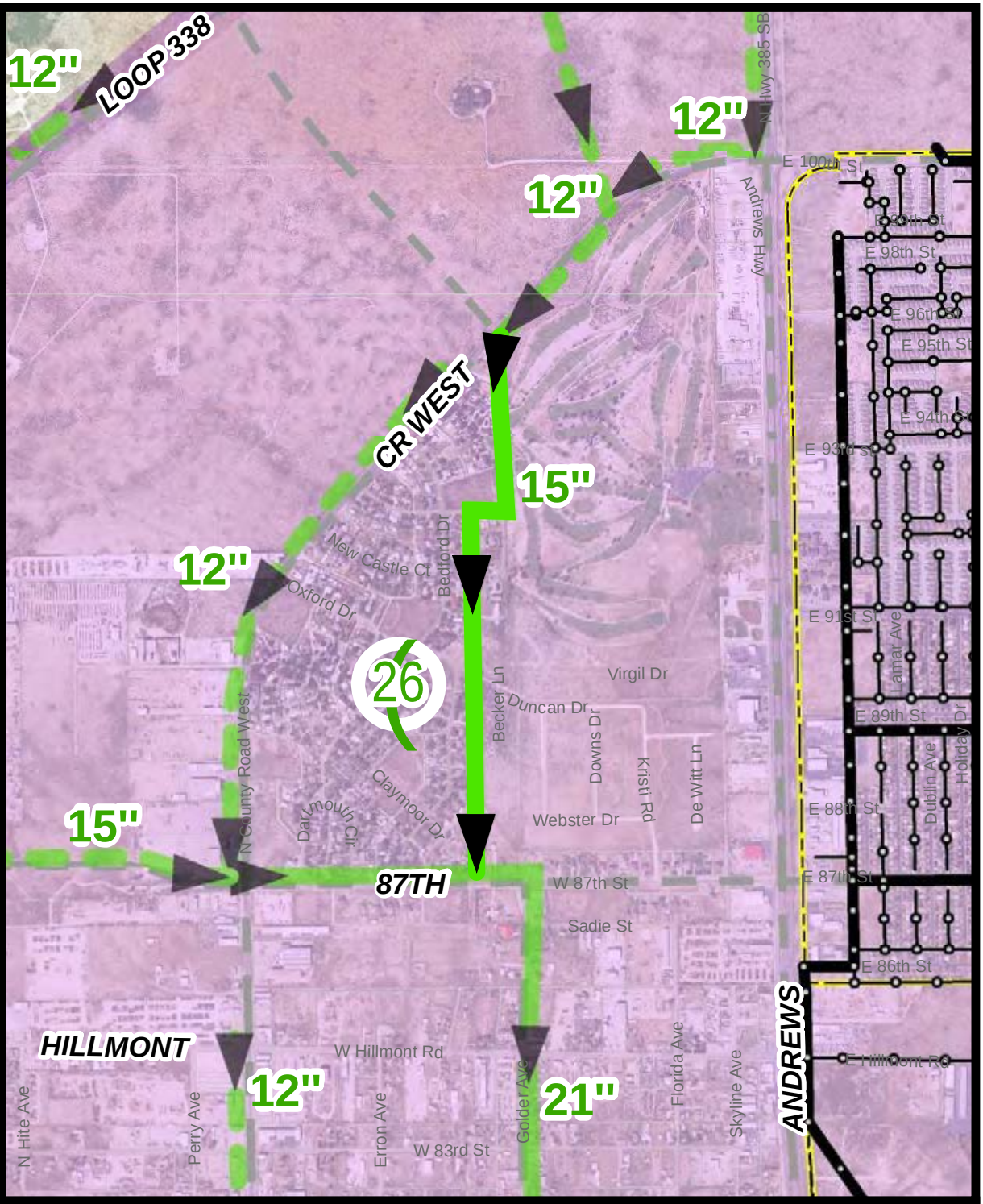
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 25-Year

Project Description: This project consists of approximately 5,600 LF of 15" sewer line from east of N County Road West to east of the intersection of Claymoor Dr and W 87th St.

Recommendation Comments: This project provides conveyance capacity from the Line 12 basin lift station to the west portion of the Line H basin. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $1,308,000.00

Project Name: SUNSET COUNTRY CLUB 15-INCH TRUNK MAIN

26

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#26 SUNSET COUNTRY CLUB 15-INCH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$30,000.00	$30,000
2	Traffic Control	1	LS	$20,000.00	$20,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	15" SDR-26 PVC Sanitary Sewer	5,300	LF	$115.00	$609,500
5	24" Bore with Steel Casing	300	LF	$500.00	$150,000
6	Sewer Line Trench Safety	5,300	LF	$3.00	$15,900
7	5' Standard Concrete Manhole	11	EA	$8,000.00	$89,600
8	Hydromulch Repair	11,800	SY	$2.00	$23,600
9	Allowance	1	LS	$20,000.00	$20,000

Basis for Cost Projection:			
	Subtotal:		$968,600
☑ No Design Completed	Conting. (%,+/-)	20%	$ 194,110
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 145,290
☐ Final Design	**Total:**		**$1,308,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 2,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

Proposed Trunk Main

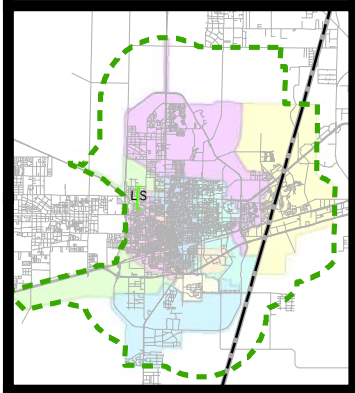
Proposed Lift Station

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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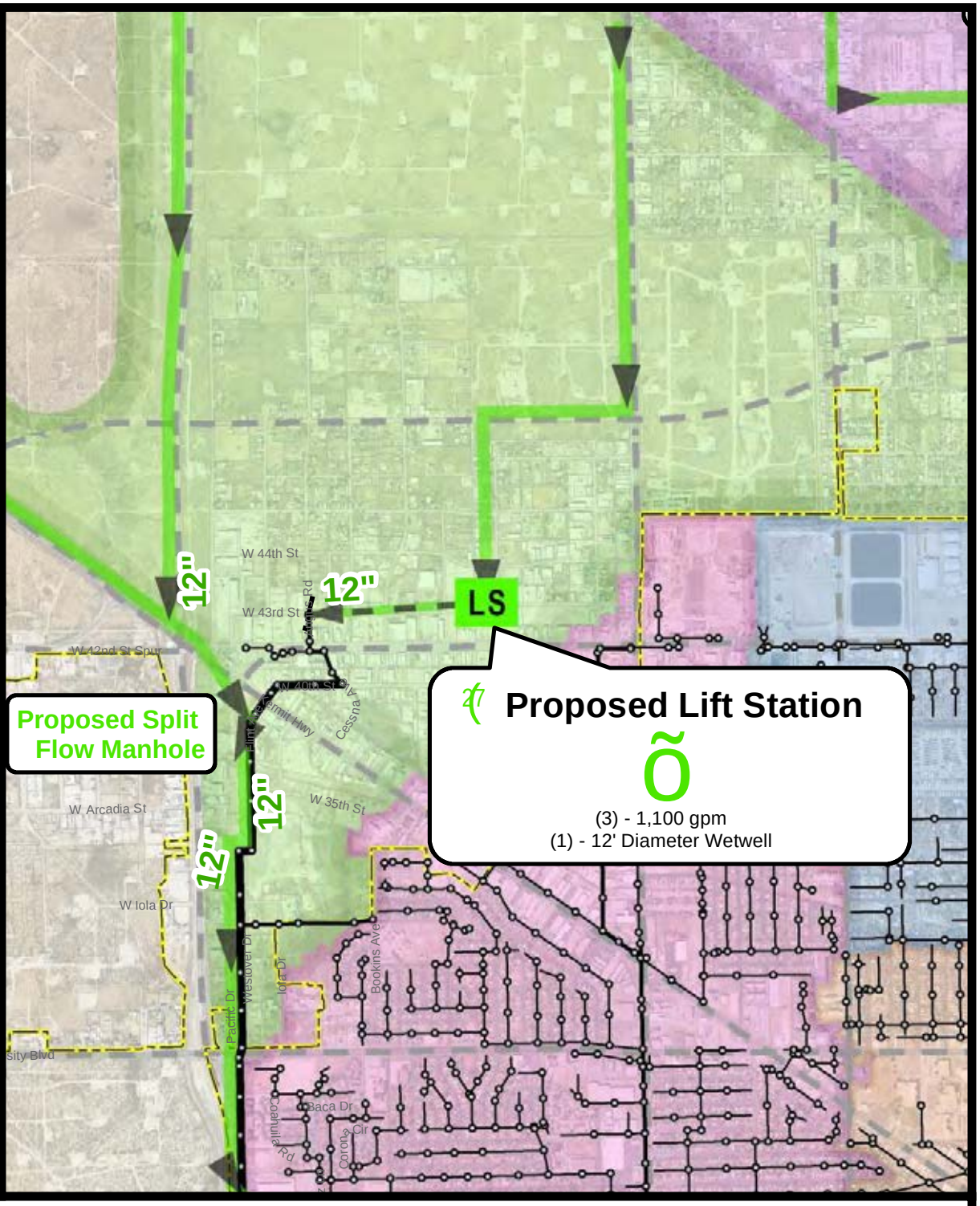
April 2019



Phase: 25-Year

Project Description: This project consists of approximately 2,400 LF of 12" force main and a 3 MGD lift station.

Recommendation Comments: This project serves a localized topographic low point in the wastewatwer system. This project provides conveyance from the north portion of the Line A basin to the existing wastewater system. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $2,867,000

Project Name: LINE G BASIN LIFT STATION AND 12-INCH FORCE MAIN

Kimley-Horn & Associates, Inc.				Opinion of Probable Construction Cost	
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#27	LINE G BASIN LIFT STATION AND 12-INCH FORCE MAIN				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$60,000	$60,000
2	Traffic Control	1	LS	$40,000	$40,000
3	Erosion Control	1	LS	$20,000	$20,000
4	Allowance	1	LS	$40,000	$40,000
Force Main					
5	12" Force Main	2,400	LF	$100.00	$240,000
6	Sewer Line Trench Safety	2,400	LF	$3.00	$7,200
7	2" Sewer Air Release Valve & Vault	2	EA	$10,000	$20,000
				Force Main Total	**$267,200**
Lift Station					
8	Submersible Pumps (1,100 gpm @ 100')	3	EA	$125,000	$375,000
9	12' Diameter Fiberglass Manhole	1	EA	$150,000	$150,000
10	12" Header and Outlet Piping	100	LF	$120	$12,000
11	12" Check Valves	2	EA	$15,000	$30,000
12	Excavation	1,000	CY	$20	$20,000
13	Excavation Protection	1	LS	$100,000	$100,000
14	Flowable Fill	200	CY	$65	$13,000
15	Electrical	1	LS	$500,000	$500,000
16	Instrumentation/SCADA	1	LS	$50,000	$50,000
17	Miscellaneous Materials	1	LS	$50,000	$50,000
18	8" MAG Meter & Vault	1	LS	$25,000	$25,000
19	Site Work				
20	6" Water Pipe (Flushing Line)	500	LF	$250	$125,000
21	Site Grading	1	LS	$50,000	$50,000
22	Site Flatwork	1	LS	$50,000	$50,000
23	Fence	1,000	LF	$40	$40,000
24	Motorized Gate	1	LS	$20,000	$20,000
25	Fire Hydrant	1	EA	$3,500	$3,500
26	Gate Valve	1	EA	$1,500	$1,500
27	Trench Safety	500	LF	$2	$1,000
28	8" Concrete Driveway	1,000	SY	$80	$80,000
				Lift Station Total	**$1,696,000**

Basis for Cost Projection:			
☑ No Design Completed	Subtotal:		$2,123,200
☐ Preliminary Design	Conting. (%,+/-)	20%	$ 425,320
☐ Final Design	Professional Services (%,+/-)	15%	$ 318,480
	Total:		**$2,867,000**

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1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

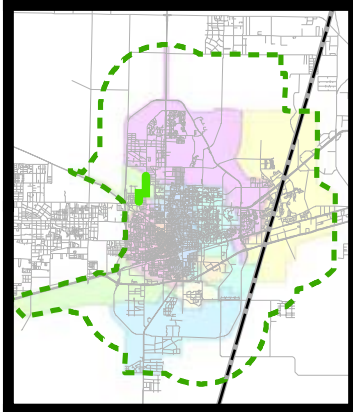
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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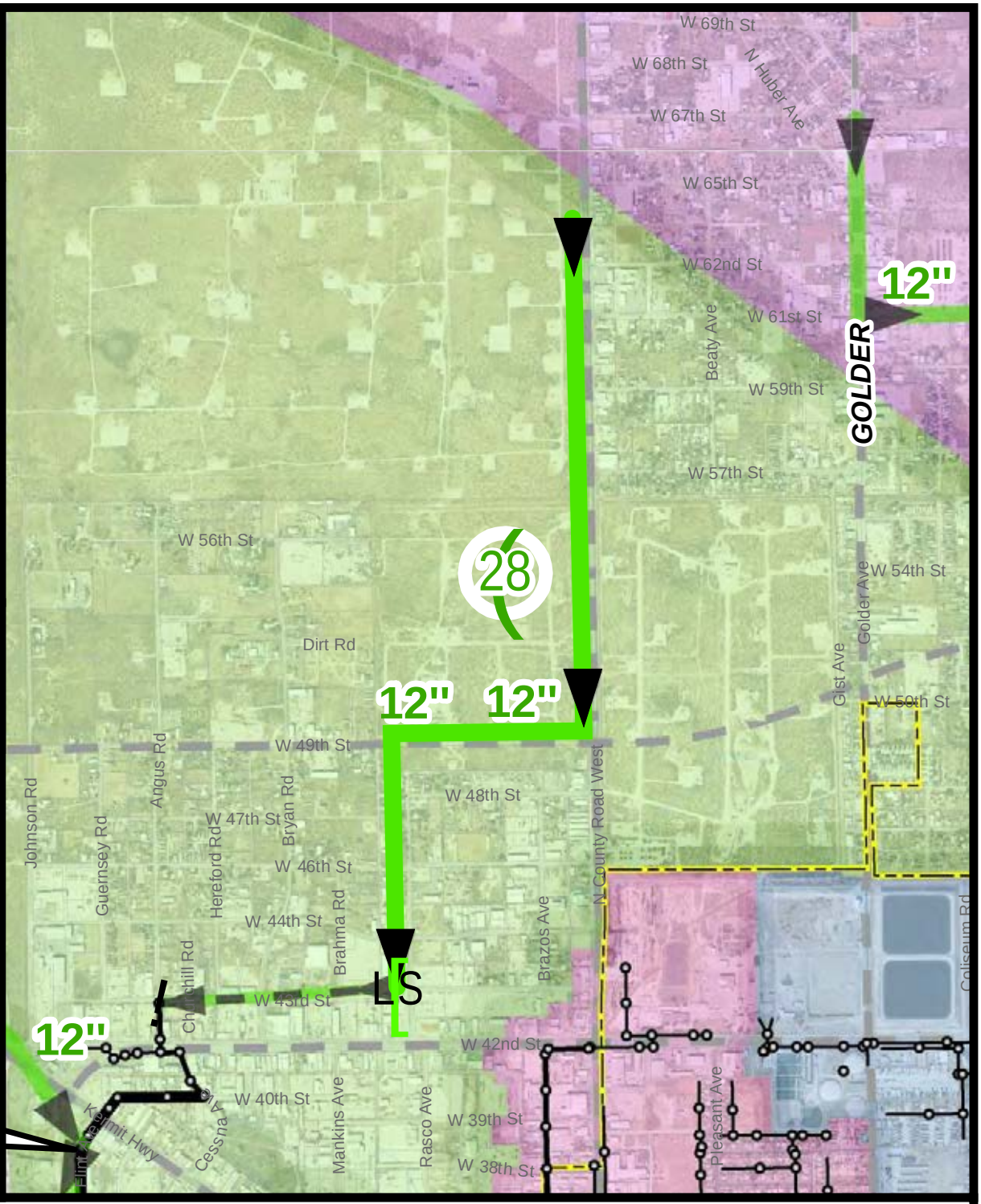


Phase: 25-Year

Project Description: This project consists of approximately 9,400 LF of 12" sewer line from the intersection of N County Rd W and W 65th St to the intersection of N Rasco Ave and W 43rd St.

Recommendation Comments: This project provides conveyance capacity from the Line G basin lift station to the north portion of the Line A basin. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $2,127,000.00

Project Name: LINE G BASIN LIFT STATION 12-INCH TRUNK MAIN

28

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#28 LINE G BASIN LIFT STATION 12-INCH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$50,000.00	$50,000
2	Traffic Control	1	LS	$30,000.00	$30,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	12" SDR-26 PVC Sanitary Sewer	8,700	LF	$100.00	$870,000
5	24" Bore with Steel Casing	700	LF	$500.00	$350,000
6	Sewer Line Trench Safety	8,700	LF	$3.00	$26,100
7	5' Standard Concrete Manhole	19	EA	$8,000.00	$150,400
8	Hydromulch Repair	19,400	SY	$2.00	$38,800
9	Allowance	1	LS	$40,000.00	$40,000

Basis for Cost Projection:			
	Subtotal:		$1,575,300
☑ No Design Completed	Conting. (%,+/-)	20%	$ 315,405
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 236,295
☐ Final Design	**Total:**		**$2,127,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

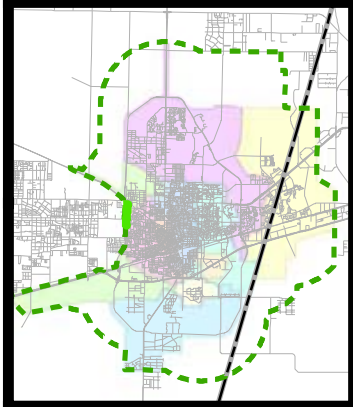
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22, Line H, Line A, Line K, Line B, Line P, Line C, Southwest, Line G, GCWD



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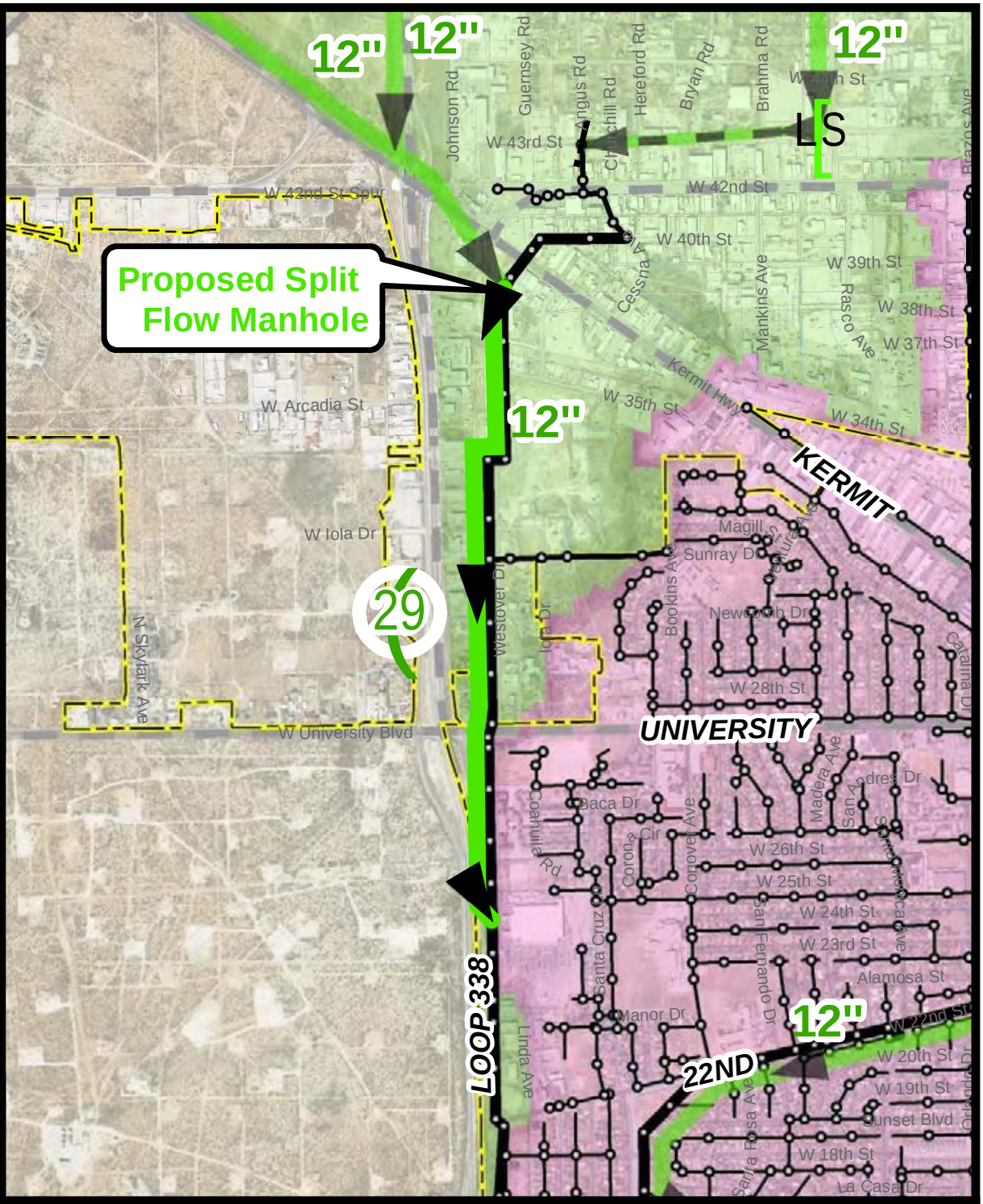


Phase: 25-Year

Project Description: This project consists of approximately 6,500 LF of 12" sewer line from just south of the intersection of Kermit Hwy and Flint Ave to just north of Wal-Mart Ct.

Recommendation Comments: This project provides relief to the existing parallel Line A basin interceptor by splitting the flow and relieving anticipated deficiences in the system.

Project Cost: $1,670,000.00

Project Name: WESTOVER DR 12-INCH PARALLEL TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#29	WESTOVER DR 12-INCH PARALLEL TRUNK MAIN		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$40,000.00	$40,000
2	Traffic Control	1	LS	$30,000.00	$30,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	12" SDR-26 PVC Sanitary Sewer	5,700	LF	$100.00	$570,000
5	24" Bore with Steel Casing	800	LF	$500.00	$400,000
6	Sewer Line Trench Safety	5,700	LF	$3.00	$17,100
7	5' Standard Concrete Manhole	13	EA	$8,000.00	$104,000
8	Hydromulch Repair	12,700	SY	$2.00	$25,400
9	Allowance	1	LS	$30,000.00	$30,000

Basis for Cost Projection:			
	Subtotal:		$1,236,500
☑ No Design Completed	Conting. (%,+/-)	20%	$ 248,025
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 185,475
☐ Final Design	**Total:**		**$1,670,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 3,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

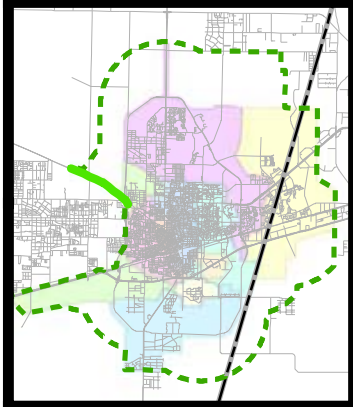
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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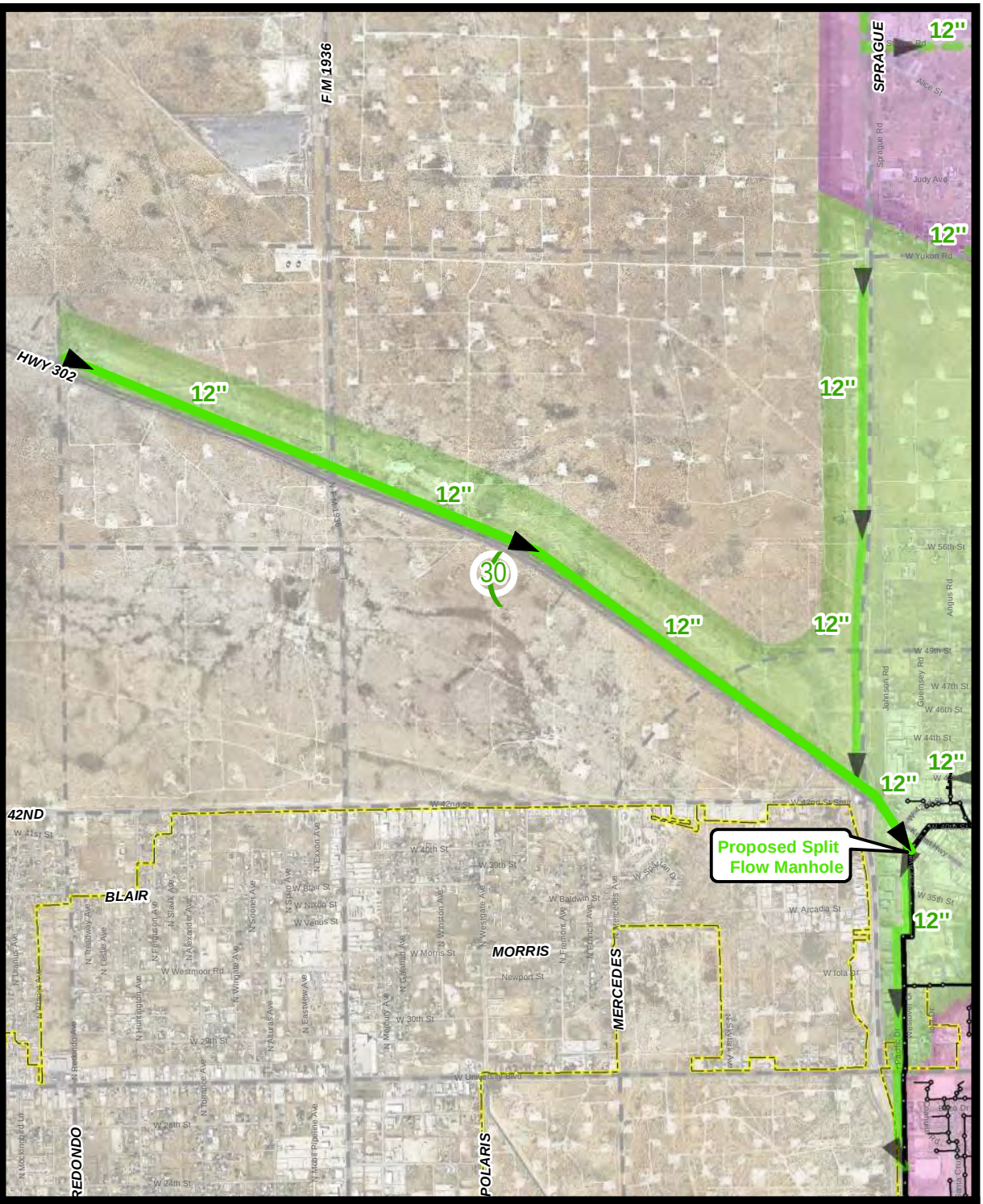


Phase: 25-Year

Project Description: This project consists of approximately 19,300 LF of 12" sewer line along Hwy 302.

Recommendation Comments: This project provides conveyance for the northwest portion of the Line A basin along Hwy 302. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $4,071,000.00

Project Name: HWY 302 12-INCH TRUNK MAIN

30

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#30	HWY 302 12-INCH TRUNK MAIN		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$90,000.00	$90,000
2	Traffic Control	1	LS	$60,000.00	$60,000
3	Erosion Control	1	LS	$30,000.00	$30,000
4	12" SDR-26 PVC Sanitary Sewer	18,300	LF	$100.00	$1,830,000
5	24" Bore with Steel Casing	1,000	LF	$500.00	$500,000
6	Sewer Line Trench Safety	18,300	LF	$3.00	$54,900
7	5' Standard Concrete Manhole	39	EA	$8,000.00	$308,800
8	Hydromulch Repair	40,700	SY	$2.00	$81,400
9	Allowance	1	LS	$60,000.00	$60,000

Basis for Cost Projection:			
☑ No Design Completed	Subtotal:		$3,015,100
☐ Preliminary Design	Conting. (%,+/-)	20%	$ 603,635
☐ Final Design	Professional Services (%,+/-)	15%	$ 452,265
	Total:		**$4,071,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

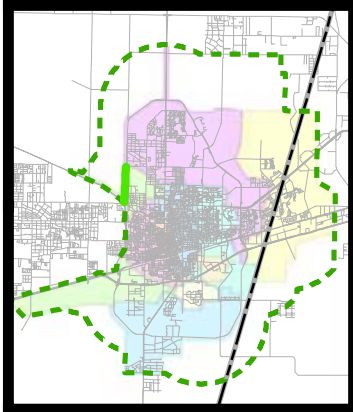
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

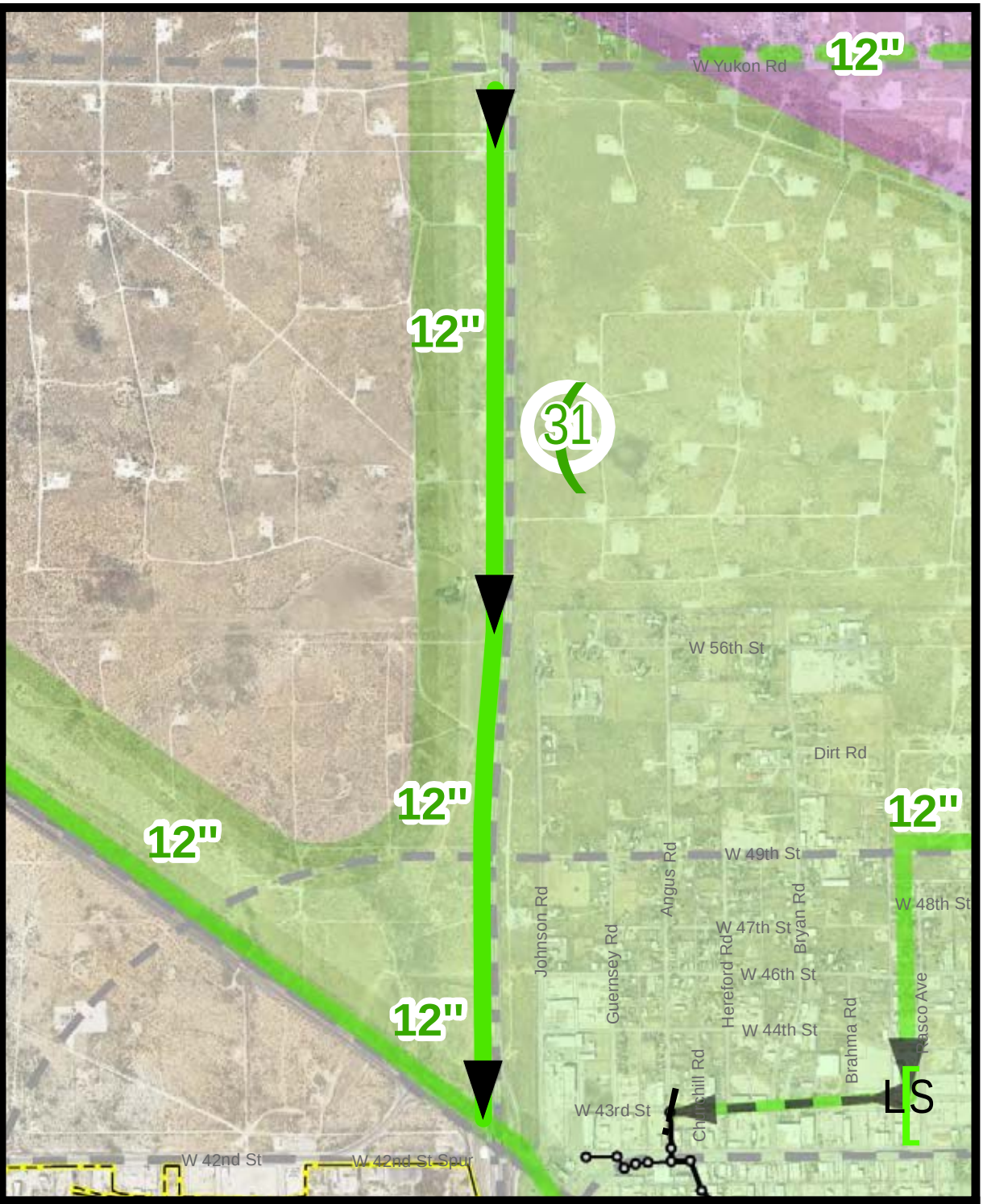
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 25-Year

Project Description: This project consists of approximately 10,000 LF of 12" sewer line from the intersection of Loop 338 and W Yukon Rd to the intersection of W 42nd St and Pacific Blvd.

Recommendation Comments: This project provides conveyance for the north portion of the Line A basin along Loop 338. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $2,174,000.00

Project Name: NORTHWEST LOOP 338 12-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#31	NORTHWEST LOOP 338 12-INCH TRUNK MAIN		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$50,000.00	$50,000
2	Traffic Control	1	LS	$30,000.00	$30,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	12" SDR-26 PVC Sanitary Sewer	9,400	LF	$100.00	$940,000
5	24" Bore with Steel Casing	600	LF	$500.00	$300,000
6	Sewer Line Trench Safety	9,400	LF	$3.00	$28,200
7	5' Standard Concrete Manhole	20	EA	$8,000.00	$160,000
8	Hydromulch Repair	20,900	SY	$2.00	$41,800
9	Allowance	1	LS	$40,000.00	$40,000

Basis for Cost Projection:			
	Subtotal:		$1,610,000
☑ No Design Completed	Conting. (%,+/-)	20%	$ 322,500
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 241,500
☐ Final Design	**Total:**		**$2,174,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 3,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

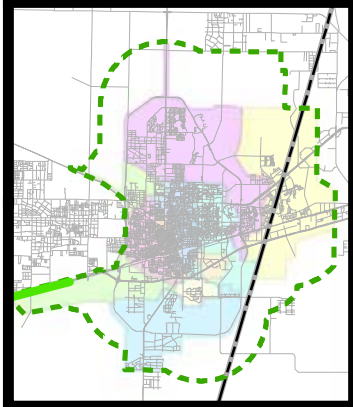
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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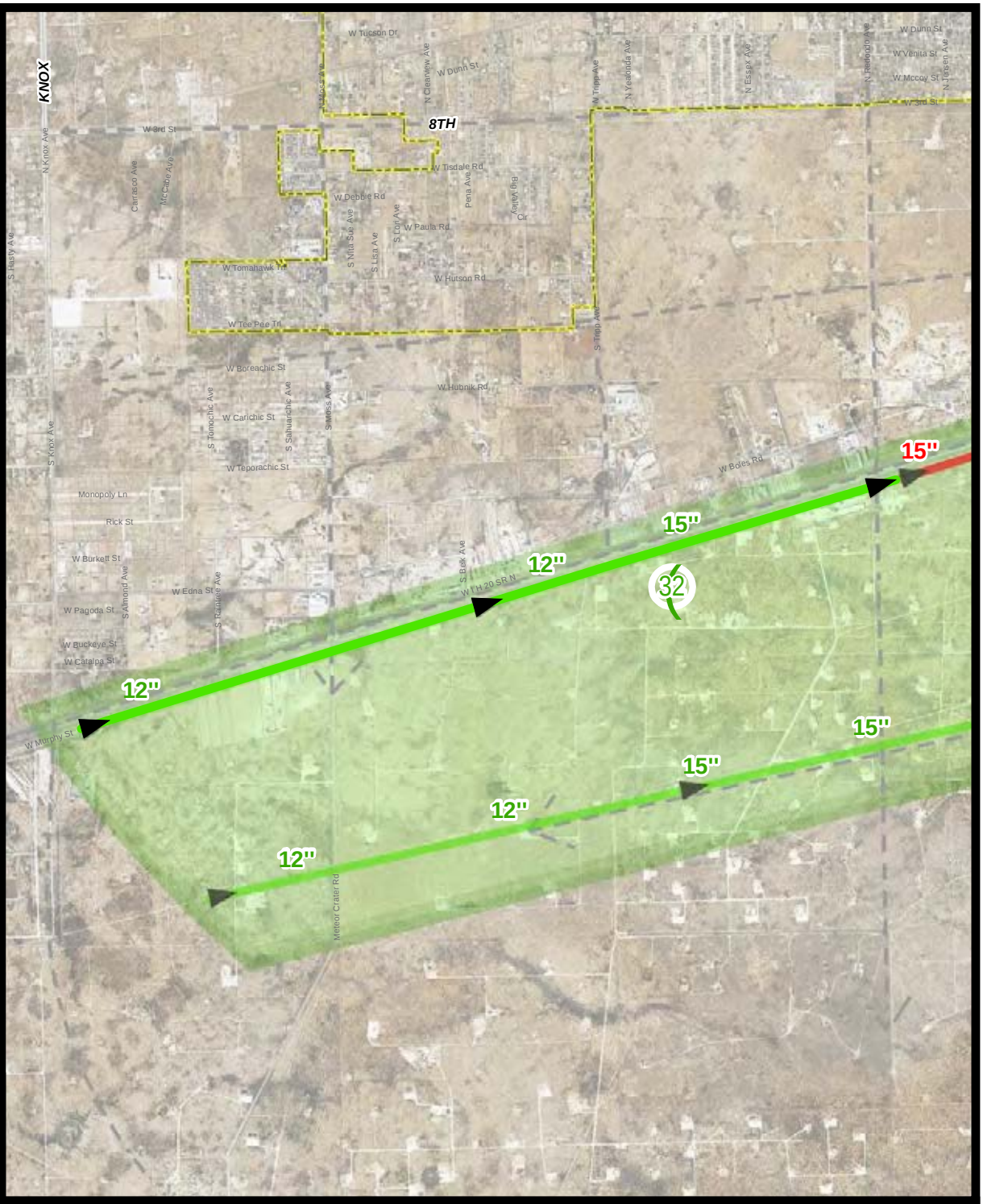
April 2019



Phase: 25-Year

Project Description: This project consists of approximately 5,900 LF of 15" sewer line and 10,700 LF of 12" sewer line adjacent to I-20.

