City of Beaumont 2021 Wastewater Master Plan

Workshop – Draft Master Plan

June 22, 2021



Historia San Timates Conny

MAY 2021

AKEL

(AUMON)

City of Beaumont

Wastewater Master Plan



Objectives of the Wastewater Master Plan

The Wastewater Master Plan (WWMP) provides a capacity adequacy assessment of the City's sewer collection system to meet the level of service expected by existing customers, and to service future growth.



- What Infrastructure Needs to be Constructed?
- When we do we need it?
- How much will it cost?
- Who pays for it?

The WWMP is a *defensible* planning and budgetary document

Wastewater Flows are Collected from our Homes

Wastewater Flows are Collected from our homes to the Sewer pipelines in the street



Wastewater flows continue to WWTP via Gravity Sewers, Lift Stations, and Force Mains

Force Main Sewer

Flow has to be "forced" through the main because gravity alone is not enough to move it.

> PUMP STATION

Gravity Sewer

Gravity pulls flow towards the pump station.

Flow uses gravity to get to pump stations and treatment plants.

----Pressurized flow is pushed uphill towards pumps and treatment plants.

Source: Metropolitan St. Louis Sewer District

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Beaumont Wastewater is Collected from Tributary Basins and Conveyed to the WWTP

- Green Lines are smaller Gravity Sewers.
- Blue Lines are Large Conveyance Sewers (Backbone).
- Dashed lines are force mains
- RED arrows indicate the direction of wastewater flows



Existing Wastewater Collection System

- 177 miles of Gravity Sewers
- 20 miles of Force Main
- 10 Lift Stations
- 1 Wastewater
 Treatment
 Plant





AGENDA – Follows WWMP Report Chapters



Chapter	Description
1	Introduction
2	Planning Area Characteristics
3	System Performance and Design Criteria
4	Existing Sewer Collection Facilities
5	Wastewater Flows
6	Hydraulic Model Development
7	Hydraulic Evaluation and Proposed Improvements
8	Capital Improvement Program (costs)



Purpose of Chapter

The purpose of this chapter is to introduce the master plan objectives.

Key Chapter Elements

- Regional Location Map
- WWMP Objectives
- Definitions
- Abbreviations
- Report Organization



Regional Location Map

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Objectives of the WWMP

Objective	Description
Characterize Planning Area (Existing Customers, Sewer Flows, Land Use for Future Developments)	How much sewer flows from existing customers? What lands are expected to develop within the planning horizon?
Develop and Calibrate GIS-based Hydraulic Model	The Model is an accurate tool for evaluating the capacity adequacy of pipelines and lift stations. How much flows are generated by Basin?
Evaluate existing pipelines and lift stations system capacities	Do we meet an adequate Level of Service?
Recommend improvements to mitigate existing pipe deficiencies	What improvements are needed to meet an adequate Level of Service?
Perform Lift Station Field Review	We rely on lift stations. What is the overall lift stations structural condition?
Required improvements to service growth	What improvements are required from future developments
Develop Capital Improvement Program (CIP)	How much do the improvements Cost (Existing Users and Future Developments)



Chapter 2 – Planning Area Characteristics

Purpose of Chapter

The purpose of this chapter is to summarize the City's service area, including existing and future land use and population.

Key Chapter Elements

- Service Area
- Existing Land Use
- General Plan Land Use
- Land Use Inventory
- Specific Plans
- Population





PRELIMINARY

Land Use Inventory

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		E	xisting Developme	ent	Fi	Future Development		
General Plan Land Use Classification ¹	Existing Land Use Classification ²	Existing Development	Existing Lands - Redeveloping	Subtotal Existing Development - Unchanged	New Lands - Redevelopment	New development	Subtotal Future Development	Total Development
1	2	3	4	5	6	7	(acre)	8
Residential								
Single Family Residential	Single Family Residential	2,568	-178	2,389	118	588	706	3,096
	Mobile Homes and Trailer Parks							
	Mixed Residential							
High Density Residential	Multi-Family Residential	134	-51	83	6	276	282	364
Rural Residential	Rural Residential	0	0	0	2,446	312	2,758	2,758
Traditional Neighborhood	-	0	0	0	76	499	574	574
	Subtotal - Residential	2,701	-229	2,472	2,645	1,676	4,321	6,793
Non-Residential								
General Commercial	Commercial and Services	389	-147	242	28	324	352	595
	General Office							
Neighborhood Commercial	-	0	0	0	34	11	46	46
Industrial	Industrial	280	-69	211	52	315	367	577
Public Facility	Facilities	293	-13	280	44	64	107	388
	Education							
Downtown Mixed Use	-	0	0	0	321	64	386	386
Urban Village	-	0	0	0	107	536	643	643
Employment District	-	0	0	0	0	179	179	179
Specific Plans and Other Developments	-	0	0	0	0	4,200	4,200	4,200
	Subtotal - Non-Residential	962	-229	733	586	5,693	6,280	7,013
Non-Flow Generating								
Open Space	Open Space and Recreation	8,533	-221	8,312	0	28	28	8,341
	Agriculture	0	0	0	0	0	0	0
Vacant	Vacant	2,934	0	2,934	0	0	0	2,934
Utilities	Utilities	4	0	4	0	0	0	4
ROW	ROW	155	0	155	0	0	0	155
	Subtotal - Non-Flow	11,626	-221	11,405	0	28	28	11,433
AKEL	Total Developed Area	15,289	-679	14,610	3,231	7,397	10,628	25,239
ENGINEERING GROUP, INC.								8/31/2020

