Master Plan

Final Draft

City of Santa Fe Wastewater Treatment Facility

City of Santa Fe, New Mexico

June 29, 2016

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Executive Summary

The City of Santa Fe (City) Wastewater Management Division developed a Master Plan (MP) in partnership with HDR Engineering, Inc. for the Paseo Real Wastewater Treatment Plant (WWTP) to review and update flows and loadings based on growth projections for 10-year (2025) and 25-year (2040) planning periods using 2015 as the base year.

The MP included the development of a database of key process equipment information at the WWTP to establish a process equipment asset inventory. The asset inventory will assist the City with management and maintenance of key process equipment as part of the City's existing WWTP Computerized Maintenance Management System (CMMS). A qualitative level condition assessment of process equipment was also performed to identify aging or high maintenance equipment that may need to be programmed for renewals as part of the City's capital improvement plan (CIP).

The MP is intended to provide the City with a phased implementation program for potential short-term and long-term improvements at the WWTP to meet current and future regulatory water quality requirements. The MP will be used as a basis to support the City's CIP process. The development of the MP consisted of the following primary activities and objectives:

- Flows and loadings assessment including short-term flow monitoring of the City's wastewater collection system to support a Sanitary Sewer Collection System Master Plan being developed by City Wastewater Management Staff
- Steady-state mass balance analysis to establish existing and future loadings of the WWTP
- Process analysis of existing treatment of process units and associated capacity based on typical industry standards
- Evaluate treatment capacity of individual process units for future regulatory conditions focused on nutrient criteria
- Develop asset inventory database for process equipment
- Complete a qualitative condition assessment of process equipment
- Identify improvement needs based on steady-state process analysis and condition assessment

The WWTP currently treats an average annual wastewater flow of approximately 6 million gallons per day (MGD). The WWTP facility includes primary, secondary, and tertiary treatment for the liquid stream and includes stabilization of the solids streams using anaerobic digestion and biosolids composting. The reclaimed water is either discharged to the Santa Fe River or reused for irrigation purposes at public and private golf courses, City recreational facilities, construction water, and other contract irrigation purposes. The stabilized solids are composted to create a biosolids used by private and public users for fertilizer. The City also land applies stabilized solids as part of the solids management. The WWTP facility operates under several permits through the US Environmental Protection Agency (EPA) and New Mexico Environment Department (NMED) for both the liquid and solids stream.

The City's WWTP is performing very well to meet current and anticipated future regulatory requirement trends focused on nitrogen and phosphorus removal. In addition, the WWTP has multiple process units and associated equipment to provide back-up in the event a process unit or

related equipment is taken out of service for maintenance or repair. The anaerobic digesters do not have the same redundancy as other process units. Emergency repairs were required in 2013 and required the City to take a digester out of service. If a digester is taken out of service the City does not have adequate detention time to meet regulatory requirements. The City has other options including sludge holding tanks, lime stabilization, and drying beds to help manage the solids if needed for emergency purposes; however, the MP recommends new digesters be added for operational flexibility and allow maintenance and repair of the existing digesters.

The result of the process analysis indicates there are no major improvements needed immediately at the WWTP to meet regulatory requirements; however, there are opportunities for process optimization to improve the current treatment performance with a focus on nutrient removal optimization. In addition, the following near-term and long-term improvements are recommended based on the process capacity analysis:

- Evaluation and/or installation of a new wastewater influent sampler (0-5 years)
- Additional anaerobic digesters (solids stream stabilization) – near-term (0-5 years)
- Sidestream management (solids dewatering liquid stream) – short- term (5-10 years)
- Additional Aeration basin (liquid stream) – long-term (10-20 years)

The process equipment condition assessment used a standard approach by evaluating the age of the equipment, maintenance history, and reliability (i.e., backup units) to evaluate remaining useful life and reliability. The City schedules and performs regular maintenance using the City's CMMS Antero by Allmax, which increases the reliability of key process equipment. However, there is existing process equipment that receives a favorable rating because of redundant units but is either at the end of the rated useful life or has a high maintenance history. Based on the age of the equipment and maintenance history, the following process equipment assemblies are recommended for rehabilitation or replacement:

- Aeration basin blowers replacement – near-term (0-5 years)
- Return activated sludge (RAS) pumps replacement – near-term (0-5 years)
- Existing anaerobic digester roof replacement – short-term (0-5 years)
- Mixed liquor suspended solids (MLSS) pumps replacement – near to short term (0-10)

1 Introduction

The City of Santa Fe (City) in partnership with HDR Engineering, Inc. developed a Master Plan for the Paseo Real Wastewater Treatment Plant (WWTP). The Master Plan (MP) is intended to provide the City with a phased implementation program for future improvements at the WWTP to meet future regulatory water quality standards and population growth for 10 and 25-year planning periods using 2015 as the base year. The Master Plan will be used as the basis to support the City's Capital Improvement Plan (CIP) process and identify short-term and long-term improvements.

2 Approach and Objectives

The major objective of the MP is to establish an initial planning document for the City to identify potential treatment process related needs at the WWTP based on regulatory projects and growth projections. The approach for the MP consists of the following:

- Evaluate historical flows and other wastewater characteristics data from the WWTP
- Determine existing and projected flows and loads for future planning horizons
- Perform short-term flow monitoring of City wastewater collection system to support the development of a Sanitary Sewer Collection Master Plan by Wastewater Management Division Staff
- Steady-state mass balance analysis to establish existing and future loadings of the WWTP
- Process analysis of existing treatment of process units and associated capacity based on typical industry standards
- Evaluate treatment capacity of individual process units for future regulatory conditions focused on nutrient criteria
- Develop an asset inventory database for process equipment
- Complete a qualitative condition assessment of process equipment
- Identify improvement needs and potential improvements

3 Regulatory Requirements

The current surface water discharge requirements for the WWTP facility were issued in 2010 by the United States Environmental Protection Agency (USEPA) Region 6 Water Quality Protection Division (6WQ) and are documented in the National Pollutant Discharge Elimination System (NPDES) permit (Permit No. NM0022292). Table 1 provides a summary of selected pollutants regulated by the City's existing NPDES permit.

Table 1: Summary of Existing NPDES Discharge Limits for Selected Pollutants

Parameter	30-Day Average	Max Day	7-Day Average	30-Day Average	Max Day	7-Day Average
Units	**pounds per day (lb/d), unless noted otherwise**			**milligrams per liter (mg/L), unless noted otherwise**		
Carbonaceous Biological Oxygen Demand, 5-day (CBOD)	709	N/A	Report	10	N/A	15
Total Suspended Solids (TSS)	2,127	N/A	Report	30	N/A	45
Ammonia Nitrogen (Total as N)	141.8	Report	N/A	2	Report	N/A
Nitrate-Nitrite (Total as N)	212.7	Report	N/A	3	Report	N/A

Note: Based on NPDES Permit No. NM0022292 issued in June 2010

The City was issued a preliminary proposed NPDES permit in 2015. The proposed draft permit includes nutrient limits of 3.1 mg/L (30-day average) for phosphorus and 6.9 mg/L (30-day average) for nitrogen. The final nutrient limits for phosphorus and nitrogen are pending final discussions between the City, EPA and the New Mexico Environment Department (NMED). As shown in Table 1, the existing NPDES permit has discharge limits based on various averaging periods. The baseline flows and loads to meet the discharge permit are based on meeting the averaging periods identified within the permit, as well as other key loading conditions important in sizing of individual unit treatment processes. The existing NPDES permit is included in Appendix A.

The City also has two operating groundwater discharge permits (DPs) with NMED including DP-289 (See Appendix B) for effluent reuse and DP-135 (See Appendix C) for subsurface sludge injection. DP-289 is currently in the public review process of renewal and contains Class 1B effluent standards for the WWTP. DP-135 was issued in November 2011 and the City is currently in the permit renewal application process. The NPDES permit contains more stringent effluent regulations and will be used as the basis of the process evaluation. Descriptions for the averaging periods that are used for design purposes and that must be met for either compliance with the existing or preliminary proposed NPDES permit are as follows:

- 30-Day Average or Max Month (MM): MM is defined as the month at which maximum flows and loads occur over the course of a year (historically occurs in January, February or March based on data analysis).
- 7-Day Average or Max Week (MW): MW is defined as the maximum flow and load averaged over a 7 day timeframe (historically occurred during the winter months based on data analysis).
- Max Day (MD): MD is defined as the maximum daily flow and load throughout the year (historically occurred during the winter months based on data analysis).

4 Existing Facilities

The Paseo Real WWTP treats municipal wastewater flow from the City of Santa Fe. The facility currently treats a hydraulic flow of approximately 6 million gallons per day (MGD) and is permitted for a maximum month capacity of 13 MGD. The WWTP facility includes primary, secondary, and tertiary treatment of the liquid stream with final disinfection and stabilization of the solids streams using anaerobic digestion and biosolids composting. Table 2 provides a summary of the unit processes for the WWTP liquid and solid streams.