Recommendation Comments: This project provides conveyance for the southwest portion of the Line A basin along Interstate 20. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $3,156,000.00

Project Name: I-20 BUSINESS 15, 12-INCH TRUNK MAIN EXTENSION

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#32	I-20 BUSINESS 15, 12-INCH TRUNK MAIN EXTENSION		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$70,000.00	$70,000
2	Traffic Control	1	LS	$50,000.00	$50,000
3	Erosion Control	1	LS	$30,000.00	$30,000
4	15" SDR-26 PVC Sanitary Sewer	5,900	LF	$115.00	$678,500
5	12" SDR-26 PVC Sanitary Sewer	10,700	LF	$100.00	$1,070,000
6	Sewer Line Trench Safety	16,600	LF	$3.00	$49,800
7	5' Standard Concrete Manhole	33	EA	$8,000.00	$265,600
8	Hydromulch Repair	36,900	SY	$2.00	$73,800
9	Allowance	1	LS	$50,000.00	$50,000

Basis for Cost Projection:			
	Subtotal:		$2,337,700
☑ No Design Completed	Conting. (%,+/-)	20%	$ 467,645
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 350,655
☐ Final Design	**Total:**		**$3,156,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

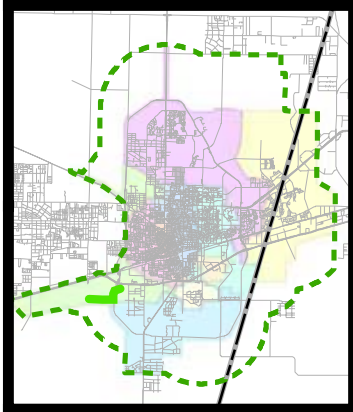
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

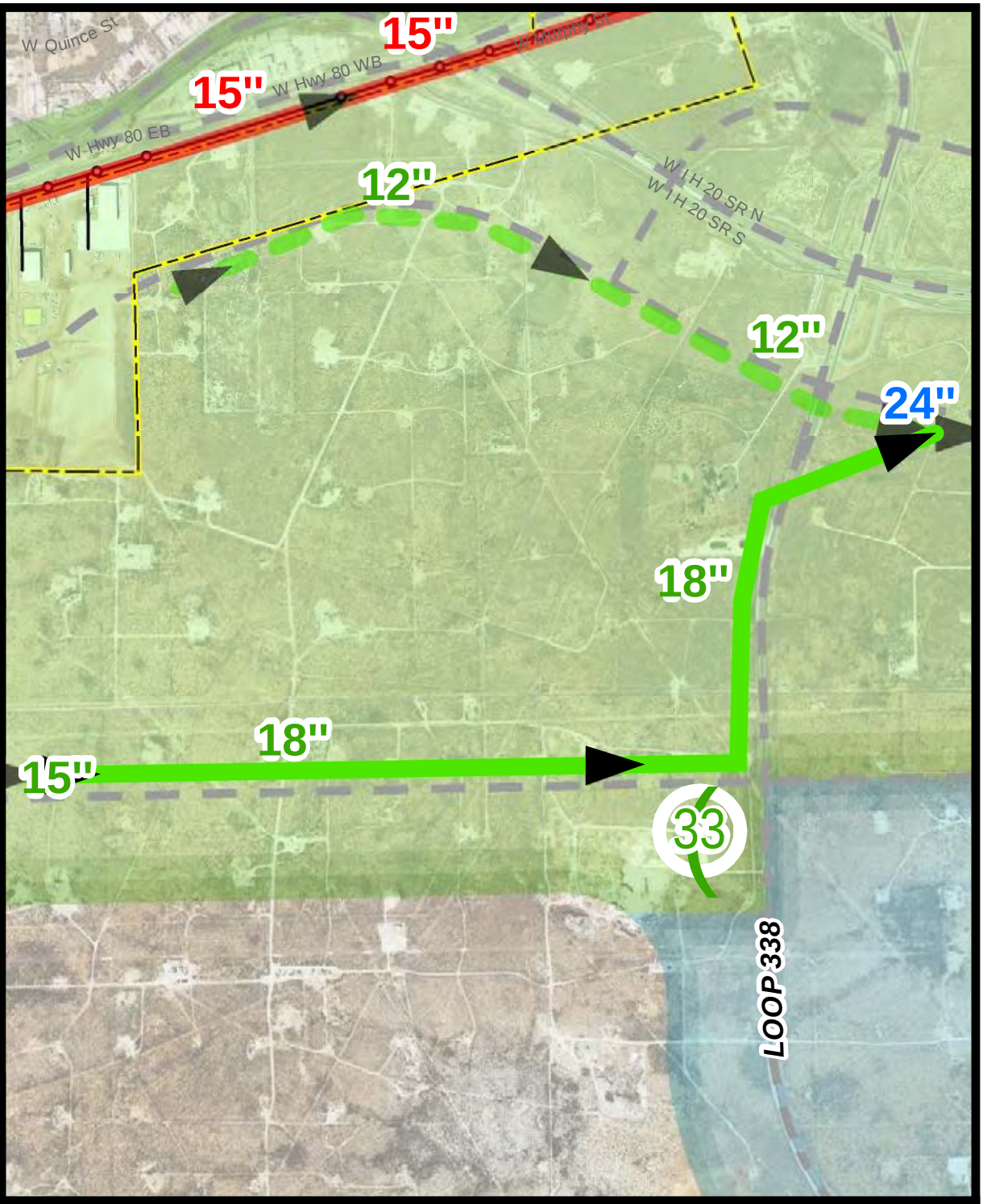
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 25-Year

Project Description: This project consists of approximately 11,300 LF of 18" south of I-20 along Bell St.

Recommendation Comments: This project provides conveyance for the southwest portion of the Line A basin. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $2,544,000.00

Project Name: MOSS RANCH 18-INCH TRUNK MAIN

33

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#33 MOSS RANCH 18-INCH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$60,000.00	$60,000
2	Traffic Control	1	LS	$40,000.00	$40,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	18" SDR-26 PVC Sanitary Sewer	11,200	LF	$125.00	$1,400,000
5	30" Bore with Steel Casing	100	LF	$600.00	$60,000
6	Sewer Line Trench Safety	11,200	LF	$3.00	$33,600
7	5' Standard Concrete Manhole	23	EA	$8,000.00	$180,800
8	Hydromulch Repair	24,900	SY	$2.00	$49,800
9	Allowance	1	LS	$40,000.00	$40,000

Basis for Cost Projection:			
	Subtotal:		$1,884,200
☑ No Design Completed	Conting. (%,+/-)	20%	$ 377,170
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 282,630
☐ Final Design	**Total:**		**$2,544,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 3,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

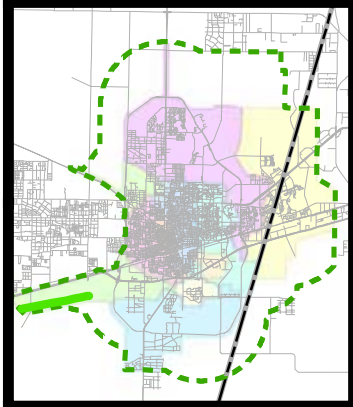
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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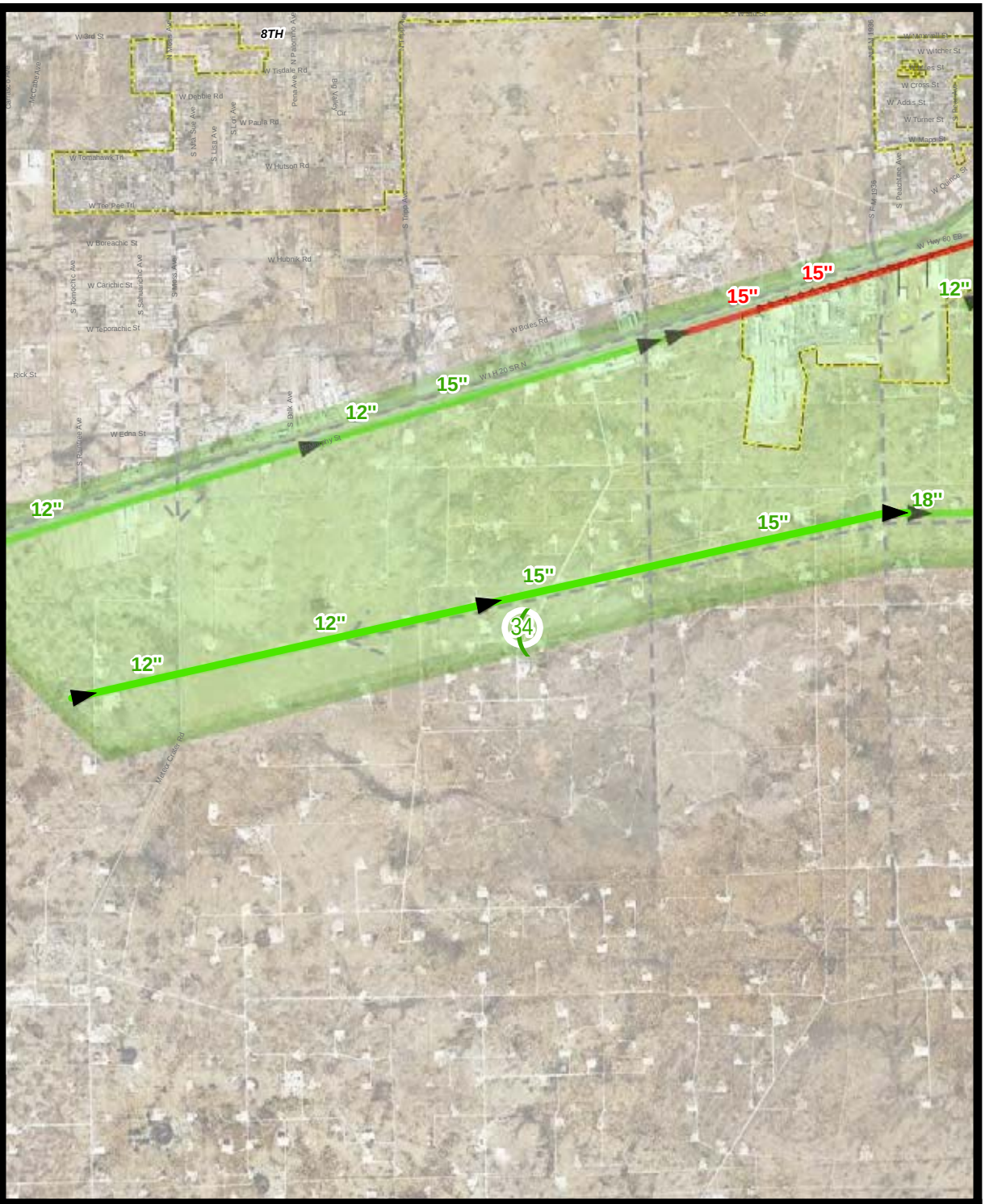


Phase: 25-Year

Project Description: This project consists of approximately 10,800 LF of 15" sewer line and 8,600 LF of 12" sewer line south of I-20.

Recommendation Comments: This project provides conveyance for the southwest portion of the Line A basin. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $3,816,000.00

Project Name: HENDERSON RANCH 15, 12-INCH TRUNK MAIN

34

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#34 HENDERSON RANCH 15, 12-INCH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$80,000.00	$80,000
2	Traffic Control	1	LS	$60,000.00	$60,000
3	Erosion Control	1	LS	$30,000.00	$30,000
4	15" SDR-26 PVC Sanitary Sewer	10,800	LF	$115.00	$1,242,000
5	12" SDR-26 PVC Sanitary Sewer	8,500	LF	$100.00	$850,000
6	24" Bore with Steel Casing	100	LF	$500.00	$50,000
7	Sewer Line Trench Safety	19,300	LF	$3.00	$57,900
8	5' Standard Concrete Manhole	39	EA	$8,000.00	$310,400
9	Hydromulch Repair	42,900	SY	$2.00	$85,800
10	Allowance	1	LS	$60,000.00	$60,000

Basis for Cost Projection:			
	Subtotal:		$2,826,100
☑ No Design Completed	Conting. (%,+/-)	20%	$ 565,985
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 423,915
☐ Final Design	**Total:**		**$3,816,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 3,500 feet

LEGEND:

- Wastewater Master Plan Boundary

5 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

10 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

25 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

Beyond 25 Year Projects

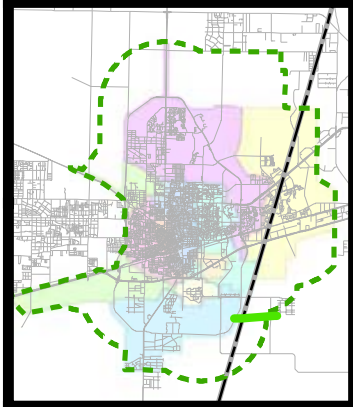
- Proposed Trunk Main

Developer Projects

- Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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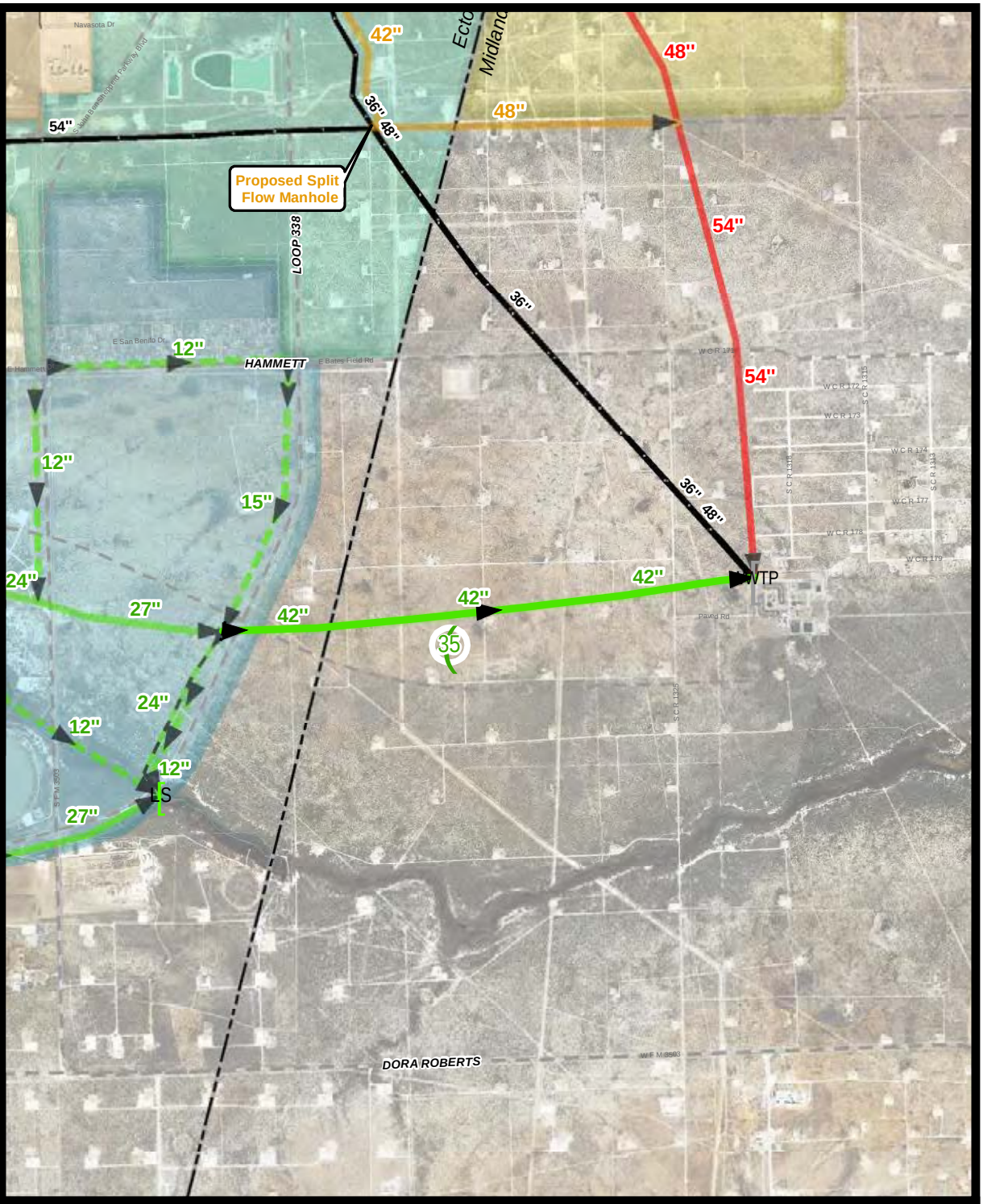


Phase: 25-Year

Project Description: This project consists of approximately 12,200 LF of 42" sewer line from Loop 338 to just east of S County Rd 1325.

Recommendation Comments: This project provides conveyance for the north portion of Southwest Basin to the Bob Derrington Wastewater Treatment Plant. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $6,165,000.00

Project Name: SOUTHWEST BASIN INTERCEPTOR SEGMENT I

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#35	SOUTHWEST BASIN INTERCEPTOR SEGMENT I		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$130,000.00	$130,000
2	Traffic Control	1	LS	$90,000.00	$90,000
3	Erosion Control	1	LS	$50,000.00	$50,000
4	42" Fiberglass Sanitary Sewer	12,000	LF	$300.00	$3,600,000
5	64" Bore with Steel Casing	200	LF	$1,000.00	$200,000
6	Sewer Line Trench Safety	12,000	LF	$3.00	$36,000
7	6' Standard Concrete Manhole	24	EA	$13,000.00	$317,200
8	Hydromulch Repair	26,700	SY	$2.00	$53,400
9	Allowance	1	LS	$90,000.00	$90,000

Basis for Cost Projection:			
	Subtotal:		$4,566,600
☑ No Design Completed	Conting. (%,+/-)	20%	$ 913,410
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 684,990
☐ Final Design	**Total:**		**$6,165,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 3,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

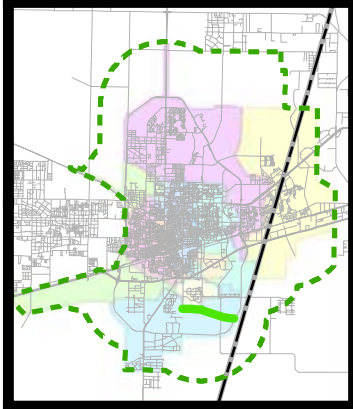
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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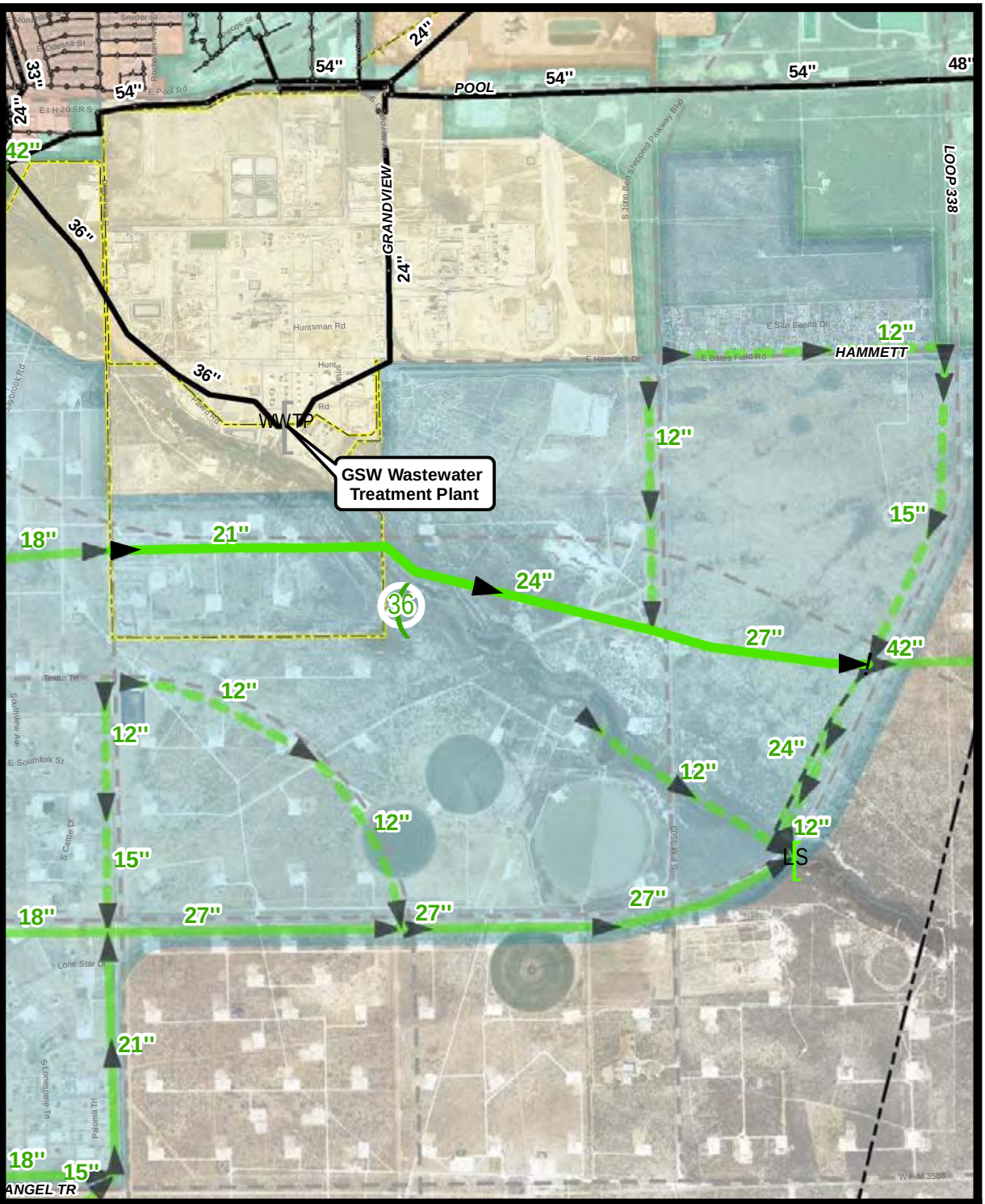


Phase: 25-Year

Project Description: This project consists of approximately 4,300 LF of 27" sewer line, 5,500 LF of 24" sewer line, and 5,400 LF 21" sewer line from S Dixie Blvd to Loop 338.

Recommendation Comments: This project provides conveyance for the north portion of Southwest Basin to the Bob Derrington Wastewater Treatment Plant. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $4,128,000.00

Project Name: SOUTHWEST BASIN INTERCEPTOR SEGMENT II

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#36	SOUTHWEST BASIN INTERCEPTOR SEGMENT II		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$90,000.00	$90,000
2	Traffic Control	1	LS	$60,000.00	$60,000
3	Erosion Control	1	LS	$30,000.00	$30,000
4	27" SDR-26 PVC Sanitary Sewer	4,200	LF	$180.00	$756,000
5	24" SDR-26 PVC Sanitary Sewer	5,500	LF	$160.00	$880,000
6	21" SDR-26 PVC Sanitary Sewer	5,400	LF	$140.00	$756,000
7	42" Bore with Steel Casing	100	LF	$700.00	$70,000
8	Sewer Line Trench Safety	15,100	LF	$3.00	$45,300
9	5' Standard Concrete Manhole	30	EA	$8,000.00	$243,200
10	Hydromulch Repair	33,600	SY	$2.00	$67,200
11	Allowance	1	LS	$60,000.00	$60,000

Basis for Cost Projection:			
	Subtotal:		$3,057,700
☑ No Design Completed	Conting. (%,+/-)	20%	$ 611,645
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 458,655
☐ Final Design	**Total:**		**$4,128,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

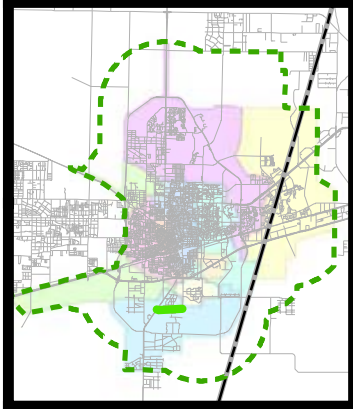
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

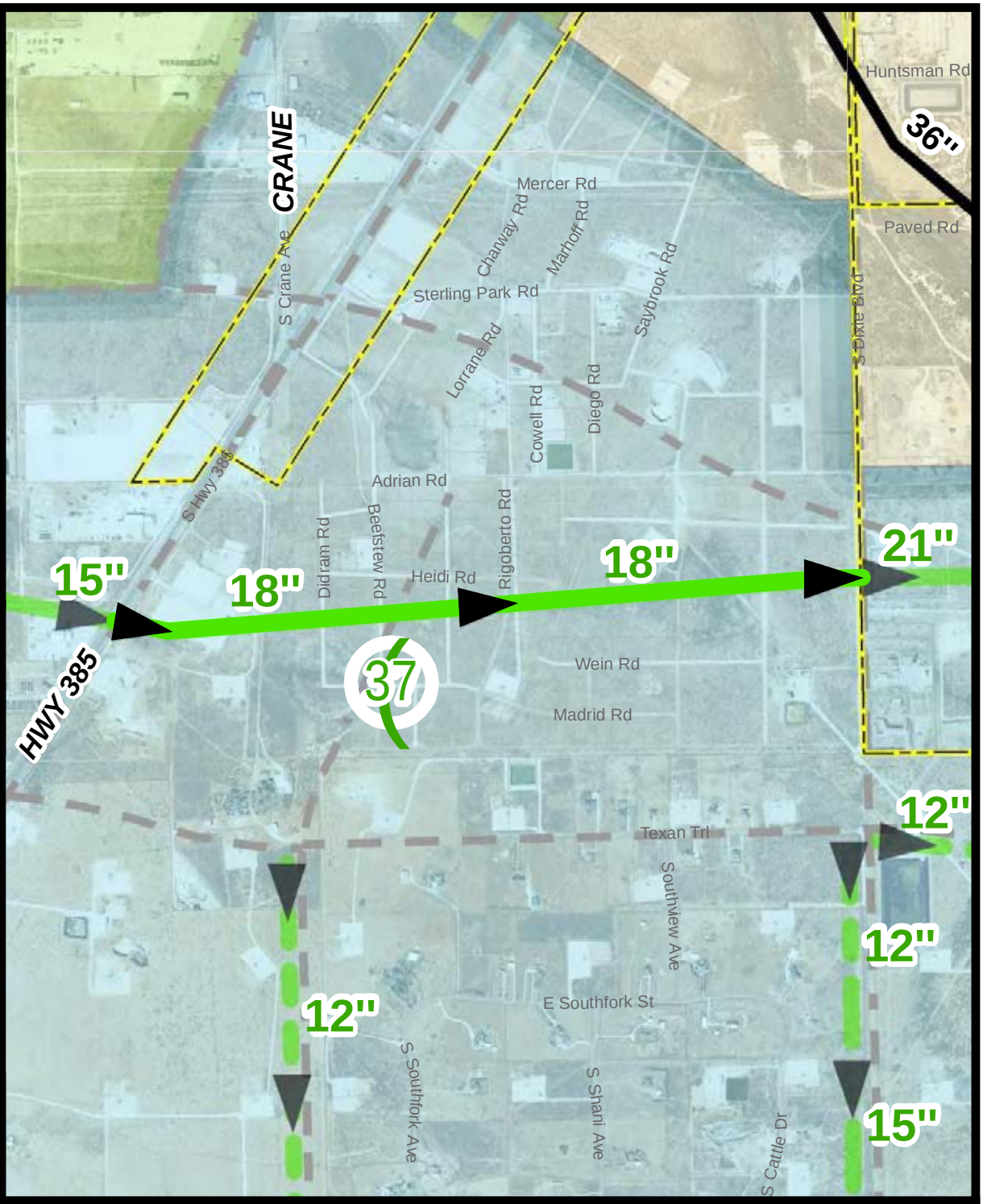
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 25-Year

Project Description: This project consists of approximately 7,300 LF of 18" sewer line from S Dixie Blvd to Highway 385.

Recommendation Comments: This project provides conveyance for the north portion of Southwest Basin to the Bob Derrington Wastewater Treatment Plant. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $1,689,000.00

Project Name: SOUTHWEST BASIN INTERCEPTOR SEGMENT III

37

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#37 SOUTHWEST BASIN INTERCEPTOR SEGMENT III

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$40,000.00	$40,000
2	Traffic Control	1	LS	$30,000.00	$30,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	18" SDR-26 PVC Sanitary Sewer	7,200	LF	$125.00	$900,000
5	30" Bore with Steel Casing	100	LF	$600.00	$60,000
6	Sewer Line Trench Safety	7,200	LF	$3.00	$21,600
7	5' Standard Concrete Manhole	15	EA	$8,000.00	$116,800
8	Hydromulch Repair	16,000	SY	$2.00	$32,000
9	Allowance	1	LS	$30,000.00	$30,000

Basis for Cost Projection:			
	Subtotal:		$1,250,400
☑ No Design Completed	Conting. (%,+/-)	20%	$ 251,040
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 187,560
☐ Final Design	**Total:**		**$1,689,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 2,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

Proposed Trunk Main

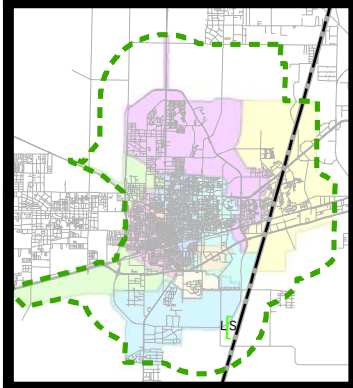
Proposed Lift Station

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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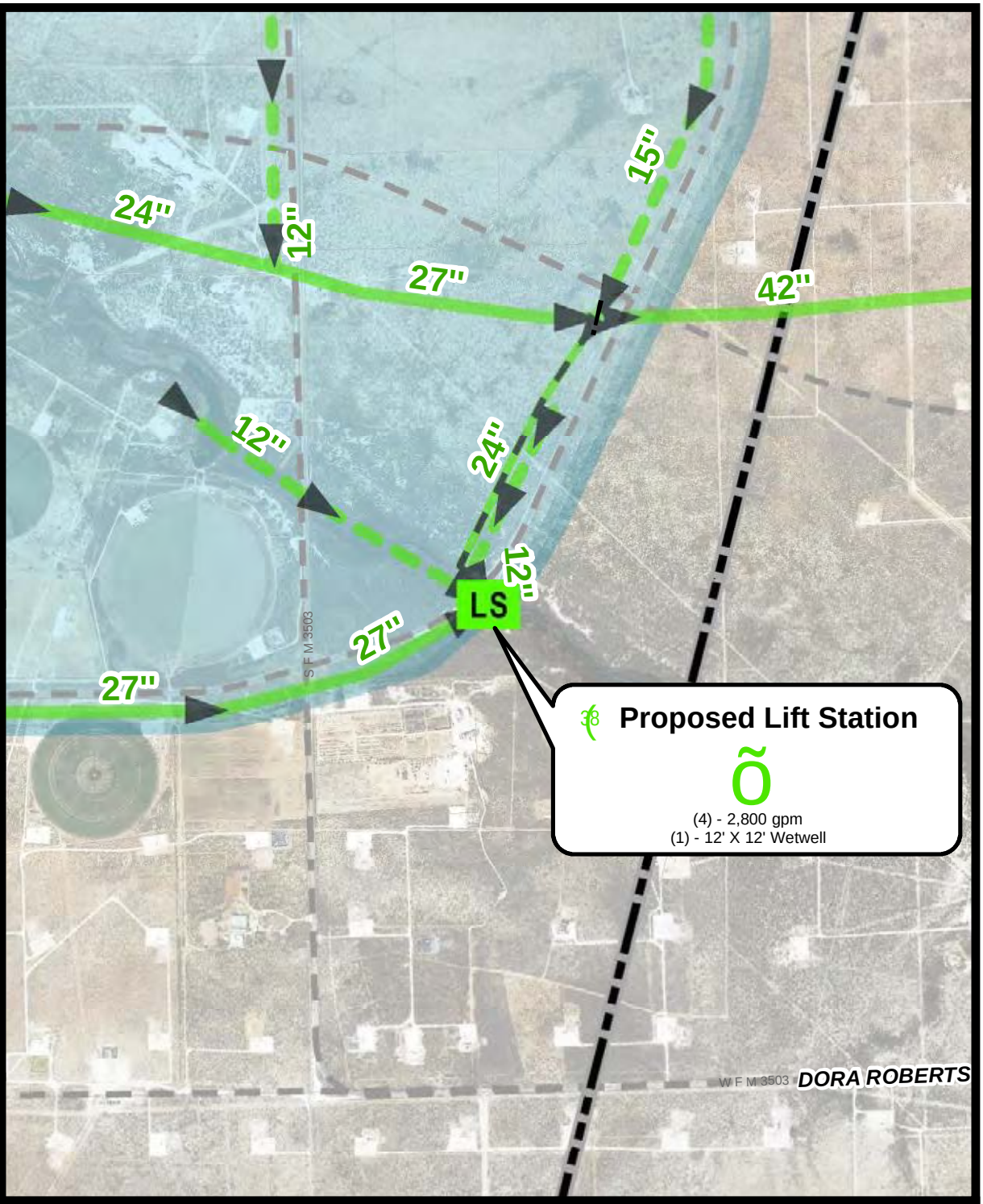


Phase: 25-Year

Project Description: This project consists of approximately 4,300 LF of 24" force main and a 12 MGD lift station adjacent to E Loop 338.

Recommendation Comments: This project serves a localized topographic low point wastewater system. This project provides conveyance for the central and south portions of the Southwest Basin to the interceptor leading to the Bob Derrington Wastewater Treatment Plant.

Project Cost: $4,645,000

Project Name: SOUTHWEST BASIN LIFT STATION AND 24-INCH FORCE MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#38	SOUTHWEST BASIN LIFT STATION AND 24-INCH FORCE MAIN		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$100,000	$100,000
2	Traffic Control	1	LS	$70,000	$70,000
3	Erosion Control	1	LS	$40,000	$40,000
4	Allowance	1	LS	$70,000	$70,000
Force Main					
5	24" Force Main	4,200	LF	$200	$840,000
6	24" Bore with Steel Casing	100	LF	$500	$50,000
7	Sewer Line Trench Safety	4,200	LF	$3	$12,600
8	2" Sewer Air Release Valve & Vault	2	EA	$10,000	$20,000
				Force Main Total	**$922,600**
Lift Station					
9	Submersible Pumps (2,800 gpm @ 50')	4	EA	$200,000	$800,000
10	10' x 10' Concrete Wetwell	1	EA	$250,000	$250,000
11	12" Header and Outlet Piping	100	LF	$120	$12,000
12	12" Check Valves	2	EA	$15,000	$30,000
13	Excavation	1,500	CY	$20	$30,000
14	Excavation Protection	1	LS	$100,000	$100,000
15	Flowable Fill	300	CY	$65	$19,500
16	Electrical	1	LS	$500,000	$500,000
17	Instrumentation/SCADA	1	LS	$50,000	$50,000
18	Miscellaneous Materials	1	LS	$50,000	$50,000
19	8" MAG Meter & Vault	1	LS	$25,000	$25,000
20	Site Work				
21	6" Water Pipe (Flushing Line)	500	LF	$250	$125,000
22	Site Grading	1	LS	$50,000	$50,000
23	Site Flatwork	1	LS	$50,000	$50,000
24	Fence	1,000	LF	$40	$40,000
25	Motorized Gate	1	LS	$20,000	$20,000
26	Fire Hydrant	1	EA	$3,500	$3,500
27	Gate Valve	1	EA	$1,500	$1,500
28	Trench Safety	500	LF	$2	$1,000
29	8" Concrete Driveway	1,000	SY	$80	$80,000
				Lift Station Total	**$2,237,500**

Basis for Cost Projection:			
☑ No Design Completed	Subtotal:		$3,440,100
☐ Preliminary Design	Conting. (%,+/-)	20%	$ 688,885
☐ Final Design	Professional Services (%,+/-)	15%	$ 516,015
	Total:		**$4,645,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 2,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

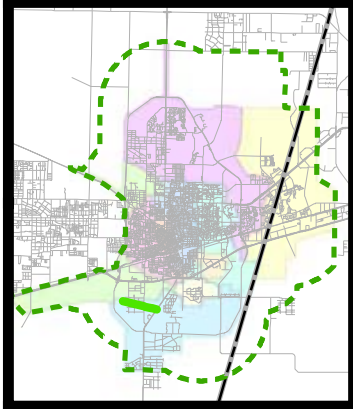
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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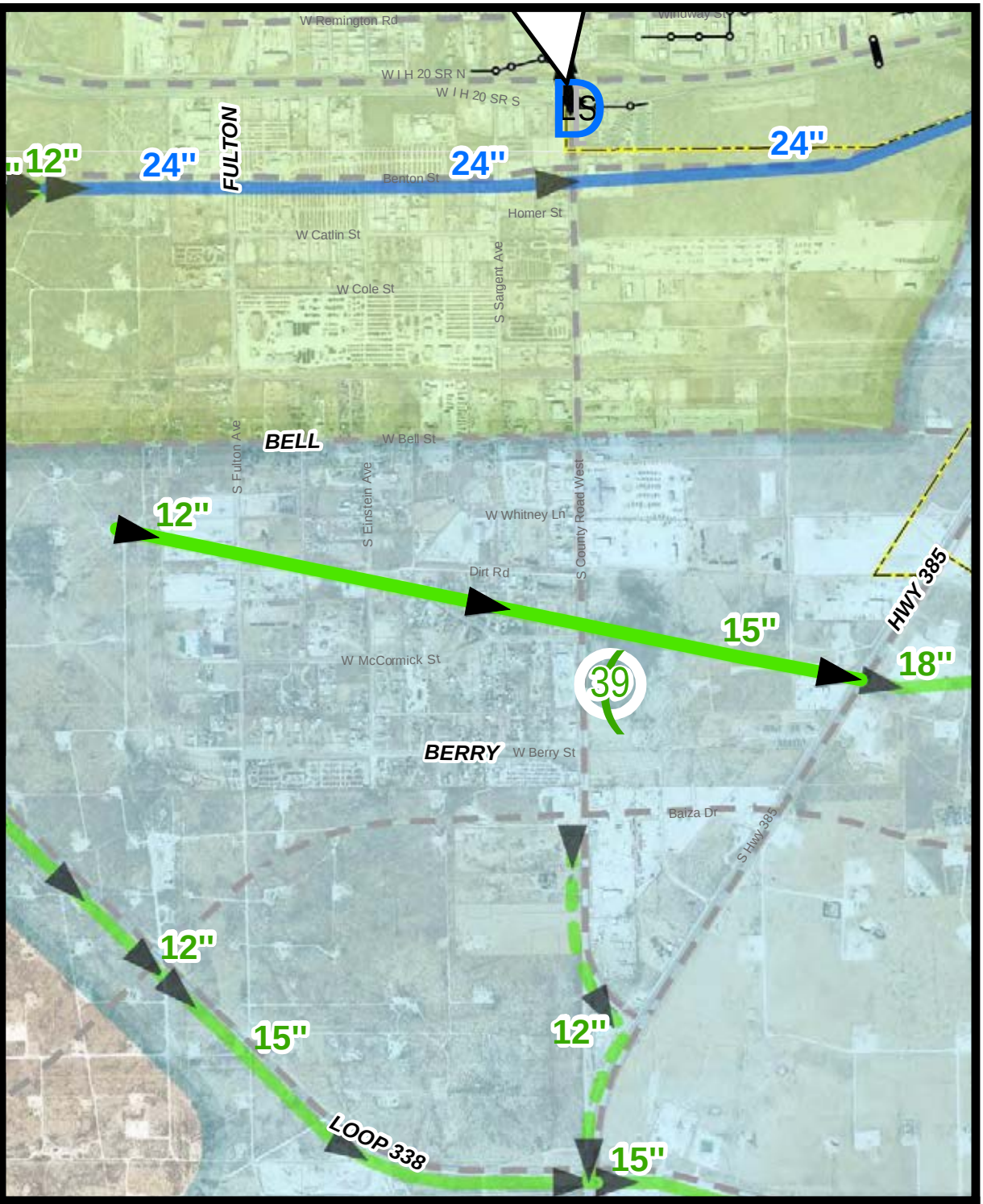


Phase: 25-Year

Project Description: This project consists of approximately 3,700 LF of 15" and 6,200 LF of 12" sewer line from just west of Fulton Dr to S Grant Ave.

