

3.0 Population, Land Use, and Flow Projections

3.1 Introduction

This chapter presents the population and land use data that is used to establish future wastewater flows within the Fountain Sanitation District's (FSD's) sanitary sewer collection system.

3.2 Current Population

Population information for this report is provided from the Water Master Plan (WMP). The year 2000 Census population for the City of Fountain was 15,197, and the WMP estimated that about 13,370 of these people (88 percent of the City's residents) obtain water from the Fountain water system. City residents who are not served by the water system are mostly served by the Widefield Water and Sanitation District, and are predominately located north of State Highway 16. The same area is excluded from the Study Area. Figure 1-1 shows additional City areas that are north of the planned FSD service area. As can be seen from the data in Table 3-1, the current population within the Study Area is estimated at 11,484, or 76 percent of the total City population.

Census Tract	Block Group	City of Fountain	Water Service Area	Wastewater Service Area
44	9	6	6	6
45.01	3 ⁽¹⁾	755	0	0
45.03	1 ⁽²⁾	253	181	0
	2 ⁽²⁾	823	823	0
	3 ⁽²⁾	882	882	0
45.06	3	0	0	0
45.07	3	14	14	14
45.08	1 ⁽¹⁾	921	0	0
	2	1,741	1,741	1,741
	3	1,964	1,952	1,952
	4	1,200	1,192	1,192
45.09	1	2,760	2,746	2,746
	2	927	927	927
	3	2,906	2,906	2,906
46	2	45	0	0
Total		15,197	13,370	11,484

(1) Water service provided by either Widefield or Security Water and Sanitation Districts.
(2) All or part excluded from Study Area boundary.

3.3 Future Population

Population projections for this report are based on the projections presented in the WMP. The WMP considered the projections in the City’s Comprehensive Development Plan and projections provided by the Pike’s Peak Area Council of Governments (PPACG). The High Level PPAGC projection was determined to best represent the City’s recent growth and expectations for accelerating future growth. The High Level projection represents an average annual population increase of about 1,090 people for the City of Fountain, which equates to about 375 dwelling units per year.

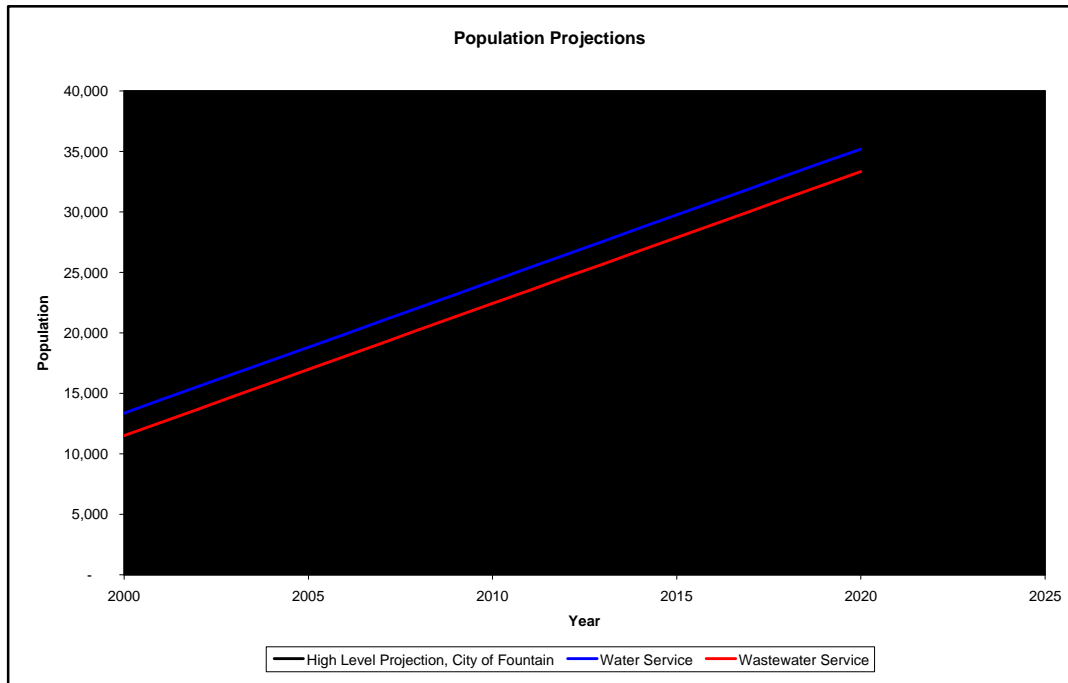
The WMP projected water service area population assumes that residents in the northwest part of the City who currently obtain water from Widefield and Security will continue to do so, but that all new residents will be served from Fountain’s water system. Therefore, the water service population projection was equal to the High Level PPAGC projection less 1,800 residents. Similarly, it was assumed for this report current City residents outside the Study Area will continue to be served by others, but that all new residents will be served by the FSD system. Future Study Area populations are set equal to the High Level PPAGC projected population less 3,690 people.