Table 2: Summary of Existing General Facilities

Facility	Number of Units	Description
Liquid Stream		
Screens	2	Fine screen 6mm opening
Grit Removal	2	Aerated Grit
Primary Clarifiers	2	94 ft. diameter, 10.5 side water depth (SWD)
Biological Treatment	2	4 Anaerobic basins (325,000 gal each) followed by 2 aeration basins (3.26 Million gals each at 16.27 ft side water depth)
Secondary Clarifiers	6	Rectangular Clarifiers 170 ft length, 32 ft. width, 12.14 SWD
Filters	3 Cloth, 2 Sand	Cloth filters, 783 sf total surface area per filter. Sand filters, 1,568 sf total surface area (not in operation)
Disinfection	4	Ultraviolet
Solids Stream		
Dissolved Air Flotation	3	DAF1= 48 ft length, 12 ft width, 8 ft. depth (2) DAF 2=40 ft length, 12 ft width, 8.75 ft depth (1)
Anaerobic Digester	2	26 ft. depth, 55 ft. diameter Lime stabilization upstream
Sludge Storage	2	Sludge Holding 1 = 55 ft diameter, 15’ SWD (digested sludge) Sludge Holding 2 = 90 ft diameter, 31.5 SWD
Belt Filter Press	2	2 meter belt width 90 gpm washwater
Disposal		Composting and disposal through subsurface injection

Treated effluent from the facility is either discharged to the Santa Fe River or is reused for irrigation purposes at City and private golf courses, City recreational facilities, construction water and other contract irrigation purposes. A flow schematic for the WWTP facility is shown in Figure 1 and an overview of the facility is shown in Figure 2.

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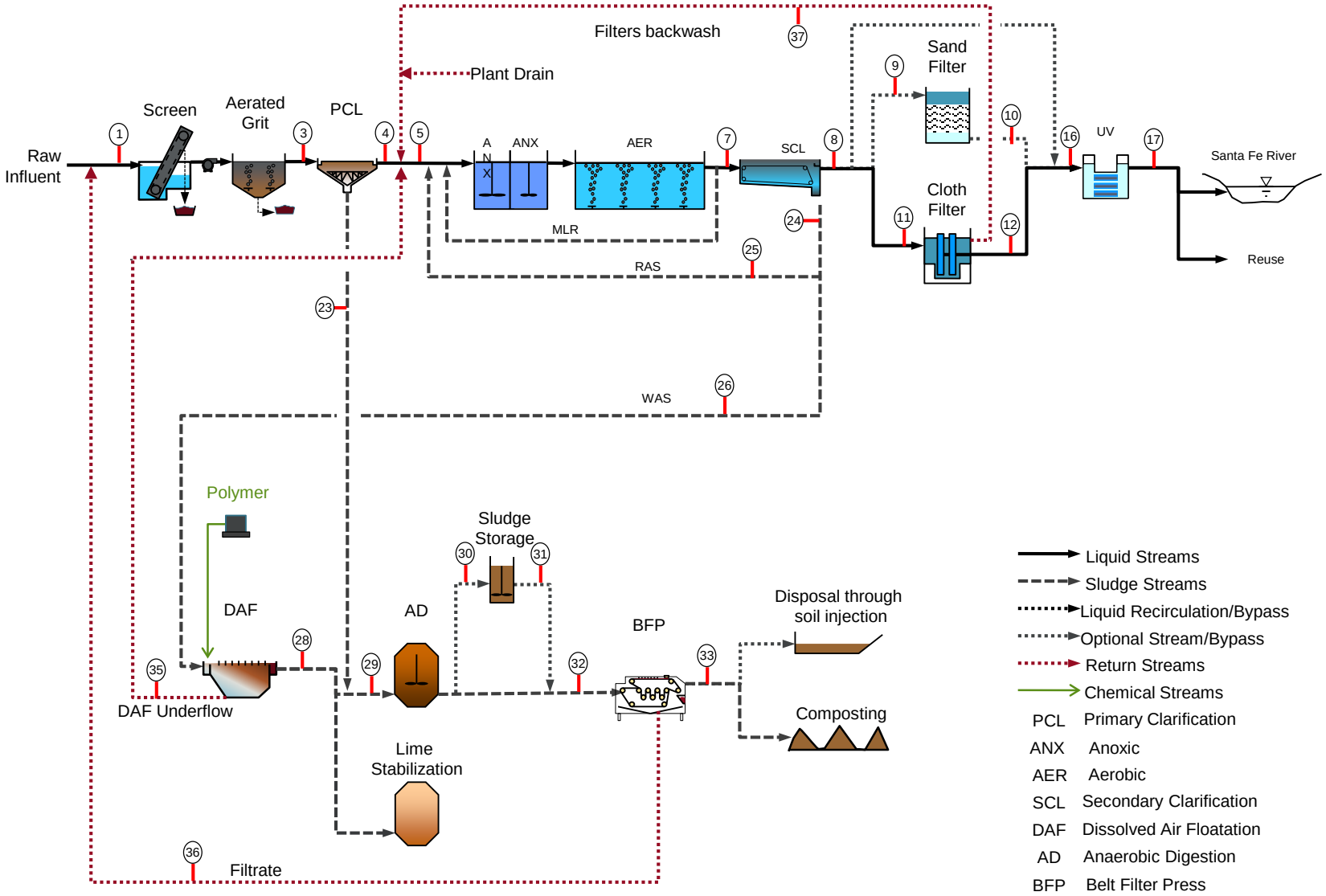
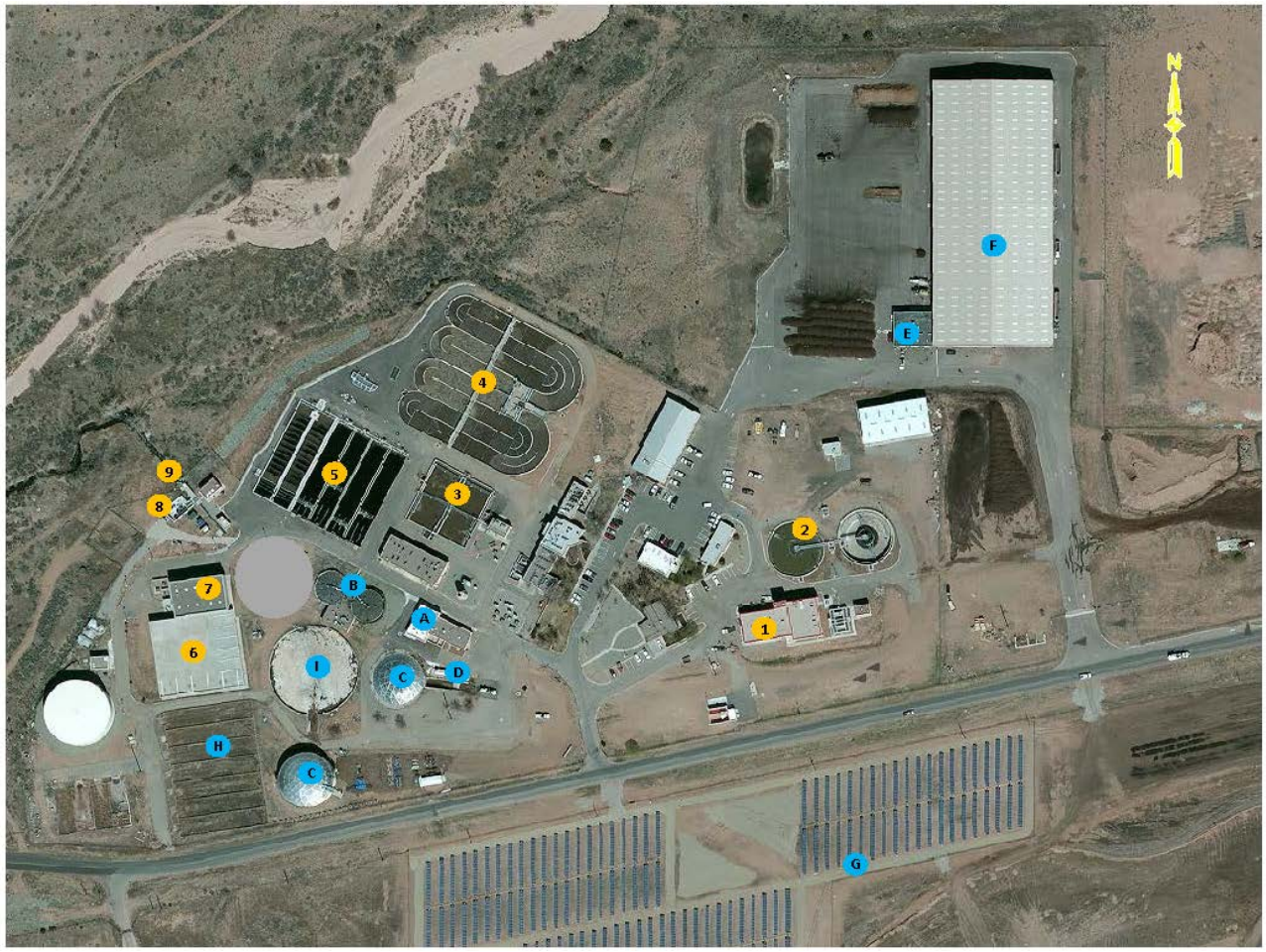


Figure 4-1: Paseo Real WWTP - Flow Schematic



Liquid Stream
1 – Headworks
2 – Primary Clarifiers
3 – Bioselectors
4 – Aeration Basins (Biological Process)
5 – Secondary Clarifiers
6 – Filters
7 – UV Disinfection
8 – Post Aeration

Solids Handling
A – Sludge Thickening (DAF)
B – Anaerobic Digesters
C – Sludge Holding Tanks
D – Lime Sludge Stabilization
E – Sludge Dewatering
F – Biosolids Compost Facility
G – Sludge Injection Field
H – Sludge Drying Beds
I – Temp Biosolids Storage

Figure 4-2: WWTP Overview

5 Determination of Wastewater Flows

This section discusses the development of the existing and future projected wastewater flows for the WWTP, which included completion of a review of the service area, a review of population data, and evaluation of historical influent flow data for the WWTP. Flow projections were developed using two methods. The first method is the most typical – flow estimates were calculated based on the historical influent flow data for the WWTP and population data. The flow projections for the second method were developed using land use and zoning data. The calculations completed for each method are described in the sections below.