Recommendation Comments: This project provides conveyance for the north portion of Southwest Basin to the Bob Derrington Wastewater Treatment Plant. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $1,887,000.00

Project Name: SOUTHWEST BASIN INTERCEPTOR SEGMENT IV

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#39	SOUTHWEST BASIN INTERCEPTOR SEGMENT IV		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$40,000.00	$40,000
2	Traffic Control	1	LS	$30,000.00	$30,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	15" SDR-26 PVC Sanitary Sewer	3,700	LF	$115.00	$425,500
5	12" SDR-26 PVC Sanitary Sewer	6,200	LF	$100.00	$620,000
6	Sewer Line Trench Safety	9,900	LF	$3.00	$29,700
7	5' Standard Concrete Manhole	20	EA	$8,000.00	$158,400
8	Hydromulch Repair	22,000	SY	$2.00	$44,000
9	Allowance	1	LS	$30,000.00	$30,000

Basis for Cost Projection:			
	Subtotal:		$1,397,600
☑ No Design Completed	Conting. (%,+/-)	20%	$ 279,760
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 209,640
☐ Final Design	**Total:**		**$1,887,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 2,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

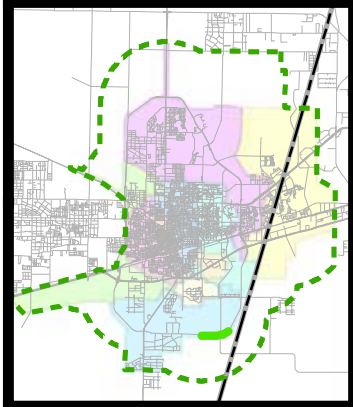
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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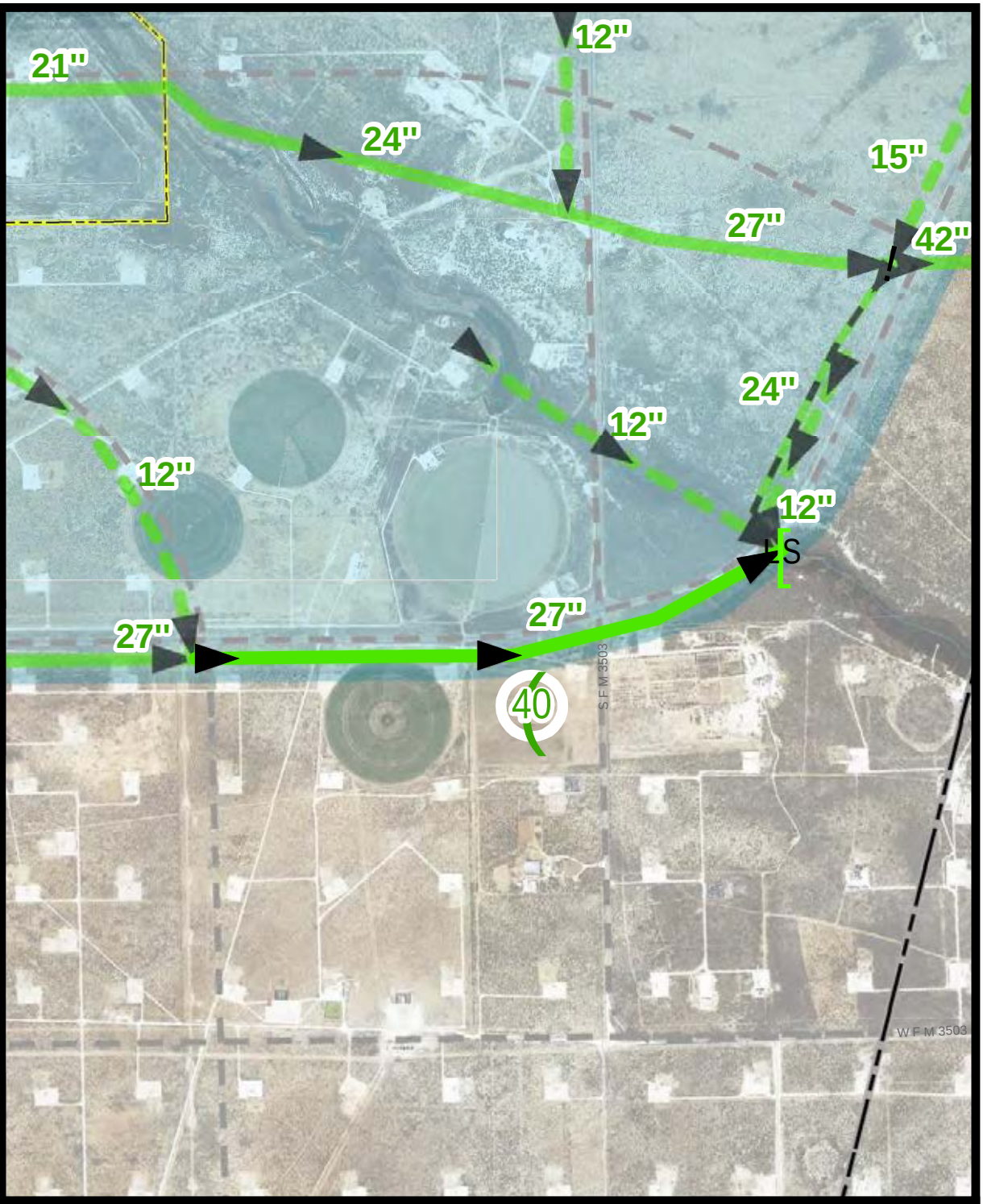
April 2019



Phase: 25-Year

Project Description: This project consists of approximately 7,900 LF of 27" sewer line along the southwest edge of N Loop 338.

Recommendation Comments: This project provides conveyance for the central portion of the Southwest Basin to the Southwest Basin Lift Station. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $2,442,000.00

Project Name: SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT I

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#40	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT I		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$50,000.00	$50,000
2	Traffic Control	1	LS	$40,000.00	$40,000
3	Erosion Control	1	LS	$20,000.00	$20,000
4	27" SDR-26 PVC Sanitary Sewer	7,800	LF	$180.00	$1,404,000
5	42" Bore with Steel Casing	100	LF	$700.00	$70,000
6	Sewer Line Trench Safety	7,800	LF	$3.00	$23,400
7	5' Standard Concrete Manhole	16	EA	$8,000.00	$126,400
8	Hydromulch Repair	17,400	SY	$2.00	$34,800
9	Allowance	1	LS	$40,000.00	$40,000

Basis for Cost Projection:			
	Subtotal:		$1,808,600
☑ No Design Completed	Conting. (%,+/-)	20%	$ 362,110
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 271,290
☐ Final Design	**Total:**		**$2,442,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 3,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

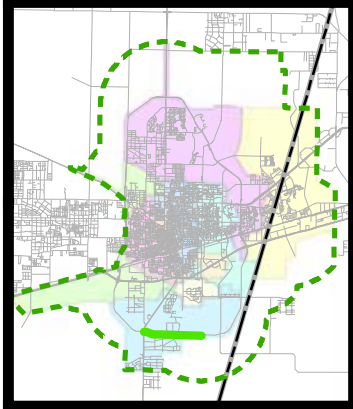
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

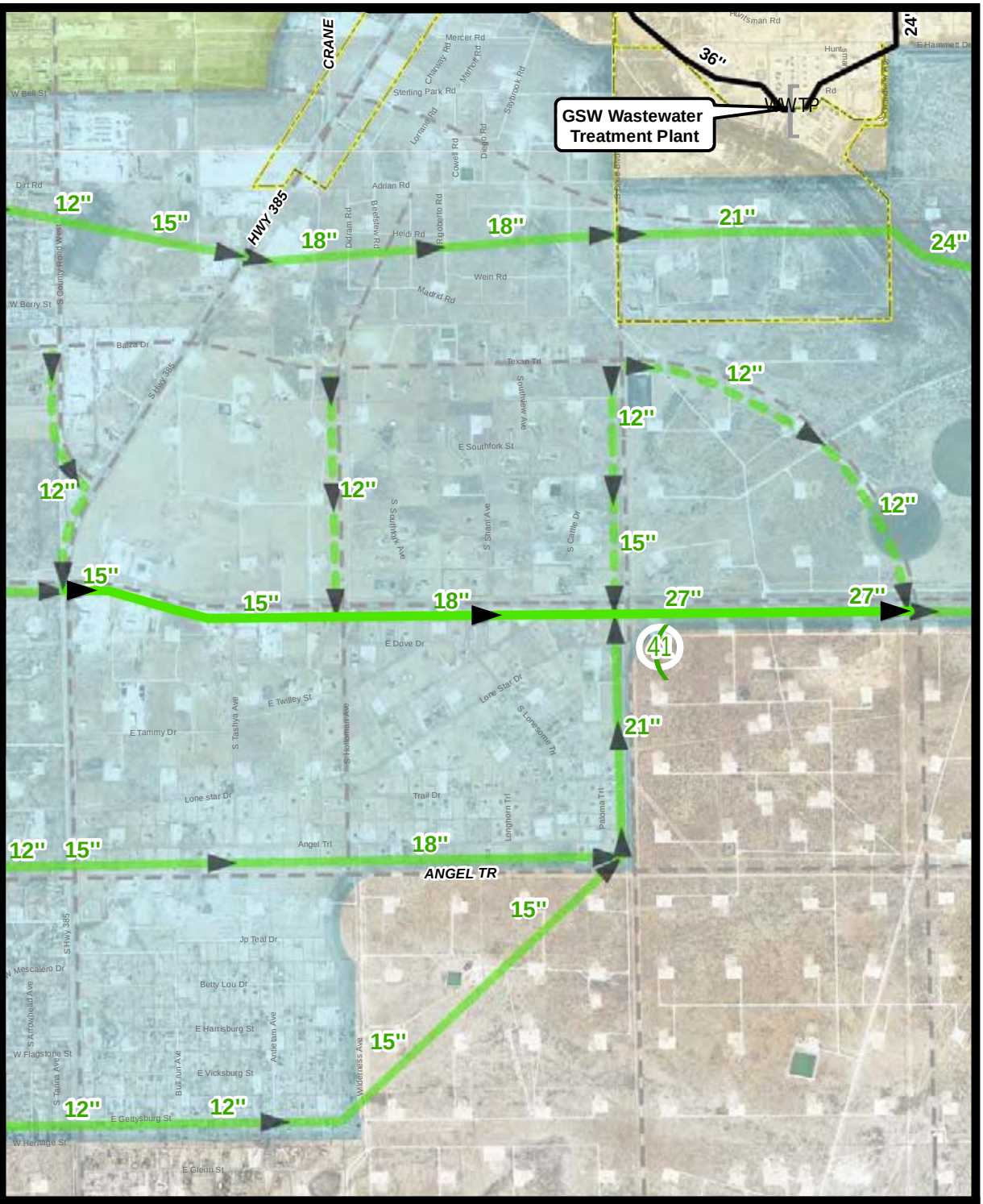
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 25-Year

Project Description: This project consists of approximately 5,800 LF of 27" sewer line, 5,500 LF of 21" sewer line, and 5,300 LF of 18" sewer line along Loop 338 from S Hwy 385 to S Dixie Blvd.

Recommendation Comments: This project provides conveyance for the central portion of the Southwest Basin to the Southwest Basin Lift Station. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $4,345,000.00

Project Name: SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT II

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#41	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT II		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$90,000.00	$90,000
2	Traffic Control	1	LS	$60,000.00	$60,000
3	Erosion Control	1	LS	$30,000.00	$30,000
4	27" SDR-26 PVC Sanitary Sewer	5,600	LF	$180.00	$1,008,000
5	21" SDR-26 PVC Sanitary Sewer	5,500	LF	$140.00	$770,000
6	18" SDR-26 PVC Sanitary Sewer	5,300	LF	$125.00	$662,500
5	42" Bore with Steel Casing	200	LF	$700.00	$140,000
6	Sewer Line Trench Safety	16,400	LF	$3.00	$49,200
7	5' Standard Concrete Manhole	33	EA	$8,000.00	$265,600
8	Hydromulch Repair	36,500	SY	$2.00	$73,000
9	Allowance	1	LS	$70,000.00	$70,000

Basis for Cost Projection:			
☑ No Design Completed	Subtotal:		$3,218,300
☐ Preliminary Design	Conting. (%,+/-)	20%	$ 643,955
☐ Final Design	Professional Services (%,+/-)	15%	$ 482,745
	Total:		**$4,345,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

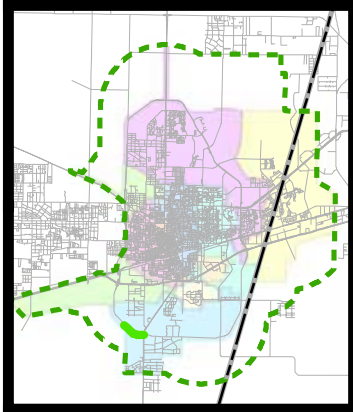
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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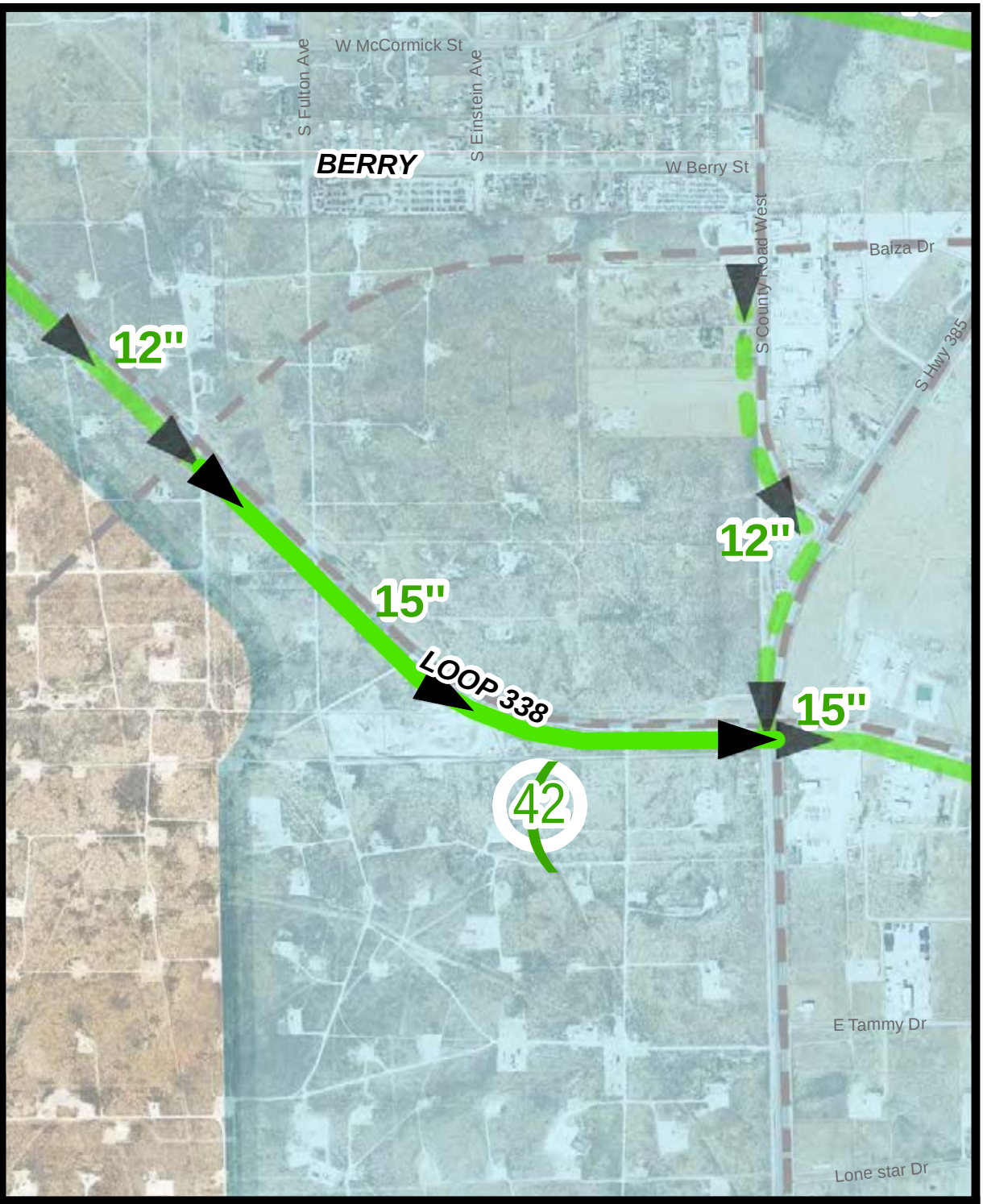


Phase: 25-Year

Project Description: This project consists of approximately 6,600 LF of 15" sewer line adjacent to Loop 338.

Recommendation Comments: This project provides conveyance for the central portion of the Southwest Basin to the Southwest Basin Lift Station. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $1,342,000.00

Project Name: SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT III

Kimley-Horn & Associates, Inc.					Opinion of Probable Construction Cost
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#42	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT III				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$30,000.00	$30,000
2	Traffic Control	1	LS	$20,000.00	$20,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	15" SDR-26 PVC Sanitary Sewer	6,600	LF	$115.00	$759,000
5	Sewer Line Trench Safety	6,600	LF	$3.00	$19,800
6	5' Standard Concrete Manhole	13	EA	$8,000.00	$105,600
7	Hydromulch Repair	14,700	SY	$2.00	$29,400
8	Allowance	1	LS	$20,000.00	$20,000
	Basis for Cost Projection:	Subtotal:			$993,800
☑	No Design Completed	Conting. (%,+/-)		20%	$ 199,130
☐	Preliminary Design	Professional Services (%,+/-)		15%	$ 149,070
☐	Final Design	**Total:**			**$1,342,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

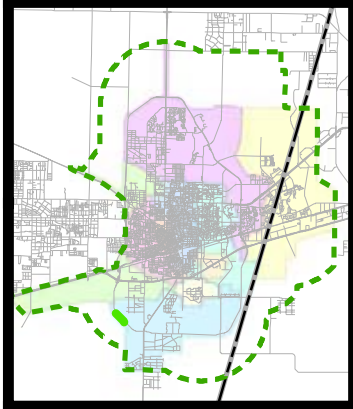
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



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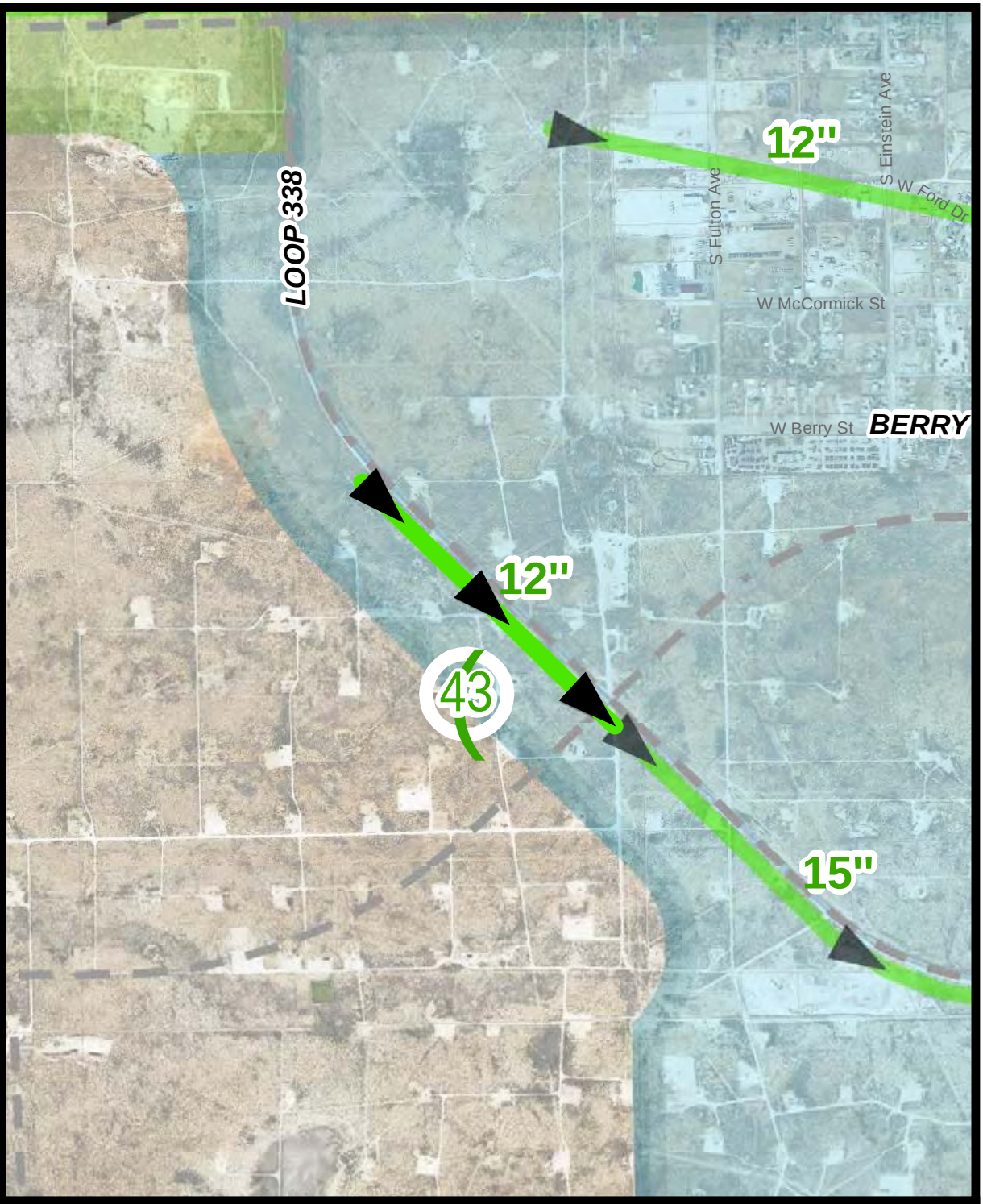


Phase: 25-Year

Project Description: This project consists of approximately 3,400 LF of 12" sewer line along Loop 338.

Recommendation Comments: This project provides conveyance for the central portion of the Southwest Basin to the Southwest Basin Lift Station. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $635,000.00

Project Name: SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT IV

Kimley-Horn & Associates, Inc.					Opinion of Probable Construction Cost
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#43	SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT IV				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$20,000.00	$20,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	12" SDR-26 PVC Sanitary Sewer	3,400	LF	$100.00	$340,000
5	Sewer Line Trench Safety	3,400	LF	$3.00	$10,200
6	5' Standard Concrete Manhole	7	EA	$8,000.00	$54,400
7	Hydromulch Repair	7,600	SY	$2.00	$15,200
8	Allowance	1	LS	$10,000.00	$10,000
	Basis for Cost Projection:	Subtotal:			$469,800
☑	No Design Completed	Conting. (%,+/-)		20%	$ 94,730
☐	Preliminary Design	Professional Services (%,+/-)		15%	$ 70,470
☐	Final Design	**Total:**			**$635,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

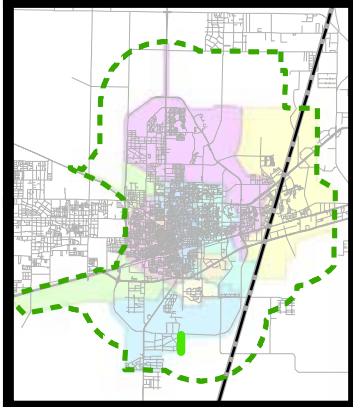
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

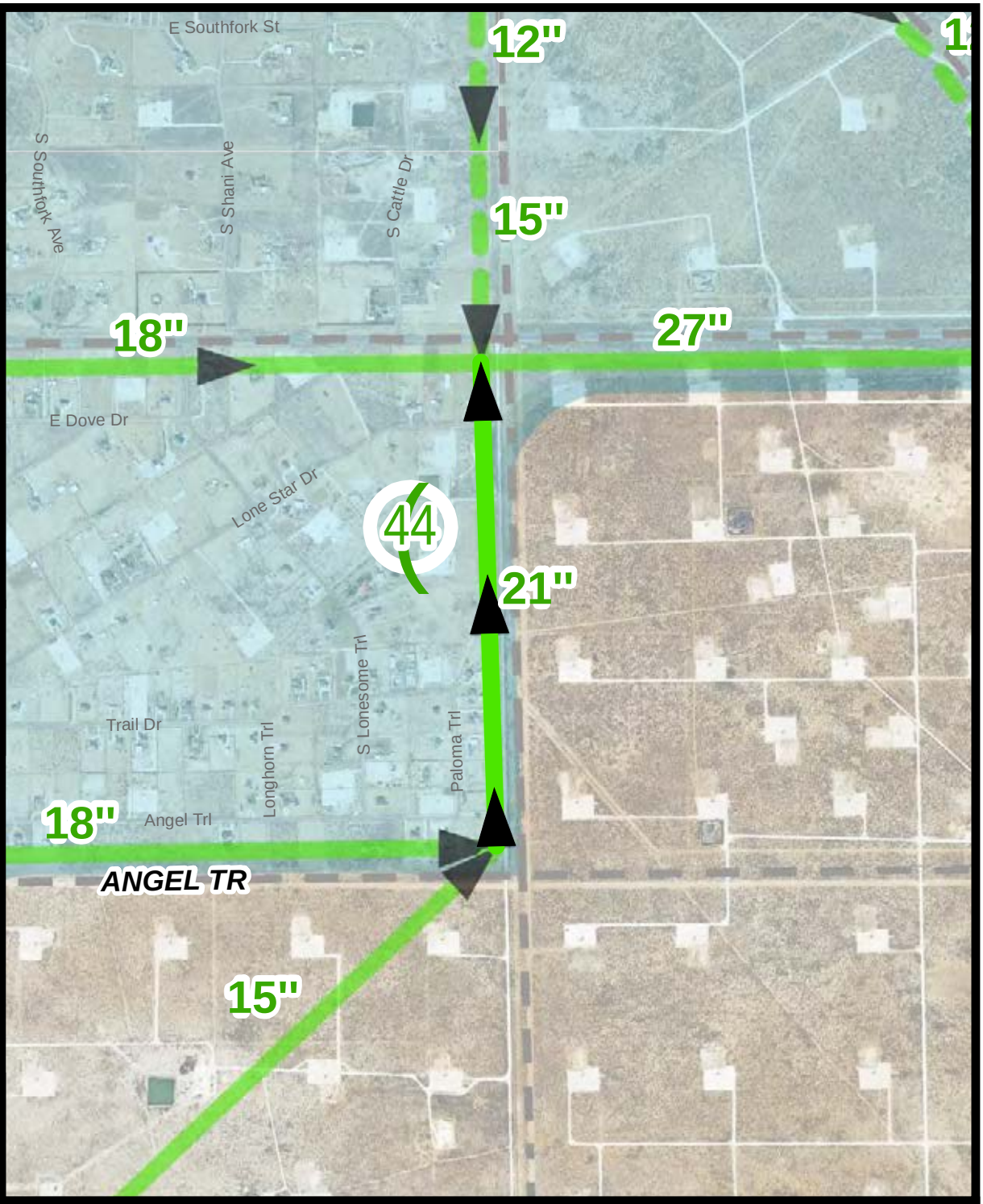
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 25-Year

Project Description: This project consists of approximately 4,700 LF of 21" sewer line along S Dixie Blvd from Loop 338 to Angel Trail.

Recommendation Comments: This project provides conveyance for the south portion of the Southwest Basin to the Southwest Basin Lift Station. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $1,207,000.00

Project Name: LONE STAR DR 21-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#44 LONE STAR DR 21-INCH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$30,000.00	$30,000
2	Traffic Control	1	LS	$20,000.00	$20,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	21" SDR-26 PVC Sanitary Sewer	4,600	LF	$140.00	$644,000
5	36" Bore with Steel Casing	100	LF	$600.00	$60,000
6	Sewer Line Trench Safety	4,600	LF	$3.00	$13,800
7	5' Standard Concrete Manhole	9	EA	$8,000.00	$75,200
8	Hydromulch Repair	10,300	SY	$2.00	$20,600
9	Allowance	1	LS	$20,000.00	$20,000

Basis for Cost Projection:			
	Subtotal:		$893,600
☑ No Design Completed	Conting. (%,+/-)	20%	$ 179,360
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 134,040
☐ Final Design	**Total:**		**$1,207,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 3,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

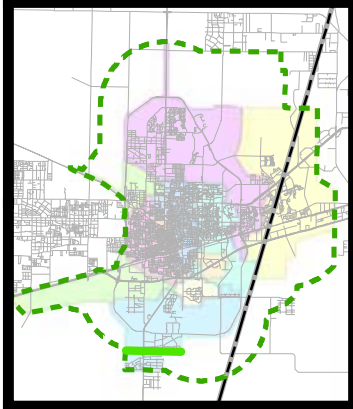
Proposed Trunk Main

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019

Phase: 25-Year

Project Description: This project consists of approximately 5,000 LF of 18", 5,500 LF of 15" sewer line, and 5,100 LF of 12" sewer line along Angel Trail east of S Dixie Blvd.

Recommendation Comments: This project provides conveyance for the south portion of the Southwest Basin to the Southwest Basin Lift Station. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $3,305,000.00

Project Name: ANGEL TR 18, 15, 12-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#45	ANGEL TR 18, 15, 12-INCH TRUNK MAIN		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$70,000.00	$70,000
2	Traffic Control	1	LS	$50,000.00	$50,000
3	Erosion Control	1	LS	$30,000.00	$30,000
4	18" SDR-26 PVC Sanitary Sewer	5,000	LF	$125.00	$625,000
5	15" SDR-26 PVC Sanitary Sewer	5,300	LF	$115.00	$609,500
6	12" SDR-26 PVC Sanitary Sewer	5,000	LF	$100.00	$500,000
7	24" Bore with Steel Casing	100	LF	$500.00	$50,000
8	24" Bore with Steel Casing	200	LF	$500.00	$100,000
9	Sewer Line Trench Safety	15,300	LF	$3.00	$45,900
10	5' Standard Concrete Manhole	31	EA	$8,000.00	$249,600
11	Hydromulch Repair	34,000	SY	$2.00	$68,000
12	Allowance	1	LS	$50,000.00	$50,000

Basis for Cost Projection:			
	Subtotal:		$2,448,000
☑ No Design Completed	Conting. (%,+/-)	20%	$ 489,800
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 367,200
☐ Final Design	**Total:**		**$3,305,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 3,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

10 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

25 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

Beyond 25 Year Projects

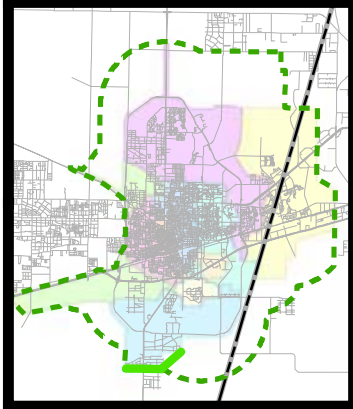
- Proposed Trunk Main

Developer Projects

- Proposed Trunk Main

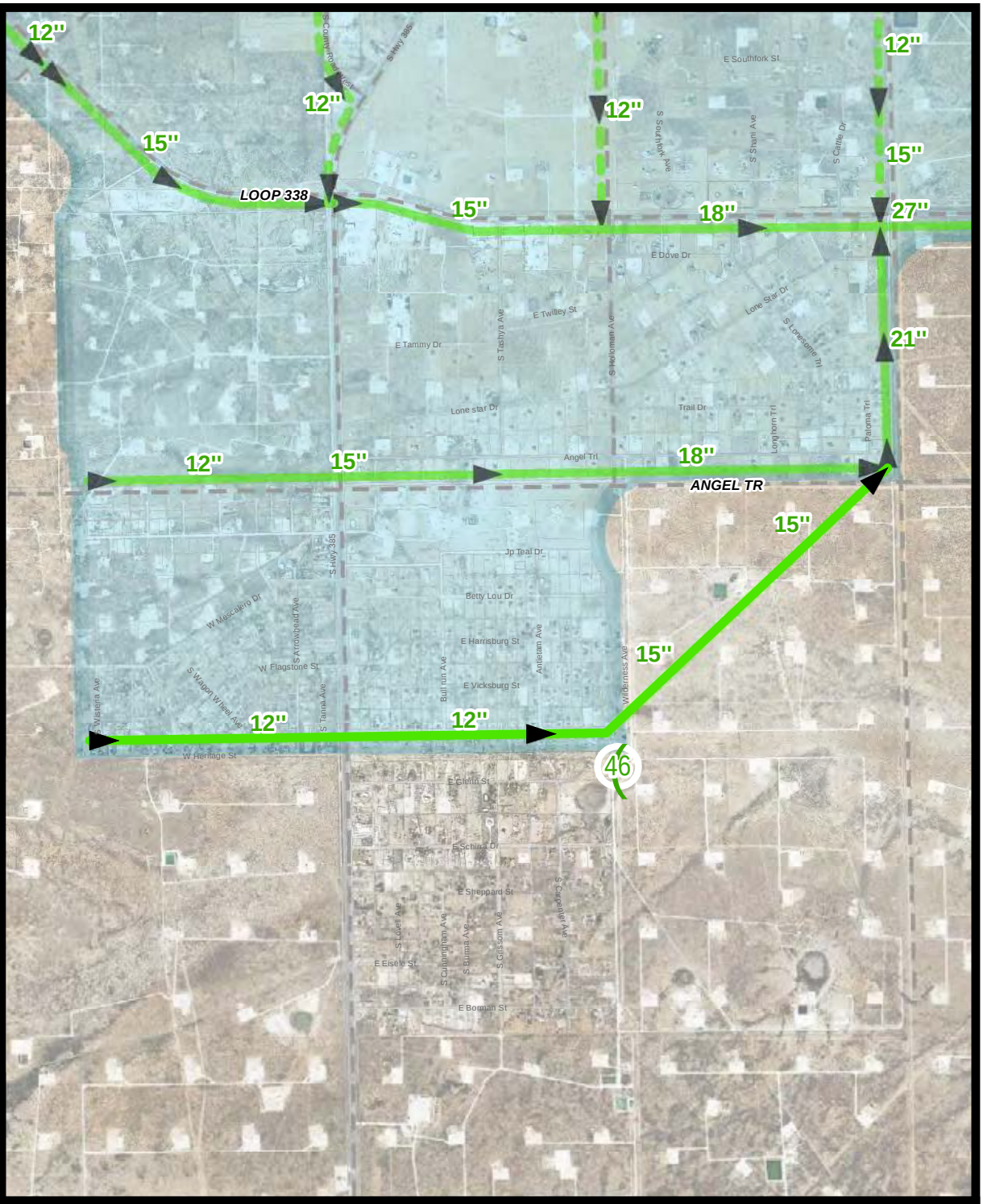
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 25-Year

Project Description: This project consists of approximately 7,500 LF of 15" sewer line and 10,100 LF of 12" sewer line north of Heritage Street and tying in at the intercetion of Angel Trail and S Dixie Blvd.

