SECTION 9

WASTEWATER FLOWS

9.1 General

Wastewater flows are generated from domestic, industrial, and commercial uses. Inflow and infiltration are terms used to describe the groundwater and stormwater seepage. Inflow enters the system at direct connection points while infiltration is the groundwater that seeps in through cracks and leaks in the system.

The domestic water that is returned to the treatment facility comes from sinks, showers, tubs, lavatories and toilets. In an average system, 60% - 90% of the potable water is directed to a wastewater treatment facility or an on-site septic system. Water not returned to the wastewater treatment plant is typically used for irrigation and industrial applications.

The rate of return flow determined for the study was developed by comparing the average daily water use and average daily wastewater flow. Lockhart and Luling were the only systems that had data available to evaluate.

9.2 Wastewater Flows

Limited wastewater flow data exists for Caldwell County. Large portions of the county are served by OSSF systems that are regulated by the County or city.

Lockhart and Luling provided the only data in the survey to determine average daily wastewater flows and peak flow factors. The average daily wastewater flow ranged from 0.4 MGD to 1.2 MGD with an average of 0.8 MGD. The average flow was considered to be the base flow and the peak flows considered as infiltration and inflow.

Given the sewer base flow and population, a per capita value was determined. The sewer populations for Lockhart and Luling were estimated to be 13,464 and 4,978

respectively from the information provided in the survey. ***Table 9-1*** provides the survey data used to determine wastewater flows. The average daily wastewater flow for the county was 85 gpcd. The peak day wastewater flow factors for Luling and Lockhart, as shown in ***Table 9-2***, were 3.75 and 1.25 respectively.

TABLE 9-1
Wastewater Connections

System	Total Water Connections	Total Sewer Connections	Percent of Sewer Connections	Population	Sewer Population	Average Daily Wastewater Flow (MGD)	Average Daily Wastewater Flow Per Capita (gpd)
Lockhart	4,095	4,085	0.998	13,600	13,464	1.2	89
Luling	2,152	2,122	0.986	5,080	4,978	0.4	80
					Average	0.8	85

TABLE 9-2
Wastewater Peak Day Flow Factors

System	Peak Day Flow Factor
Lockhart	1.25
Luling	3.75

As seen from ***Table 9-2***, the water to wastewater return rates varied from 56% to 79%. The lower return rate can indicate greater outdoor water use or loss and the higher return rates can imply water inflow and infiltration. Normally, average return rates vary from about 60% - 80%. The return rate determined from the survey information provided was an average of 68%. The return rate was used to estimate return flows from the projected water demands.

TABLE 9-3
Wastewater Return Rate

System	Wastewater per capita	Water per capita	Return Rate
Lockhart	89	113	79%
Luling	80	143	56%
	Average		68%

The projected wastewater flows for Caldwell County are presented in ***Table 9-3***. The wastewater flows are based on 150 gpcd at a 68% return rate. The projected wastewater flows will increase along with population as shown in the table below. The wastewater flow is expected to increase approximately 5.5 MGD from 2010 to 2040.

TABLE 9-4
Caldwell County Projected Wastewater Flows

Projected Population	2010	2020	2030	2040
	46,308	65,057	86,902	100,000
Total Projected Wastewater Flows (MGD)	4.723	6.636	8.864	10.200

Caldwell County will be required to increase or develop new treatment facilities as limits are reached on facilities that treat 4.9 MGD.

9.3 Wastewater Loads

Loads produced from the expected wastewater flows are shown in ***Table 9-5*** and ***Table 9-6*** assumes the adoption of stringent discharge parameters**.** The BOD, TSS, Ammonia, and Phosphorus loading values are based on existing water quality conditions and the need for remediation in Plum Creek, where wastewater is discharged.

TABLE 9-5
Caldwell County Projected Wastewater Loads, (lbs/day)

BOD	5	mg/ L	Ammonia	2	mg/L
TSS	5	mg/ L	Phosphorous	1	mg/L

Year of Projected Wastewater Flows (MGD)	2010	2020	2030	2040
	4.723	6.636	8.864	10.200
BOD	197	277	370	425
TSS	197	277	370	425
Ammonia	79	111	148	170
Phosphorous	39	55	74	85

TABLE 9-6

Caldwell County Projected Wastewater Loads, (lbs/year)

Year	2010	2020	2030	2040
BOD	71,893	101,000	134,915	155,249
TSS	71,893	101,000	134,915	155,249
Ammonia	28,757	40,400	53,966	62,100
Phosphorous	14,379	20,200	26,983	31,050