5.1 WWTP Service Area

The WWTP is responsible for providing sewer service for an area defined by the boundary known as the Presumptive City Limits. The City also provides sewer service for the Agua Fria Village, which is contained completely within the Presumptive City Limits, and other subdivisions located beyond the Presumptive City Limits including Vista Aurora (a development located within the Agua Fria Village boundary), Thornburg, Aldea, Tessera, Old Las Vegas Highway, and the Santa Fe Brewery.

The Presumptive City limits were created as a result of a 2008 Settlement Agreement between the City of Santa Fe and Santa Fe County and includes all properties currently within the City's municipal limits and all properties within Santa Fe County that are beyond the existing municipal City limits but are scheduled to be annexed into the City limits in the future. Under the terms of the Settlement Agreement, the City is to provide water and sewer service to those areas within the Presumptive City limits and the County is to provide water and sewer service to those areas outside of the Presumptive City Limits.

The Agua Fria Village is a Traditional Historic Community within Santa Fe County as designated by the Santa Fe Board of County Commissioners in 1995 and subsequent Santa Fe County Ordinance #1996-16. Although the Agua Fria Village is contained completely within the Presumptive City Limits, it is not anticipated to be annexed and is expected to remain part of County jurisdiction. In the 2008 Settlement Agreement, the County is to be responsible for providing water and sewer service to the Agua Fria Village. However, the Agua Fria Village currently does not have its own wastewater collection and treatment system so it has historically relied upon the City's wastewater collection system and WWTP for treatment. As a result, it is anticipated that all wastewater flows generated by current and future developments within the Agua Fria Village will continue to be served by the City's Paseo Real WWTP facility.

In total, the service area for the WWTP shown in Figure 3 encompasses approximately 39,742 acres or 62 square miles. Table 3 provides a summary of the areas served by the WWTP.

Figure 5-1: Sewer System Service Area

Table 3. WWTP Service Area Summary

Item	Area	
	(Square Feet)	(Acres)
Municipal City Limits	1,463,216,484	33,591
Presumptive City Limits	169,223,833	3,862
Agua Fria Village	65,839,967	1,511
Aldea de Santa Fe	13,421,890	308
Tessera	6,340,907	146
Thornburg	10,762,360	247
Harry's Road House	3,331,306	76
Total	**1,732,136,747**	**39,742**

5.2 Population

This section discusses the evaluation of population data completed for developing growth projections used for estimating future wastewater flows and loads for the WWTP.

5.2.1 Existing Population

Population data for the WWTP service area was obtained from the University of New Mexico (UNM) Bureau of Business & Economic Research (BBER), which is New Mexico's lead agency in the US Census Bureau's State Data Center program and is the state's primary source for economic, social and demographic data.

Per the US Census data obtained from BBER, the population within the City's municipal limits was 55,859 residents in 1990, 62,203 residents in 2000, and 67,947 residents in 2010. Based on this data, the increase in population for the ten-year period between 1990 and 2000 was approximately 11 percent, representing an average increase of 1.14 percent per year. Similarly, between 2000 and 2010 the City's overall population increased by approximately 9.2 percent for an average estimated growth of approximately 0.92 percent per year.

HDR also coordinated with staff from the City's Long Range Planning Division to obtain information on historical population and future potential growth within the City. The information provided contains land use assumptions / growth projections for the City's municipal limits and the Urban Area, which is the same area identified herein as the Presumptive City Limits. The population data provided by the City is provided in Appendix D.

Per the City's population data, the population within the City's municipal limits was reported as 62,203 residents in 2000 and 67,947 residents in 2010. This data is also based on the US Census and is consistent with the BBER data. For the same period, the City estimated the population for the Presumptive City Limits to be 79,100 residents in 2000 and 84,877 residents in 2010.

For the period between 2000 and 2010, the majority of growth (~ 99 percent) occurred within the City's municipal limits where the population increased by 5,744 residents and the area outside of the City only included an increase of 33 residents. This trend is anticipated to continue in the future and as a result eventually it won't be necessary to make a distinction between the City Limits and Presumptive City Limits.

Per further discussions with the City's Long Range Planning Division, as of January 1, 2016, the population within the City's municipal limits was estimated to be 83,200 residents. In 2014, the City annexed areas outside of the City, which increased the population by 13,200 residents. The corresponding population for the Presumptive City Limits was estimated to be 87,200 residents.

5.2.2 Population Projections

Based on the historical population data from BBER and the information on future potential growth provided by the City's Long Range Planning Division, the growth trend for the City appears to be relatively stable at a rate of approximately one percent per year.

The information on future potential growth provided by the City's Long Range Planning Division contains land use assumptions / growth projections for the City's municipal limits and Presumptive City Limits. The projections completed by the City are for a period of seven years from the beginning of the Year 2014 through the end of the Year 2020 and are broken down by residential and non-residential land use.

According to the City's information, in general, it is estimated that growth through the Year 2020 will be on a pace slower than what was experienced over the last 10 years. This is mainly due to the recent downturn in the economy and an overall slowdown in population growth for the area.

Residential growth will continue to be slow. It is anticipated that the majority of any growth that occurs will be associated with larger master-planned developments. On average, it is estimated that 250 single-family units and 50 multi-family residential units will be added per year with each new housing unit containing an average of 1.67 occupants.

Non-residential construction, mainly comprised of commercial construction, is also anticipated to continue at a modest pace. It is estimated that an annual average of 175,000 square feet of new commercial construction will occur each year based on the annual average of new commercial development that occurred in the City between the Years 2006 and 2012.

As indicated, the information provided by the City's Long Range Planning Division provides population projections through the Year 2020. However, for the purpose of the Master Plan for the Paseo Real WWTP, it is necessary to estimate the potential wastewater flow requirements through the Year 2040. Since no other information regarding future growth beyond 2020 is available, the future population was estimated based on the assumption that growth rates will follow a trend similar to what has been observed over the last 20 years, which is a growth rate of one percent per year.

The population projections were developed by using the City population of 83,200 residents for the Year 2015 and applying the estimated growth rate of one percent per year for the 25-year planning horizon. This was completed based on the fact that in recent years the majority of growth within the service area for the WWTP has occurred within the City's municipal limits. In addition, at some point the City's municipal limits and Presumptive City Limits will be the same as the City continues to annex areas from Santa Fe County. A summary of the historical and future projected population for the City of Santa Fe through the Year 2040 is provided in Figure 4.

As shown on Figure 4, for the future planning horizon of 25-years, the future population for the City is estimated to be approximately 87,113 residents in the Year 2020 and 104,694 residents in the Year 2040.

It is important to note, the City's Long Range Planning Division estimates that at build-out, the population for the City will be approximately 105,000 residents. However, the time frame for when build-out is anticipated to be realized is not known. It is possible that build-out may not be realized until after the Year 2040 or could occur sooner if growth rates accelerate beyond what is currently anticipated. For the purposes of this Master Plan, achieving build-out over the 25-year planning horizon is considered to be reasonable and will provide a conservative basis for evaluating the WWTP facility.

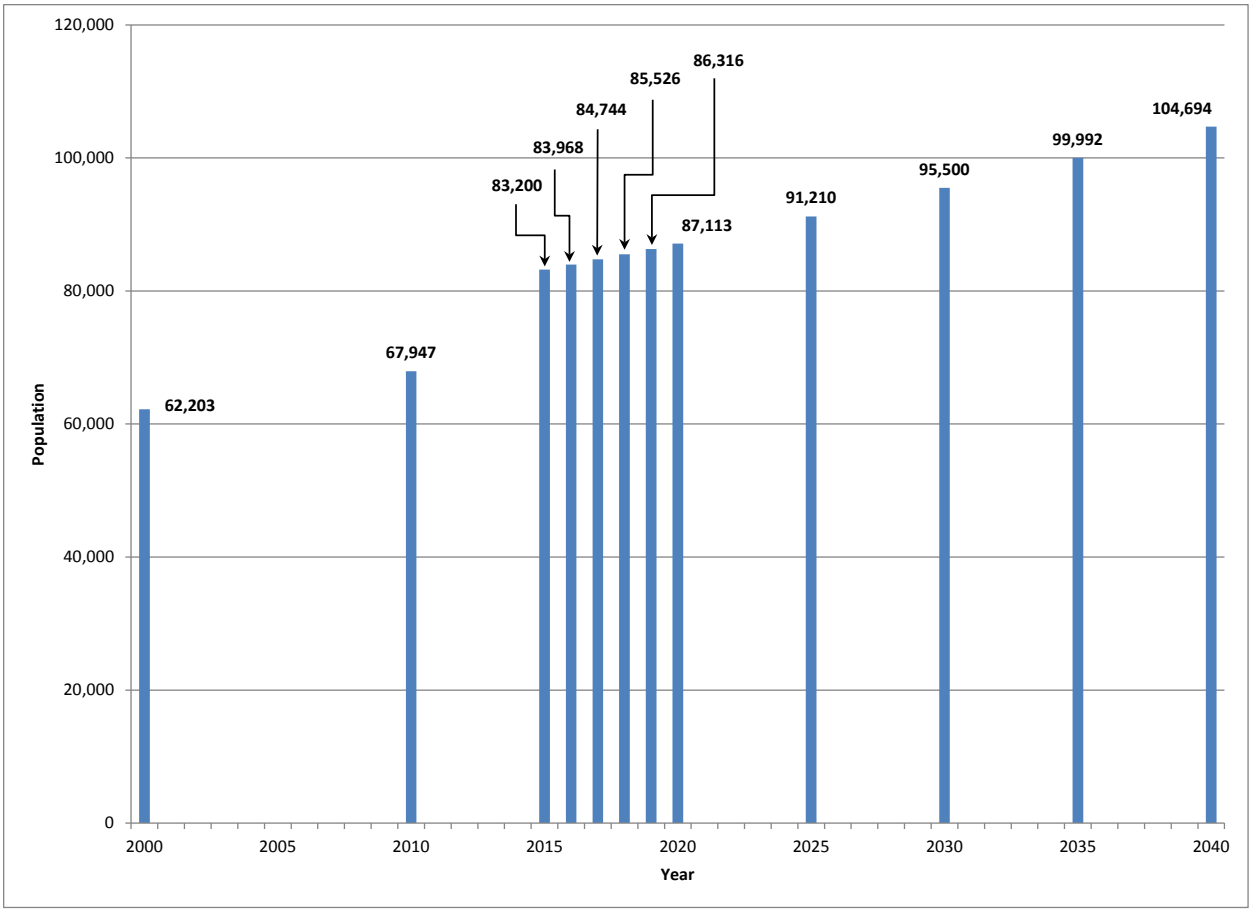


Figure 5-2: City of Santa Fe Historical and Future Projected Population

5.3 Calculation of Wastewater Flows based on Population and Historical WWTP Influent Flows

In the first method, flow projections for the WWTP were developed using the population projections in combination with historical influent flow data for the WWTP. The evaluation of historical influent flow data and flow projections are described in the following sections.