Table 3-2 and Figure 3-1 present the projected population for the City of Fountain, the WMP Water Service Area, and the FSD Sewer Service Area.

Table 3-2 Future Population			
Year	City of Fountain ⁽¹⁾	Water Service Area ⁽²⁾	Sewer Service Area
2000	15,197	13,370	11,484
2010	26,096	24,300	22,400
2020	37,000	35,200	33,300

⁽¹⁾Based on PPACG High Level Projection. Projections were updated subsequently to the preparation to this report.
⁽²⁾Values from Water Distribution Master Plan Report, B&V, 2002

**Figure 3-1
Population Projections**



3.4 Current and Future Land Use

The current land use and planned future land use was provided in GIS format by the City's Planning Department. The current land uses along with currently planned subdivisions are shown on Figure 3-2. Table 3-3 identifies the planned subdivisions that correspond to Figure 3-2. Within the study area, current land uses include 1,091 acres of residential uses, 355 acres of commercial and public type uses, and 251 industrial acres. These areas are net and exclude the area of street rights of way, because of the data format provided by the City. For the year 2000 Study Area population, the average population density is 11.3 people per net residential acre. The total current area that is developed is 9,784 acres.

Table 3-3 Known Planned Developments		
Subdivision Name	Map ID Number	Zoning
Parkview	1	Commercial
South Park	2	Commercial
Fountain Colony	3	Commercial
Valley Ranch	4 ⁽¹⁾	Commercial
	5 ⁽¹⁾	Residential
	6 ⁽¹⁾	Commercial
	25	Residential
Link Road	7	Residential
Mersa Hills	8	Residential
Cumberland Green	9	Residential
McGahan	10	Residential
Crescent Heights	11	Commercial
	12	Commercial
	13	Residential
	14	Commercial
Larson Ranch	15	Commercial
	16	Residential
Cross Creek	17	Residential
	18	Commercial
	19	Commercial
	23	Residential
The Glen	20	Commercial
	21 ⁽¹⁾	Residential
Valley Ranch Unseth	22	Residential
Heritage	24	Residential
Fountain Brook	25	Commercial
Cheyenne Ridge	26	Residential
Ft. Mesa Heights	27	Residential
Mesa Vista	28	Residential
Ft. Ridge Apts.	29	Residential
(Unnamed)	30	Residential
⁽¹⁾ Outside Study Area		

FIGURE 3-2, EXISTING LAND USE AND PLANNED SUBDIVISIONS

The City of Fountain Comprehensive Development Plan, adopted in 1999, specifies future land uses, the location and extent of the future land uses, and for some categories defines an allowable density range. Future land uses through build-out of the Study Area are shown on Figure 3-3. Each planning sub-area shown on Figure 3-3 represents a specific land use type. The Appendix includes a detailed tabulation of the land use sub-areas, their expected staging of development, and expected wastewater flow generation. Table 3-4 shows the categories and acreages assigned in the future land use database for areas within the Study Area.