Recommendation Comments: This project provides conveyance for the south portion of the Southwest Basin to the Southwest Basin Lift Station. This project is anticipated to be driven by demand from prospective developments.

Project Cost: $3,526,000.00

Project Name: EAST GETTYSBURG ST 15, 12-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#46	EAST GETTYSBURG ST 15, 12-INCH TRUNK MAIN		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$80,000.00	$80,000
2	Traffic Control	1	LS	$50,000.00	$50,000
3	Erosion Control	1	LS	$30,000.00	$30,000
4	15" SDR-26 PVC Sanitary Sewer	7,400	LF	$115.00	$851,000
5	12" SDR-26 PVC Sanitary Sewer	9,900	LF	$100.00	$990,000
6	24" Bore with Steel Casing	100	LF	$500.00	$50,000
7	24" Bore with Steel Casing	200	LF	$500.00	$100,000
8	Sewer Line Trench Safety	17,300	LF	$3.00	$51,900
9	5' Standard Concrete Manhole	35	EA	$8,000.00	$281,600
10	Hydromulch Repair	38,500	SY	$2.00	$77,000
11	Allowance	1	LS	$50,000.00	$50,000

Basis for Cost Projection:			
	Subtotal:		$2,611,500
☑ No Design Completed	Conting. (%,+/-)	20%	$ 522,775
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 391,725
☐ Final Design	**Total:**		**$3,526,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

- Wastewater Master Plan Boundary

5 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

10 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

25 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

Beyond 25 Year Projects

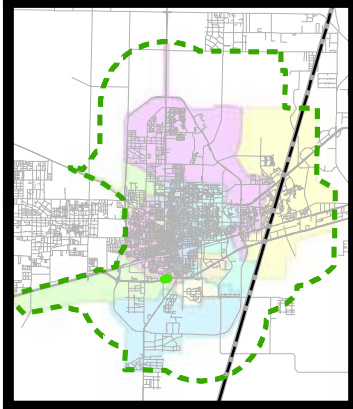
- Proposed Trunk Main

Developer Projects

- Proposed Trunk Main

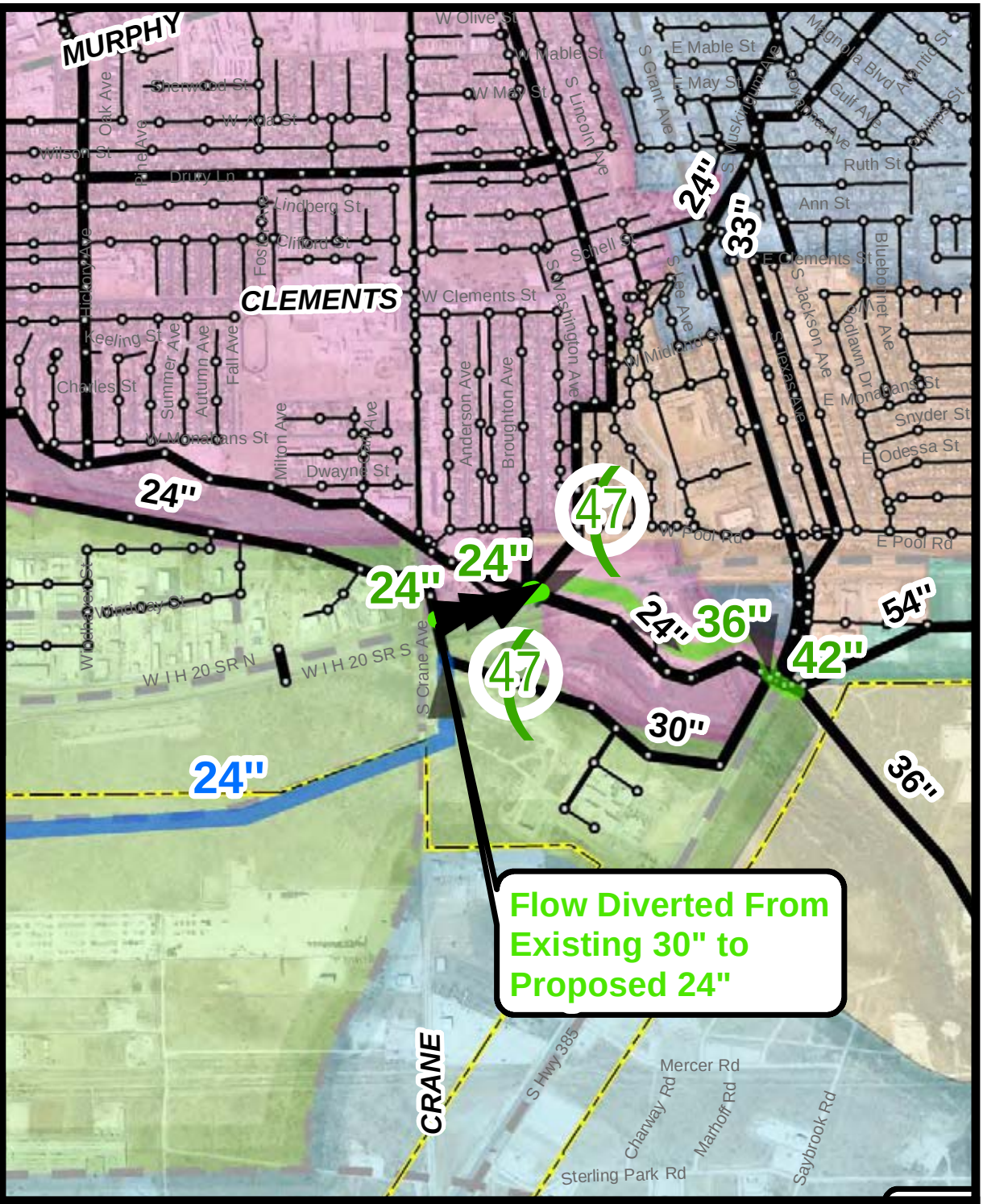
Sewer Basins

- Line 22
- Line H
- Line A
- Line K
- Line B
- Line P
- Line C
- Southwest
- Line G
- GCWD



Kimley»Horn

April 2019



Phase: 25-Year

Project Description: This project consists of approximately 1,100 LF of 24" sewer line adjacent to I-20.

Recommendation Comments: This project will divert flow from the existing 30-inch line to the proposed 36-line installed as a part of Project #19. The existing 30-inch line is anticipated to be under capacity without the flow diversion.

Project Cost: $327,000.00

Project Name: MCKINNEY PARK 24-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#47	MCKINNEY PARK 24-INCH TRUNK MAIN		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	24" SDR-26 PVC Sanitary Sewer	1,100	LF	$160.00	$176,000
5	Sewer Line Trench Safety	1,100	LF	$3.00	$3,300
6	5' Standard Concrete Manhole	2	EA	$8,000.00	$17,600
7	Hydromulch Repair	2,500	SY	$2.00	$5,000
8	Allowance	1	LS	$10,000.00	$10,000

Basis for Cost Projection:			
	Subtotal:		$241,900
☑ No Design Completed	Conting. (%,+/-)	20%	$ 48,815
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 36,285
☐ Final Design	**Total:**		**$327,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 1,500 feet

LEGEND:

- Wastewater Master Plan Boundary

5 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

10 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

25 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

Beyond 25 Year Projects

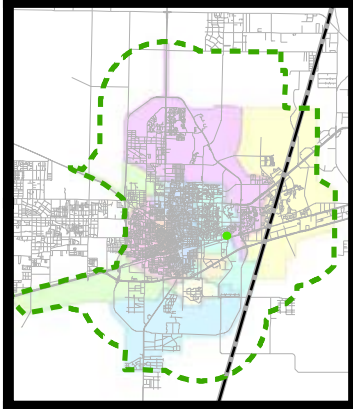
- Proposed Trunk Main

Developer Projects

- Proposed Trunk Main

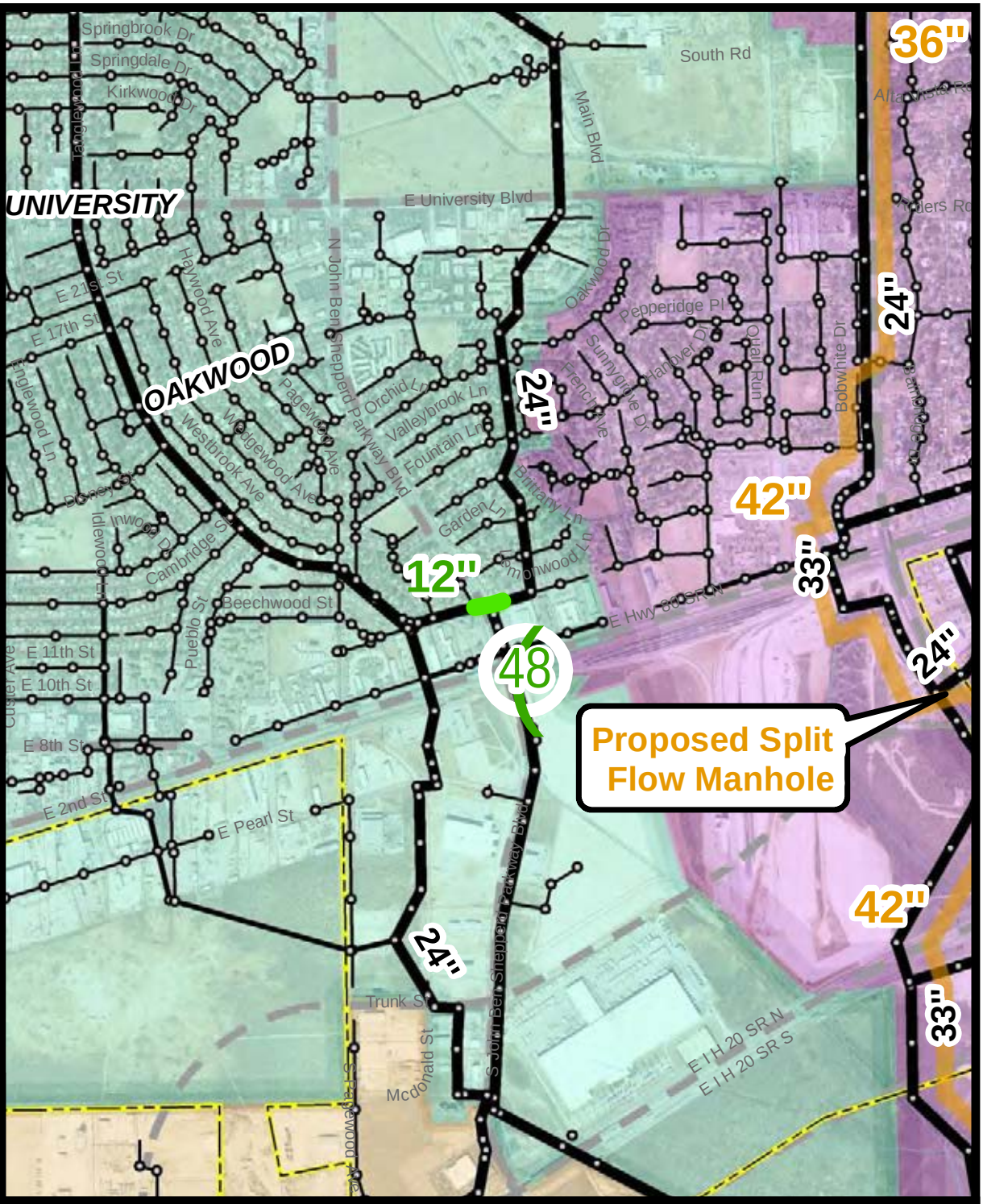
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 25-Year

Project Description: This project consists of approximately 300 LF of 12" sewer line across John Ben Shepperd Pkwy.

Recommendation Comments: This project will connect 24-inch and 18-inch downstream interceptors so that flow is split equally at the upstream manhole. The existing 18-inch interceptor is anticipated to be under capacity without the flow diversion.

Project Cost: $373,000.00

Project Name: SOUTH JOHN BEN SHEPPARD PARKWAY BLVD 12-INCH TRUNK MAIN

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#48 SOUTH JOHN BEN SHEPPARD PARKWAY BLVD 12-INCH TRUNK MAIN

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	42" Bore with Steel Casing	300	LF	$700.00	$210,000
5	6' Standard Concrete Manhole	2	EA	$13,000.00	$26,000
6	Allowance	1	LS	$10,000.00	$10,000

Basis for Cost Projection:			
	Subtotal:		$276,000
☑ No Design Completed	Conting. (%,+/-)	20%	$ 55,600
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 41,400
☐ Final Design	**Total:**		**$373,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 2,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

Proposed Trunk Main

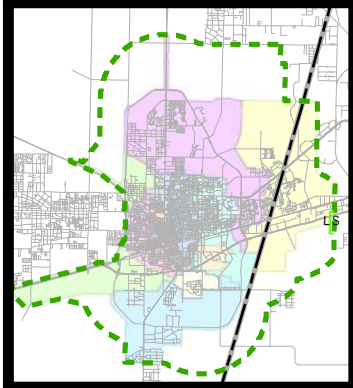
Proposed Lift Station

Developer Projects

Proposed Trunk Main

Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019

Phase: 25-Year

Project Description: This project consists of the upgrade of the Line P Basin lift station to a capacity of 5 MGD.

Recommendation Comments: This project will add a third pump to the Line P basin lift station and increase the firm pumping capacity to 3,500 gpm.

Project Cost: $608,000

Project Name: LINE P BASIN SOUTHEAST LIFT STATION PHASE II UPGRADE

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#49	LINE P BASIN SOUTHEAST LIFT STATION PHASE II UPGRADE		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Submersible Pumps (1,750 gpm @ 100')	3	EA	$150,000	$450,000

Basis for Cost Projection:			
☑ No Design Completed	Subtotal:		$450,000
☐ Preliminary Design	Conting. (%,+/-)	20%	$ 90,500
☐ Final Design	Professional Services (%,+/-)	15%	$ 67,500
	Total:		**$608,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 2,000 feet

LEGEND:

Wastewater Master Plan Boundary

5 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

10 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

25 Year Projects

Proposed Trunk Main

Proposed Force Main

Proposed Lift Station

Beyond 25 Year Projects

Proposed Trunk Main

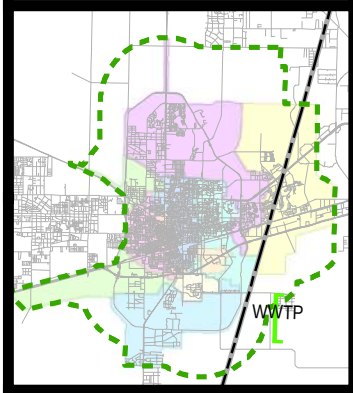
Proposed Lift Station

Developer Projects

Proposed Trunk Main

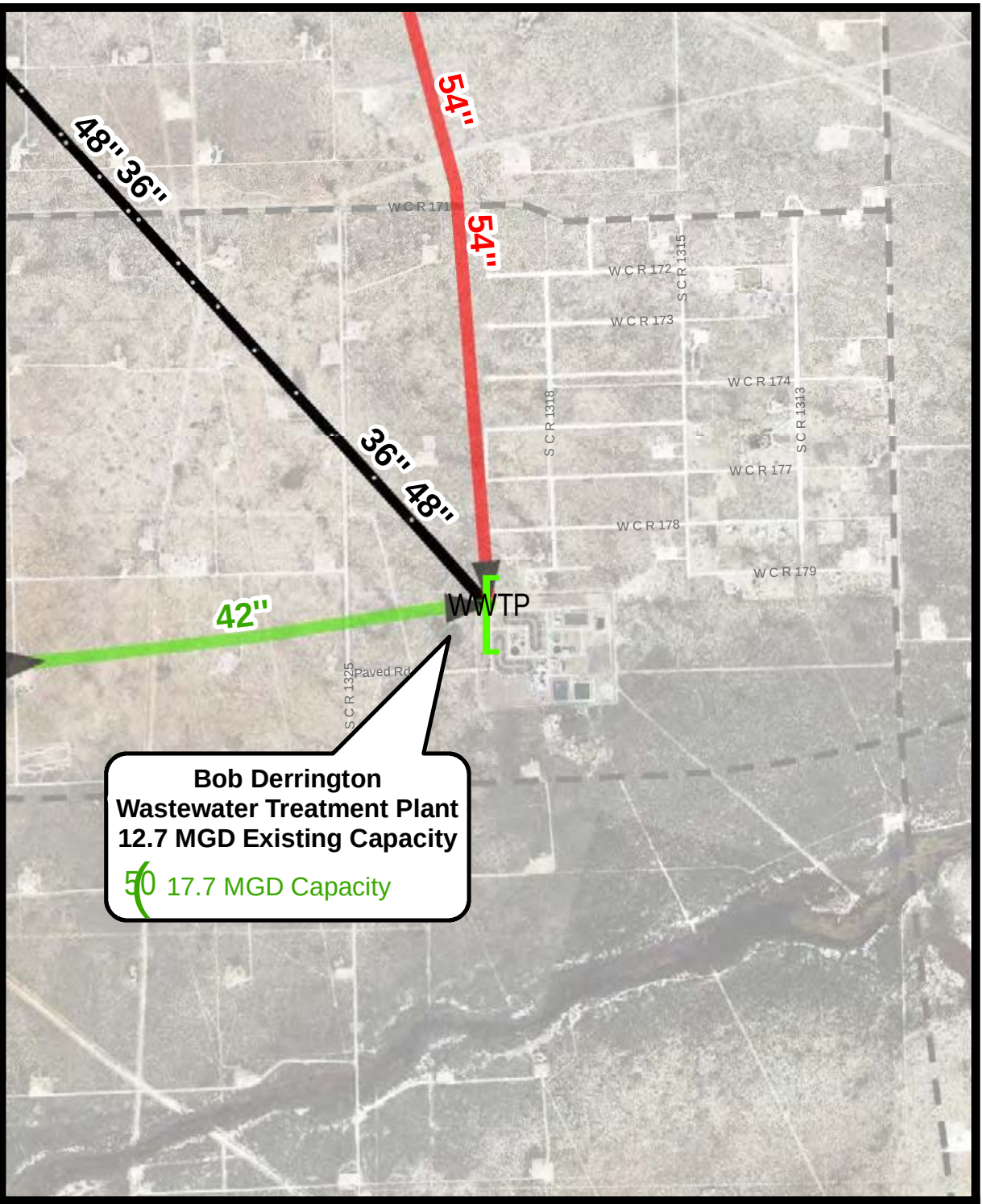
Sewer Basins

Line 22	Line H
Line A	Line K
Line B	Line P
Line C	Southwest
Line G	GCWD



Kimley»Horn

April 2019



Phase: 25-Year

Project Description: This project consists of the upgrade of the existing treatment plant to a capacity of 17.7 MGD.

Recommendation Comments: This project will increase the average treatment capacity of the Bob Derrington Wastewater Treatment Plant to 17.7 MGD and the 2-hour peak capacity to 53.1 MGD. This project is anticipated to be necessary near the end of the 25-year planning period.

Project Cost: $101,250,000

Project Name: BOB DERRINGTON TREATMENT PLANT UPGRADE TO 17.7 MGD

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#50	BOB DERRINGTON TREATMENT PLANT UPGRADE TO 17.7 MGD		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Treatment Plant Improvements	1	LS	$75,000,000.00	$75,000,000

Basis for Cost Projection:			
☑ No Design Completed	Subtotal:		$75,000,000
☐ Preliminary Design	Conting. (%,+/-)	20%	$ 15,000,000
☐ Final Design	Professional Services (%,+/-)	15%	$ 11,250,000
	Total:		**$101,250,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

1 inch = 4,000 feet

LEGEND:

- Wastewater Master Plan Boundary

5 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

10 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

25 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

Beyond 25 Year Projects

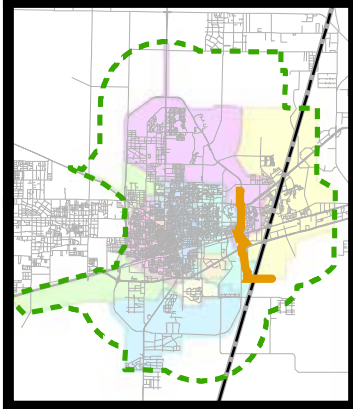
- Proposed Trunk Main

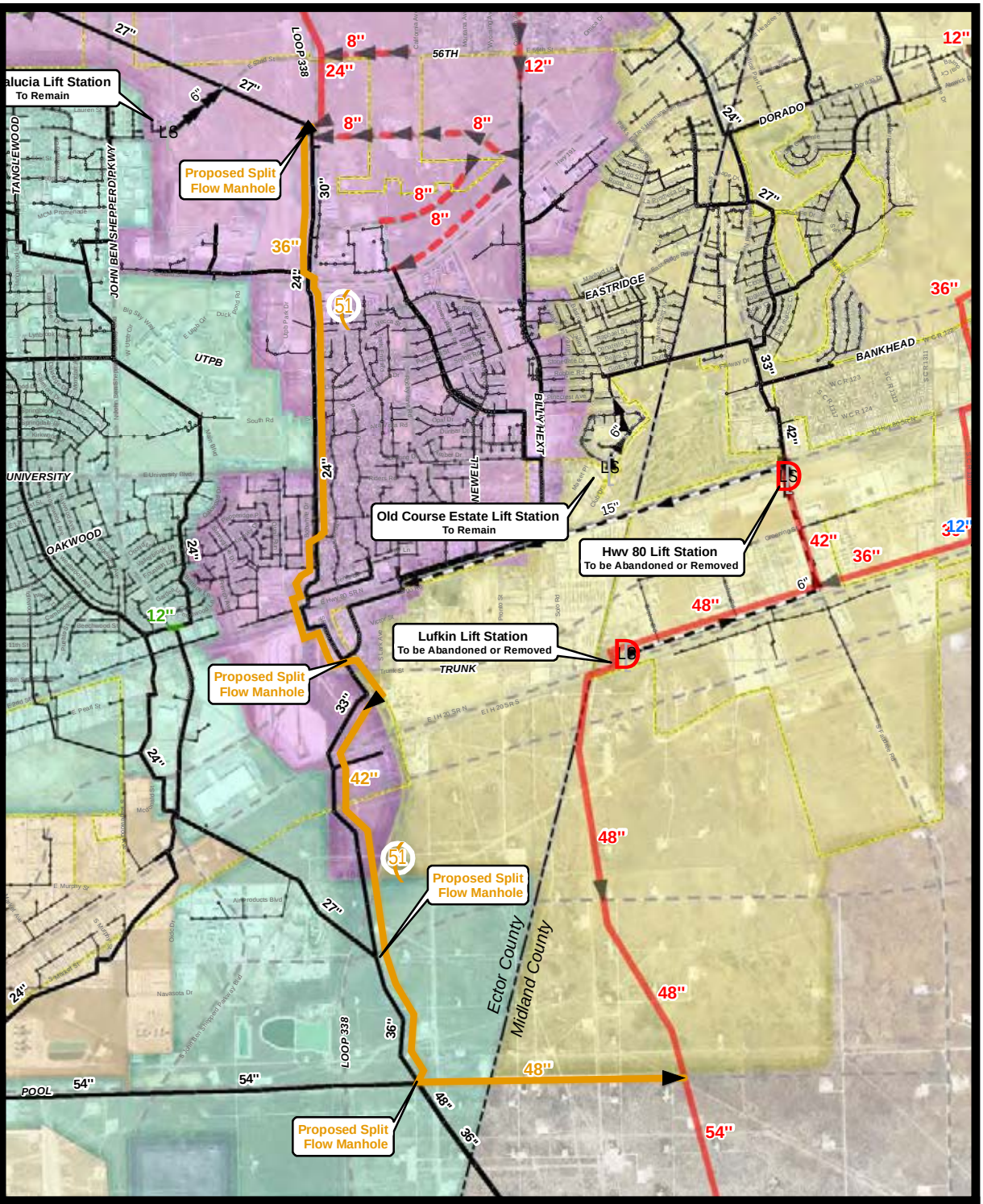
Developer Projects

- Proposed Trunk Main

Sewer Basins

- Line 22
- Line A
- Line B
- Line C
- Line G
- Line H
- Line K
- Line P
- Southwest
- GCWD





Kimley»Horn

April 2019

Phase: Beyond 25-Year

Project Description: This project consists of approximately 15,200 LF of 42", 10,000 LF of 36" and 6,900 LF of 48" sewer line from just south of the intersection of E 52nd St and N Loop 338 to just east of the Ector/ Midland County Line.

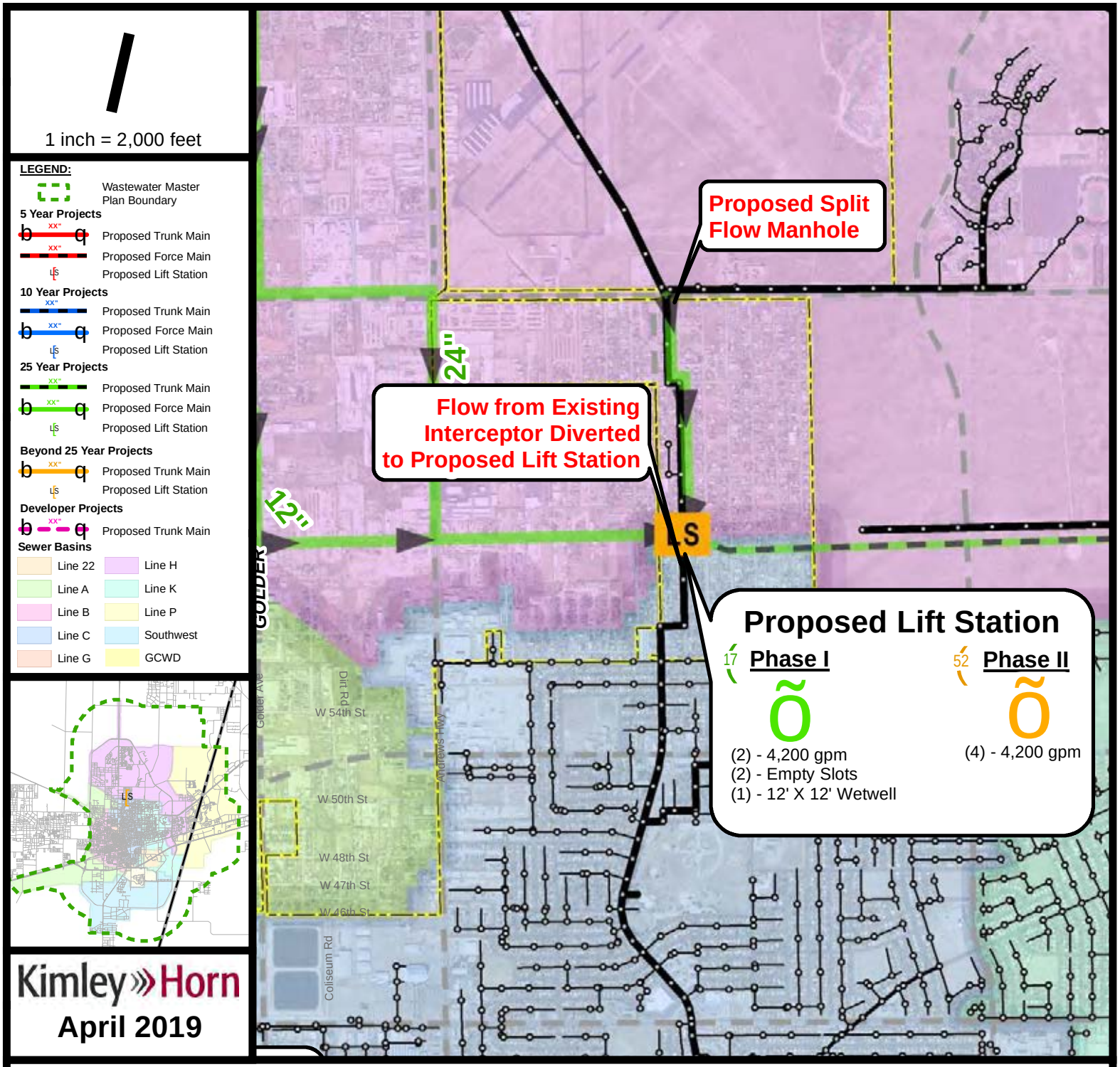
Recommendation Comments: This project provides additional capacity to the existing Line H interceptor. This project is not anticipated to be necessary within the 25-year planning period however it will be necessary for ultimate buildout of the Line H basin.

Project Cost: $15,730,000.00

Project Name: LINE H INTERCEPTOR SEGMENT I

Kimley-Horn & Associates, Inc.				Opinion of Probable Construction Cost	
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#51	LINE H INTERCEPTOR SEGMENT I				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$320,000.00	$320,000
2	Traffic Control	1	LS	$220,000.00	$220,000
3	Erosion Control	1	LS	$220,000.00	$220,000
4	48" Fiberglass Sanitary Sewer	6,900	LF	$350.00	$2,415,000
5	42" Fiberglass Sanitary Sewer	15,200	LF	$300.00	$4,560,000
6	36" Fiberglass Sanitary Sewer	10,000	LF	$250.00	$2,500,000
7	Curb and Gutter Repair	1,500	LF	$35.00	$52,500
8	Hydromulch Repair	750	LF	$2.00	$1,500
9	Sewer Line Trench Safety	32,100	LF	$3.00	$96,300
10	6' Standard Concrete Manhole	69	EA	$13,000.00	$893,100
11	Hydromulch Repair	71,400	SY	$2.00	$142,800
12	Allowance	1	LS	$230,000.00	$230,000
	Basis for Cost Projection:	Subtotal:			$11,651,200
☑	No Design Completed	Conting. (%,+/-)		20%	$ 2,331,120
☐	Preliminary Design	Professional Services (%,+/-)		15%	$ 1,747,680
☐	Final Design	**Total:**			**$15,730,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.



Phase: Beyond 25-Year

Project Description: This project consists of the upgrade of the Line 12 Basin lift station to a capacity of 18 MGD.

Recommendation Comments: This project will add a fourth pump to the Line 12 basin lift station and increase the firm pumping capacity to 12,600 gpm.

Project Cost: $2,160,000

Project Name: LINE 12 BASIN LIFT STATION PHASE II UPGRADE

Kimley-Horn & Associates, Inc.					Opinion of Probable Construction Cost
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#52	LINE 12 BASIN LIFT STATION PHASE II UPGRADE				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Submersible Pumps (4,200 gpm @ 55')	4	EA	$400,000	$1,600,000

Basis for Cost Projection:			
☑ No Design Completed	Subtotal:		$1,600,000
☐ Preliminary Design	Conting. (%,+/-)	20%	$ 320,000
☐ Final Design	Professional Services (%,+/-)	15%	$ 240,000
	Total:		**$2,160,000**

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Kimley-Horn & Associates, Inc. | Opinion of Probable Construction Cost

Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

Project No.	Project Name	Project Cost	Market Scarcity Adjustment (1.5x)
Sewer Rehabilitation Projects			
1	Line K and C Basin Sewer Lines	$192,000	$288,000
2	42nd Street Sewer Lines	$226,000	$339,000
3	Carolyn Drive Sewer Lines	$192,000	$288,000
4	Orchard Drive Sewer Lines	$286,000	$429,000
5	Lotteman and Ellis Drive Sewer Lines	$209,000	$313,500
6	N. Washington Street Sewer Lines	$115,000	$172,500
7	W. 31st Street Sewer Lines	$303,000	$454,500
8	N. Gobler Avenue Sewer Lines	$200,000	$300,000
9	W. University Boulevard Sewer Lines	$234,000	$351,000
10	Line B and G Sewer Basin Sewer Lines	$419,000	$628,500
11	S. Crane Avenue Sewer Lines	$567,000	$850,500
12	S. Grandview Avenue Sewer Lines	$295,000	$442,500
	Sewer Rehabilitation Projects Total:	**$3,238,000**	**$4,857,000**

Basis for Cost Projection:

- [x] No Design Completed
- [ ] Preliminary Design
- [ ] Final Design

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Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#1 Line K and C Basin Sewer Lines

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	6" SDR-26 PVC Sanitary Sewer	700	LF	$60.00	$42,000
5	Sewer Line Trench Safety	700	LF	$3.00	$2,100
6	5' Standard Concrete Manhole	2	EA	$8,000.00	$16,000
7	Asphalt Pavement Repair	700	SY	$60.00	$42,000
8	Allowance	1	LS	$10,000.00	$10,000

Basis for Cost Projection:			
	Subtotal:		$142,100
☑ No Design Completed	Conting. (%,+/-)	20%	$ 28,585
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 21,315
☐ Final Design	**Total:**		**$192,000**

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Kimley-Horn & Associates, Inc.				Opinion of Probable Construction Cost	
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#2	42nd Street Sewer Lines				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	8" SDR-26 PVC Sanitary Sewer	300	LF	$80.00	$24,000
5	6" SDR-26 PVC Sanitary Sewer	600	LF	$60.00	$36,000
6	Sewer Line Trench Safety	900	LF	$3.00	$2,700
7	5' Standard Concrete Manhole	2	EA	$8,000.00	$16,000
8	Asphalt Pavement Repair	800	SY	$60.00	$48,000
9	Allowance	1	LS	$10,000.00	$10,000
	Basis for Cost Projection:	Subtotal:			$166,700
☑	No Design Completed	Conting. (%,+/-)		20%	$ 34,295
☐	Preliminary Design	Professional Services (%,+/-)		15%	$ 25,005
☐	Final Design	**Total:**			**$226,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#3	Carolyn Drive Sewer Lines		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	6" SDR-26 PVC Sanitary Sewer	700	LF	$60.00	$42,000
5	Sewer Line Trench Safety	700	LF	$3.00	$2,100
6	5' Standard Concrete Manhole	2	EA	$8,000.00	$16,000
7	Asphalt Pavement Repair	700	SY	$60.00	$42,000
8	Allowance	1	LS	$10,000.00	$10,000

Basis for Cost Projection:			
	Subtotal:		$142,100
☑ No Design Completed	Conting. (%,+/-)	20%	$ 28,585
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 21,315
☐ Final Design	**Total:**		**$192,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#4	Orchard Drive Sewer Lines		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	10" SDR-26 PVC Sanitary Sewer	600	LF	$90.00	$54,000
5	6" SDR-26 PVC Sanitary Sewer	500	LF	$60.00	$30,000
6	Sewer Line Trench Safety	1,100	LF	$3.00	$3,300
7	5' Standard Concrete Manhole	3	EA	$8,000.00	$24,000
8	Asphalt Pavement Repair	1,000	SY	$60.00	$60,000
9	Allowance	1	LS	$10,000.00	$10,000

Basis for Cost Projection:			
	Subtotal:		$211,300
☑ No Design Completed	Conting. (%,+/-)	20%	$ 43,005
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 31,695
☐ Final Design	**Total:**		**$286,000**

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Kimley-Horn & Associates, Inc.					Opinion of Probable Construction Cost
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#5	Lotteman and Ellis Drive Sewer Lines				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	6" SDR-26 PVC Sanitary Sewer	800	LF	$60.00	$48,000
5	Sewer Line Trench Safety	800	LF	$3.00	$2,400
6	5' Standard Concrete Manhole	2	EA	$8,000.00	$16,000
7	Asphalt Pavement Repair	800	SY	$60.00	$48,000
8	Allowance	1	LS	$10,000.00	$10,000
	Basis for Cost Projection:	Subtotal:			$154,400
☑	No Design Completed	Conting. (%,+/-)		20%	$ 31,440
☐	Preliminary Design	Professional Services (%,+/-)		15%	$ 23,160
☐	Final Design	**Total:**			**$209,000**

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Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#6	N. Washington Street Sewer Lines		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	6" SDR-26 PVC Sanitary Sewer	300	LF	$60.00	$18,000
5	Sewer Line Trench Safety	300	LF	$3.00	$900
6	5' Standard Concrete Manhole	1	EA	$8,000.00	$8,000
7	Asphalt Pavement Repair	300	SY	$60.00	$18,000
8	Allowance	1	LS	$10,000.00	$10,000

Basis for Cost Projection:			
	Subtotal:		$84,900
☑ No Design Completed	Conting. (%,+/-)	20%	$ 17,365
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 12,735
☐ Final Design	**Total:**		**$115,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#7	W. 31st Street Sewer Lines		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	8" SDR-26 PVC Sanitary Sewer	300	LF	$80.00	$24,000
5	6" SDR-26 PVC Sanitary Sewer	1,000	LF	$60.00	$60,000
6	Sewer Line Trench Safety	1,300	LF	$3.00	$3,900
7	5' Standard Concrete Manhole	3	EA	$8,000.00	$24,000
8	Asphalt Pavement Repair	1,200	SY	$60.00	$72,000
9	Allowance	1	LS	$10,000.00	$10,000

Basis for Cost Projection:			
	Subtotal:		$223,900
☑ No Design Completed	Conting. (%,+/-)	20%	$ 45,515
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 33,585
☐ Final Design	**Total:**		**$303,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA

#8 N. Gobler Avenue Sewer Lines

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	8" SDR-26 PVC Sanitary Sewer	300	LF	$80.00	$24,000
5	6" SDR-26 PVC Sanitary Sewer	400	LF	$60.00	$24,000
6	Sewer Line Trench Safety	700	LF	$3.00	$2,100
7	5' Standard Concrete Manhole	2	EA	$8,000.00	$16,000
8	Asphalt Pavement Repair	700	SY	$60.00	$42,000
9	Allowance	1	LS	$10,000.00	$10,000

Basis for Cost Projection:			
☑ No Design Completed	Subtotal:		$148,100
☐ Preliminary Design	Conting. (%,+/-)	20%	$ 29,685
☐ Final Design	Professional Services (%,+/-)	15%	$ 22,215
	Total:		**$200,000**

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Kimley-Horn & Associates, Inc.					Opinion of Probable Construction Cost
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#9	W. University Boulevard Sewer Lines				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	6" SDR-26 PVC Sanitary Sewer	1,000	LF	$60.00	$60,000
5	Sewer Line Trench Safety	1,000	LF	$3.00	$3,000
6	5' Standard Concrete Manhole	2	EA	$8,000.00	$16,000
7	Asphalt Pavement Repair	900	SY	$60.00	$54,000
8	Allowance	1	LS	$10,000.00	$10,000
	Basis for Cost Projection:	Subtotal:			$173,000
☑	No Design Completed	Conting. (%,+/-)		20%	$ 35,050
☐	Preliminary Design	Professional Services (%,+/-)		15%	$ 25,950
☐	Final Design	**Total:**			**$234,000**

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Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#10	Line B and G Sewer Basin Sewer Lines		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	8" SDR-26 PVC Sanitary Sewer	200	LF	$80.00	$16,000
5	6" SDR-26 PVC Sanitary Sewer	1,800	LF	$60.00	$108,000
6	Sewer Line Trench Safety	2,000	LF	$3.00	$6,000
7	5' Standard Concrete Manhole	4	EA	$8,000.00	$32,000
8	Asphalt Pavement Repair	1,800	SY	$60.00	$108,000
9	Allowance	1	LS	$10,000.00	$10,000

Basis for Cost Projection:			
	Subtotal:		$310,000
☑ No Design Completed	Conting. (%,+/-)	20%	$ 62,500
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 46,500
☐ Final Design	**Total:**		**$419,000**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Kimley-Horn & Associates, Inc.			Opinion of Probable Construction Cost
Client:	City of Odessa	Date:	4/30/2019
Project:	Wastewater System Master Plan	Prepared By:	AWS
KHA No.:	063685005	Checked By:	JRA
#11	S. Crane Avenue Sewer Lines		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	8" SDR-26 PVC Sanitary Sewer	1,200	LF	$80.00	$96,000
5	6" SDR-26 PVC Sanitary Sewer	1,400	LF	$60.00	$84,000
6	Sewer Line Trench Safety	2,600	LF	$3.00	$7,800
7	5' Standard Concrete Manhole	6	EA	$8,000.00	$48,000
8	Asphalt Pavement Repair	2,400	SY	$60.00	$144,000
9	Allowance	1	LS	$10,000.00	$10,000

Basis for Cost Projection:			
	Subtotal:		$419,800
☑ No Design Completed	Conting. (%,+/-)	20%	$ 84,230
☐ Preliminary Design	Professional Services (%,+/-)	15%	$ 62,970
☐ Final Design	**Total:**		**$567,000**

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Kimley-Horn & Associates, Inc.					Opinion of Probable Construction Cost
Client:	City of Odessa		Date:		4/30/2019
Project:	Wastewater System Master Plan		Prepared By:		AWS
KHA No.:	063685005		Checked By:		JRA
#12	S. Grandview Avenue Sewer Lines				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization, Bonding, and Insurance	1	LS	$10,000.00	$10,000
2	Traffic Control	1	LS	$10,000.00	$10,000
3	Erosion Control	1	LS	$10,000.00	$10,000
4	6" SDR-26 PVC Sanitary Sewer	1,300	LF	$60.00	$78,000
5	Sewer Line Trench Safety	1,300	LF	$3.00	$3,900
6	5' Standard Concrete Manhole	3	EA	$8,000.00	$24,000
7	Asphalt Pavement Repair	1,200	SY	$60.00	$72,000
8	Allowance	1	LS	$10,000.00	$10,000
	Basis for Cost Projection:	Subtotal:			$217,900
☑	No Design Completed	Conting. (%,+/-)		20%	$ 44,415
☐	Preliminary Design	Professional Services (%,+/-)		15%	$ 32,685
☐	Final Design	**Total:**			**$295,000**

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Appendix G – Lift Station Evaluations

Pump Station Evaluation Report

Andalucia

Prepared For:

City of Odessa, TX

Evaluation Date:

May 3, 2017

Kimley»Horn

Introduction:

Kimley-Horn and Associates, Inc. conducted a pump performance test and evaluation of the pump station. This report summarizes the data and results of that evaluation. The following pages provide summaries of the data collected and notes about the pumps' performance.