5.3.1 Historical WWTP Influent Flows

In 2006, HDR was contracted by the City's Wastewater Management Division to provide a process assessment of the WWTP to evaluate improvements to be completed as a part of CIP No. 932 which included two new final clarifiers, one new dissolved air flotation (DAF) unit, and a Class A sludge composting facility. The process assessment included an analysis of historical flows and loads to evaluate the performance of existing units in relation to industry standards, evaluation of treatment alternatives to address observed increases in biochemical oxygen demand (BOD) and total suspended solids (TSS) influent concentrations, and sizing of the new process units proposed by the City.

As a part of the project completed in 2006, HDR analyzed four years of historical flow and performance data (June 2001 to March 2005) for the WWTP and reviewed the 1996 Master Plan Report compiled by Greeley and Hansen (GH). HDR updated the findings of the GH report using the more recent historical data. Table 4 summarizes the GH (1996) and HDR (2006) flows for a 40-year projection period through 2045 and is provided as a reference for comparison to updated projections completed herein.

Table 4: Historic and Projected Influent Flows from 2006 HDR Study

	Flow (MGD)			
Parameter	**Year 2006**		**Year 2045**	
	HDR	**GH**	**HDR**	**GH**
Average Flow Rate	5.4	-	12.0	12.5
Max Month Flow Rate	-	-	13.5	13.75
Peak Hour Flow Rate	-	-	27	27

As part of the 2006 study, it was determined that between 1996 and 2006, there was a significant increase in TSS, BOD and Chemical Oxygen Demand (COD) concentrations and a corresponding decrease in flow relative to the population. These trends are likely due to a combination of aggressive water conservation programs, low flow fixtures, more water efficient appliances, and completion of improvements to the collection system.

As a follow-up to the evaluation completed in 2006, an analysis on a subsequent dataset for a seven year period (January 2008 to December 2015) was completed as a part of this project. The data provided by the City included flows and concentrations for selected wastewater constituents/characteristics at the influent sampler for the WWTP.

It is important to note the influent sampler includes the raw influent from the collection system and the dewatering filtrate return stream from the WWTP. Based on sampling of the dewatering filtrate, which is described later in this report, the dewatering filtrate was determined to be less than one percent of the total flow for the WWTP.

The dataset provided by the City was first checked for erroneous or missing data. Due to large variability with the data, it was found that accurate flow and load measurements could not be determined for the data recorded prior to 2012. Figure 5 shows the influent flow data provided by the City from January 2012 through August 2015.

As shown in Figure 5, there is a significant drop in flow during the first half of 2012, with relatively steady influent flows following the mid-year 2012. Therefore, the analysis only considered the data from July 2012 through June 2015 which represents three consecutive years of complete data.

Based on evaluation of the historical influent flow data, it was determined that the WWTP treats an average annual flow of approximately 5.5 MGD.

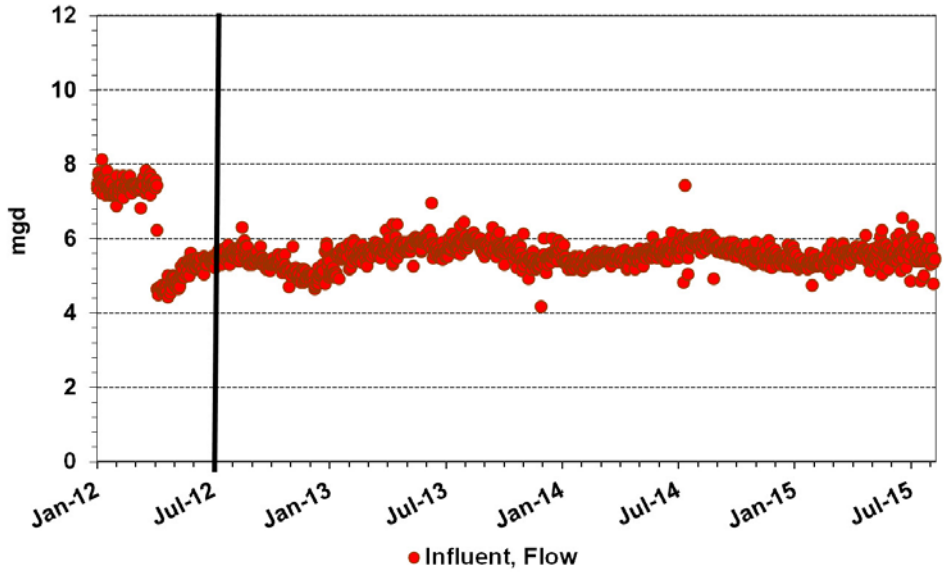


Figure 5-3: Historical WWTP Influent Flow Meter Data

5.3.2 Flow Monitoring

The historical influent flow for the WWTP was also confirmed as a part of a flow monitoring study completed by HDR in conjunction with the development of the Master Plan for the Paseo Real WWTP facility.

The City requested that HDR complete a flow monitoring study primarily to provide supplemental data for the City's Wastewater Management Division staff for their use in completing a Master Plan for the Sanitary Sewer Collection System.

The flow monitoring data was collected to obtain flow data for dry and wet weather conditions as needed to determine:

- Flow rates and diurnal patterns throughout the City's sewer collection system.

- Actual flows for the 11 major sewer basins established by the City's Wastewater Management Division staff and strategically selected trunk sewer lines.
- Average flow rates for the various types of land use within the City including residential (single and multi-family), hotel/motel, commercial, and industrial.

A comparison was made between the historical data for the influent flow meter at the WWTP vs. the data collected by the flow monitors in the sewer collection system.

The average flow for the WWTP was 5.42 MGD for the Year 2015 based on data for the influent flow meter provided by the City. For the corresponding period of the flow monitoring study (August 8, 2015 through November 23, 2015), the average flow recorded by the influent flow meter at the WWTP was 5.30 MGD.

During the period between September 10, 2015 and October 9, 2015, the flow monitors recorded an average dry weather flow of 5.45 MGD being conveyed to the WWTP which compares well to the average flow of 5.30 MGD recorded by the WWTP influent flow meter during the period coincident with the flow monitoring study and the average flow of 5.42 MGD calculated for the Year 2015 from the historical data.

Appendix E includes additional discussion pertaining to the flow monitoring study and the results that were obtained.

5.3.3 Per Capita Wastewater Flow

The historical population and influent flow data was also used in determining the associated per capita wastewater flow. Corresponding population and influent flow data was available for the Year 2000 and 2015. For the Year 2000, the average daily influent flow rate to the WWTP was 6.5 MGD and the population was 62,203 for the City's municipal limits and 79,100 residents for the Presumptive City Limits. Based on these values the City's per capita wastewater flow was calculated to range between 81 and 103 gallons per capita per day (gpcd). For the Year 2015 the per capita flow was estimated at approximately 63 to 66 gpcd based on a population of 83,200 residents for the City's municipal limits, 87,200 for the Presumptive City Limits and average daily influent flow rate to the WWTP of 5.5 MGD.

The calculated per capita flow varies based on which population, the City's municipal limits or Presumptive City Limits, is used for completing the calculations. As stated previously, the WWTP provides service for the Presumptive City Limits. The Presumptive City Limits includes the City's municipal limits plus other areas outside that City within Santa Fe County that are scheduled to be annexed sometime in the future. The Presumptive City Limits provides the overall extent of the service area for the WWTP but it is known that not all residents residing within the region are connected to the sanitary sewer system. The actual population connected to the sanitary sewer system is likely somewhere between the population for the City and Presumptive City Limits. As a result, the range of per capital flows calculated provides a minimum and maximum basis for use in projecting future flows.

As is the case with the influent flow for the WWTP, the per capita wastewater flow for the City has decreased over the years. Based on comparison with typical rates for other US municipalities the per capita flow rate of 81 to 103 gpcd calculated for the Year 20000 is generally within the range of typical industry standards. The value of 63 to 66 gpcd calculated for 2015 is considered to be slightly low but is not exceptional. As noted previously, it is known that the City has implemented an aggressive water conservation program and other contributing factors such as low flow fixtures,

more water efficient appliances, and completion of improvements to the collection system have resulted in a reduction in the per capita flow rate. Additionally, the per capita wastewater flow is a combined flow since it includes all flow contributions to the WWTP which are from both residential and non-residential sources.

5.3.4 Wastewater Flow Peaking Factors

A peaking factor is defined as the ratio between various averaging periods. For example, the peaking factor for maximum average and average annual flows is the maximum month average flow (e.g., 30-day maximum average) divided by the annual average flow. Peaking factors for the raw influent flow were compiled for each year and projected forward based on population projections. This approach is commonly referred to as the calendar method, which is a statistical analysis method in which peaking factors are determined based on historical data for each calendar year. In this case, the calendar year refers to months from July through June of the following year (i.e., 12-consecutive months).