Notes:

1. Source: City of Beaumont Public Draft General Plan (2020)

2. Source: Southern California Association of Governments (SCAG) 2016 Existing Land Use file extracted from City of Beaumont Planning Viewer online web application.

PRELIMINARY

Specific Plan Land

Use Inventory

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		Total Deve	lopment Area,	, by Land Use	e Type ¹	
Known Developments	Single Family Residential	Multi-Family Residential	Commercial	Industrial	Public Facilities	Total
	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)
Amazon	-	-	-	65.7	-	65.7
ASM	-	-	-	49.3	-	49.3
Beaumont Commercial Center	-	-	17.4	-	-	17.4
Beaumont Crossroads II	-	-	-	165.5	-	165.5
Curtis Development	66.7	-	-	-	-	66.7
Fairway Canyon	660.9	-	12.0	-	30.0	702.9
Four Seasons	365.3	3.3	17.0	-	-	385.6
Hall	-	-	-	11.2	-	11.2
Heartland/Olivewood	207.6	-	11.5	50.3	9.2	278.6
Home Depot	-	-	21.8	-	-	21.8
Jack Rabbit Trail	-		30.0	225.0	-	255.0
Kirkwood Ranch	123.0	5.0	-	-	-	128.0
Lassen	-	-	-	17.3	-	17.3
Legacy Highlands Residential	541.4	71.3	-		20.0	632.7
Legacy Highlands Warehouse	-	-	14.0	92.0	-	106.0
Marketplace Beaumont	-	-	17.4	-	-	17.4
Noble Creek Vistas	181.2		-		32.6	213.8
Portrero Creek Estates ²	733.0	-	-	-	-	733.0
Ricker			-	18.0	-	18.0
San Gorgaonio	-	-	23.0		-	23.0
Sundance	874.4	39.0	14.0		39.0	966.3
Sunny Cal	112.1	-	-	-	-	112.1
Three Rings Ranch	143.2	10.0	-		-	153.2
Tournament Hills	305.4	-	34.4		10.0	349.8
Walmart - Farmer Boys	-		22.7		-	22.7
Wolverine	-	-		60.0	-	60.0
	4,314	129	235	754	141	5,573
Notes:						10/19/2020

1. Unless noted otherwise, development information shown based on planning documents provided by City staff on November 25, 2019 and December 5, 2019.

2. Source: City of Beaumont General Plan Public Draft, August 2020

Service Area Population

- Historical and projected populations documented for informational purposes
- Population of 67,144 by 2038 (Based on City Staff projections)

Year	Population	Percent Growth
	City-Wide	
		09.
Historical		
2007	28,250	10.9%
2008	31,317	10.9%
2009	32,403	5.3%
2010	36,877	5.3%
2011	38,201	5.3%
2012	39,317	5.3%
2013	40,472	5,3%
2014	41,659	3.6%
2015	43,370	3.6%
2016	44,821	3.6%
2017	46,179	3.6%
2018	48,237	3.6%
Projected		
2019	49,915	2.3%
2020	51,263	2.3%
2021	52,291	2.3%
2022	53,061	2.3%
2023	53,950	2.3%
2024	54,463	1.8%
2025	55,234	1.8%
2026	56,261	1.8%
2027	57,416	1.8%
2028	58,947	1.8%
2029	59,974	1.3%
2030	60,745	1.3%
2031	61,258	1.3%
2032	61,772	1.3%
2033	62,917	1.3%
2034	63,816	1.3%
2035	64,715	1.3%
2036	65,485	1.3%
2037	66,127	1.3%
2038	67,144	1.3%

1. Historical and Projected Population provided by City staf

Chapter 3 – System Performance and Design Criteria



Purpose of Chapter

The purpose of this chapter is to discuss City's wastewater system performance and design criteria.