The pump station is a duplex submersible sewage pump station.

General Notes:

1.) Pumps are operating very inefficiently.
2.) The Static Head provided in the following pages is approximated based on GIS
3.) Working around the wet well is a safety risk due to limited space and arrangement of electrical panel relative to the wet well.

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

	Component	Score	Description
Structural	Site	1 2 **3** 4 5	Concrete sprawling near wet well, valve vault. Fence is not intruder resistant.
	Wetwell	1 **2** 3 4 5	
	Structures	1 2 3 **4** 5	Vent pipe: significant corrosion. Standing water in valve vault. Peeling paint on wall.
	Penetrations/Joints	1 **2** 3 4 5	
	Civil - Other	1 2 3 4 5	
Mechanical	Bolts	1 **2** 3 4 5	
	Fittings	1 **2** 3 4 5	
	Hardware	1 **2** 3 4 5	
	Piping - Suction	1 2 3 4 5	
	Piping - Discharge	1 **2** 3 4 5	Schedule 80
	Pumps	1 **2** 3 4 5	
	Valves - Check	1 2 **3** 4 5	#1, lever arm is off, minor corrosion on #2
	Valves - Isolation	1 **2** 3 4 5	
	Valves - Other	1 2 3 4 5	
	Mechanical - Other	1 2 3 4 5	
Electrical	Conduits	1 **2** 3 4 5	Good condition, PVC only
	Control Panel	1 **2** 3 4 5	Dirty
	Generator	1 2 3 4 5	
	Motor Starters	1 2 3 **4** 5	Charring
	Panels	1 2 **3** 4 5	FRP panel showing signs of degradation. Some trash in PCP
	RTU	1 2 3 4 5	
	TVSS	1 2 3 4 5	
	Wiring	1 2 3 **4** 5	Charring on wiring leaving motor starter
	Electrical - Other	1 2 3 4 5	

Scores listed above are on a scale of 1 to 5. 1 = Like New, 5= Failure Imminent

Photo 1 - Wetwell Vent Pipe

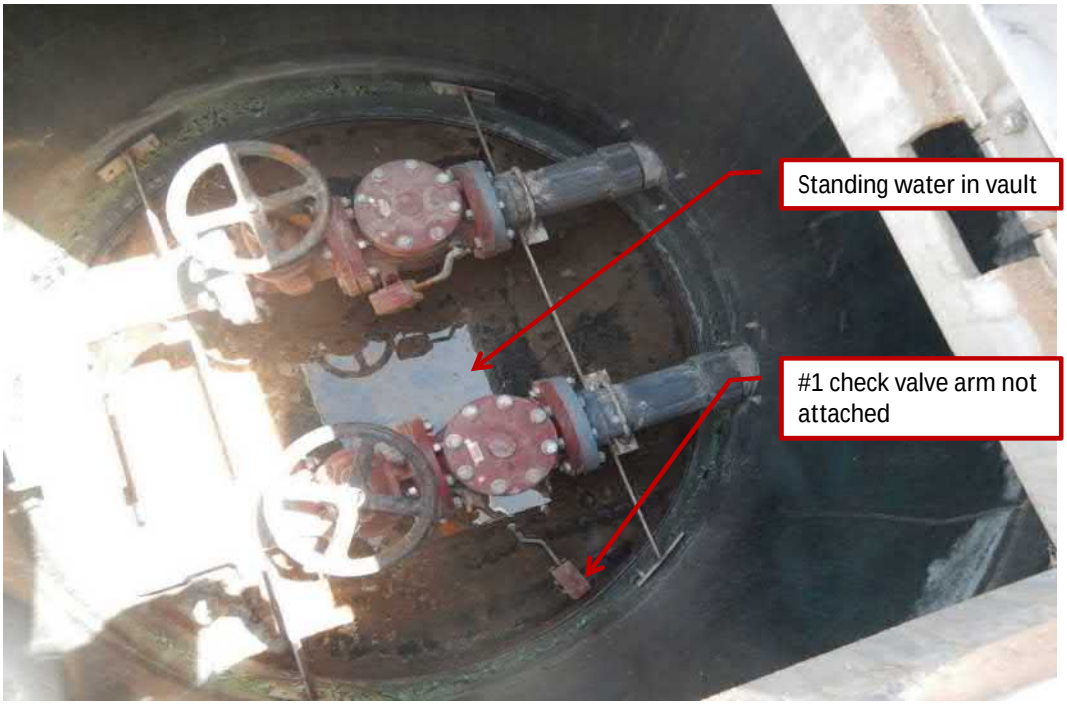


Photo 2 - Valve Vault

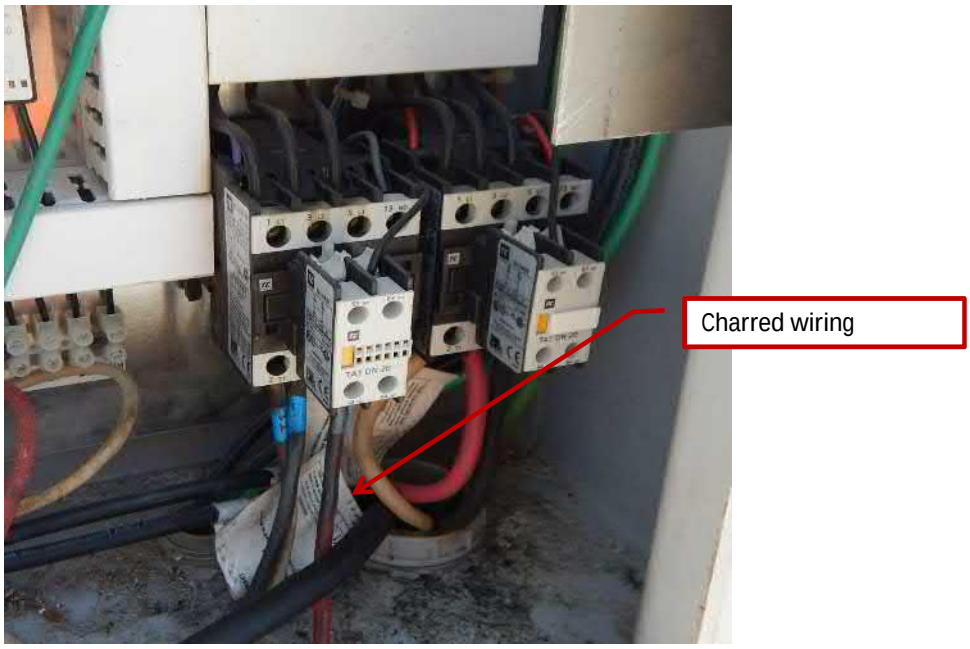


Photo 3 - Charred wiring

Photo 4 - Grease In Wet Well

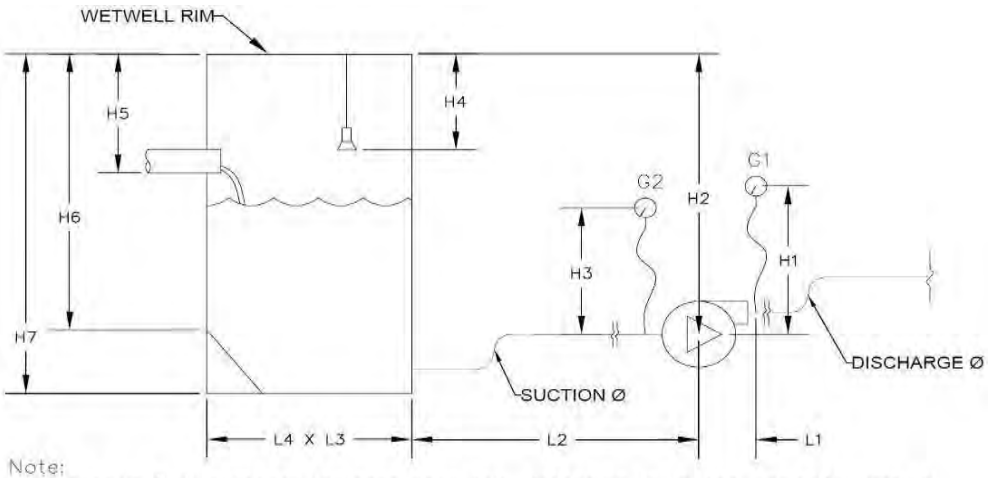
Station Information

Station Type: Duplex Submerged
Utilty Service: 480V Corner Grounded Delta

System Parameters

Parameter	Units	P1	P2
H1 - G1 to Center Pipe	In	194.0	194.0
H2 - Center Pump to Rim	In	194.0	194.0
H3 - G2 to Center Pipe	In		
H4 - Transducer to Rim	In	143.0	143.0
H5 - Lowest Invert	In	124.0	124.0
H6 - Chamfer to Rim	In	124.0	124.0
H7 - WW Bottom to Rim	In	204.0	204.0
Discharge ø	In	4.0	4.0
Suction ø	In		
L1	Ft	11.7	11.7
L2	In		
L3	In	60.0	60.0
L4	In		
Electrical Phases	No	3.0	3.0
Nominal Voltage	Volts	480	480
No Pump Leads	-	4	4
Starters	-	ATL	ATL
Pump Rated Horsepower	HP	7.5	7.5
Pump ETM	Hours	No Timer	No Timer

Hydraulic Test Schematic



Note:
1.) Negative "–" numbers indicate that the dimension is in the opposite vertical direction than shown in sketch.
2.) L4 is the width for rectangular structures. L4=0 for circular structures

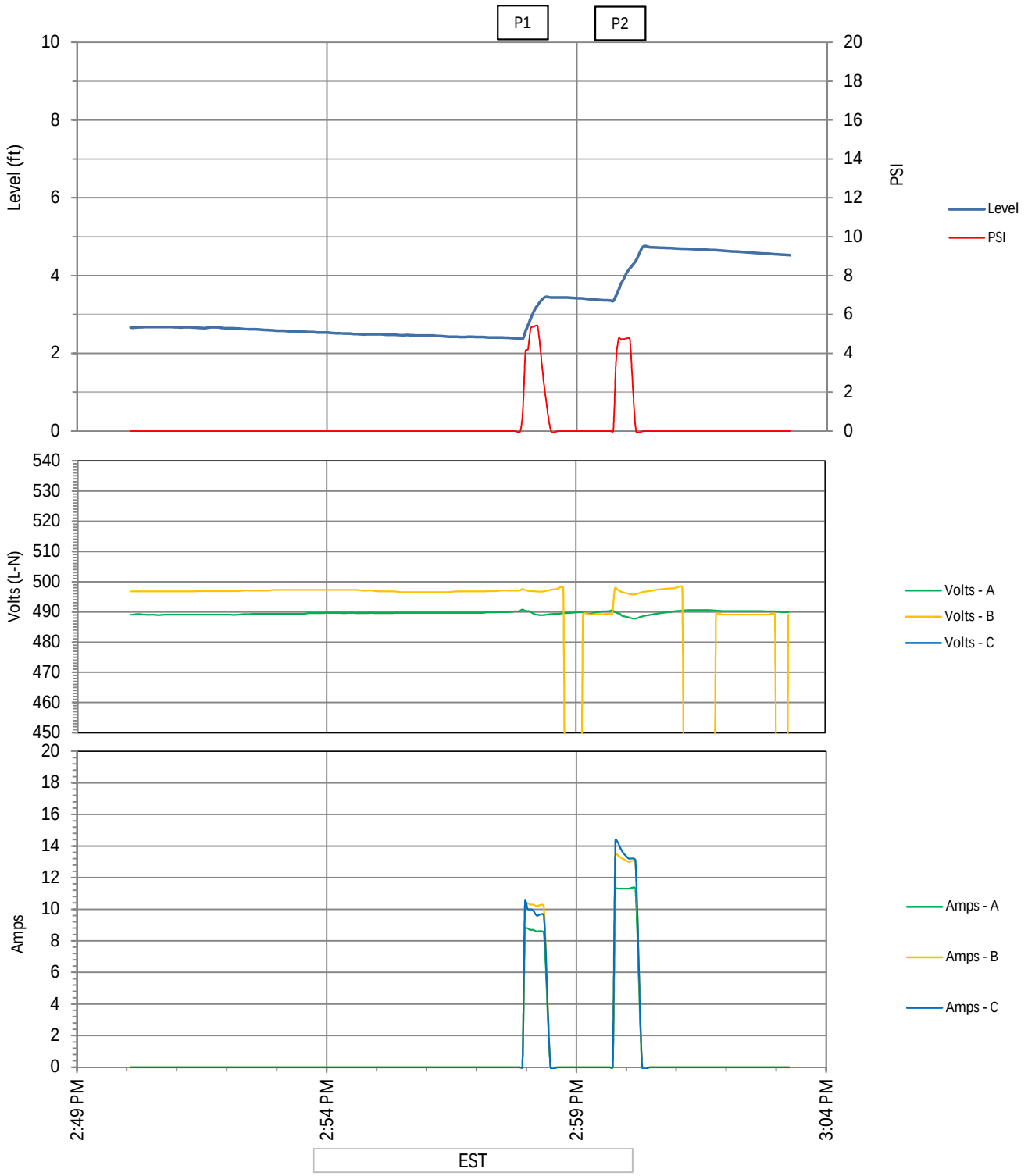
Test Results Summary

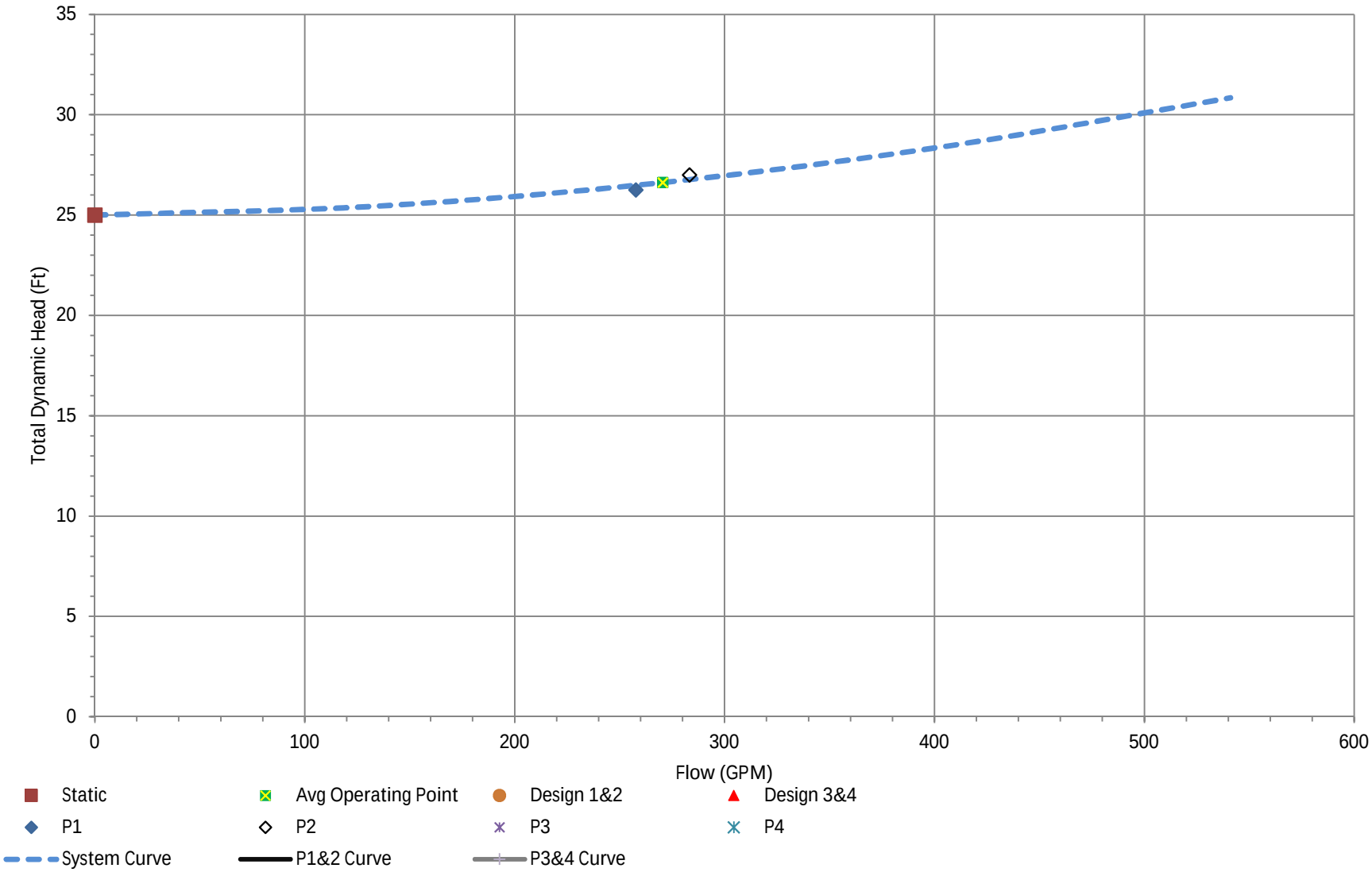
Performance Parameter	Units	P1	P2	
Avg Inflow	GPM	-5	-10	
Avg Output	GPM	258	283	
Discharge Piping Velocity	FPS	6.6	7.2	
Velocity Head	Ft	0.7	0.8	
Total Calculated Friction Loss**	Ft	2.6	3.2	
Average Operating Pressure	PSI	4.3	4.8	
Static Discharge Pressure	PSI	0.0	0.0	
Avg Dist to Water	Ft	3.3	4.1	
Static Suction Head	Ft	-2.6	-1.7	
Static to P1 Gauge	Ft	12.9	12.0	
Measured Static Head	Ft	25.0	25.0	<-- Estimated
Average Operating TDH	Ft	26.2	27.0	
Avg L-N Voltage	Volts	493.1	491.2	
Avg L-L Voltage	Volts	493.1	491.2	
Voltage Imbalance	%	0.70%	0.80%	
Ambient Current	Amps	0.0	0.0	
Current Draw	Amps	9.6	10.7	
Full Load Amps	Amps	21.0	21.0	
Motor Operating %FLA	%	46%	51%	
Current Imbalance	%	10.20%	11.95%	
Power Factor	-	0.65	0.60	
Motor Load % Rated	%	95%	97%	
Input Horsepower	HP	7.1	7.3	
Output Horsepower	HP	1.7	2.0	
WTW Efficiency	%	24.2%	26.7%	

Average Energy Consumption Calculations

Parameter	Units	P1	P2
Run Time	Hrs/Day	0.5	0.8
Energy Usage/ Day	KWH/Day	2.5	4.4
Energy Usage/Year	KWH/Yr	924	1612
Electricity Cost	$/KWH	0.1	0.1
Electrical Operating Cost*	$/Yr	$92	$161

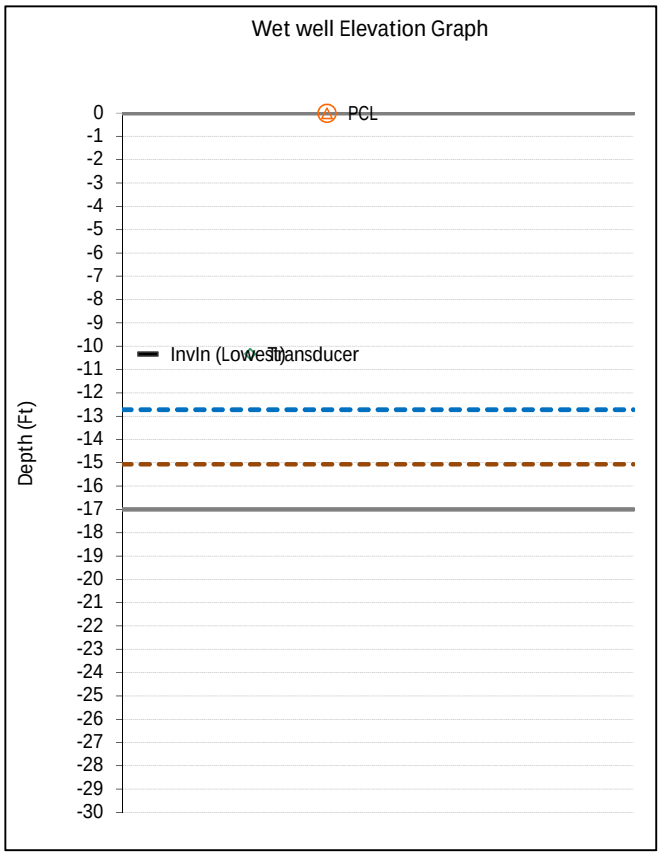
Notes:
* Energy calcs are based on the Avg Inflow observed during test and can vary significantly
** Calculated friction losses account for losses not measured by pressure transducer

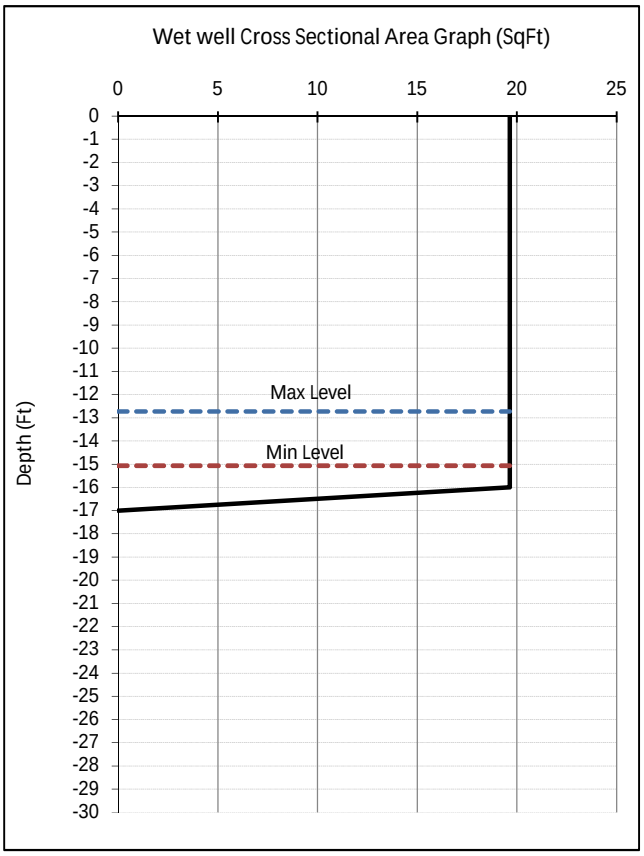

P1
P2
Level (ft)
PSI
Level
PSI
Volts (L-N)
Volts - A
Volts - B
Volts - C
Amps
Amps - A
Amps - B
Amps - C
2:49 PM
2:54 PM
2:59 PM
3:04 PM
EST


35
30
25
20
15
10
5
0
Total Dynamic Head (Ft)
0
100
200
300
400
500
600
Flow (GPM)
Static
Avg Operating Point
Design 1&2
Design 3&4
P1
P2
P3
P4
System Curve
P1&2 Curve
P3&4 Curve

Wet well Elevation Data	
Description	Ft
Top of WW	0.0
InvIn (Lowest)	-10.33
Transducer	-10.33
PCL	0.00
Bottom of WW	-17.00
Max Level	-12.72
Min Level	-15.07

Wet well Area Data			
Width/Dia	Length	Area	Depth
Ft	Ft	SqFt	Ft
5.00		19.6	0
5.00		19.6	-14.00
5.00		19.6	-15.00
5.00		19.6	-16.00
0.00		0.0	-17.00





*Notes:

1.) "Max Level" & "Min Level" are the maximum and minimum water levels used to calculate volumetric displacements for tests.
2.) Depths shown are measured in feet below rim of wet well.

Cell Color Code Key	
Text	Heading
123.45	User Entered Data
123.45	Log Data
123.45	Assumed
123.45	Calculated Data
123.45	By Others

Abbreviations Key	
Abbreviation	Description
Ø	Phase
AC	Alternating Current
ADF	Average Daily Flow
ATL	Across The Line
Avg	Average
CL	Center Line
Disch	Discharge
ETM	Elapsed Time Meter
FLA	Full Load Amps
Ft	Feet
Gal	Gallons
GPM	Gallons Per Minute
HP	Horse Power
Hrs	Hours
H:M:S	Hours:Minutes:Seconds
Hz	Hertz
In	Inches
InvIn	Invert In
KWH	KiloWatt Hours
L	Length
L1, L2, L3	Leg 1, 2 & 3 or Length 1, 2 & 3
N	Neutral
P	Pump
PCL	Pump Center Line
PF	Power Factor
PSI	Pounds per Square Inch
TDH	Total Dynamic Head
V	Volts
VFD	Variable Frequency Drive
WTW	Wire To Water
WW	Wet Well
Yr	Year

Notes

1.) Piping characteristics are based on best available data

2.) Avg Inflow is based on flow observed during tests. Actual ADF may vary significantly.

3.) Common accuracies for measurements of flow, pressure, voltage and current are ±1%

4.) Friction loss is calculated using the Hazen-Williams formula and the Bernouli equation

Pump Station Evaluation Report

Old Golf Course

Prepared For:

City of Odessa, TX

Evaluation Date:

May 3, 2017

Kimley»Horn

Introduction:

Kimley-Horn and Associates, Inc. conducted a pump performance test and evaluation of the pump station. This report summarizes the data and results of that evaluation. The following pages provide summaries of the data collected and notes about the pumps' performance.

The pump station is a duplex submersible sewage station located off of Old Course Rd.

General Notes:

1.) Pumps are operating very near to the pump curve and are approximately 53-54% efficient
2.) Station is in new to like new condition overall

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	Component	Score	Description
Structural	Site	1 **2** 3 4 5	Water draining into valve vault. Minor soil accumulation in vault.
	Wetwell	1 **2** 3 4 5	
	Structures	1 **2** 3 4 5	Valve vault, Fiberglass. Water not draining to drain line fully.
	Penetrations/Joints	1 **2** 3 4 5	
	Civil - Other	1 2 3 4 5	
Mechanical	Bolts	**1** 2 3 4 5	
	Fittings	**1** 2 3 4 5	
	Hardware	1 **2** 3 4 5	Vent Pipe is galvanized.
	Piping - Suction	**1** 2 3 4 5	
	Piping - Discharge	1 **2** 3 4 5	
	Pumps	1 **2** 3 4 5	
	Valves - Check	1 **2** 3 4 5	
	Valves - Isolation	1 **2** 3 4 5	
	Valves - Other	1 2 3 4 5	
	Mechanical - Other	1 2 3 4 5	
Electrical	Conduits	1 2 **3** 4 5	PVC only, no PVC coated RGS in explosion proof zone
	Control Panel	1 **2** 3 4 5	
	Generator	1 2 3 4 5	N/A
	Motor Starters	1 **2** 3 4 5	
	Panels	1 **2** 3 4 5	
	RTU	1 **2** 3 4 5	
	TVSS	1 2 3 4 5	N/A
	Wiring	1 **2** 3 4 5	
	Electrical - Other	1 2 3 **4** 5	No ground wiring on SCADA tower.

Scores listed above are on a scale of 1 to 5. 1 = Like New, 5= Failure Imminent

Photo 1 - Wetwell

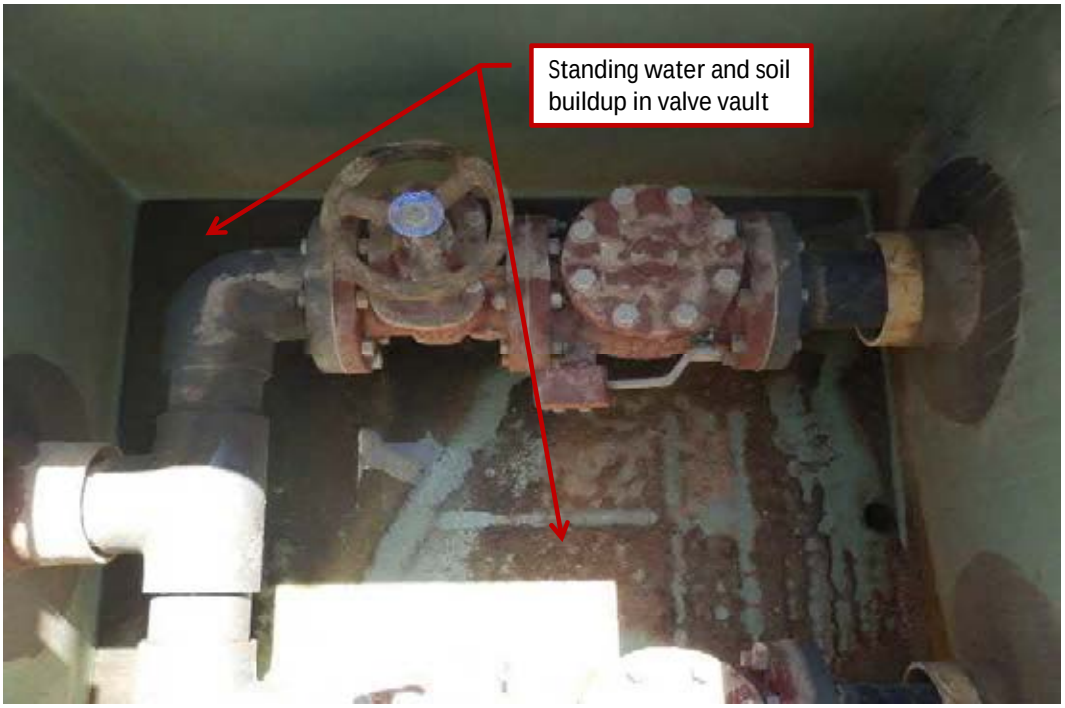


Photo 2 - Valve Vault

Photo 3 - Galvanized Vent Pipe

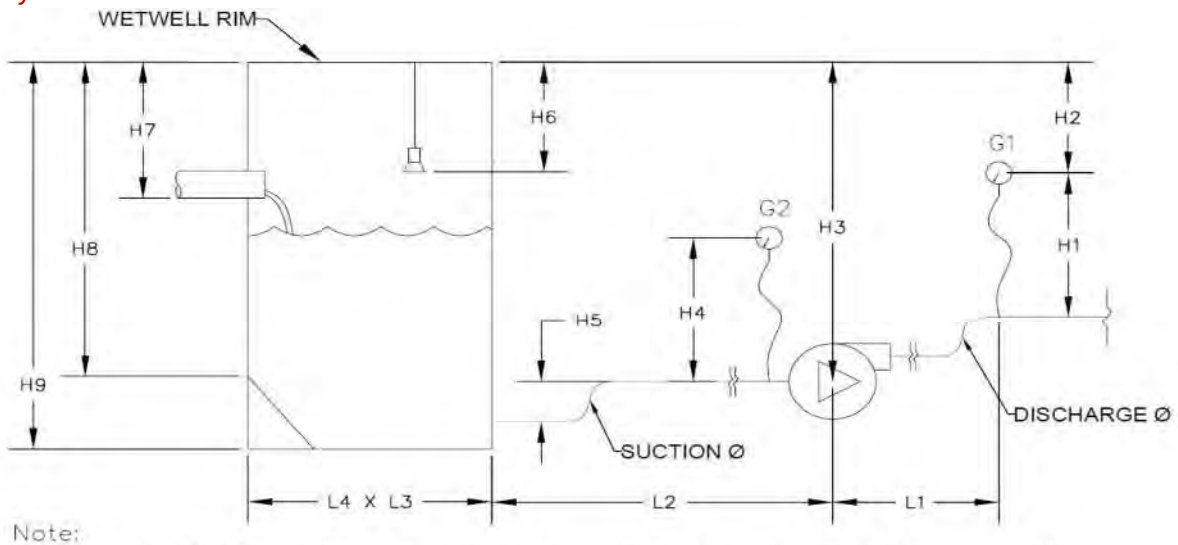
Station Information

Station Type: Duplex Submerged
Utilty Service: 480V Corner Grounded Delta

System Parameters

Parameter	Units	P1	P2
H1 - G1 to Center Pipe	In	36.0	36
H2 - G1 to Rim	In		
H3 - Center Pump to Rim	In	231.0	231.0
H4 - G2 to Center Pipe	In		
H5 - Pump to Suction	In		
H6 - Transducer to Rim	In	141.00	141
H7 - Lowest Invert	In	221.0	221.0
H8 - Chamfer to Rim	In	238.0	238.0
H9 - WW Bottom to Rim	In	239.0	239.0
Discharge ø	In	4.0	4.0
Suction ø	In		
L1	Ft	13.3	13.3
L2	In		0
L3	In	60.0	60
L4	In		0
Electrical Phases	No	3	3
Nominal Voltage	Volts	480	480
No Pump Leads	-	4	4
Starters	-	ATL	ATL
Pump Rated Horsepower	HP	5.5	5.5
Pump ETM	Hours	No timers	No timers

Hydraulic Test Schematic



Note:
1.) Negative "–" numbers mean that the actual dimension is in the opposite vertical direction than shown in sketch.
2.) L4 is the width for rectangular structures. L4=0 for circular structures