Table 5 provides a summary of the peaking factors determined from the data evaluation. Three independent peaking factors for each averaging period were developed for each 12-month period of interest (7/2012-6/2013; 7/2013-6/2014; 7/2014-6/1015). Of those data points per averaging period, the maximum peaking factor was conservatively used to populate Table 5. For example, the maximum month to average annual peaking factors for each year of the three-year period are 1.08, 1.07, and 1.07. The 1.08 value from July 2012 through June 2013 was used to populate Table 5.

Table 5: Wastewater Flow Peaking Factor with Respect to Average Annual Summary

Parameter	Max Month	Max Week	Max Day
Peaking Factor	1.08	1.13	1.18

5.3.5 Existing Wastewater Flows

The projected maximum monthly, maximum weekly, and maximum daily flows and loads can be determined by first determining the average annual flow and then applying the developed peaking factors. As indicated previously, the average annual flow for the WWTP was 5.5 MGD based on a review of the most recent influent flow data.

Table 6 provides a summary of the existing flows for the WWTP determined from the data evaluation and peaking factors.

Table 6: Summary of Existing Wastewater Flows based on Historical WWTP Influent Flow Data

Parameter	Flow (MGD)
Average Annual Flow	5.5
Max Day Flow	6.5
Max Week Flow	6.2
Max Month Flow	6.0

5.3.6 Wastewater Flow Projections based on Population and Historical WWTP Influent Flows

Based on completion of the data review and analysis above, estimates of the future flows to be conveyed to the WWTP were developed. Future flows were developed through the Year 2040 for an overall planning horizon of 25 years and were based on using the future projected population and the associated per capita wastewater flows.

A per capita wastewater flow of 66 gpcd was used for the period between 2015 and 2020. Due to the unpredictability associated with estimating future population the per capita wastewater flow of 81 gpcd was used for the period between 2020 and 2040 to provide a more conservative estimate of the potential flow for the years further into the future.

The resulting estimated average annual wastewater flows are 5.8 MGD for the Year 2020 and 8.5 MGD for the Year 2040. The flow for the Year 2040 represents an overall increase of approximately 55 percent over the flow for the Year 2015.

Table 7 provides a summary of the future flows for the WWTP.

Figure 6 provides a summary of the projected wastewater flows through the Year 2040.

Table 7: Summary of Projected Wastewater Flows based on Historical WWTP Influent Flow Data

Parameter	Year 2025					Year 2040			
	Average Annual	Max Month	Max Week	Max Day		Average Annual	Max Month	Max Week	Max Day
Flow (MGD)	5.8	5.8	6.6	6.8		8.5	9.2	9.6	10.0

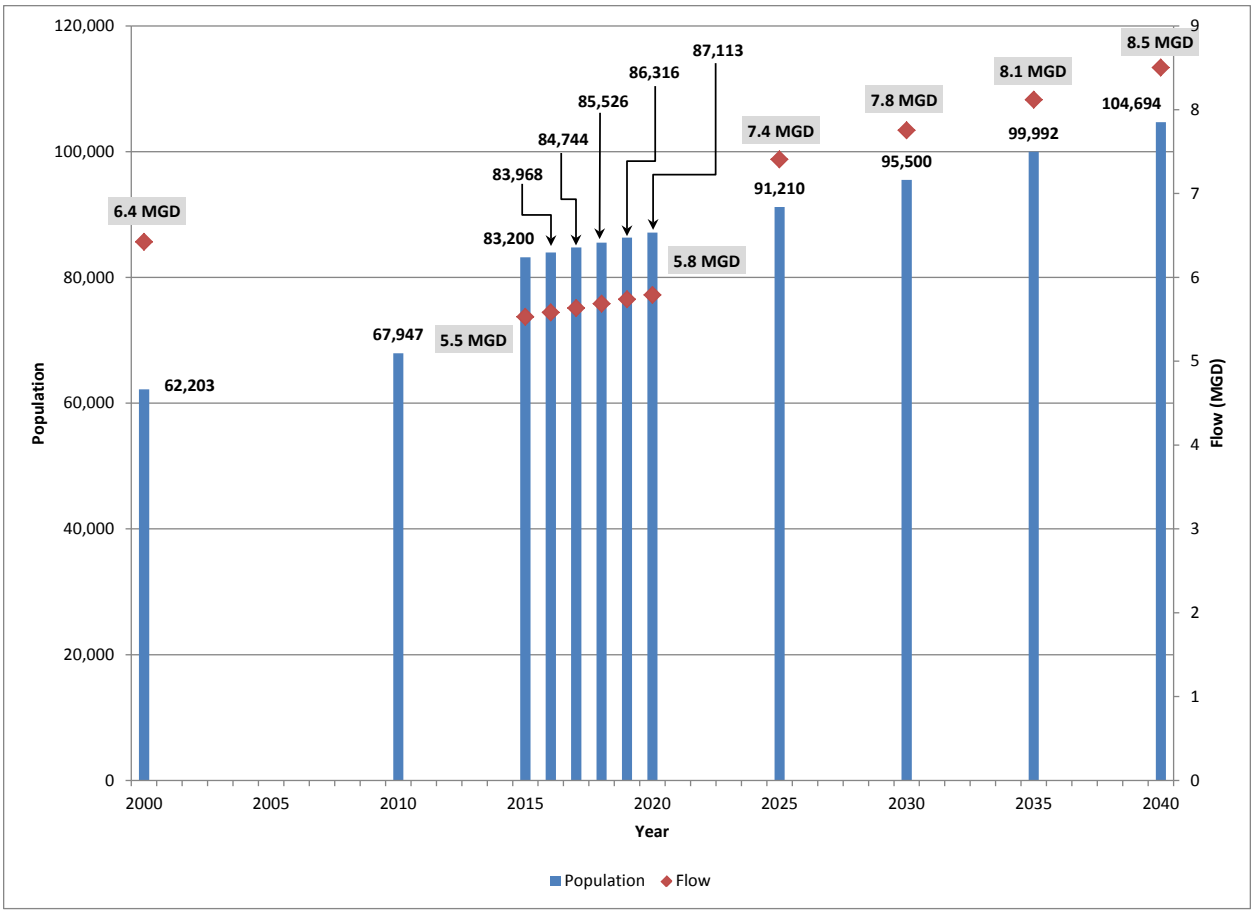


Figure 5-4: Wastewater Flow Projections based on Population and Historical WWTP Influent Flows

5.4 Calculation of Wastewater Flows based on Land Use and Zoning

In the second method, flow projections for the WWTP were developed using land use and zoning data in combination with the service area boundaries. The land use projections are described in the following sections.

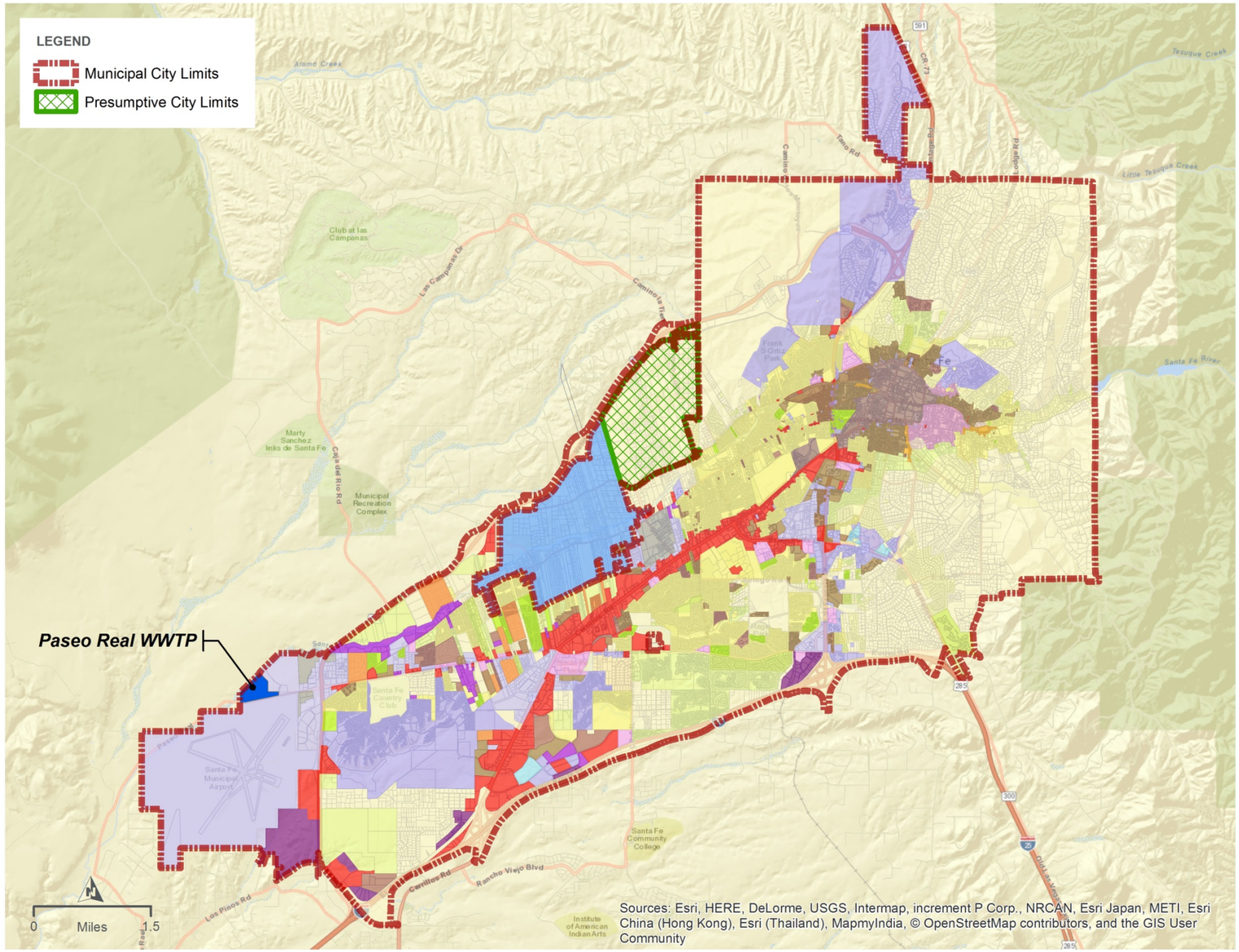
5.4.1 Existing Land Use and Zoning

The service area for the WWTP includes a variety of land uses. A limited review of the City's zoning code was completed to develop an understanding of the City's zoning guidelines and determined that the City's zoning code defines twenty-six (26) major zoning districts including residential and non-residential (i.e. commercial and industrial) land use. Table 8 provides a summary of the zoning categories and current distribution of each land use throughout the City. An illustration showing the distribution of land use and zoning throughout the sewer system service area is provided in Figure 7.