Key Chapter Elements

- System Performance and Design Criteria
- Wastewater Unit Factor Analysis
- Wastewater Diurnal Pattern

Criteria is consistent with Eastern Municipal Water District

PRELIMINARY

System Performance and Criteria

Criteria consistent with Eastern Municipal Water District



Dry Weather Flow Criteria (EMWD Wastewater Criteria)								
Sewer Trunk	d/D							
Diameter < 15 inches	0.50							
Diameter ≥ 15 inches	0.70							
Wet Weather Flow Criteria (EMWD Wastewater Criteria)								
Sewer Trunk	d/D							
Existing System	1.00							
Future System	0.75							
Ріре S (ЕМWD W	lope Criteria /astewater Criteria)							
Pipe Size	Minimum Slope (ft/ft)							
8"	0.004							
10" 0.0032								
12"	0.0024							
15"	0.0016							
18"	0.0014							
21"	0.0012							
24" and Up	0.001							
Pipe Ve (EMWD W	locity Criteria Jastewater Criteria)							
Ріре Туре	Minimum / Maximum Velocity (fps)							
Gravity Sewer	Minimum 2 / Maximum 10							

Wastewater Unit Factor Analysis

		2017 Average Demand Un	Daily Water it Factors		ner Sewer Flow	ewer Flow Unit Factors					
Land Use Classification	Existing Development	2017 Water Co	nsumption ¹	Return to	Dry Weather Sewer Flows		Sewer Flows at 100% Occupancy			Sewer Unit Factor	
		Annual Consumption	Unadjusted Water Unit Factors	Sewer Ratio	Unadjusted Sewer Unit Factor	Balance using Recommended Unit Factor	Vacancy Rate ^{2,3}	Projected Fl Occu	ows at 100% pancy	ADWF Factor	Balance Using ADWF Factor
	(acre)	(gpd)	(gpd/acre)		(gpd/acre)	(gpd)		(gpd/acre)	(gpd)	(gpd/acre)	(gpd)
Residential											
Single Family Residential ⁴	2,568	5,432,317	2,116	0.50	1,064	2,732,455	10.0%	1,171	3,005,701	1,200	3,081,236
Multi-Family Residential	134	315,111	2,358	0.70	1,660	221,838	10.0%	1,826	244,022	1,850	247,193
Subtotal Residential	2,701	5,747,428				2,954,294			3,249,723		3,328,429
Non-Residential											
Commercial and Services ⁵	389	413,338	1,062	0.85	903	351,337	2.0%	921	358,364	925	360,038
Public Facilities ⁶	293	286,703	979	0.85	832	243,698	2.0%	849	248,572	850	248,974
Industrial ⁷	223	130,310	585	0.85	497	110,764	0.2%	498	110,985	500	111,360
Subtotal Non-Residential	905	830,351				705,798			717,921		720,372
Totals				2017 /	Average Dry Weath	er Flows					
	3,606	6,577,779		Estin	nated Sewer Flows	3,660,092			3,967,644		4,048,800
AKEL				Measu	red WWTP Flows ⁸	3,662,673					

Notes:

8/24/2020

1. Water consumption extracted from water billing data received from City staff November 21, 2019.

2. Residential vacancy rate extracted from California Department of Finance E-5 Population estimates.

3. Office Commercial and Industrial vacancy rates extracted from "Beaumont Economic Development Strategic Plan". For planning purposes, Business Commercial vacancy rate assumed equal to Office Commercial.

4. "Single Family Residential" contains development and consumption for "Mobile Homes and Trailer Parks".

Factors applied to Land Use to estimate wastewater flows

Characterizing WW Flows



Shows hourly variations in wastewater flow Developed from flow monitoring data.



Purpose of Chapter

Key Chapter Elements

The purpose of this chapter is to discuss City's existing wastewater system.

- Existing Pipelines Inventory
- Lift Station Inventory



Existing Wastewater Collection System

- 177 miles of Gravity Sewers
- 19 miles of Force Main
- 10 Lift Stations
- 1 Wastewater
 Treatment
 Plant



Existing System Pipeline Inventory

Pipeline Diameter	Leng	th	Percent Contributio			
(in)	(ft)	(mi)	% Total			
Gravity Mains						
4	883	0.2	0.1%			
6	2,612	0.5	0.3%			
8	759,884	143.9	73.4%			
10	28,526	5.4	2.8%			
12	59,788	11.3	5.8%			
15	48,929	9.3	4.7%			
16	1,898	0.4	0.2%			
18	7,782	1.5	0.8%			
24	13,012	2.5	1.3%			
30	8,890	1.7	0.9%			
48	222	0.04	0.02%			
Unknown	226	0.04	0.02%			
Subtotal - Gravity Mains	932,653	176.6	90.1%			
Force Mains						
6	1,060	0.2	0.1%			
8	33,208	6.3	3.2%			
10	17,254	3.3	1.7%			
12	31,787	6.0	3.1%			
14	18,776	3.6	1.8%			
Subtotal - Force Mains	102,086	19.3	9.9%			
Total Sewer Pipe			2			
Total	1,034,739	196.0	100.0%			

DOT HARLAD!