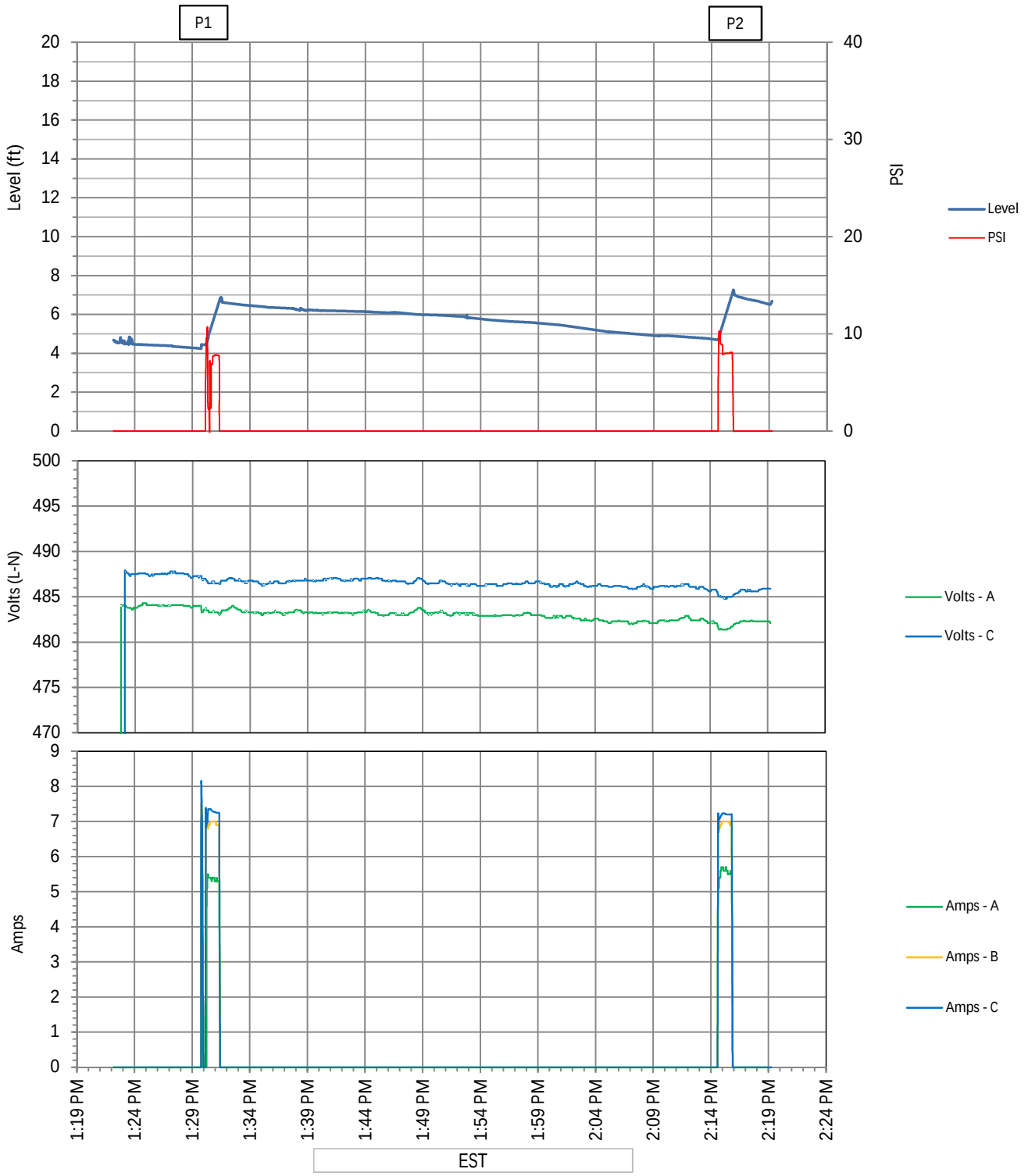
Test Results Summary

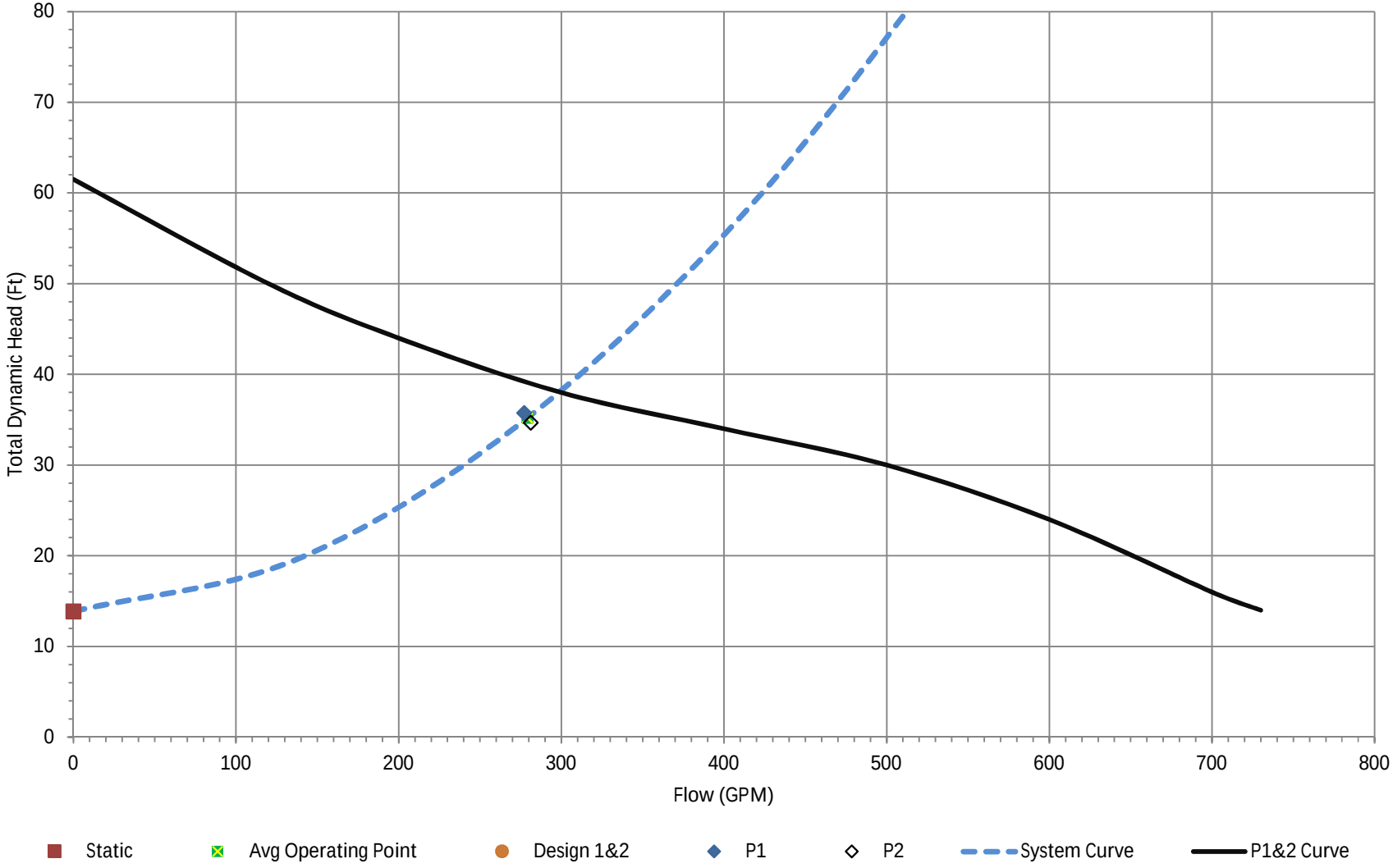
Performance Parameter	Units	P1	P2	
Avg Inflow	GPM	-7	-12	
Avg Output	GPM	277	281	
Suction Piping Velocity	FPS			
Discharge Piping Velocity	FPS	7.1	7.2	
Velocity Head	Ft	0.8	0.8	
Total Calculated Friction Loss**	Ft	2.1	2.1	
Average Operating Pressure	PSI	7.8	7.2	
Static Discharge Pressure	PSI	6.0	6.0	
Avg Dist to Water	Ft	6.1	6.3	
Static Suction Head	Ft	-1.4	-1.2	
Static to P1 Gauge	Ft	14.9	15.0	
Measured Static Head	Ft	13.9	13.9	<-- Estimated based on GIS record drawings
Average Operating TDH	Ft	35.7	34.7	
Avg L-N Voltage	Volts	484.9	483.2	
Avg L-L Voltage	Volts	484.9	483.2	
Voltage Imbalance	%	0.33%	0.37%	
Ambient Current	Amps	0.0	0.0	
Current Draw	Amps	6.5	6.6	
Full Load Amps	Amps	7.4	7.4	
Motor Operating %FLA	%	88%	89%	
Current Imbalance	%	18.13%	15.38%	
Power Factor	-	0.64	0.64	
Motor Load % Rated	%	85%	86%	
Input Horsepower	HP	4.7	4.7	
Output Horsepower	HP	2.5	2.5	
WTW Efficiency	%	54.1%	52.7%	

Average Energy Consumption Calculations

Parameter	Units	P1	P2
Run Time	Hrs/Day	0.6	1.0
Energy Usage/ Day	KWH/Day	2.0	3.5
Energy Usage/Year	KWH/Yr	726	1269
Electricity Cost	$/KWH	0.1	0.1
Electrical Operating Cost*	$/Yr	$73	$127

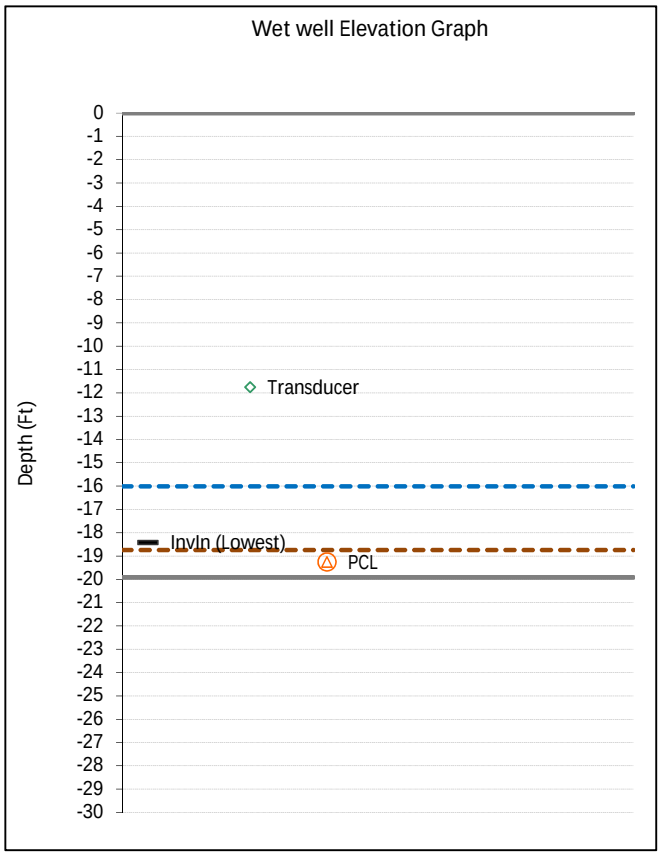
Notes:
* Energy calcs are based on the Avg Inflow observed during test and can vary significantly
** Calculated friction losses account for losses not measured by pressure transducer

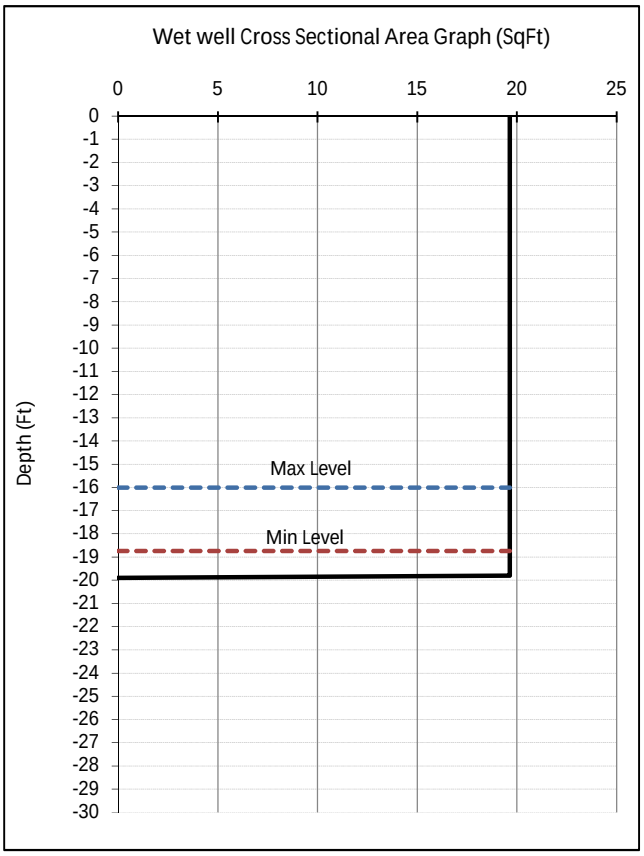

P1
P2
Level (ft)
PSI
Level
PSI
Volts (L-N)
Volts - A
Volts - C
Amps
Amps - A
Amps - B
Amps - C
1:19 PM
1:24 PM
1:29 PM
1:34 PM
1:39 PM
1:44 PM
1:49 PM
1:54 PM
1:59 PM
2:04 PM
2:09 PM
2:14 PM
2:19 PM
2:24 PM
EST


80
70
60
50
40
30
20
10
0
Total Dynamic Head (Ft)
0
100
200
300
400
500
600
700
800
Flow (GPM)
Static
Avg Operating Point
Design 1&2
P1
P2
System Curve
P1&2 Curve

Wet well Elevation Data	
Description	Ft
Top of WW	0.0
InvIn (Lowest)	-18.42
Transducer	-11.75
PCL	-19.25
Bottom of WW	-19.92
Max Level	-16.01
Min Level	-18.74

Wet well Area Data			
Width/Dia	Length	Area	Depth
Ft	Ft	SqFt	Ft
5.00		19.6	0
5.00		19.6	-10.00
5.00		19.6	-15.00
5.00		19.6	-19.80
0.00		0.0	-19.90





*Notes:

1.) "Max Level" & "Min Level" are the maximum and minimum water levels used to calculate volumetric displacements for tests.
2.) Depths shown are measured in feet below rim of wet well.

Pump Station Evaluation Report

Highway 80

Prepared For:

City of Odessa, TX

Evaluation Date:

May 3, 2017

Kimley»Horn

Introduction:

Kimley-Horn and Associates, Inc. conducted a pump performance test and evaluation of the pump station. This report summarizes the data and results of that evaluation. The following pages provide summaries of the data collected and notes about the pumps' performance.

The pump station is a triplex submersible sewage pump station.

General Notes:

1.) Significant current imbalance between phases. Further analysis recommended.
2.) Significant voltage drop when pumps engage (see graphs). Further analysis recommended.
3.) Significant cyclic voltage spikes are present likely due to outside influences. Further analysis recommended.
4.) Recommend installation of an air vacuum valve immediately down stream of the check valves on the force main. Large gas pocket was expelled during the first pump test from the pressure tap.
5.) Significant corrosion in wet well. Rebar exposed in large patches. Structural integrity is compromised. Recommend a structural rehabilitation and coating installation.
6.) Check valves are not accessible without excavation. Recommend installation of a valve vault.

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	Component	Score	Description
Structural	Site	1 2 3 4 5	One quarter of perimeter fence missing
	Wetwell	1 2 3 4 5	Rebar showing in large patches, severe concrete corrosion
	Structures	1 2 3 4 5	
	Penetrations/Joints	1 2 3 4 5	Corrosion appears worse at wall penetrations
	Civil - Other	1 2 3 4 5	
Mechanical	Bolts	1 2 3 4 5	Existing bolts severely corroded and should not be reused
	Fittings	1 2 3 4 5	Corrosion
	Hardware	1 2 **3** 4 5	
	Piping - Suction	1 2 3 4 5	
	Piping - Discharge	1 2 3 4 5	Corrosion
	Pumps	1 2 **3** 4 5	Reclaimed from pump #3
	Valves - Check	1 2 **3** 4 5	Reclaimed from pump #3
	Valves - Isolation	**1** 2 3 4 5	Brand new
	Valves - Other	1 2 3 4 5	
	Mechanical - Other	1 2 3 4 5	PVC vent pipe is not secured and center hatch leans against it.
Electrical	Conduits	1 2 3 **4** 5	Not PVC coated- galvanized
	Control Panel	1 2 **3** 4 5	
	Generator	1 2 3 4 5	No generator
	Motor Starters	1 2 **3** 4 5	
	Panels	1 2 3 **4** 5	Some wirenut connections not secured; may contact high voltage terminals
	RTU	1 **2** 3 4 5	
	TVSS	1 2 3 4 5	No TVSS
	Wiring	1 2 **3** 4 5	Corroded terminals
	Electrical - Other	1 2 3 4 5	Corrosion in transfer switch.

Scores listed above are on a scale of 1 to 5. 1 = Like New, 5= Failure Imminent

Photo 1 - Wetwell

Photo 2 - Exposed Rebar in Wetwell

Photo 3 - One Quarter of Perimeter Fence Missing

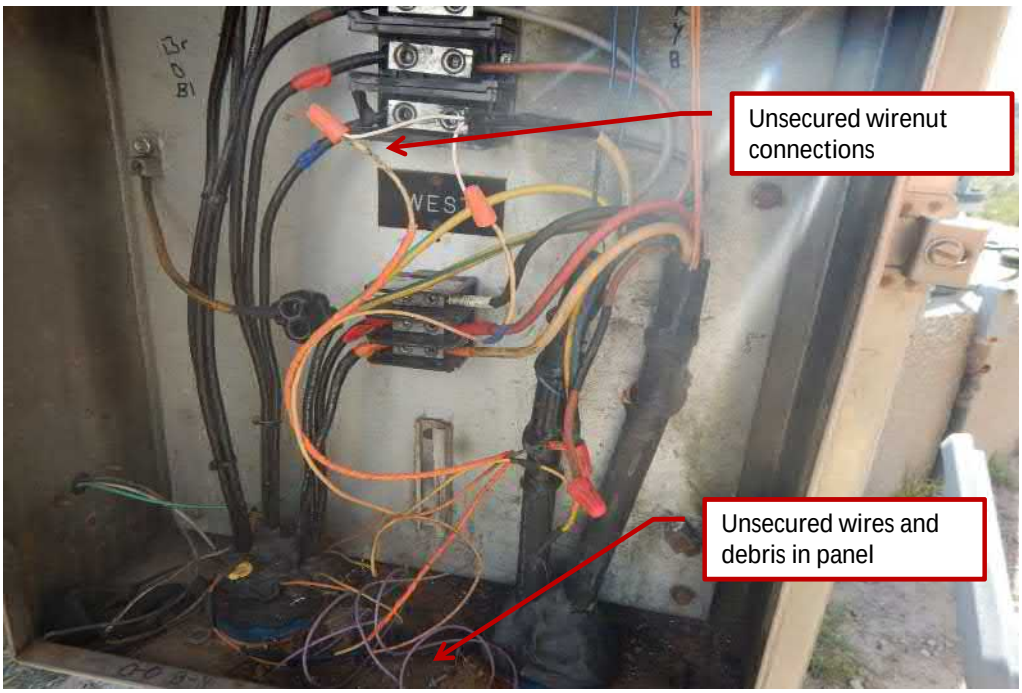


Photo 4 - Wetwell Junction Panel

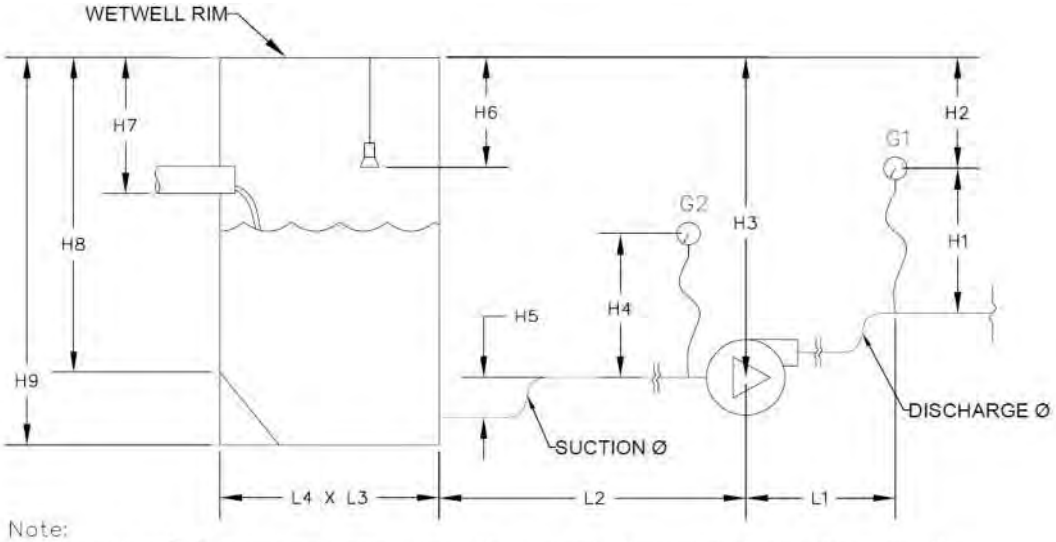
Station Information

Station Type: Triplex Submersible Sewage
Utilty Service: 480V Corner Grounded Delta

System Parameters

Parameter	Units	P1	P1	P2	P1&2	P1&2
H1 - G1 to Center Pipe	In	5.0	10.0	10.0	10.0	10.0
H2 - Gauge to Rim/Datum	In	18.0	18.0	18.0	18.0	18.0
H3 - Center Pump to Rim/Datum		362.4	362.4	362.4	362.4	362.4
H4 - G2 to Center Pump	In					
H5 - Pump Center to Suction						
H6 - Transducer to Rim	In	204.7	204.7	204.7	204.7	204.7
H7 - Lowest Invert	In	276.2	276.2	276.2	276.2	276.2
H8 - Chamfer to Rim	In	372.0	372.0	372.0	372.0	372.0
H9 - WW Bottom to Rim	In	372.4	372.4	372.4	372.4	372.4
Discharge ø	In	12.0	12.0	12.0	12.0	12.0
Suction ø	In					
L1	Ft	34.0	34.0	34.0	34.0	34.0
L2	In		18.0	18.0	18.0	19.0
L3	Ft	10.0	10.0	10.0	10.0	10.0
L4	Ft					
Electrical Phases	No	3.0	3.0	3.0		
Nominal Voltage	Volts	480	480	480		
Ground	-	Ph B	Ph B	Ph B		
No Pump Leads	-	4	4	5		
Starters	-	ATL	ATL	ATL		
Pump Rated Horsepower	HP	20	20	20	20	20
Pump ETM	Hours	4972	4972	4972		

Hydraulic Test Schematic



Note:
1.) Negative "–" numbers mean that the actual dimension is in the opposite vertical direction than shown in sketch.
2.) L4 is the width for rectangular structures. L4=0 for circular structures

Test Results Summary

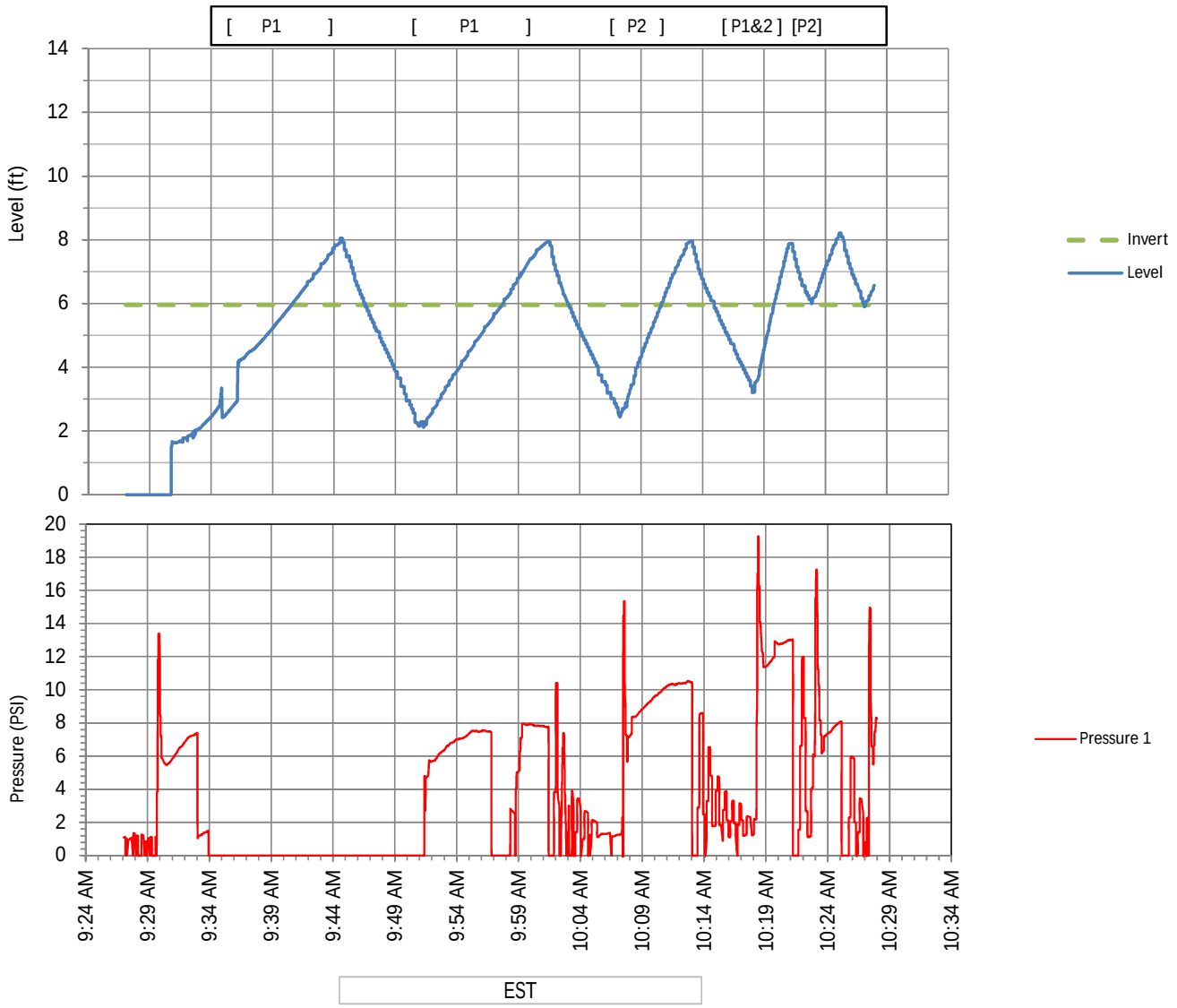
Performance Parameter	Units	P1	P1	P2	P1&2	P2
Avg Inflow	GPM	-682	-862	-712	-909	-701
Avg Output	GPM	971.8	1222	1297	1761	1319
Suction Piping Velocity	FPS					
Discharge Piping Velocity	FPS	2.8	3.5	3.7	5.0	3.7
Velocity Head	Ft	0.1	0.2	0.2	0.4	0.2
Total Calculated Friction Loss**	Ft	0.1	0.1	0.2	0.3	0.2
Average Operating Pressure	PSI	0.0	7.8	8.6	12.3	9.0
Static Discharge Pressure	PSI	0.0	0.0	0.0	0.0	0.0
Avg Dist to Water	Ft	7.1	7.7	5.0	6.6	7.0
Static Suction Head	Ft	-6.0	-5.5	-8.2	-6.5	-6.1
Static to P1 Gauge	Ft	22.3	22.4	19.7	21.3	21.8
Measured Static Head	Ft	0.0	0.0	0.0	0.0	0.0
Total Static	Ft	27.0	27.0	27.0	27.0	27.0
Average Operating TDH	Ft	22.5	40.7	39.8	50.5	43.0
Avg L-N Voltage	Volts	480.5	483.4	480.6	480.9	486.1
Avg L-L Voltage	Volts	480.5	483.4	480.6	480.9	486.1
Motor Winding Voltage	Volts	480.5	483.4	480.6	480.9	486.1
Voltage Imbalance	%	1.00%	1.00%	1.00%	1.00%	1.00%
Ambient Current	Amps	0.0	0.0	0.0	0.0	1.0
Current Draw	Amps	20.7	20.8	22.7	21.5	22.5
Full Load Amps	Amps	26.0	26.0	26.0	26.0	26.0
Motor Operating %FLA	%	80%	80%	87%	83%	87%
Current Imbalance	%	10.79%	10.29%	11.98%	16.92%	11.64%
Power Factor	-	0.83	0.83	0.83	0.83	0.83
Motor Load % Rated	%	96%	97%	105%	58%	61%
Input Horsepower	HP	19.2	19.4	21.0	11.5	12.2
Output Horsepower	HP		12.7	13.2		
WTW Efficiency	%		65.4%	62.6%		

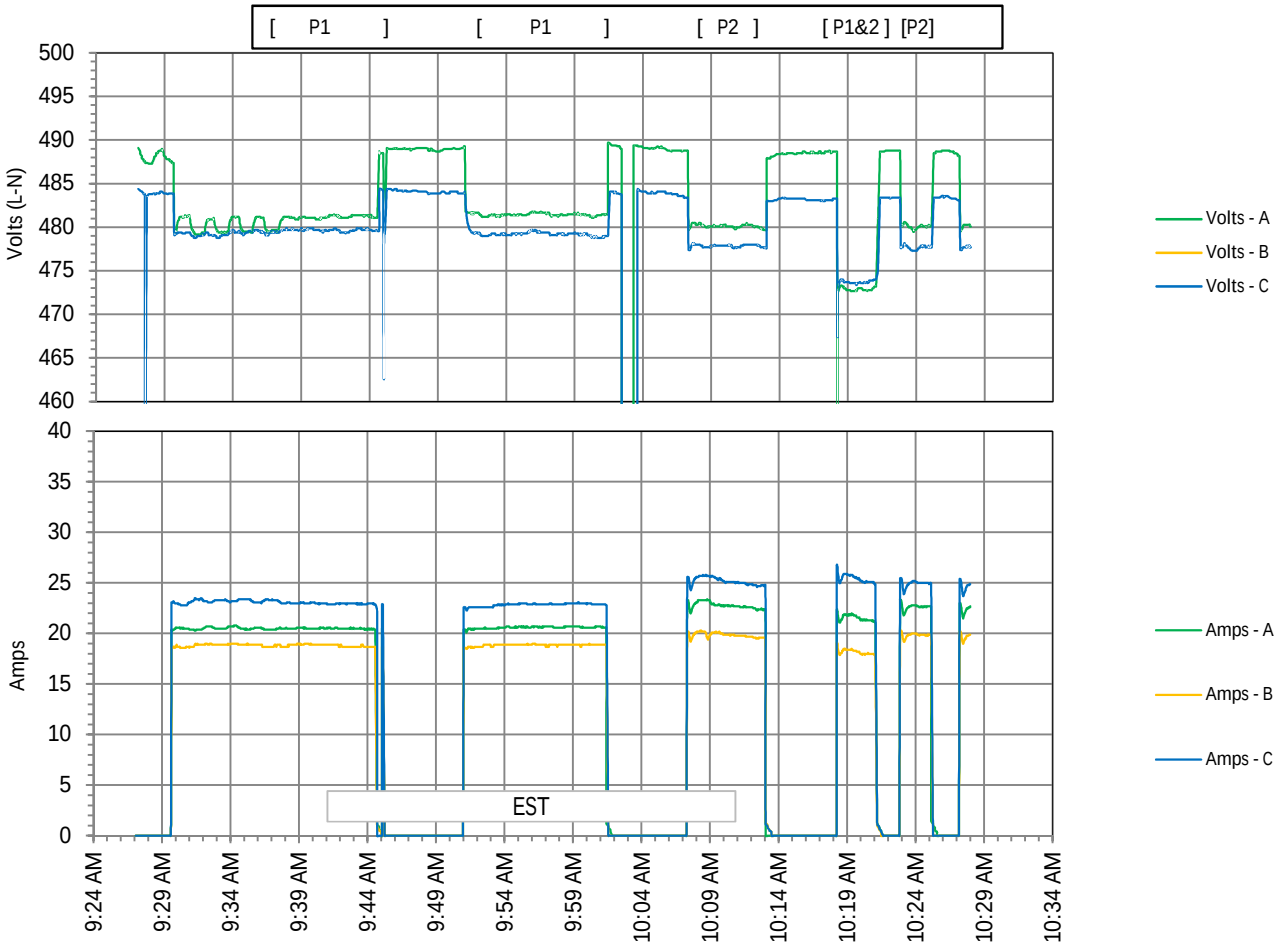
Average Energy Consumption Calculations

Parameter	Units	P1	P1	P2	P1&2	P1&2
Run Time	Hrs/Day	16.8	16.9	13.2	12.4	12.8
Energy Usage/ Day	KWH/Day	240.8	244.7	206.8	106.3	116.0
Energy Usage/Year	KWH/Yr	87882	89323	75467	38816	42332
Electricity Cost	$/KWH	0.1	0.1	0.1	0.1	0.1
Electrical Operating Cost*	$/Yr	$8,788	$8,932	$7,547	$3,882	$4,233

Notes:
* Energy calcs are based on the Avg Inflow observed during test and can vary significantly
** Calculated friction losses account for losses not measured by pressure transducer

1.) The initial P1 test recorded no pressure due to pressure sensor lines being clogged. A large volume of air was discharged once clog was cleared.


[P1]
[P1]
[P2]
[P1&2] [P2]
Level (ft)
14
12
10
8
6
4
2
0
Invert
Level
Pressure (PSI)
20
18
16
14
12
10
8
6
4
2
0
Pressure 1
9:24 AM
9:29 AM
9:34 AM
9:39 AM
9:44 AM
9:49 AM
9:54 AM
9:59 AM
10:04 AM
10:09 AM
10:14 AM
10:19 AM
10:24 AM
10:29 AM
10:34 AM
EST


[P1]
[P1]
[P2]
[P1&2] [P2]
Volts (L-N)
500
495
490
485
480
475
470
465
460
Volts - A
Volts - B
Volts - C
Amps
40
35
30
25
20
15
10
5
0
EST
Amps - A
Amps - B
Amps - C
9:24 AM
9:29 AM
9:34 AM
9:39 AM
9:44 AM
9:49 AM
9:54 AM
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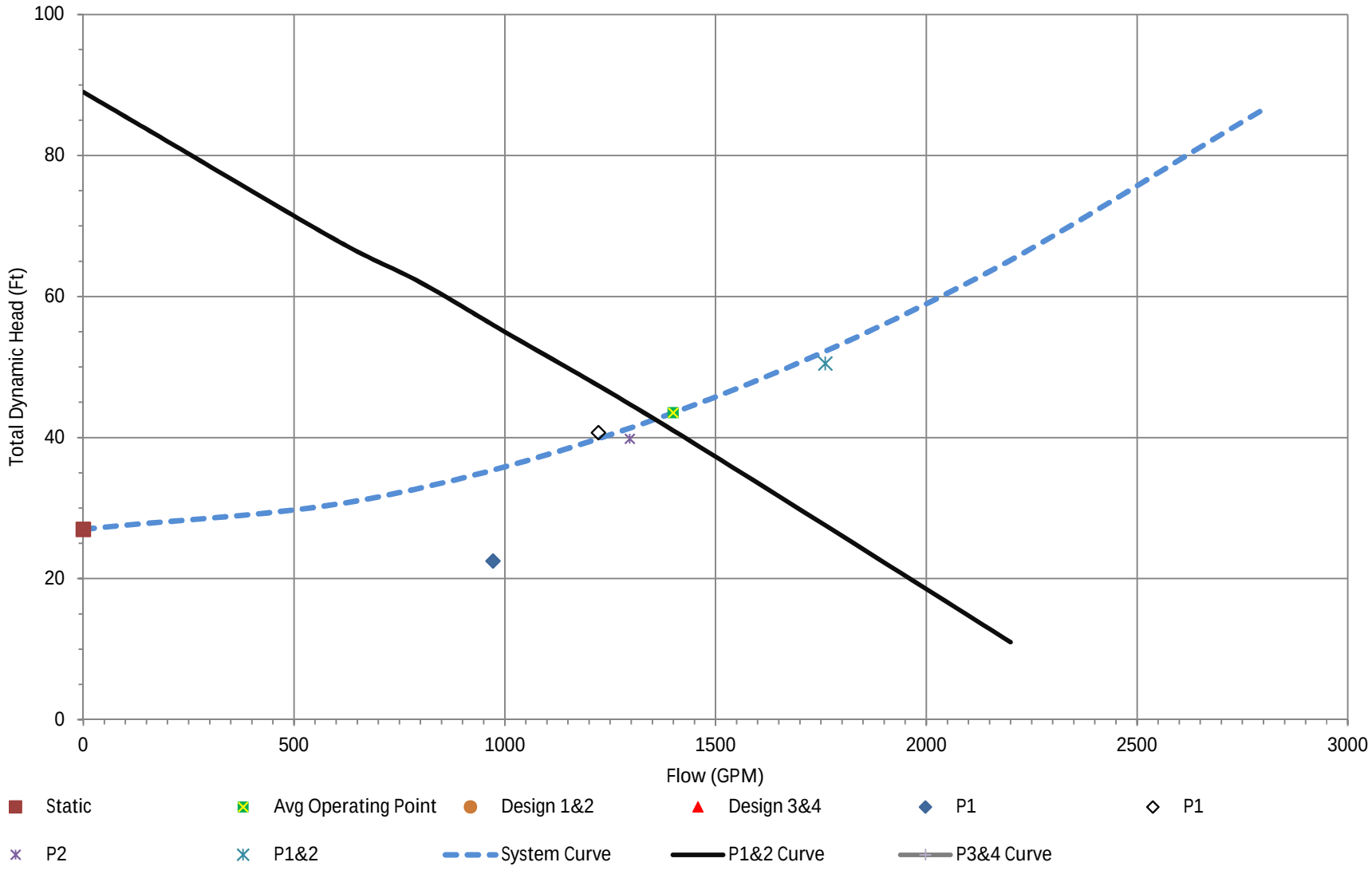
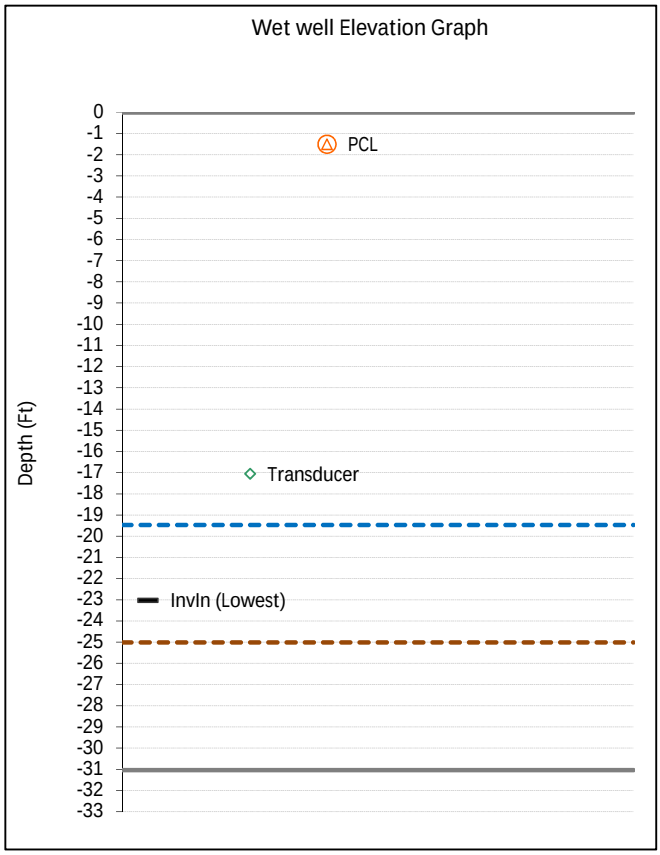
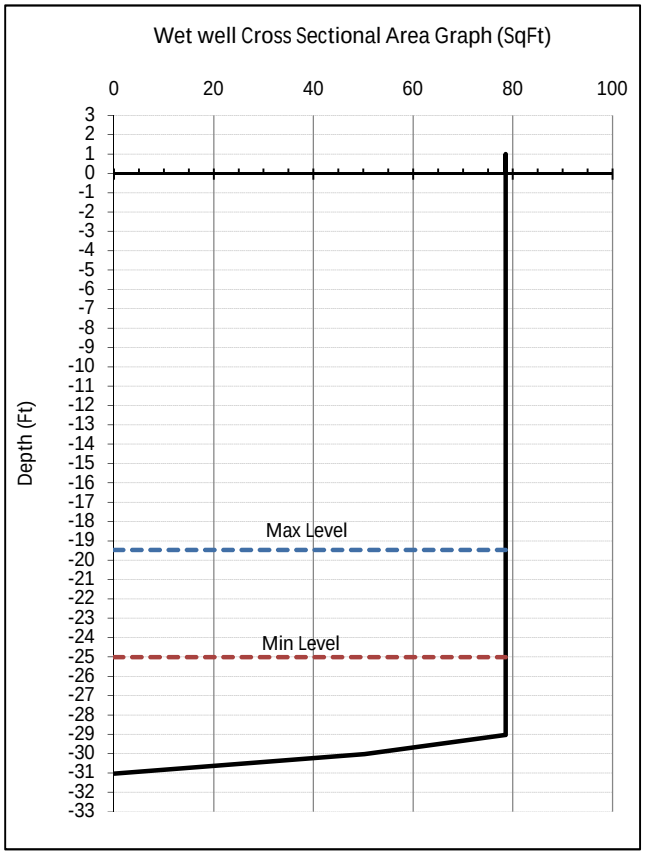
10:09 AM
10:14 AM
10:19 AM
10:24 AM
10:29 AM
10:34 AM


100
80
60
40
20
0
Total Dynamic Head (Ft)
0
500
1000
1500
2000
2500
3000
Flow (GPM)
Static
Avg Operating Point
Design 1&2
Design 3&4
P1
P1
P2
P1&2
System Curve
P1&2 Curve
P3&4 Curve

Wet well Elevation Data	
Description	Ft
Top of WW	0.0
InvIn (Lowest)	-23.01
Transducer	-17.06
PCL	-1.50
Bottom of WW	-31.03
Max Level	-19.47
Min Level	-25.02

Wet well Area Data			
Width/Dia	Length	Area	Depth
Ft	Ft	SqFt	Ft
10.00		78.5	0
10.00		78.5	1.00
10.00		78.5	-29.03
8.00		50.3	-30.03
0.00		0.0	-31.03





*Notes:

1.) "Max Level" & "Min Level" are the maximum and minimum water levels used to calculate volumetric displacements for tests.