Table 8: City of Santa Fe Zoning Districts

Zoning Category	Description	Area (ft^2)	Area (acre)
Residential Land Use			
RR	Rural Residential	4,692,848	108
R1, R1PUD	Single Family Residential - 1 DU/Acre	594,194,095	13,641
R2, R2DT, R2PUD, R2AC	Single Family Residential - 2 DU/Acre	60,909,310	1,398
R3, R3PUD	Single Family Residential - 3 DU/Acre	89,547,428	2,056
R4	Single Family Residential - 4 DU/Acre	17,012,909	391
R5, R5DT, R5PUD, R5AC, R6, R6PUD	Single Family Residential - 5 to 6 DU/Acre	160,074,861	3,675
R7, R7I, R7PUD, R8	Single Family Residential - 7 to 8 DU/Acre	15,097,692	347
RC5, RC5AC	Residential Compound - 5 DU/Acre	882,171	20
RC8, RC8AC	Residential Compound - 8 DU/Acre	8,818,382	202
R10, R10PUD	Multiple Family Residential - 10 DU/Acre	4,674,411	107
R12, R12PUD	Multiple Family Residential - 12 DU/Acre	19,189,061	441
R21, R21PUD	Multiple Family Residential - 21 DU/Acre	38,020,167	873
R29, R29PUD, R29AC	Multiple Family Residential - 29 DU/Acre	8,388,616	193
RAC	Residential Arts & Crafts	1,720,312	39
MHP	Mobile Home Park	13,782,164	316
Non-Residential Land Use			
C1, C1PUD	Office and Related Commercial	19,864,768	456
C2, C2PUD	General Commercial	75,114,363	1,724
C4	Limited Office and Retail	520,446	12
HZ	Hospital Zone	3,075,768	71
BCD	Business Capital District	21,690,830	498
I1	Light Industrial	139,711,143	3,207
I2	General Industrial	10,682,675	245
BIP	Business Industrial Park	20,197,190	464
PRC, PRRC	Planned Community	158,938,435	3,649
SC1, SC2, SC3	Planned Shopping Center	12,215,817	280
MU	Mixed Use	11,208,276	257

Note:
Table includes zoning information for all areas within the City's municipal city limits with the exception of the Agua Fria Village. All other areas beyond the City Limits (i.e. Presumptive City Limits and other subdivisions) are excluded as zoning data for these areas was not available.



City Zoning

Residential Districts

- RR Rural Residential
- R1, (PUD) Single- Family 1du/ac.
- R2, (DT), (PUD),(AC) Single - Family 2du/ac
- R3, (PUD) Single - Family 3du/ac
- R4 Single - Family 4du/ac
- R5, (DT), (PUD), (AC), R6, (PUD) Single - Family 5-6du/ac
- R7, (I), (PUD), R8 Single - Family 7-8du/ac
- RC5, RC5AC Compound 5du/ac
- RC8, RC8AC Compound 8du/ac
- R10, (PUD) Multiple - Family 10du/ac
- R12, (PUD) Multiple - Family 12du/ac
- R21, (PUD) Multiple - Family 21du/ac
- R29, (PUD),(AC) Multiple - Family 29du/ac
- RAC Residential Arts & Crafts
- MHP Mobile Home Park

Non-Residential and Mixed Use Districts

- C1, (PUD) Office and Related Commercial
- C2, (PUD) General Commercial
- C4 Limited Office and Retail
- HZ Hospital Zone
- BCD Business Capital District
- I1, (PUD) Light Industrial
- I2 General Industrial
- BIP Business Industrial Park
- PRC, PRRC Planned Community
- SC1, SC2, SC3 Planned Shopping Center
- MU Mixed Use

Figure 5-5: Sewer System Service Area – Land use and Zoning

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The majority of land within the service area, approximately 70%, is comprised of residential land use (See Figure 7).

As indicated previously, the service area for the WWTP includes approximately 36,946 acres (62 square miles) of land but this includes all land (i.e. both developed and undeveloped). The existing service area includes a total of 38,627 parcels but all parcels do not currently contribute wastewater to the WWTP. Some parcels are currently served by on-site septic systems, some are not connected to an existing sewer main and some are vacant and/or undeveloped.

To determine the wastewater flow for existing conditions it was first necessary to identify the existing properties that currently contribute wastewater to the WWTP. For the purposes of this analysis, any parcel located within 50 ft of an existing sewer main was considered to be served by the WWTP. Based on this criteria, it was determined that approximately 33,776 parcels are currently located within 50 ft of an existing sewer main. These parcels encompass an area of 15,900 acres, which represents approximately 45% of the existing service area.

Next, these parcels were reviewed to determine their current development status (i.e. developed or vacant). Using a GIS layer of parcels provided to HDR by the City the status for each parcel (i.e. Vacant or Not Vacant) was reviewed and all parcels identified to be “Vacant” were removed from the data set. A total of 4,851 parcels were determined to be “Vacant”. Figure 8 shows all parcels located within 50 ft of an existing sewer main along with their corresponding status.

After identifying all developed parcels, the type of land use and zoning for each of these parcels was determined. Figure 9 shows the land use and zoning for all developed parcels.

The WWTP receives wastewater from both residential and non-residential (e.g. commercial and industrial) customers. A series of calculations were completed to determine the quantity of wastewater flow contributed by each customer category. The residential portion of the wastewater flow was determined first and was calculated based on estimating the number of dwelling units (DU’s) and equivalent population and then applying a typical per capita wastewater flow. The number of existing DU’s within each zoning category was estimated from a GIS layer of address points for the City provided to HDR. A review of this data indicated that an address point was assigned to any location containing a building or structure. For areas of residential land use, the GIS layer of address points was used to determine the number of DU’s within each zoning category. After determining the number of DU’s, the equivalent population was estimated based on assuming a population of 2 people per DU which was assumed based on information provided by staff from the City’s Long Range Planning Division. The previously calculated per capita wastewater flow of 66 gpcd was then used to estimate the estimated average dry weather wastewater flow for residential areas.

Based on the calculations the residential portion of the average dry weather wastewater flow was determined to be approximately 4,581,324 gallons per day or 4.58 MGD as summarized in Table 9.