Source: Sewer System GIS provided by City staff on November 20, 2019.

Lift Station Connectivity Schematic





Lift Station Inventory

Lift Station	Information	Pumps ¹			Pump Controls ²						Wet Well Dimensions ²			
No.	Location	Quantity	Full Capacity	Firm Capacity	Current Capacity	High Level	Low Level	Lead On	Lag 1 Off	Lag 2 On	Lag 2 Off	Area	Depth	Volume
		Quality	(gpm)	(gpm)	(gpm)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft ²)	(ft)	(gal)
Beaumont Mesa	12940 Potrero Blvd.	2 @ 1,797 gpm	3,594	1,797	3,594	21.50	2.00	9.50	7.00	12.00	7.00	697.4	21.0	109,593
Fairway Canyon ³ (Little Lower Oak Valley)	34003 Crenshaw St.	2 @ 400 gpm	800	400	800	8.33	2.92	6.61	3.58	7.83	6.61	50.3	11.50	2,022
Lower Oak Valley	11246 Palmer Ave.	2 @ 650 gpm 1 @ 400 gpm	1,700	1,050	1,700	7.50	1.50	4.00	2.00	7.00	2.00	212.7	16.5	26,252
Marshall Creek	990 Ring Ranch Rd.	2 @ 1,150 gpm	2,300	1,150	2,300	10.75	8.08	9.75	8.25	10.50	8.25	223.9	18.0	30,149
Noble Creek	1899 W Oak Valley Pkwy.	2 @ 1,865 gpm	3,730	1,865	3,730	6.00	1.50	4.25	2.00	5.75	2.00	180.8	14.5	19,606
Seneca Springs	1390 Potrero Blvd.	3 @ 450 gpm	1,350	900	1,125	6.00	1.25	4.50	2.50	5.50	2.50	184.7	31.50	43,519
Upper Oak Valley	35980 Oak Valley Pkwy.	2 @ 1,350 gpm 1 @ 2,300 gpm	5,000	2,700	5,000	7.50	1.00	4.50	2.50	7.00	2.50	345.7	19.5	51,283
Four Seasons	1075 S Highland Springs Ave.	2 @ 1,675 gpm 1 @ 365 gpm	3,715	1,740	1,675	9.50	1.50	4.75	2.25	9.00	4.75	249.6	22.0	41,078
Industrial Park ⁴ (Coopers Creek)	715 W 4th St.	1 @ 112 gpm 1 @ 150 gpm	262	112	262	6.00	1.00	5.75	2.00	5.75	2.00	58.7	16.0	7,022
	North of Artisan Pl.	2 @ 310gpm	620	310	620	6.25	2.00	5.25	3.00	5.75	3.00	50.3	19.5	7,332

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Notes:

1. Source: Pumps information provided by City staff on December 13, 2019.

2. Unless noted otherwise, pump controls and wet well dimensions provided by City staff on March 04, 2020.

3. Fairway Canyon wet well dimensions provided by City staff on April 28, 2021.

Chapter 5 – Wastewater Flows



Purpose of Chapter

The purpose of this chapter is to summarize historical wastewater flows at City's WWTP and project flows for future growth.

Key Chapter Elements

- Historical Flow Summary
- Buildout Wastewater
 Flows



2019 WWTP Flows (January-December)

Highest months are August and November.

November high flows due to Wet weather flows



Historical

Wastewater Flows Data

- 3.66 mgd is the average flow
- 1.33 times higher than average during maximum day dry weather
- 1.88 times higher than average during maximum day wet weather