2.) Depths shown are measured in feet below rim of wet well.

Cell Color Code Key	
Text	Heading
123.45	User Entered Data
123.45	Log Data
123.45	Assumed
123.45	Calculated Data
123.45	By Others

Abbreviations Key	
Abbreviation	Description
Ø	Phase
AC	Alternating Current
ADF	Average Daily Flow
ATL	Across The Line
Avg	Average
CL	Center Line
Disch	Discharge
ETM	Elapsed Time Meter
FLA	Full Load Amps
Ft	Feet
Gal	Gallons
GPM	Gallons Per Minute
HP	Horse Power
Hrs	Hours
H:M:S	Hours:Minutes:Seconds
Hz	Hertz
In	Inches
InvIn	Invert In
KWH	KiloWatt Hours
L	Length
L1, L2, L3	Leg 1, 2 & 3 or Length 1, 2 & 3
N	Neutral
P	Pump
PCL	Pump Center Line
PF	Power Factor
PSI	Pounds per Square Inch
TDH	Total Dynamic Head
V	Volts
VFD	Variable Frequency Drive
WTW	Wire To Water
WW	Wet Well
Yr	Year

Notes

1.) Piping characteristics are based on best available data

2.) Avg Inflow is based on flow observed during tests. Actual ADF may vary significantly.

3.) Common accuracies for measurements of flow, pressure, voltage and current are ±1%

4.) Friction loss is calculated using the Hazen-Williams formula and the Bernouli equation

Pump Station Evaluation Report

Love's

Prepared For:

City of Odessa, TX

Evaluation Date:

May 3, 2017

Kimley»Horn

Introduction:

Kimley-Horn and Associates, Inc. conducted a pump performance test and evaluation of the pump station. This report summarizes the data and results of that evaluation. The following pages provide summaries of the data collected and notes about the pumps' performance.

The pump station is a duplex submersible sewage pump station located off of Hwy 20 and CR West Street.

General Notes:

1.) WTW efficiency is very low.
2.) Pump 1 test experienced a clog in the pressure transducer piping.

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	Component	Score	Description
Structural	Site	1 **2** 3 4 5	
	Wetwell	1 2 **3** 4 5	
	Structures	1 2 **3** 4 5	Galvanized vent pipe, valve vault under construction
	Penetrations/Joints	1 2 **3** 4 5	Debris in between wall sleeve and discharge piping
	Civil - Other	1 2 3 4 5	
Mechanical	Bolts	1 **2** 3 4 5	
	Fittings	1 **2** 3 4 5	
	Hardware	1 **2** 3 4 5	Bracket on one side of guardrails missing
	Piping - Suction	1 2 3 4 5	
	Piping - Discharge	1 **2** 3 4 5	Schedule 80
	Pumps	1 2 **3** 4 5	Vibration on Pump #1
	Valves - Check	1 2 3 **4** 5	Significant corrosion on #1 lever arm. Missing one lever arm.
	Valves - Isolation	1 2 3 4 5	
	Valves - Other	1 2 3 4 5	
	Mechanical - Other	1 2 3 4 5	
Electrical	Conduits	1 2 **3** 4 5	Galvanized only. No PVC Coated Galvanized
	Control Panel	1 2 **3** 4 5	Debris in panel. Seems to collect water.
	Generator	1 2 3 4 5	N/A
	Motor Starters	1 2 3 4 5	
	Panels	1 2 **3** 4 5	Corrosion on terminals & general disorganization of wires
	RTU	1 **2** 3 4 5	
	TVSS	1 2 3 4 5	N/A
	Wiring	1 2 **3** 4 5	Pump 1 terminal strip. Corrosion on bus fuses.
	Electrical - Other	1 2 3 4 5	

Scores listed above are on a scale of 1 to 5. 1 = Like New, 5= Failure Imminent

Photo 1 - Wetwell

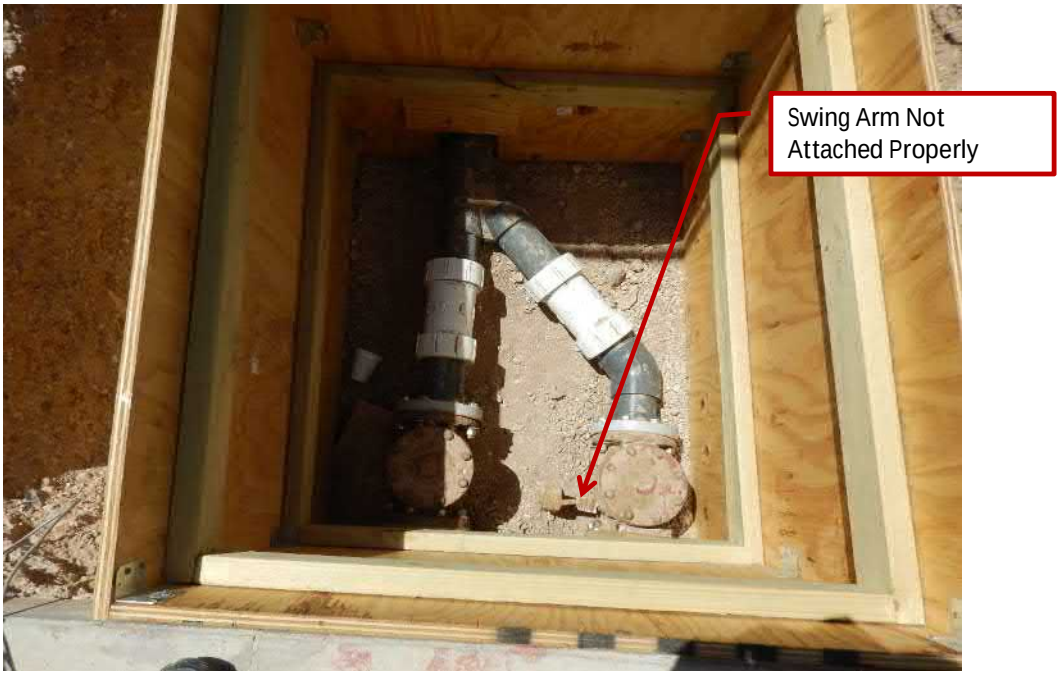


Photo 2 - Check Valves

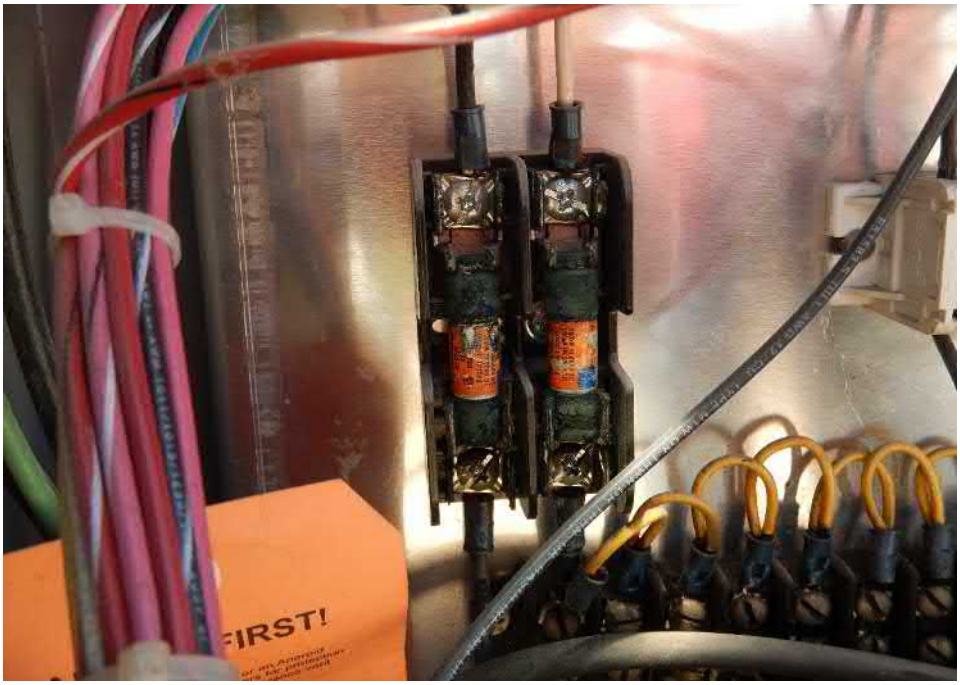


Photo 3 - Corroded Fuses In PCP

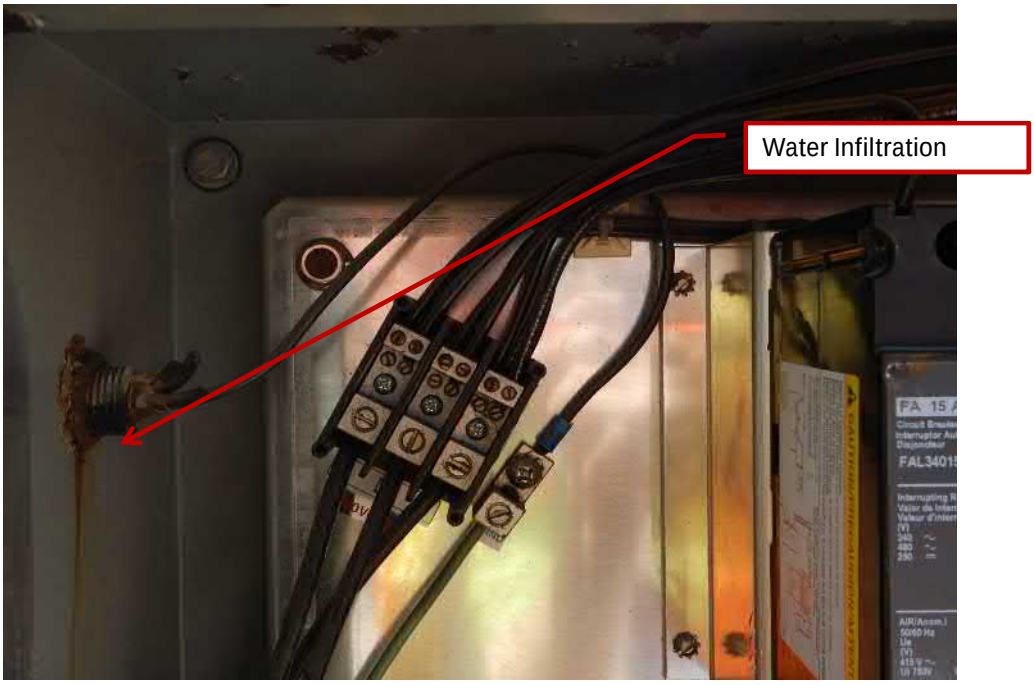


Photo 4 - Water Infiltration Into PCP

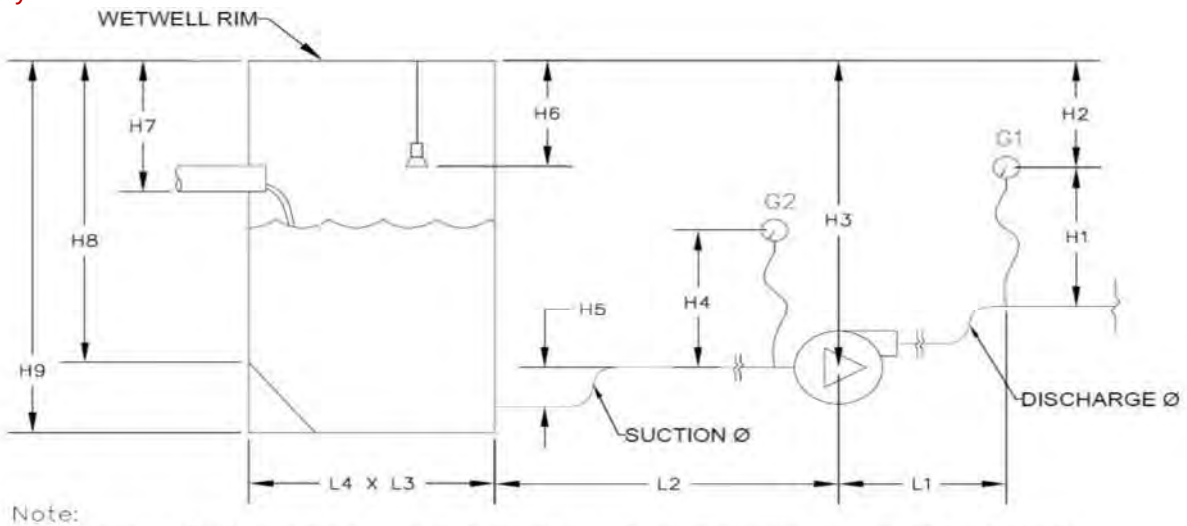
Station Information

Station Type: Duplex submersible Sewage
Utilty Service: 480V Corner grounded delta

System Parameters

Parameter	Units	P1	P2
H1 - G1 to Center Pipe	In	194.0	194.0
H2 - G1 to Rim	In		
H3 - Center Pump to Rim	In	194.0	194.0
H4 - G2 to Center Pipe	In		
H5 - Pump to Suction	In		
H6 - Transducer to Rim	In	66.0	66.0
H7 - Lowest Invert	In	118.0	118.0
H8 - Chamfer to Rim	In	198.0	198.0
H9 - WW Bottom to Rim	In	204.0	204.0
Discharge ø	In	4.0	4.0
Suction ø	In		
L1	Ft	11.3	11.3
L2	In		
L3	In	48.0	48.0
L4	In		
Electrical Phases	No	3.0	3.0
Nominal Voltage	Volts	460	460
No Pump Leads	-	4	4
Starters	-	ATL	ATL
Pump Rated Horsepower	HP	2.9	2.9
Pump ETM	Hours	6572	143

Hydraulic Test Schematic



Note:
1.) Negative "–" numbers mean that the actual dimension is in the opposite vertical direction than shown in sketch.
2.) L4 is the width for rectangular structures. L4=0 for circular structures

Test Results Summary

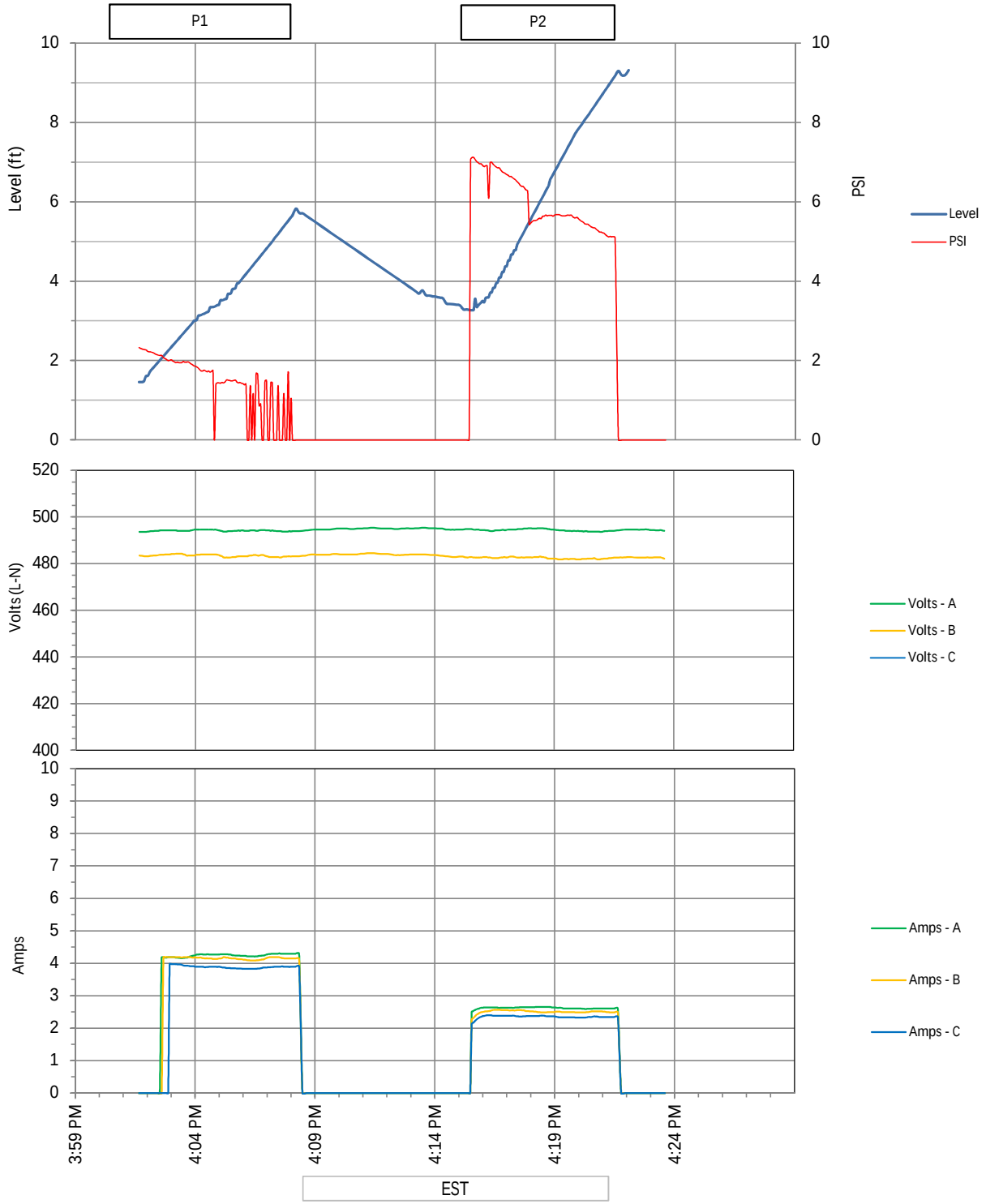
Performance Parameter	Units	P1	P2	
Avg Inflow	GPM	-39	-19	
Avg Output	GPM	110	117	
Discharge Piping Velocity	FPS	2.8	3.0	
Velocity Head	Ft	0.1	0.1	
Total Calculated Friction Loss**	Ft	0.3	0.4	
Average Operating Pressure	PSI	5.7	5.7	<-- See Note 1
Static Discharge Pressure	PSI	8.0	8.9	
Avg Dist to Water	Ft	4.6	7.3	
Static Suction Head	Ft	-6.0	-3.4	
Static to P1 Gauge	Ft	11.5	8.9	
Measured Static Head	Ft	18.5	20.5	<-- See Note 3
Average Operating TDH	Ft	25.2	22.6	
Avg L-N Voltage	Volts	488.8	488.6	
Avg L-L Voltage	Volts	488.8	488.6	
Voltage Imbalance	%	3.10%	0.50%	
Ambient Current	Amps	0.0	0.0	
Current Draw	Amps	4.1	2.5	
Full Load Amps	Amps	5.1	5.1	
Motor Operating %FLA	%	80%	49%	
Current Imbalance	%	5.48%	5.76%	
Power Factor	-	0.66	0.67	
Motor Load % Rated	%	105%	66%	
Input Horsepower	HP	3.1	1.9	
Output Horsepower	HP	0.7	0.7	
WTW Efficiency	%	23.2%	35.5%	

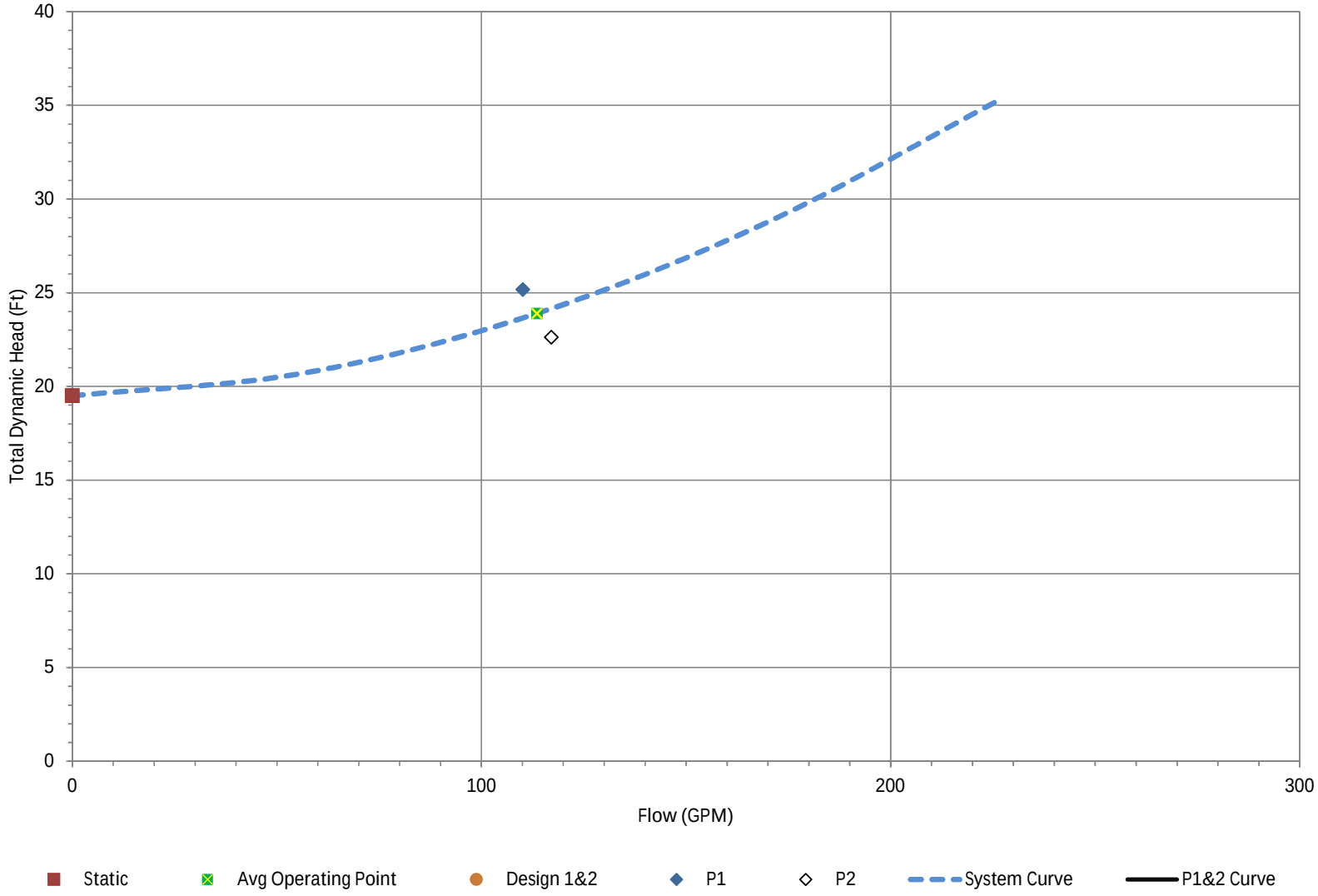
Average Energy Consumption Calculations

Parameter	Units	P1	P2
Run Time	Hrs/Day	8.5	3.9
Energy Usage/ Day	KWH/Day	19.4	5.5
Energy Usage/Year	KWH/Yr	7092	2008
Electricity Cost	$/KWH	0.1	0.1
Electrical Operating Cost*	$/Yr	$709	$201

Notes:
* Energy calcs are based on the Avg Inflow observed during test and can vary significantly
** Calculated friction losses account for losses not measured by pressure transducer

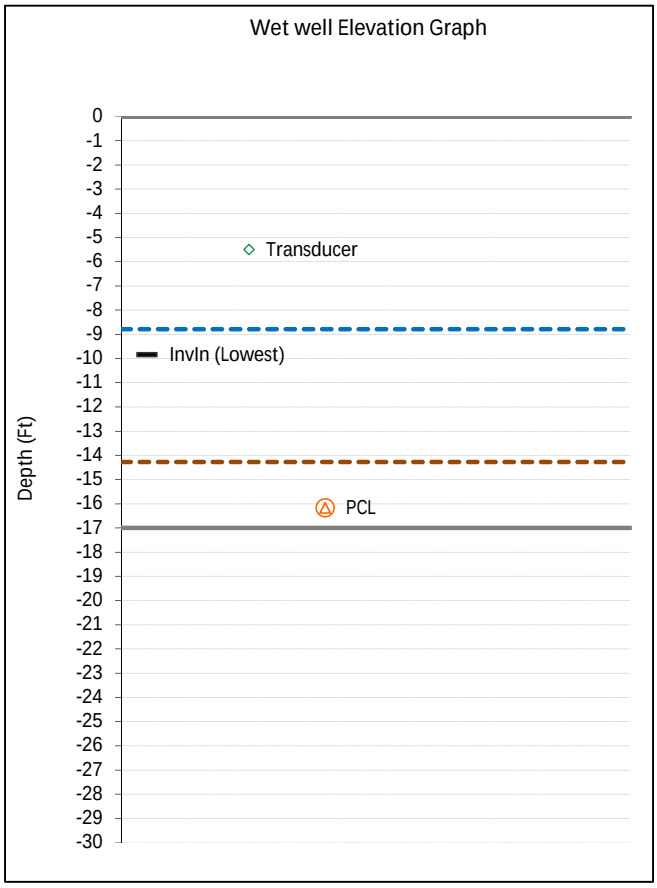
1.) P1 test most likely had a clog on the pressure transducer connection.
2.) Assumed P1 Operating pressure is equal to P2 based on similar output flow.
3.) Estimated based on aerial contours.

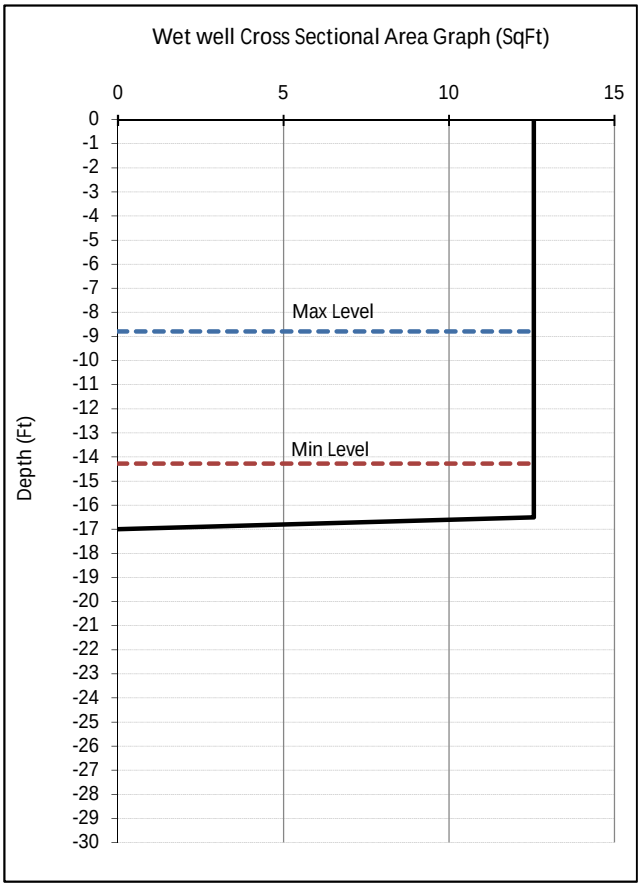

P1
P2
Level (ft)
PSI
Level
PSI
Volts (L-N)
Volts - A
Volts - B
Volts - C
Amps
Amps - A
Amps - B
Amps - C
3:59 PM
4:04 PM
4:09 PM
4:14 PM
4:19 PM
4:24 PM
EST


40
35
30
25
20
15
10
5
0
Total Dynamic Head (Ft)
0
100
200
300
Flow (GPM)
Static
Avg Operating Point
Design 1&2
P1
P2
System Curve
P1&2 Curve

Wet well Elevation Data	
Description	Ft
Top of WW	0.0
InvIn (Lowest)	-9.83
Transducer	-5.50
PCL	-16.17
Bottom of WW	-17.00
Max Level	-8.79
Min Level	-14.27

Wet well Area Data			
Width/Dia	Length	Area	Depth
Ft	Ft	SqFt	Ft
4.00		12.6	0
4.00		12.6	-14.50
4.00		12.6	-15.50
4.00		12.6	-16.50
0.00		0.0	-17.00





*Notes:

1.) "Max Level" & "Min Level" are the maximum and minimum water levels used to calculate volumetric displacements for tests.

2.) Depths shown are measured in feet below rim of wet well.

Cell Color Code Key	
Text	Heading
123.45	User Entered Data
123.45	Log Data
123.45	Assumed
123.45	Calculated Data
123.45	By Others

Abbreviations Key	
Abbreviation	Description
Ø	Phase
AC	Alternating Current
ADF	Average Daily Flow
ATL	Across The Line
Avg	Average
CL	Center Line
Disch	Discharge
ETM	Elapsed Time Meter
FLA	Full Load Amps
Ft	Feet
Gal	Gallons
GPM	Gallons Per Minute
HP	Horse Power
Hrs	Hours
H:M:S	Hours:Minutes:Seconds
Hz	Hertz
In	Inches
InvIn	Invert In
KWH	KiloWatt Hours
L	Length
L1, L2, L3	Leg 1, 2 & 3 or Length 1, 2 & 3
N	Neutral
P	Pump
PCL	Pump Center Line
PF	Power Factor
PSI	Pounds per Square Inch
TDH	Total Dynamic Head
V	Volts
VFD	Variable Frequency Drive
WTW	Wire To Water
WW	Wet Well
Yr	Year

Notes

1.) Piping characteristics are based on best available data

2.) Avg Inflow is based on flow observed during tests. Actual ADF may vary significantly.

3.) Common accuracies for measurements of flow, pressure, voltage and current are ±1%

4.) Friction loss is calculated using the Hazen-Williams formula and the Bernouli equation

Pump Station Evaluation Report

Lufkin

Prepared For:

City of Odessa, TX

Evaluation Date:

May 3, 2017

Kimley»Horn

Introduction:

Kimley-Horn and Associates, Inc. conducted a pump performance test and evaluation of the pump station. This report summarizes the data and results of that evaluation. The following pages provide summaries of the data collected and notes about the pumps' performance.

The pump station is a duplex submersible sewage pump station located off of Highway 20.

General Notes:

1.) Thick coating of oil inside the wet well, see end of P2 test for increased current draw when pumping oil.
2.) Station should be evaluated for explosion proof ratings. Electrical panel is inside explosion hazard zone.
3.) Wire to water efficiency is very low.
4.) Either the pump curve provided for this station is wrong or there is significant impeller wear on each pump leading to the low WTW efficiency.
5.) Erosion around wet well. Dirt may be eroding into wet well through influent annular space leak.