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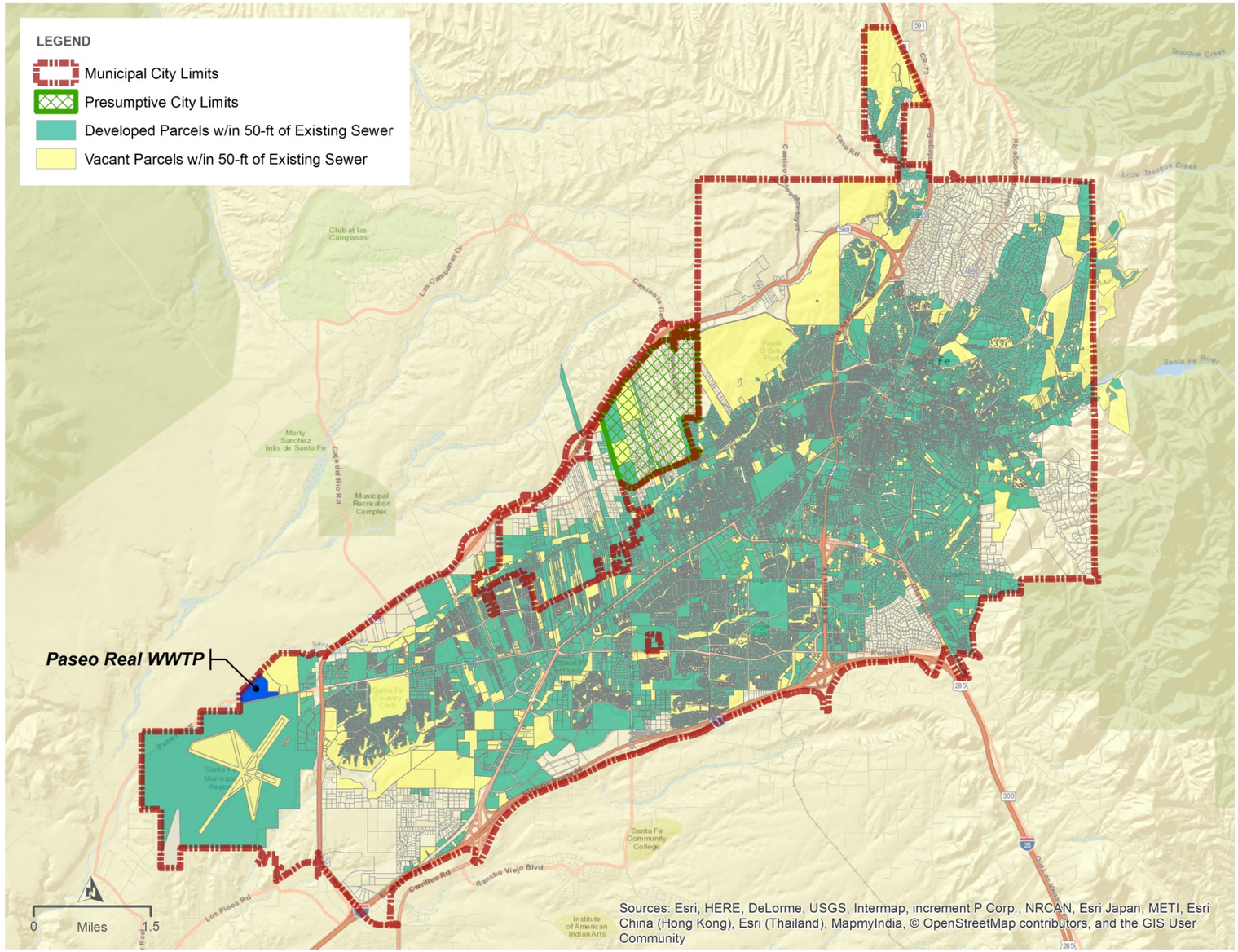
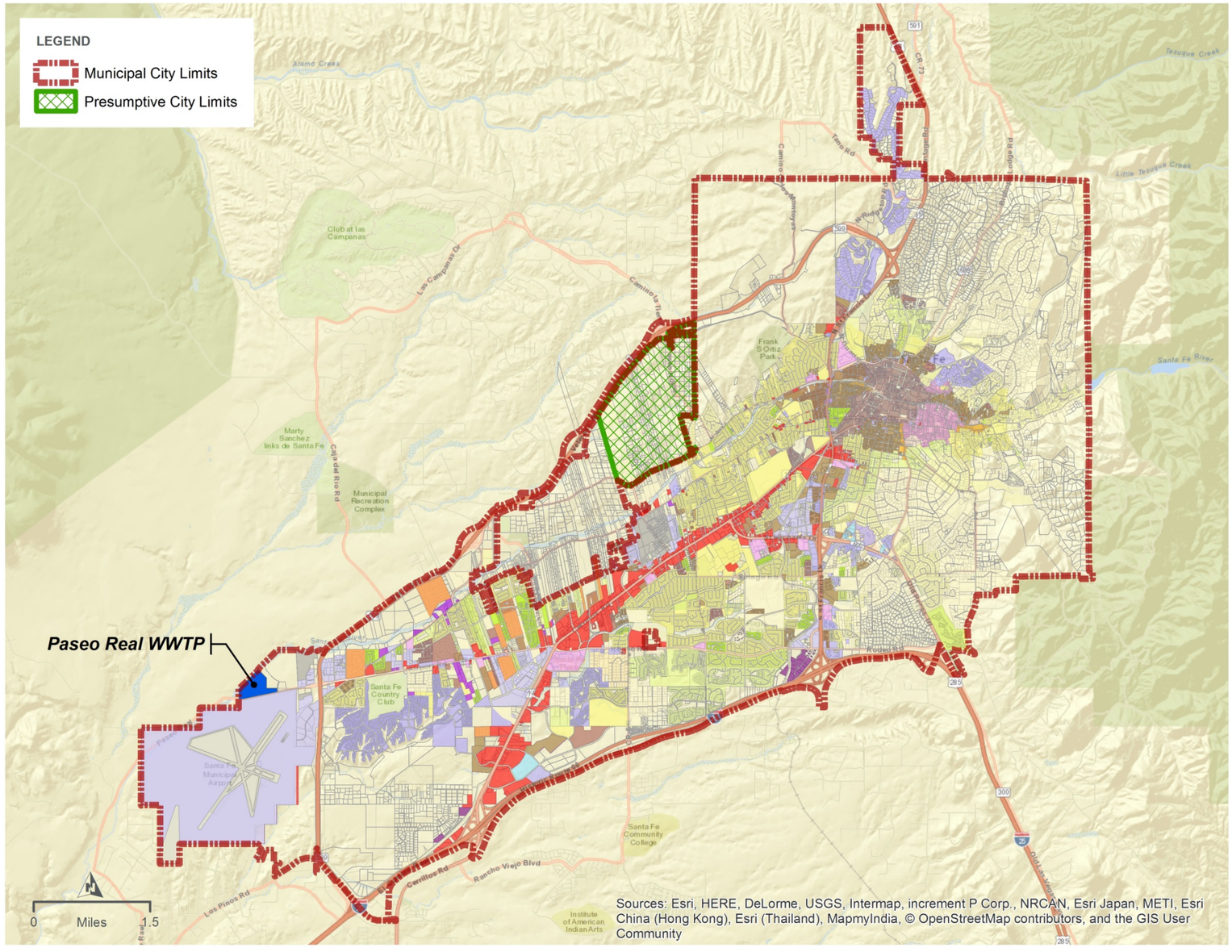


Figure 5-6: Existing Properties located within 50-ft of an Existing Sewer Main and Development Status



City Zoning

Residential Districts

- RR Rural Residential
- R1, (PUD) Single- Family 1du/ac.
- R2, (DT), (PUD),(AC) Single - Family 2du/ac
- R3, (PUD) Single - Family 3du/ac
- R4 Single - Family 4du/ac
- R5, (DT), (PUD), (AC), R6, (PUD) Single - Family 5-6du/ac
- R7, (I), (PUD), R8 Single - Family 7-8du/ac
- RC5, RC5AC Compound 5du/ac
- RC8, RC8AC Compound 8du/ac
- R10, (PUD) Multiple - Family 10du/ac
- R12, (PUD) Multiple - Family 12du/ac
- R21, (PUD) Multiple - Family 21du/ac
- R29, (PUD),(AC) Multiple - Family 29du/ac
- RAC Residential Arts & Crafts
- MHP Mobile Home Park

Non-Residential and Mixed Use Districts

- C1, (PUD) Office and Related Commercial
- C2, (PUD) General Commercial
- C4 Limited Office and Retail
- HZ Hospital Zone
- BCD Business Capital District
- I1, (PUD) Light Industrial
- I2 General Industrial
- BIP Business Industrial Park
- PRC, PRRC Planned Community
- SC1, SC2, SC3 Planned Shopping Center
- MU Mixed Use

Figure 5-7: Land Use and Zoning for Existing Properties located within 50-ft of an Existing Sewer Main

Table 9: Existing Wastewater Flow Calculation Summary – Residential Zoning Categories

Zoning Category	Area		No. of Existing DU's	Residents per DU	Estimated Population	Wastewater Generation Rate (gpcd)	Estimated Average Dry Weather Wastewater Flow (gpd)
	Square Feet	Acres					
RR	4,188,405	96.15	76	2	152	66	10,032
R1	153,578,136	3,525.70	2,148	2	4,296	66	283,536
R1PUD	7,752,270	177.97	188	2	376	66	24,816
R2	35,119,857	806.25	1,176	2	2,352	66	155,232
R2AC	77,229	1.77	33	2	66	66	4,356
R2DT	542,497	12.45	18	2	36	66	2,376
R2PUD	7,571,658	173.82	439	2	878	66	57,948
R3	24,087,111	552.97	1,629	2	3,258	66	215,028
R3PUD	13,308,212	305.52	1,231	2	2,462	66	162,492
R4	13,916,777	319.49	841	2	1,682	66	111,012
R5	108,310,479	2,486.49	10,104	2	20,208	66	1,333,728
R5AC	299,941	6.89	0	2	0	66	0
R5DT	360,344	8.27	39	2	78	66	5,148
R5PUD	1,303,615	29.93	177	2	354	66	23,364
R6	2,621,174	60.17	305	2	610	66	40,260
R6PUD	2,247,312	51.59	400	2	800	66	52,800
R7	5,880,533	135.00	957	2	1,914	66	126,324
R7I	93,162	2.14	18	2	36	66	2,376
R7PUD	2,432,186	55.84	391	2	782	66	51,612
R8	1,096,491	25.17	231	2	462	66	30,492
RC5	639,562	14.68	50	2	100	66	6,600
RC5AC	73,747	1.69	10	2	20	66	1,320
RC8	4,313,051	99.01	643	2	1,286	66	84,876
RC8AC	2,407,765	55.28	407	2	814	66	53,724
R10	3,156,767	72.47	446	2	892	66	58,872
R10PUD	124,358	2.85	18	2	36	66	2,376
R12	7,848,381	180.18	1,092	2	2,184	66	144,144
R12PUD	2,891,770	66.39	551	2	1,102	66	72,732
R21	22,796,102	523.33	4,551	2	9,102	66	600,732
R21PUD	4,594,866	105.48	1,771	2	3,542	66	233,772
R29	5,261,913	120.80	2,008	2	4,016	66	265,056
R29AC	15,328	0.35	1	2	2	66	132
R29PUD	1,294,308	29.71	751	2	1,502	66	99,132
RAC	1,236,951	28.40	199	2	398	66	26,268
MHP	12,345,216	283.41	1,808	2	3,616	66	238,656
Totals	**453,787,471**	**10,418**	**34,707**	-	**69,414**	-	**4,581,324**
	% of Total Area	**65.5%**				**% of Total Flow**	**65.4%**

For non-residential areas, the wastewater flow was calculated using typical industry standard wastewater generation rates in conjunction with the estimated area of land within each zoning category. Based on information obtained from industry guidance documents, commercial and business areas were assigned generation rates of 1,200 gallons per acre per day (gpd/Ac) while light, medium and heavy industrial areas were assigned wastewater generation rates of 500 gpd/Ac, 1,500 gpd/Ac and 6,000 gpd/Ac, respectively. Table 10 provides a summary of the land use types selected for each zoning category for the purposes of determining the corresponding wastewater generation rate.