Voor	Average Annual	Percentage	Seasonal Average		Maximu	m Month	Maximum Day		
real	Flow (AAF)	Change	ADWF ¹	AWWF ²	MMDWF	MMWWF	MDDWF	MDWWF	
	(mgd)		(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	(mgd)	
2012	2.68		2.70	2.67	2.74	2.80	3.12	3.18	
2013	2.79	3.9%	2.68	2.90	2.82	3.12	3.40	3.50	
2014	2.98	6.9%	2.97	2.99	3.02	3.19	3.50	3.62	
2015	2.92	-1.8%	2.91	2.94	2.97	3.05	3.86	3.58	
2016	2.83	-3.4%	2.80	2.86	2.91	3.29	3.27	5.26	
2017	3.27	15.8%	-	-	-	-	-	-	
2018	3.39	3.7%	3.40	3.38	3.51	3.51	-	-	
2019	3.66	8.0%	3.66	3.67	3.72	3.77	4.14	5.07	
2020	-	-	-	-	-	4.01	-	4.57	
		F	listorical Peal	king Factors (Applied to AD	OWF)			
2012	1.00		1.00	0.99	1.02	1.04	1.16	1.18	
2013	1.04		1.00	1.08	1.05	1.17	1.27	1.31	
2014	1.00		1.00	1.01	1.02	1.07	1.18	1.22	
2015	1.00		1.00	1.01	1.02	1.05	1.33	1.23	
2016	1.01		1.00	1.02	1.04	1.18	1.17	1.88	
2017	-		-	-	-	-	-	-	
2018	1.00		1.00	0.99	1.03	1.03	-	-	
2019	1.00		1.00	1.00	1.02	1.03	1.13	1.39	
2020	-		-	-	-	-	-	-	
	I		Recommend	ed Evaluatio	n Peaking Fac	tor	I		
				1.08	1.05	1.18	1.33	1.88	
ENGINEERING	SROUP, INC.							2/3/202	
Notes :									
1. Sour	rce: 2012-2016 WWT	P flows extracted	I from the City of B d by City staff on F	eaumont 2017 Infl ebruary 18, 2020	low and Infiltration	Study.			
2.000	cc. Lour Lous only I	ion add provide	a sy one stan office	20.001 9 20, 2020.					

3. Source: Hourly influent flows at the WWTP for the period of 02/20/20 to 04/09/20 provided by City staff on May 1, 2020.

Projected Buildout Wastewater Flows

	t		Future Developr								
Land Use Type	Existing Lands, No Redevelopment	Sewer Unit Factor	Average Daily Flow	Y Lands Planned for New Development Subtotal Redevelopment Future Development			Sewer Unit Factor	Average Dry Weather Flow	Total Development at Buildout of Study Area	Total Average I Flor	Dry Weather w
1	(acre)	(gpd/acre)	(gpd)	(acre)	(acre)	(acre)	(gpd/acre)	(gpd)	(acre)	(gpd)	(gpd)
General Plan Residential	-	-	-					-			
Single Family Residential	2,389	1,396	3,335,391	118	588.3	706	1,396	986,125	3,096	4,321,516	4.32
High Density Residential	83	2,609	215,334	6	276.1	282	2,609	735,343	364	950,677	0.95
Rural Residential	0	611	0	2,446	312.3	2,758	611	1,685,107	2,758	1,685,107	1.69
Subtotal - General Plan Residential	2,472		3,550,725	2,570	1,176.7	3,746		3,406,575	6,218	6,957,301	6.96
General Plan Non-Residential											
General Commercial	242	1,175	284,837	28	323.8	352	1,175	413,753	595	698,590	0.70
Neighborhood Commercial	0	1,175	0	34	11.5	46	1,175	53,539	46	53,539	0.05
Industrial	211	1,763	371,281	52	315.2	367	1,763	646,780	577	1,018,062	1.02
Public Facility	280	800	224,260	44	63.6	107	800	85,932	388	310,191	0.31
Subtotal - General Plan Non-Residential	733		880,378	158	714.0	872		1,200,004	1,605	2,080,381	2.08
General Plan Overlays											
Traditional Neighborhood ¹	0	-	0	76	498.8	574	-	692,049	574	692,049	0.69
Downtown Mixed Use ¹	0	-	0	321	64.4	386	-	578,272	386	578,272	0.58
Urban Village ¹	0	-	0	107	536.0	643	-	1,041,439	643	1,041,439	1.04
Employment District ¹	0	-	0	0	179.1	179	-	216,814	179	216,814	0.22
Subtotal - General Plan Overlays	0		0	504	1,278.4	1,782		2,528,575	1,782	2,528,575	2.53
Known Developments											
Specific Plan and Other Developments ²	0	-	0	0	4,199.7	4,200	-	6,214,824	4,200	6,214,824	6.21
Subtotal - Known Developments	0		0	0	4,199.7	4,200		6,214,824	4,200	6,214,824	6.21
Total											
AKEL	3,205		4,431,103	3,231	7,368.8	10,600		13,349,978	13,805	17,781,081	17.78

ENGINEERING GROUP, INC. Notes:

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10/19/2020

1. Development flows for Overlay Areas documented in Table 2, General Plan Overlay Development and Flows

2. Specific Plan and Other Development flows documented in Table 5, Specific Plan and Other Development, Remaining Development Flows

Chapter 6 – Hydraulic Model Development

Purpose of Chapter

The purpose of this chapter is to discuss the hydraulic model development and calibration process of the wastewater collection system.