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	Component	Score	Description
Structural	Site	1 **2** 3 4 5	Erosion along wetwell
	Wetwell	1 **2** 3 4 5	Fairly new. No liner
	Structures	1 2 3 4 5	
	Penetrations/Joints	1 2 **3** 4 5	Leak on top of #2 discharge pipe.
	Civil - Other	1 2 **3** 4 5	Significant sludge on surface, along fillet. Lots of oil.
Mechanical	Bolts	1 2 **3** 4 5	Coated in oil. Some corrosion on guide rail anchor bolts.
	Fittings	1 2 **3** 4 5	
	Hardware	1 2 **3** 4 5	
	Piping - Suction	1 2 3 4 5	
	Piping - Discharge	1 2 3 4 5	4"- Look on top of discharge #2
	Pumps	1 2 **3** 4 5	Rattle on pump 1 guide rail.
	Valves - Check	1 2 3 **4** 5	Metal flaking off valve
	Valves - Isolation	1 2 3 4 5	
	Valves - Other	1 2 3 4 5	
	Mechanical - Other	1 2 3 4 5	
Electrical	Conduits	1 2 3 **4** 5	PVC, good condition. No PVC coated galvanized conduit in explosion proof zone.
	Control Panel	1 **2** 3 4 5	
	Generator	1 2 3 4 5	
	Motor Starters	1 **2** 3 4 5	
	Panels	1 **2** 3 4 5	
	RTU	1 **2** 3 4 5	
	TVSS	1 **2** 3 4 5	
	Wiring	1 **2** 3 4 5	
	Electrical - Other	1 2 3 4 5	

Scores listed above are on a scale of 1 to 5. 1 = Like New, 5= Failure Imminent

Photo 1 - Wetwell

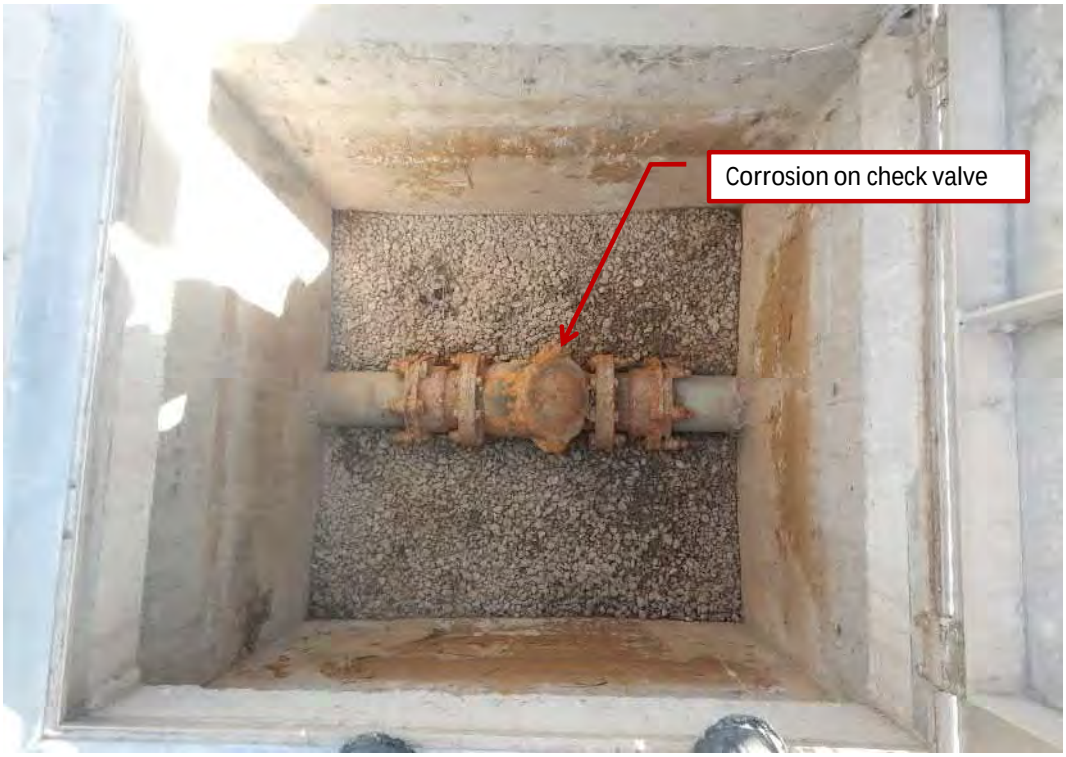


Photo 2 - Check Valve

Photo 3 - Sludge/Oil Buildup on Discharge Piping

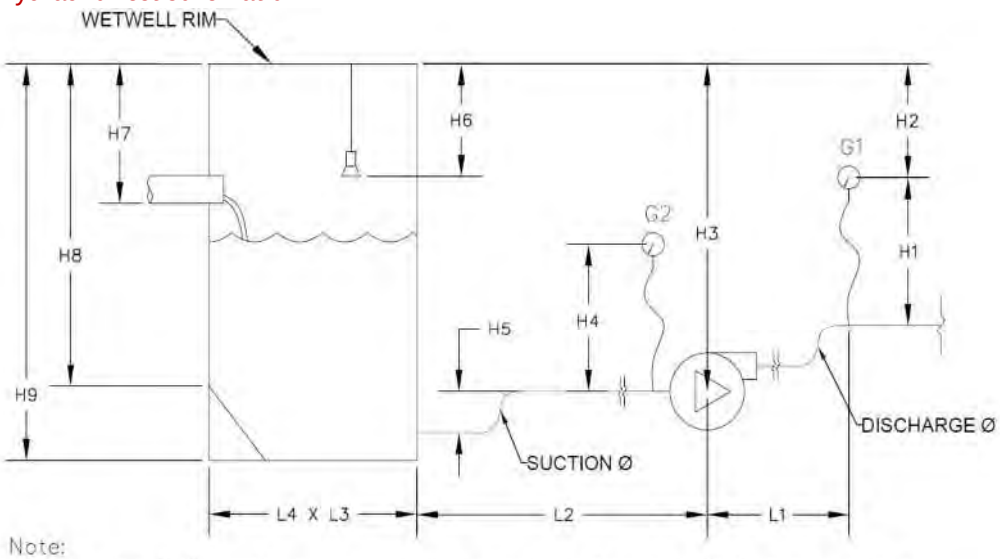
Station Information

Station Type: Duplex Submerged
Utilty Service: 240/120 Delta High Leg

System Parameters

Parameter	Units	P1	P2
H1 - G1 to Center Pipe	In	36.0	36.0
H2 - G1 to Rim	In		
H3 - Center Pump to Rim	In	327.0	327.0
H4 - G2 to Center Pipe	In		
H5 - Pump to Suction	In		
H6 - Transducer to Rim	In	241.0	241.0
H7 - Lowest Invert	In	261.6	261.6
H8 - Chamfer to Rim	In	288.0	288.0
H9 - WW Bottom to Rim	In	335.0	335.0
Discharge ø	In	6.0	6.0
Suction ø	In		
L1	Ft	30.2	30.2
L2	In		
L3	In	72.0	72.0
L4	In		
Electrical Phases	No	3.0	3.0
Nominal Voltage	Volts	240	240
No Pump Leads	-	4	4
Starters	-	ATL	ATL
Pump Rated Horsepower	HP	13.4	13.4
Pump ETM	Hours	15	1488

Hydraulic Test Schematic



Note:
1.) Negative "–" numbers mean that the actual dimension is in the opposite vertical direction than shown in sketch.
2.) L4 is the width for rectangular structures. L4=0 for circular structures

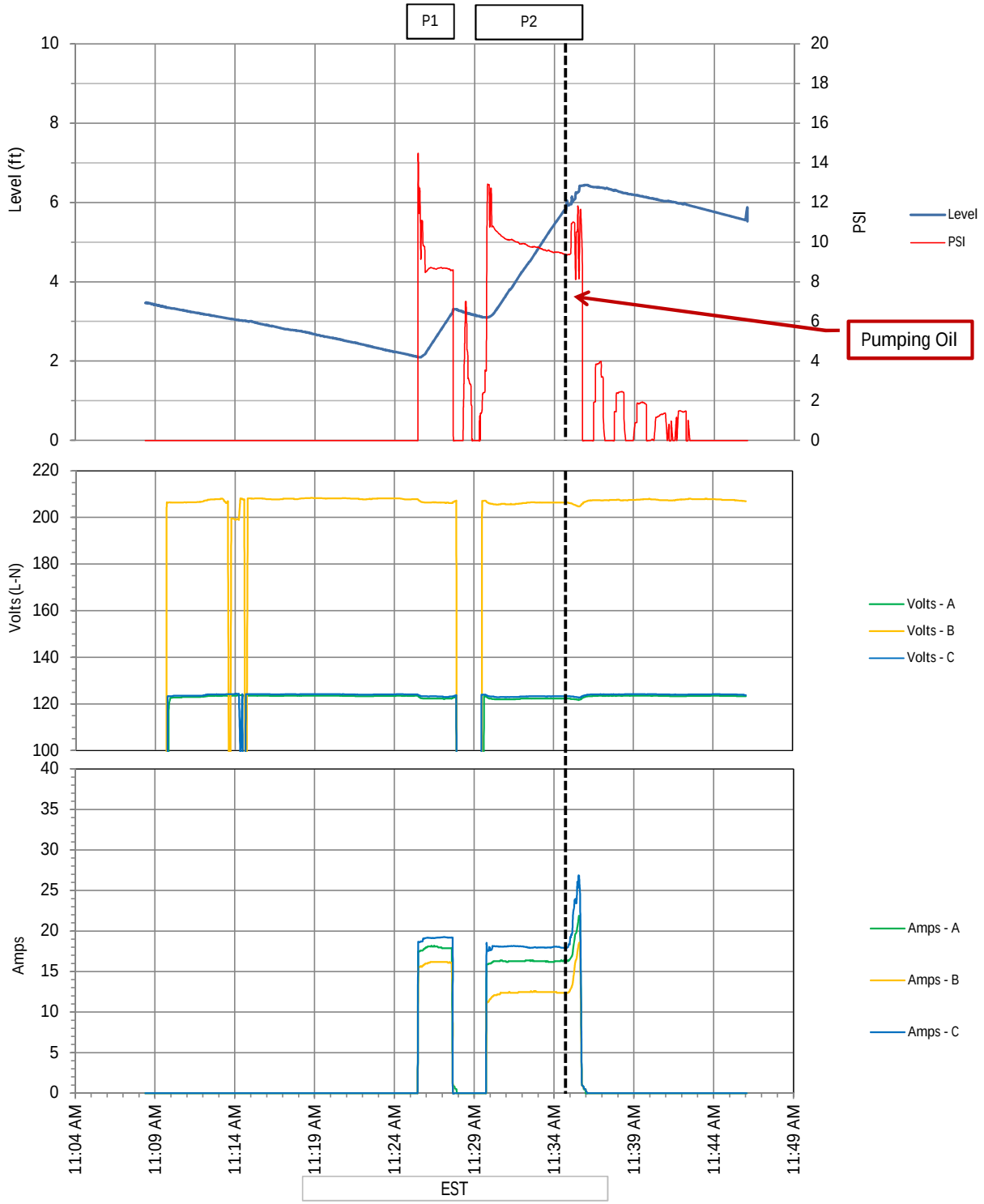
Test Results Summary

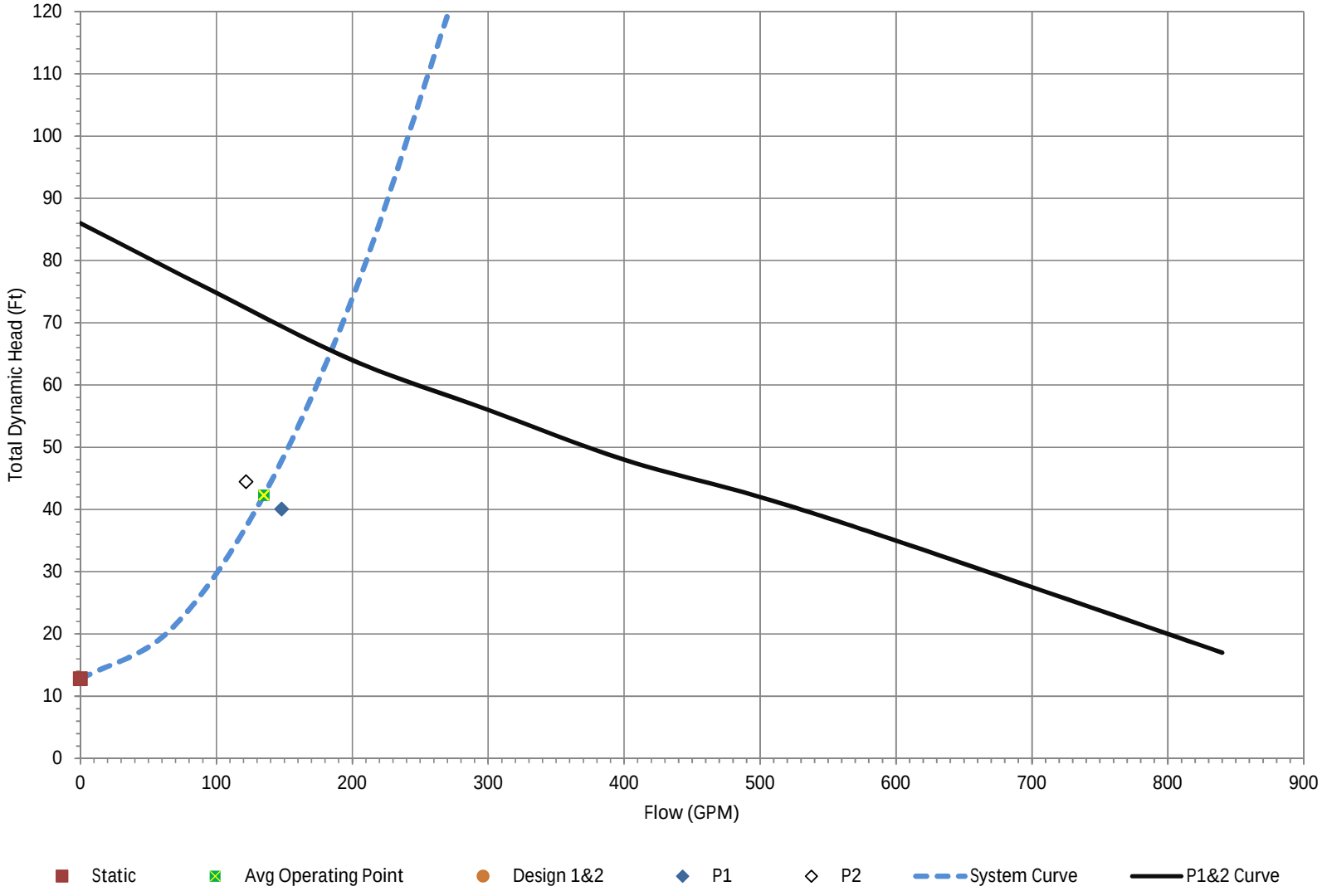
Performance Parameter	Units	P1	P2	
Avg Inflow	GPM	-19	-24	
Avg Output	GPM	148	122	
Suction Piping Velocity	FPS			
Discharge Piping Velocity	FPS	1.7	1.4	
Velocity Head	Ft	0.0	0.0	
Total Calculated Friction Loss**	Ft	0.1	0.1	
Average Operating Pressure	PSI	8.7	9.9	
Static Discharge Pressure	PSI	8.0	3.0	<-- Estimated based on GIS
Avg Dist to Water	Ft	2.8	4.5	
Static Suction Head	Ft	-4.4	-2.6	
Static to P1 Gauge	Ft	19.9	21.6	
Measured Static Head	Ft	18.5	7.0	<-- Estimated based on GIS
Average Operating TDH	Ft	40.1	44.5	
Avg Std L-N Voltage	Volts	122.7	122.8	
Avg L-L Voltage	Volts	245.4	245.6	
Voltage Imbalance	%	1.49%	1.52%	
Ambient Current	Amps	0.0	0.0	
Current Draw	Amps	16.3	13.7	
Full Load Amps	Amps	29.4	29.4	
Motor Operating %FLA	%	55%	47%	
Current Imbalance	%	9.05%	20.13%	
Power Factor	-	0.82	0.82	
Motor Load % Rated	%	55%	46%	
Input Horsepower	HP	7.4	6.2	
Output Horsepower	HP	1.5	1.4	
WTW Efficiency	%	20.6%	22.3%	

Average Energy Consumption Calculations

Parameter	Units	P1	P2
Run Time	Hrs/Day	3.0	4.7
Energy Usage/ Day	KWH/Day	16.5	21.7
Energy Usage/Year	KWH/Yr	6025	7909
Electricity Cost	$/KWH	0.1	0.1
Electrical Operating Cost*	$/Yr	$602	$791

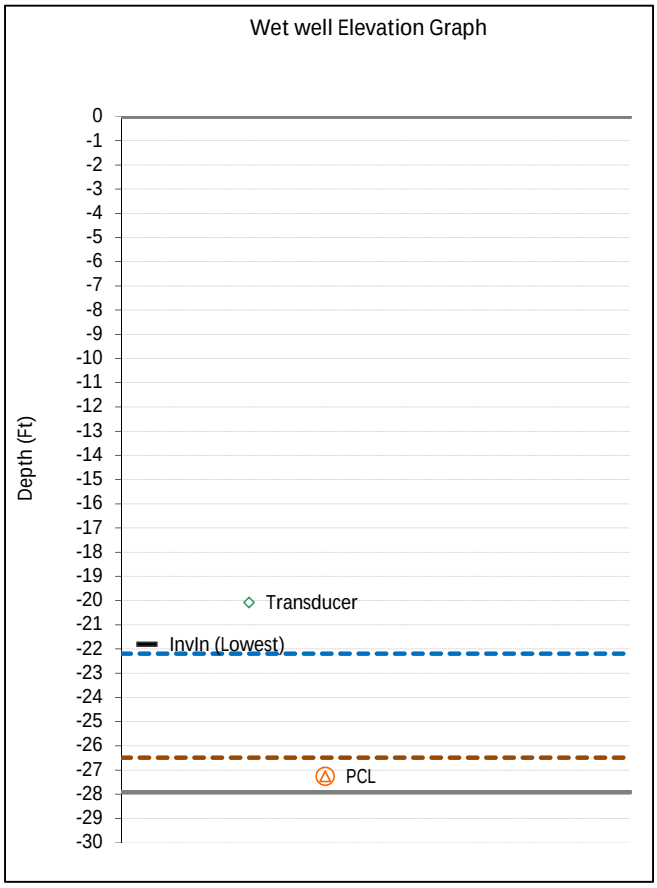
Notes:
* Energy calcs are based on the Avg Inflow observed during test and can vary significantly
** Calculated friction losses account for losses not measured by pressure transducer

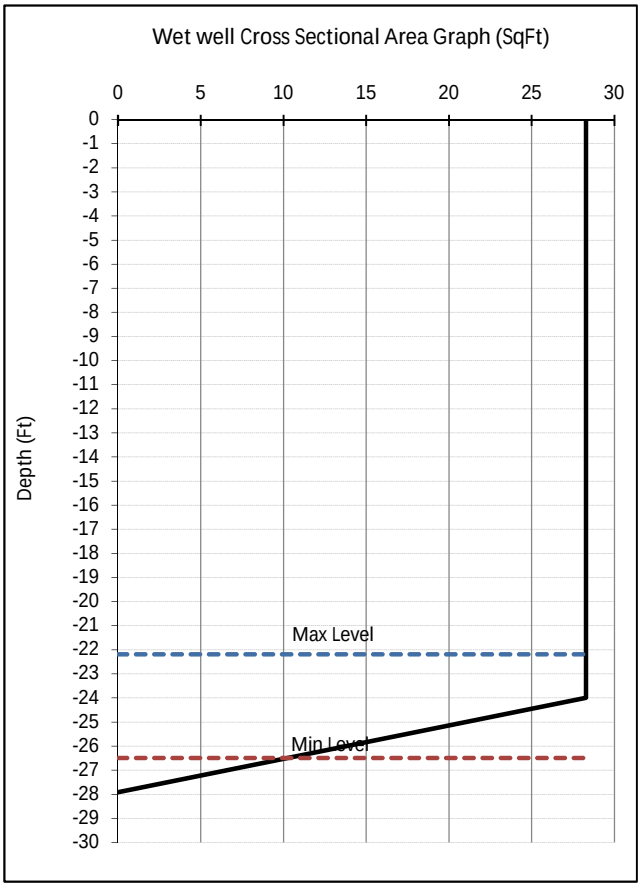

P1
P2
Level (ft)
PSI
Level
PSI
Pumping Oil
Volts (L-N)
Volts - A
Volts - B
Volts - C
Amps
Amps - A
Amps - B
Amps - C
11:04 AM
11:09 AM
11:14 AM
11:19 AM
11:24 AM
11:29 AM
11:34 AM
11:39 AM
11:44 AM
11:49 AM
EST


120
110
100
90
80
70
60
50
40
30
20
10
0
Total Dynamic Head (Ft)
0
100
200
300
400
500
600
700
800
900
Flow (GPM)
Static
Avg Operating Point
Design 1&2
P1
P2
System Curve
P1&2 Curve

Wet well Elevation Data	
Description	Ft
Top of WW	0.0
InvIn (Lowest)	-21.80
Transducer	-20.08
PCL	-27.25
Bottom of WW	-27.92
Max Level	-22.19
Min Level	-26.49

Wet well Area Data			
Width/Dia	Length	Area	Depth
Ft	Ft	SqFt	Ft
6.00		28.3	0
6.00		28.3	-10.00
6.00		28.3	-20.00
6.00		28.3	-24.00
0.00		0.0	-27.92



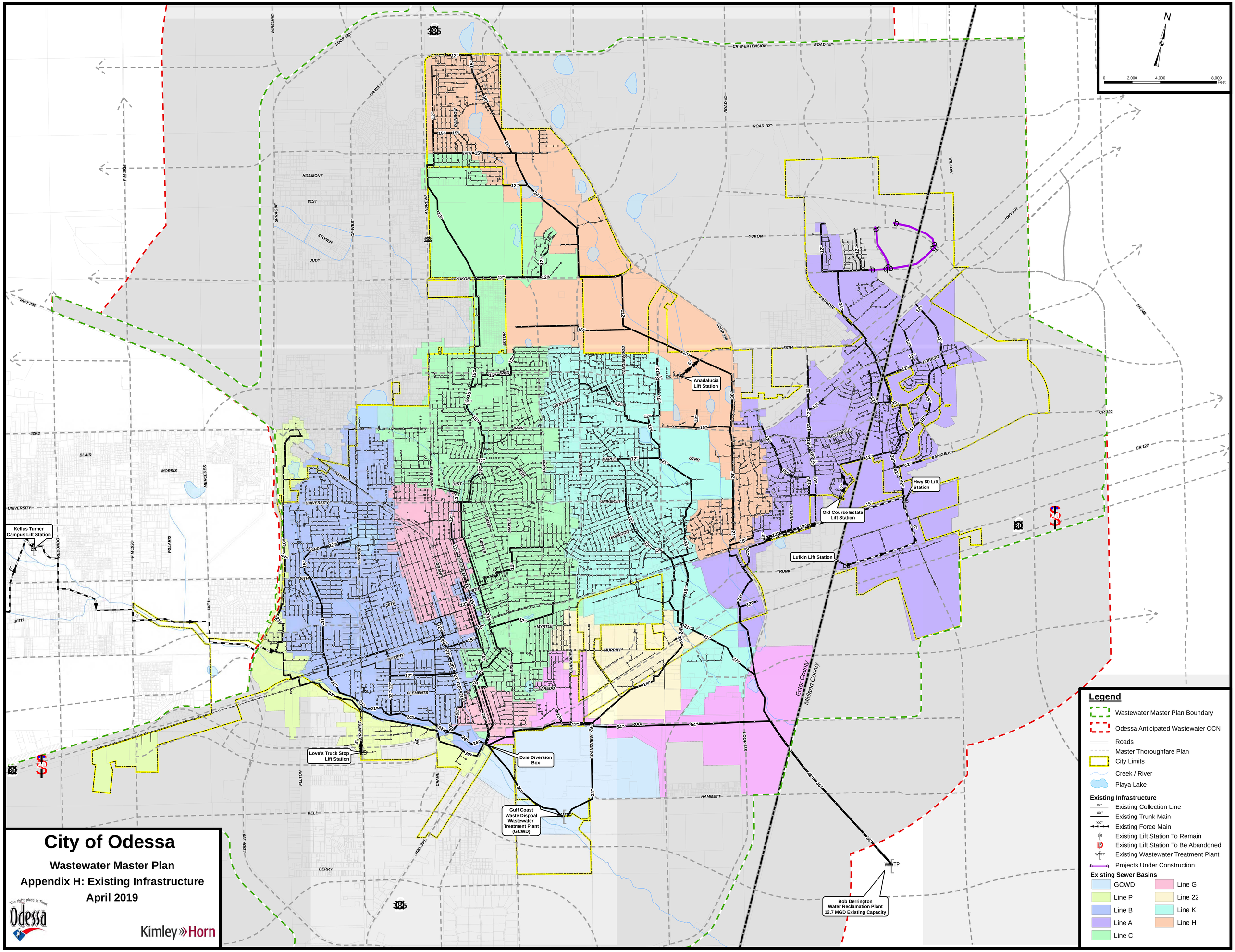


*Notes:

1.) "Max Level" & "Min Level" are the maximum and minimum water levels used to calculate volumetric displacements for tests.

2.) Depths shown are measured in feet below rim of wet well.

Appendix H – Existing Infrastructure



City of Odessa

Wastewater Master Plan

Appendix H: Existing Infrastructure

April 2019

The right place in Texas
Odessa

Kimley»Horn

Appendix I – Flow Meter and Rain Gauge Location Map

City of Odessa

Wastewater Master Plan

Appendix I: Flow Meter and Rain Gauge Locations

April 2019

Kimley»Horn

The right place in Texas Odessa

N

0 2,000 4,000 8,000 Feet

Anadalucia Lift Station

Hwy 80 Lift Station

Old Course Estate Lift Station

Lufkin Lift Station

Kellus Turner Campus Lift Station

Love's Truck Stop Lift Station

Dixie Diversion Box

Gulf Coast Waste Dispoal Wastewater Treatment Plant (GCWD)

Bob Derrington Water Reclamation Plant 12.7 MGD Existing Capacity

MH-8035

MH-232A006

MH-8034

MH-8033

MH-8019

MH-8020

MH-8021

MH-8017

MH-8018

GCWD

WWTP

Ector County

Midland County

Legend

- Wastewater Master Plan Boundary
- Odessa Anticipated Wastewater CCN
- Roads
- Master Thoroughfare Plan
- City Limits
- Creek / River
- Playa Lake

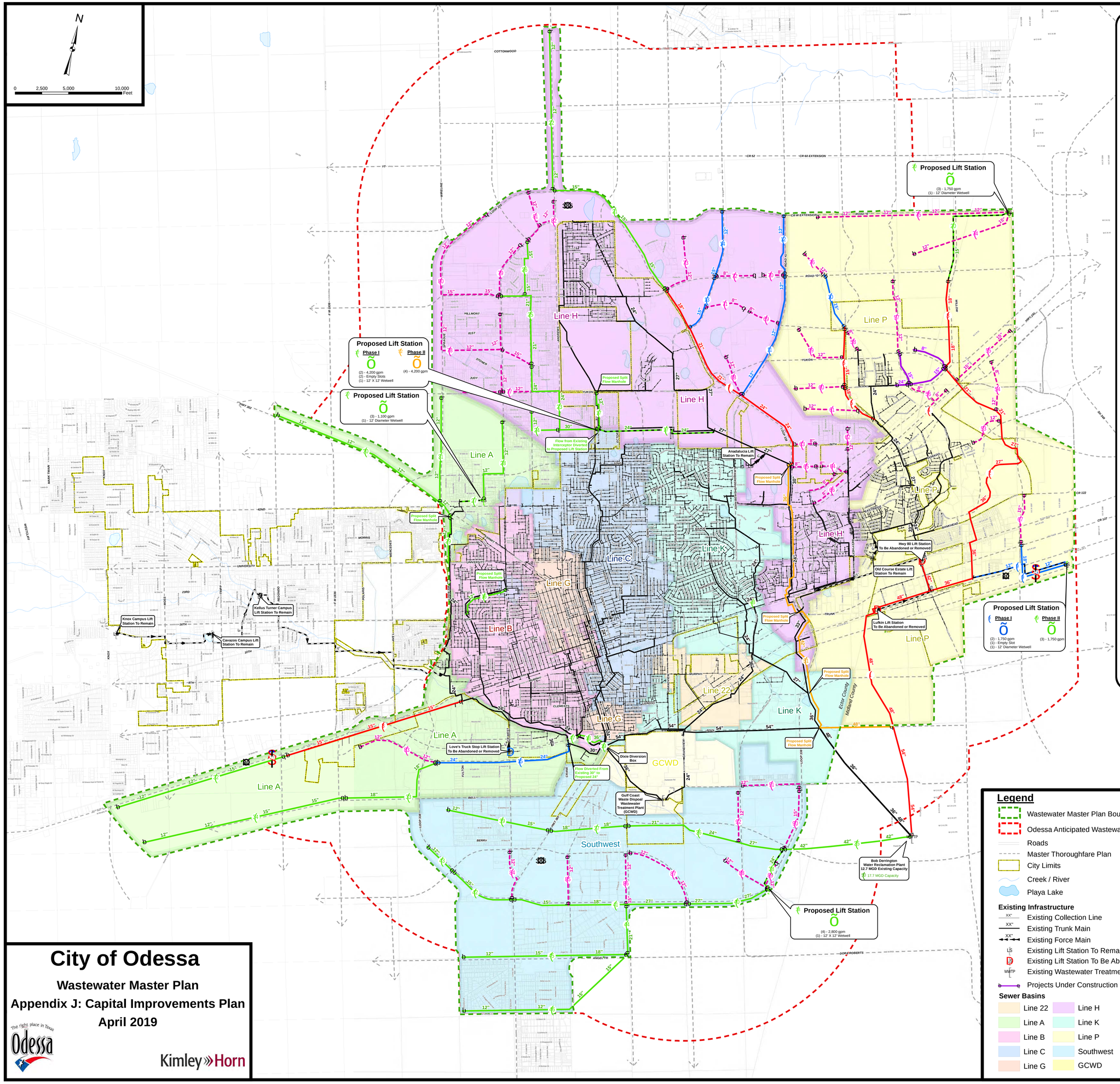
Existing Infrastructure

- Existing Collection Line
- Existing Trunk Main
- Existing Force Main
- Existing Lift Station To Remain
- Existing Lift Station To Be Abandoned
- Existing Wastewater Treatment Plant
- Existing Rain Gauge
- Existing Flow Meter
- Projects Under Construction

Existing Sewer Basins

- GCWD
- Line G
- Line P
- Line 22
- Line B
- Line K
- Line A
- Line H
- Line C

Appendix J – Capital Improvement Plan



5-Year Projects

- #1 LINE P INTERCEPTOR SEGMENT I
- #2 LINE Q INTERCEPTOR SEGMENT I
- #3 LINE Q INTERCEPTOR SEGMENT II
- #4 MISSION BLVD 8-INCH TRUNK MAIN
- #5 FAUDREE RD 18-INCH TRUNK MAIN
- #6 FAUDREE RD 15-INCH NORTH TRUNK MAIN
- #7 LINE H INTERCEPTOR SEGMENT I
- #8 I-20 BUSINESS 15-INCH TRUNK MAIN EXTENSION

10-Year Projects

- #9 LINE P BASIN SOUTHEAST LIFT STATION, FORCE MAIN, AND RELIEF TRUNK MAIN
- #10 FAUDREE RD 15-INCH NORTH TRUNK MAIN EXTENSION
- #11 RATLIFF RANCH NORTHEAST 12-INCH TRUNK MAIN
- #12 RATLIFF RANCH NORTH 12-INCH TRUNK MAIN
- #13 FM 554 NORTHEAST 15-INCH TRUNK MAIN
- #14 FM 554 NORTH 15, 12-INCH TRUNK MAIN
- #15 WEST I-20 24-INCH TRUNK MAIN

25-Year Projects

- #16 WEST 22ND ST 12-INCH PARALLEL TRUNK MAIN
- #17 LINE 12 BASIN LIFT STATION, 24-INCH FORCE MAIN, AND 12-INCH TRUNK MAIN
- #18 COMANCHE TRAIL EAST PARK 36-INCH TRUNK MAIN
- #19 SOUTH GRANT AVE 42-INCH TRUNK MAIN
- #20 LINE P BASIN NORTHEAST LIFT STATION & 15-INCH FORCE MAIN
- #21 LINE H NORTHWEST INTERCEPTOR SEGMENT III
- #22 US 385 NORTH 12-INCH TRUNK MAIN
- #23 LINE 12 BASIN LIFT STATION 30, 24-INCH TRUNK MAIN
- #24 GOLDER AVE 12-INCH TRUNK MAIN
- #25 GOLDER AVE AND WEST 87TH ST 21, 15-INCH TRUNK MAIN
- #26 SUNSET COUNTRY CLUB 15-INCH TRUNK MAIN
- #27 LINE G BASIN LIFT STATION AND 12-INCH FORCE MAIN
- #28 LINE G BASIN LIFT STATION 12-INCH TRUNK MAIN
- #29 WESTOVER DR 12-INCH PARALLEL TRUNK MAIN
- #30 HWY 302 12-INCH TRUNK MAIN
- #31 NORTHWEST LOOP 338 12-INCH TRUNK MAIN
- #32 I-20 BUSINESS 15, 12-INCH TRUNK MAIN EXTENSION
- #33 MOSS RANCH 18-INCH TRUNK MAIN
- #34 HENDERSON RANCH 15, 12-INCH TRUNK MAIN
- #35 SOUTHWEST BASIN INTERCEPTOR SEGMENT I
- #36 SOUTHWEST BASIN INTERCEPTOR SEGMENT II
- #37 SOUTHWEST BASIN INTERCEPTOR SEGMENT III
- #38 SOUTHWEST BASIN LIFT STATION AND 24-INCH FORCE MAIN
- #39 SOUTHWEST BASIN INTERCEPTOR SEGMENT IV
- #40 SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT I
- #41 SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT II
- #42 SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT III
- #43 SOUTHEAST LOOP 338 INTERCEPTOR SEGMENT IV
- #44 LONE STAR DR 21-INCH TRUNK MAIN
- #45 ANGEL TR 18, 15, 12-INCH TRUNK MAIN
- #46 EAST GETTYSBURG ST 15, 12-INCH TRUNK MAIN
- #47 MCKINNEY PARK 24-INCH TRUNK MAIN
- #48 SOUTH JOHN BEN SHEPPARD PARKWAY BLVD 12-INCH TRUNK MAIN
- #49 LINE P BASIN SOUTHEAST LIFT STATION PHASE II UPGRADE
- #50 BOB DERRINGTON TREATMENT PLANT UPGRADE TO 17.7 MGD

Beyond 25-Year Projects

- #51 LINE H INTERCEPTOR SEGMENT I
- #52 LINE 12 BASIN LIFT STATION PHASE II UPGRADE

Developer Projects

- #53 DORADO DR LINE P BASIN 12-INCH MAIN
- #54 LINE P BASIN NORTHEAST 12, 8-INCH TRUNK MAIN
- #55 SMITH PARK 15-INCH MAIN
- #56 ESTATES OF SHILOH EXPANSION 8-INCH TRUNK MAIN
- #57 PARKS BILL RANCH NORTH 12-INCH TRUNK MAIN
- #58 FAUDREE RD 15-INCH NORTH TRUNK MAIN EXTENSION #1
- #59 YUKON RD 12-INCH NORTHWEST TRUNK MAIN
- #60 FAUDREE RD 12-INCH WEST TRUNK MAIN #2
- #61 FAUDREE RD 12-INCH WEST TRUNK MAIN #1
- #62 COLORADO AVE 12-INCH TRUNK MAIN
- #63 56TH ST 8-INCH TRUNK MAIN
- #64 BILLY HEXT RD 8-INCH WEST TRUNK MAIN
- #65 LOOP 338 8-INCH EAST TRUNK MAIN
- #66 ARROYO RD 8-INCH EAST TRUNK MAIN
- #67 LINE P BASIN SOUTHEAST LIFT STATION 15-INCH TRUNK MAIN EXTENSION
- #68 RATLIFF RANCH RD 12-INCH TRUNK MAIN
- #69 RATLIFF RANCH NORTHWEST 8-INCH TRUNK MAIN
- #70 RATLIFF RANCH WEST 8-INCH TRUNK MAIN
- #71 FM 554 EAST 8-INCH TRUNK MAIN #1
- #72 FM 554 EAST 8-INCH TRUNK MAIN #2
- #73 NORTH RATLIFF RANCH 12-INCH TRUNK MAIN
- #74 LINE P BASIN NORTHEAST LIFT STATION 15, 12-INCH MAIN
- #75 LINE P BASIN NORTHEAST LIFT STATION WEST 12-INCH MAIN
- #76 FAUDREE RD 15-INCH NORTH TRUNK MAIN EXTENSION #2
- #77 WEST YUKON RD 12-INCH TRUNK MAIN AND 12-INCH MAIN
- #78 STEVEN RD 15, 12-INCH TRUNK MAIN
- #79 FM 1882 12-INCH TRUNK MAIN
- #80 NORTHWEST LOOP 338 15, 12-INCH TRUNK MAIN
- #81 SUNSET COUNTRY CLUB 12-INCH TRUNK MAIN
- #82 SUNSET COUNTRY CLUB 12-INCH EXTENSION
- #83 WEST I-20 12-INCH TRUNK MAIN
- #84 FM 1882 AND US 385 12-INCH MAIN
- #85 SOUTHEAST LOOP 338 NORTH 12-INCH TRUNK MAIN
- #86 DIXIE BLVD 15, 12-INCH TRUNK MAIN
- #87 SOUTHEAST LOOP 338 NORTHWEST 12-INCH TRUNK MAIN
- #88 SOUTHWEST BASIN LIFT STATION 12-INCH TRUNK MAIN #1
- #89 SOUTHWEST BASIN LIFT STATION 12-INCH TRUNK MAIN #2
- #90 BATES FIELD RD 15-INCH TRUNK MAIN
- #91 BATES FIELD RD 12-INCH TRUNK MAIN
- #92 DORA ROBERTS ROAD 12-INCH TRUNK MAIN

Legend

- Wastewater Master Plan Boundary
- Odessa Anticipated Wastewater CCN
- Roads
- Master Thoroughfare Plan
- City Limits
- Creek / River
- Playa Lake

Existing Infrastructure

- Existing Collection Line
- Existing Trunk Main
- Existing Force Main
- Existing Lift Station To Remain
- Existing Lift Station To Be Abandoned
- Existing Wastewater Treatment Plant
- Projects Under Construction

Sewer Basins

- Line 22
- Line A
- Line B
- Line C
- Line G
- Line H
- Line K
- Line P
- Southwest
- GCWD

5 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

10 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Project - Proposed Lift Station

25 Year Projects

- Proposed Trunk Main
- Proposed Force Main
- Proposed Lift Station

Beyond 25 Year Projects

- Proposed Trunk Main

Developer Projects

- Proposed Trunk Main

City of Odessa

Wastewater Master Plan

Appendix J: Capital Improvements Plan

April 2019

The right place in Texas Odessa

Kimley»Horn

Appendix K – Wastewater Rehabilitation Plan

City of Odessa

Wastewater Master Plan

Appendix K: Wastewater Rehabilitation Plan

April 2019

Kimley»Horn

The right place in Texas Odessa

Proposed Rehabilitation Projects

#1	Line K and C Basin Sewer Lines
#2	42nd Street Sewer Lines
#3	Carolyn Drive Sewer Lines
#4	Orchard Drive Sewer Lines
#5	Lotteman and Ellis Drive Sewer Lines
#6	N. Washington Street Sewer Lines
#7	W. 31st Street Sewer Lines
#8	N. Gobler Avenue Sewer Lines
#9	W. University Boulevard Sewer Lines
#10	Line B and G Sewer Basin Sewer Lines
#11	S. Crane Avenue Sewer Lines
#12	S. Grandview Avenue Sewer Lines

Legend

- Wastewater Master Plan Boundary
- Odessa Anticipated Wastewater CCN
- Roads
- Master Thoroughfare Plan
- City Limits
- Creek / River
- Playa Lake

Existing Infrastructure

- XX" Existing Collection Line
- XX" Existing Trunk Main
- XX" Existing Force Main
- LS Existing Lift Station To Remain
- LS Existing Lift Station To Be Abandoned
- WWTP Existing Wastewater Treatment Plant
- Projects Under Construction

Sewer Basins

- Line 22
- Line A
- Line B
- Line C
- Line G
- Line H
- Line K
- Line P
- Southwest
- GCWD

Rehab Projects

- Project No. 1
- Project No. 2
- Project No. 3
- Project No. 4
- Project No. 5
- Project No. 6
- Project No. 7
- Project No. 8
- Project No. 9
- Project No. 10
- Project No. 11
- Project No. 12