Table 3-4 Future Land Use ⁽¹⁾				
Land Use	Existing Development (Acres)	Year 2010 Incremental Development ⁽³⁾ (Acres)	Total Year 2020 Development ⁽³⁾ (Acres)	Build-out (Acres)
Agriculture	0	0	0.0	1158
Commercial	83	0	83	1142
Fountain Creek Regional	0	0	0	310
Industrial	249	0	249	2087
Open Space	0	0	0	139
Park	0	278	278	1128
Public	108	0	108	195
Residential	748	1596	2344	5249
School	112	0	112	132
Village Commercial	0	15	15	15
Total Area	1300	1889	3189	11586
Total Sewered Area ⁽²⁾	1300	1611	2911	8851

⁽¹⁾ Acres are gross acres for the subareas shown on Figure 3-3.
⁽²⁾ Sewered area total excludes the Fountain Creek Regional Park, Open Space, and Park categories.
⁽³⁾ Total gross area within the known subdivision projects is 7,707 acres. The year 2010 projections account for 1611 acres of the known subdivision, or approximately 21 percent of the subdivision area.

Figure 3-3 – Buildout Land Use

3.5 Future Wastewater Flow Projections

3.5.1 Design Flow Curve

To convert future population and land use into wastewater flows, a system-wide design flow curve was developed. The design flow curve considers land use, equivalent population, per capita water use, per acre average wastewater production, infiltration, and inflow parameters. The design curve estimates peak flows for a given area and equivalent population, utilizing the design parameters established in Chapter 2.

The instantaneous peak flow, or critical design condition, will change depending on the total tributary area, population, and the condition of the system. The ratio of peak flow to average daily flow will decrease as the time of concentration increases.

The design curve utilizes per-acre average dry weather flow rates. Table 3-5 presents the basis for selecting loading rates for each category. Figure 3-4 presents the resulting design flow curve for the Study Area.

Table 3-5 Land-Use Based Unit Flow Rates			
Land Use Category	Basis for Build-out Units per Acre	Selected Design Build-out gpd per acre	Selected BO PE per Acre
Agriculture	Unsewered	0	0.0
Business Park	15 gcd, 10 empl./unit, 5 units/ac	750	11.0
Community Commercial	15 gcd, 15 empl./unit, 3 units/ac	750	11.0
Downtown Mixed Use	25 gcd, 15 empl./unit, 3 units/ac	1,200	17.6
Large Lot Residential	1 -3	500	7.3
Mineral Extraction	Unsewered	0	0.0
Mixed Residential	7 - 20 du/ac, 2.5 people/du	2,300	33.7
Mobile Homes	10 - 12 du/ac, 2.5 people/du	1,850	27.1
Multi-family Dwellings	10 - 12 du/ac, 2.5 people/du	1,850	27.1
Neighborhood Commercial	15 gcd, 15 empl./unit, 3 units/ac	750	11.0
Open Space	Unsewered	0	0.0
Park	Unsewered	0	0.0
Planned Industrial	1000 - 1500 gpd/ac	1,250	18.3
Public	15 gcd, 5 empl./unit, 3 units/ac	250	3.7
Regional Commercial	15 gcd, 15 empl./unit, 3 units/ac	750	11.0
Single Family Dwellings	2 - 7 du/ac, 3.5 people/du	1,050	15.4
Small Office/Warehouse	15 gcd, 5 empl./unit, 3 units/ac	250	3.7
Village Center	15 gcd, 15 empl./unit, 3 units/ac	750	11.0
Village Commercial	15 gcd, 15 empl./unit, 3 units/ac	750	11.0
School	25 gcd, 200 - 800students/school, 5 acres	2,500	36.6

Figure 3-4 **Design Flow Curve**

3.5.2 Projected Wastewater Flows

Projected wastewater flows (5-year storm) tributary to the WWTF are given in Table 3-6. This flow was determined using the flow monitoring data and the projected growth with the recommended design curve.

Table 3-6								
Design Year Flow Projection Summary								
Year	Total Sewered Population	Dev. Acres	ADDF (mgd)	Peaking Factor	PDF (mgd)	Total Infiltration (mgd)	5-year Inflow (mgd)	5-year PWWF (mgd)
2000	11,484	1300	1.03	1.45	1.49	0.26	1.76	3.51
2010	22,400	2911	1.84	1.45	2.67	0.58	3.95	7.20
2020	33,300	4477	2.60	1.45	3.77	0.90	6.08	10.75
Build-out	91,600	8765	8.30	1.45	12.03	1.77	12.00	25.80