Key Chapter Elements

- Hydraulic Model
 Development
- Flow Monitoring Program
- Hydraulic Model Calibration





(mi) 3.6 5.3	% Total
3.6 5.3	5.4%
3.6 5.3	6.4%
5.3	0.470
	9.5%
11.3	20.3%
9.2	16.6%
0.4	0.6%
1.5	2.7%
2.3	4.2%
1.7	3.0%
35.3	63.4%
0.2	0.4%
6.3	11.3%
3.3	5.9%
6.0	10.8%
3.6	6.5%
1.0	1.7%
20.3	36.6%
55.6	100.0%
	20.3 55.6

Flow Monitoring Program



14 Flow Monitoring Sites

	Site ID	Location Description	Pipe Size (in)	Manhole ID				
_	Gravity Main	Flow Monitors						
	FM-1	Cherry Avenue north of Mary Lane	8" N (In Pipe)	SSMH01048				
	FM-2	Minnesota Avenue approx 500' north of 4th Street	24" N (In Pipe)	SSMH01728				
	FM-3	California Avenue approx 400' north of 1st Street	30" N (In Pipe)	SSMH00381				
uge nitor Locations	FM-4	6th Street approx 400' west of American Avenue	24" E (In Pipe)	SSMH00330				
ons ains	Lift Station Flo	ow Monitors						
ete Force Main	FM-5	1075 South Highland Springs Road	-	LS-1 (Four Seasons)				
maller	FM-6	1390 Potrero Boulevard	-	LS-2 (Seneca Springs)				
Easins -	FM-7	990 Ring Ranch Road	-	LS-3 (Marshall Creek)				
nt	FM-8	1899 West Oak Valley Parkway	-	LS-4 (Noble Creek)				
Canyon esons	FM-9	715 West 4th Street	-	LS-5 (Industrial Park)				
d Springs	FM-10	35980 Oak Valley Parkway	-	LS-6 (Upper Oak Valley)				
ak Valley	FM-11	11246 Palmer Avenue	-	LS-7 (Lower Oak Valley)				
Creek rook	FM-12	34003 Crenshaw Street	-	LS-8 (Beaumont Mesa)				
od vania	FM-13	12940 Potrero Boulevard	-	LS-9 (Olivewood)				
Springs		Castello Lane approx 450' north of Artisan Place	-	LS-10 (Fairway Canyon)				
enterlines Its JMINARY	ENGINEERING GROUP, INC. Notes: 1. GIS Manhole ID	is based on GIS shapefiles provided by City staff Nover	nber 18, 2019.	2/11/202				
jure 6.2								

Hydraulic Model Calibration





• Dry and Wet Weather

- Benchmark for future evaluations
- Calibration results were acceptable

Chapter 7 - Hydraulic Evaluation and Proposed Improvements



Purpose of Chapter

The purpose of this chapter is to evaluate the existing wastewater system and recommend improvements to mitigate existing deficiencies and serve future growth.

Key Chapter Elements

- Existing System Evaluation
- Recommended
 Improvements
- Future System Evaluation



Existing System Evaluations



 Evaluated for peak dry and wet conditions

- Considered 10-Year 24-Hour Design Storm
- Capacity of Existing Pipelines is Good.

Beaumont Mesa LS Improvements



- Critical Regional Lift Station
- Planned improvements to mitigate deficiencies
 - Replace existing pumps (undersized)
 - Complete parallel force main (segment currently offline)
 - Expand wet well (lacks sufficient emergency capacity)

Lift Station Capacity Evaluation

- Capacity of Existing Lift Stations not adequate.
- Future growth requires additional lift station capacity

A	Κ	E	L
ENGINE	ERING	GROUP,	INC

	Desire Form	Tetel Constitu	Exis	sting System An	alysis	Fut	ture System Ana	alysis					
Pump Station	Capacity	(Includes Standby)	Peak Wet W	eather Flows ¹	Surplus/ Deficiency	Peak Wet We	eather Flows ¹	Surplus/ Deficiency	Recommended Improvements				
	(gpm)	(gpm)	(gpm)	(mgd)	(gpm)	(gpm)	(mgd)	(gpm)					
Existing System													
Beaumont Mesa ³	1,797	3,594	2,020	2.91	-223	4,530	6.52	-2,733	Construct two 3,500 gpm and two 1,500 gpm pumps, three duty and one standby, for total capacity of 10,000 gpm.				
Fairway Canyon ²	400	800	77	0.11	323	90	0.13	310					
Lower Oak Valley	1,050	1,700	965	1.39	85	1,217	1.75	-167	Construct three 625 gpm pumps, two duty and one standby, for total capacity of 1,875 gpm				
Marshall Creek	1,150	2,300	778	1.12	372	1,696	1,696 2.44		Construct two 1,700 gpm pumps, one duty and one standby, for total capacity of 3,400 gpm				
Noble Creek	1,865	3,730	465	0.67	1,400	958	1.38	907					
Seneca Springs	900	1,350	201	0.29	699	378 0.54		522					
Upper Oak Valley	2,700	5,000	1,914	2.76	786	3,634	5.23	-934	Construct three 1,850 gpm pumps, two duty and one standby, for total capacity of 5,550 gpm				
Four Seasons	1,740	3,715	442	0.64	1,298	2,616	3.77	-876	Construct three 1,350 gpm pumps, two duty and one standby, for total capacity of 4,050 gpm				
Industrial Park	112	262	106	0.15	6	288	0.41	-176	Construct two 300 gpm pumps, one duty and one standby, for total capacity of 600 gpm				
Olivewood	310	620	53	0.08	257	612	0.88	-302	Construct two 625 gpm pumps, one duty and one standby, for total capacity of 1,300 gpm				
Future System					I				1				
Beaumont Ave South			-		-	1,788	2.57	-1,788	Construct three 900 gpm pumps, two duty and one standby, for total capacity of 2,700 gpm				
Beaumont Crossroads	-	-	-	-	-	4,659	6.71	-4,659	Construct three 2,350 gpm pumps, two duty and one standby, for total capacity of 7,050 gpm				
Brookside Ave	-	-	-	-	-	278	0.40	-278	Construct two 300 gpm pumps, one duty and one standby, for total capacity of 600 gpm				
Tukwet Canyon	-	-	-	-	-	709	1.02	-709	Construct three 375 gpm pumps, two duty and one standby, for total capacity of 1,125 gpm				
			I		I	1		I	6/8/202				

1. Maximum average hour flows extracted from sewer system hydraulic model

2. Lift station current capacity is different than Design Capacity as directed by City staff December 15, 2020.

3. Pump information provided by Xylem staff March 02, 2021.

Future Capacity Improvements

- Red represent existing pipe deficiencies.
- Purple represent existing pipes needing upgrade to service growth
- Green lines represent New pipes to service growth



Future System Evaluations

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Clayly None Earling Differ by Class by Density Proton De Districtly Constraints Report

Existing System I I Stature Modalist Force Idates *X* All Stature *X* All Stature

Figure 7.5 Figure 7.5 Figure 7.5 Figure 7.5 Figure Modeled System Analysis for PWWF Watasevic Hance Par Cit of Description

Part 40 40 3.7 + 1.3 40 3.3 + 1.3 40 3.3 + 1.5 40 3.35 + 0.5 Wednet Dueby Mere P 17 set Logie



AKEL

 Evaluated for peak dry and wet conditions Validates the recommended improvements

Chapter 8 – Capital Improvement Program



Purpose of Chapter

Key Chapter Elements

The purpose of this chapter is to summarize the City's Buildout and 10-Year Capital Improvement Programs.

- Unit Costs
- Buildout Capital Improvement Program
- 10-Year CIP



Units Costs

Documenting Cost Assumptions

	FILLIWINAN									
Pipeline										
ravity Main ¹										
Pipe Size	Cost ¹									
(in)	(\$/lineal foot)									
8	\$188									
10	\$196									
12	\$204									
15	\$226									
18	\$242									
21	\$325									
24	\$388									
27	\$459									
30	\$517									
36	\$657									
orce Main ²										
6	\$215									
8	\$263									
10	\$277									
16	\$374									
perational and Maintenance ²										
Sewer Pipeline CCTV	\$2.04									
Sewer Pipeline Cleaning	\$1.78									
Lift Station ³										
Estimated Lift Station Project Cost = 9,484*Q ² + 308,219*Q + 358,874, where Q is in mgd										
	3/4/2021									
tes : I. Unit costs indexed using the Engineering News Record (ENR) Construction Cost Index of 11,628 for January 2021.										

Sewer pipeline operational and maintenance costs based on Akel Engineering Group experience on similar projects.

 Lift Station costs based on Akel Engineering Group experience on similar projects and escalated using the Engineering News Record (ENR) Construction Cost Index of 11,628 for January 2021.

Capital Improvement Program



 Prepare Capital Improvement Projects based on recommended improvements

10-Year CIP

					Print Part Harmond Printing													
Carlo Pending Type	Topred Instantion	Project Sector	Progent Description	NUMBER OF	** 300 0/00					- 141200-0120		**3105236	**2408/11					
Granity I	Main Improvente	mb ²																
904-P2		Existing Capacity Definitions	Apren Lane Pipeline Reprovement	Replace existing 8-then gravity main with new 12-then analysis math in Januari Ja			#1.40E		-									
WWTF-PE		Existing Capacity Deficiency	Edgir Ave Pipeline Replacement	Replace witting 12-both gravity main with new 15-both gravity main in Digar Aus		306,700												
				Sublished - Screenty Mass Improvements		254,788	87,898			- 40	+3	- E.:	(e)					
Reserves	of Mexia Improve	arises the		10		1	1 1						() ()					
		New Force Main	Force Main Design and Pursy Design	Design of two force main and pump additions	150,000													
			Fung Replacement Soldhier Construction	Easthration of regradement pumps and additional pumps for LS		750.000												
			Free Main Construction	Construction of new 34-instribute main		4.000.000												
		New West Stell	Wei Wei Deug-	Design of New York West	406.000													
			Wari Wali Construction	Carutruction of New Yeah Well				4,000,000										
				Subratel - Sesurcost Mate Improvements	15,00	4,750,000		4,808,000	- K:			- E	0.0					
Lift Stats	on Condition As	-current improve	mette	1					() · · · · · · · · · · · · · · · · · · ·	(()	-				
		Station Gendition		Organing life station: improvements to include new electrical, new pumps, repairs to werwellit, repairs to service and the 12, etc.		405,080	-80.008	48.00	40.008	400,005	480,000	430.000	400.000	480,000				
			54	Alutet - 130 Status Condition Jantan and Ingermanis		405,988	430,000	38,30	495,000	410,300	10,000	10,000	.000,000	405,000				
Operatio	n and Maintena	nie logrovennist	r.							()								
			CCTv Program	0079 Wistewater System every S-years (approx. 59 miles/year) - calmers & truck			110.000					1	194,000					
			On-going Figuine Replacement Program	Arrenalisi pipelon nalasarani be argaing synam ingenation(2)			390.006	506.000	500,000	400.000	400.000	605-005	798.000	750.000				
				Subtrial - Operation and Maintonanian Improvements			Red Doe	38,00	180,008	800,000	400,000	820,030	300,000	750,005				
Water	And Treatment I	Next																
		and a	Warnevoler Nate Insti-	Rate Study for \$122 - \$122	100.000							-						
		Generation	(E) Project - Piece Meters	Installation of Flow Meters at 15	100.008				1	1	1							
		Generation	10 System Repairs - Prior 1	Variate resided repairs system with		200.000			C		D:							
		Design/Construction	Office Experialem	WHITP office and part workspace turleting			100.000		Gra	νιτγ	' Pip	pellr	<u>ie ir</u>	npr				
		Generation	Ut Sub-Repairment	30WPR I/V surfa replacements			90,000		_	-			_					
		Communition	RO Madule Replacement	NWTP RD matility replacement					Bea	um	ont	Me	sa L	S Ir				
				Schoolal - Wantswater Treatment Plant	400,000	290.000	556,068											
Total Imp	provement Cost	÷							l ift	Sta	tion	Co	ndit	ion				
				Ficult Taler Tartet	1.250-000	5.598.780	1.697,408		LIIL	JLd			null					
				Completion Tenal	1,750,000	6.006.200	in these week	1.1										

1. Untere notes attentions includency signifies activities accorded to City staff on June 81, 2021 the Waterstate Lotter catally definers; Casta Instrument Prints

- ovements: \$0.3 million
- mprovements: \$9.6 million

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3,000,000 LHCOM 300,000 4,830,000 1,100,000

108:005

- **Assessment Improvements: \$3.6 million**
- Operation and Maintenance Improvements: \$5.1 million
- Wastewater Treatment Plant Improvements: \$2.0 million

10-Year CIP Cost: \$20.6 million



Buildout CIP

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2018/100

314,750

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New Capacity

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- Force Main Capacity Improvements: \$21.2 million
 - Lift Station Improvements: \$34.6 million +13,100 W
 - Other Wastewater System Improvements: \$10.7 million **Total Cost: \$98.9 million**

Sewer System MP Summary Points

- Serving Existing Customers
 - Capacity of Existing Sewer System is good.
 - Capacity of Most Existing Lift Stations not adequate.
- Extending Service to Future Growth
 - Future Capacity Pipeline Projects are Developer Driven.
- Deliverables
 - Master Plan Document
 - Hydraulic Model





Rate Study

Pipeline Condition Assessment (State and Federal Regulations)
Lift Station Condition Assessment
Update Master Plans every 5 years



Next Steps: Evaluate Condition of the Sewer System

Sewer system pipes age over the years, and if not replaced on time, they will fail



Methods for Evaluating Pipe Condition

- Age-based Replacement Program
- Risk-based Replacement Program
 - Evaluate the Likelihood of Failure
 - Evaluate the Consequence of Failure
 - Evaluate the total Risk Score



4/16/2020 2:04:05 AN

ADERA SEWER ASSESMENT

City of Beaumont 2021 Wastewater Master Plan

Workshop – Draft Master Plan

June 22, 2021



Historia San Timates Conny

MAY 2021

AKEL

(AUMON)

City of Beaumont

Wastewater Master Plan