Table 10: Relationship between Zoning Category and Land use Type

Zoning Category	Land use Type
C1, C1 PUD, C2, C2PUD, C4	Commercial and Business
HZ	Heavy Industrial
All BCD Categories	Commercial and Business
I1, I1 PUD	Light Industrial
I2	Medium Industrial
BIP*	Heavy Industrial
PRC, PRRC	Light Industrial
SC1, SC2, SC3	Commercial and Business
MU	Commercial and Business

For non-residential areas it was assumed that the developed area is approximately equal to ½ of the gross area. This assumption was based on information reviewed in the City's zoning code which indicates that for many of the business and commercial zoning categories, the maximum lot coverage allowable is 60 percent. Using the estimated developed areas for the non-residential parcels, the non-residential portion of the average dry weather flow was determined to be approximately 2,429,097 gallons per day or 2.43 MGD as summarized in Table 11.

Table 11: Existing Wastewater Flow Calculation Summary – Non-Residential Zoning Categories

Zoning Category	Total Gross Area (Sq. Ft.)	Total Gross Area (acres)	Developed Area (acres)	Wastewater Generation Rate (gpd/Acre)	Estimated Average Dry Weather Wastewater Flow (gpd)
C1	9,518,283	218.51	109.26	1,200	131,107
C1PUD	2,006,136	46.05	23.03	1,200	27,633
C2	36,693,251	842.37	421.18	1,200	505,421
C2PUD	6,337,375	145.49	72.74	1,200	87,292
C4	386,459	8.87	4.44	1,200	5,323
HZ	2,353,854	54.04	27.02	6,000	162,112
BCD	9,582	0.22	0.11	1,200	132
BCDALA	1,387,835	31.86	15.93	1,200	19,116
BCDBAR	435,144	9.99	4.99	1,200	5,994
BCDCER	1,066,937	24.49	12.25	1,200	14,696
BCDDON	408,902	9.39	4.69	1,200	5,632
BCDEAS	1,488,244	34.17	17.08	1,200	20,499
BCDLEN	42,958	0.99	0.49	1,200	592
BCDLOR	183,545	4.21	2.11	1,200	2,528
BCDMAR	1,629,203	37.40	18.70	1,200	22,441
BCDMCK	464,339	10.66	5.33	1,200	6,396
BCDOLD	282,655	6.49	3.24	1,200	3,893
BCDPLA	933,311	21.43	10.71	1,200	12,856
BCDRED	3,258,628	74.81	37.40	1,200	44,885
BCDROS	649,145	14.90	7.45	1,200	8,941
BCDSAN	793,613	18.22	9.11	1,200	10,931
BCDSTA	1,468,468	33.71	16.86	1,200	20,227
BCDWES	641,389	14.72	7.36	1,200	8,835
I1	97,178,273	2,230.92	1,115.46	500	557,731
I1PUD	1,500,647	34.45	17.23	500	8,613
I2	7,988,715	183.40	91.70	1,500	137,548
BIP*	2,493,789	57.25	28.62	6,000	171,750
PRC	38,049,054	873.49	436.75	500	218,373
PRRC	7,126,170	163.60	81.80	500	40,899
SC1	2,478,306	56.89	28.45	1,200	34,137
SC2	3,450,403	79.21	39.61	1,200	47,527
SC3	3,005,203	68.99	34.50	1,200	41,394
MU	3,168,386	72.74	36.37	1,200	43,642
Totals	**238,878,202**	**5,484**	-	-	**2,429,097**
	% of Total Area	**34.5%**		**% of Total Flow**	**34.6%**

Table 12 provides a summary of the existing flows for the WWTP determined from the land use and zoning data.

Table 12: Summary of Existing Wastewater Flows based on Land Use and Zoning Flow Data

Item	Flow (MGD)
Existing Wastewater Flow for Residential Zoning Categories	4.58
Existing Wastewater Flow for Non-Residential Zoning Categories	2.43
Total Existing Wastewater Flow	7.01

Based on the calculations completed, the total estimated average dry weather wastewater flow for the WWTP is approximately 7.01 MGD (4.58 residential + 2.43 non-residential). The residential portion constitutes 65 percent of the total flow while the non-residential portion of the total flow is 35 percent.

To evaluate the accuracy of the calculations completed, the flow estimated from land use and zoning data was compared to the historical WWTP influent flow meter data. As indicated previously, the City provided daily flows recorded by the influent flow meter at the WWTP for the period between July 2012 and June 2015. From this data the average daily flow for the WWTP was determined to be 5.5 MGD. Comparing the wastewater flow calculated using land use and zoning data with the actual flow observed at the WWTP, the calculated flow is significantly higher (7.01 MGD vs. 5.5 MGD).

Further evaluation of the calculations shows that the calculations determined a population of approximately 69,414 people for the residential areas which is lower than the population provided by the City which estimates the population to be approximately 83,200 residents as of January 1, 2016. Although a lower residential population was estimated, the residential portion of the flow was estimated to be 4.58 MGD or 65 percent of the overall wastewater flow. This value appears to be within reasonable accuracy and the discrepancy between the calculated flow and the actual flow observed at the WWTP is more likely associated with the wastewater flows estimated for the non-residential land use areas.

Wastewater generation rates for commercial and industrial facilities can widely vary based on the size and type of facility. According to industry guidance documents, wastewater generation rates can vary between 800 and 1,500 gpd/Acre for commercial facilities and 1,000 to 3,000 gpd/Acre for light to medium industrial facilities. Like most cities, the City of Santa Fe has a wide variety of commercial and industrial customers. A more accurate estimate of the wastewater generation rates for the City's commercial and industrial customers would require completing a more comprehensive evaluation of the water billing records for individual customers, which was not included in the scope of work for this project. These values can be refined if the City has evaluated water billing data and has this information readily available.

5.5 Wastewater Flow Projections Summary

Wastewater flows for the Paseo Real WWTP were developed using two methods. The first method estimated existing and future wastewater flows based on the historical influent flow data for the WWTP and population data. The second method developed existing wastewater flows using land use and zoning data.

Developing wastewater flow rates from actual WWTP historical operations data and population projections is a typical approach utilized for WWTP master planning. The estimate of the wastewater flow for the WWTP based on land use and zoning was completed as requested by the City primarily to assist the City with the Sanitary Sewer Collection System Master Plan being developed by Wastewater Management Division staff and for use in making comparisons with historical flow data projections for the WWTP. As discussed previously, the flows estimated using this method produced a clear discrepancy between the calculated flow and actual flow observed at the WWTP facility.

As a result, for the purposes of this project, it was decided to use the projected wastewater flow rates developed from actual WWTP historical operations and population data since this method produced flow rates that were viewed to be reasonable and consistent with what has been historically observed at the WWTP facility.

As summarized in Table 77 and shown in Figure 6, the estimated average annual wastewater flows for the Paseo Real WWTP are 5.8 MGD for the Year 2020 and 8.5 MGD for the Year 2040.

6 Determination of Influent Wastewater Characteristics

This section describes the approach used to develop the existing and projected wastewater characteristics and associated loadings. The following paragraphs describe the raw influent data, statistical method for evaluating the raw influent data, data validation, and future hydraulic loading projections.

6.1 Data Analysis and Validation

Historical data from 2008 to 2015 was used for analyzing the current combined loads. The data provided by the City included flows and concentrations for selected wastewater constituents/ characteristics at the plant influent sampler. Daily loads on a mass basis were calculated using the average daily flow and average daily concentration values (i.e., flow times concentration times 8.34 unit conversion). Loadings were analyzed for the averaging periods of interest (average annual, maximum month, maximum week, and maximum day).

Similar to the flow data discussed in Section 5, the wastewater characteristics dataset provided by the City was first checked for erroneous or missing data. Loading data prior to mid-2012 was not used due to the previously discussed flow meter issue. As a result, only the data for the Years 2012 through 2015 were considered in the analysis. Outliers in the dataset were examined for accuracy and were removed if found to be erroneous or inconsistent with other sampling data. Figure 10 shows influent TSS and BOD values from 2008 to 2015.

The influent TSS and BOD spiked to well over the typical upper limit of approximately 1,000 mg/L in mid-2010 and mid-2014. These elevated values were not consistent with other WWTP performance data during this timeframe. The data from other downstream unit processes for the same time period suggested no significant increase in influent TSS or BOD. Therefore, the circled values were removed from analysis.

Following removal of inconsistent concentration data, the influent loading was calculated by multiplying the influent flow times the concentration. Data prior to 2012 was not considered due to the flow meter issues which were discussed previously. A plot of the influent TSS and BOD loading

is provided in Figure 11. Vertical black lines were added to group data over a 12-month period. Prior to July 2012 and after July 2014, the data had significant scatter. In contrast, the data from July 2012 through June 2014 had minimal scatter. To verify this data trending, the influent ammonia, TKN, orthophosphate, and total loading are trended in Figure 12 and Figure 13. Similar to BOD and TSS, there was scatter prior to June 2012 but less pronounced scatter following July 2014.

As a result, the data was grouped in 12-month periods from July through the following June (e.g., July 2012 through June 2013) over three consecutive years. The flow and nutrient loadings used all three consecutive years (July 2012 through June 2015). The BOD and TSS loading did not include the most recent years dataset (July 2014 through June 2015) due to the previously mentioned data scatter from July 2014 through June 2015.

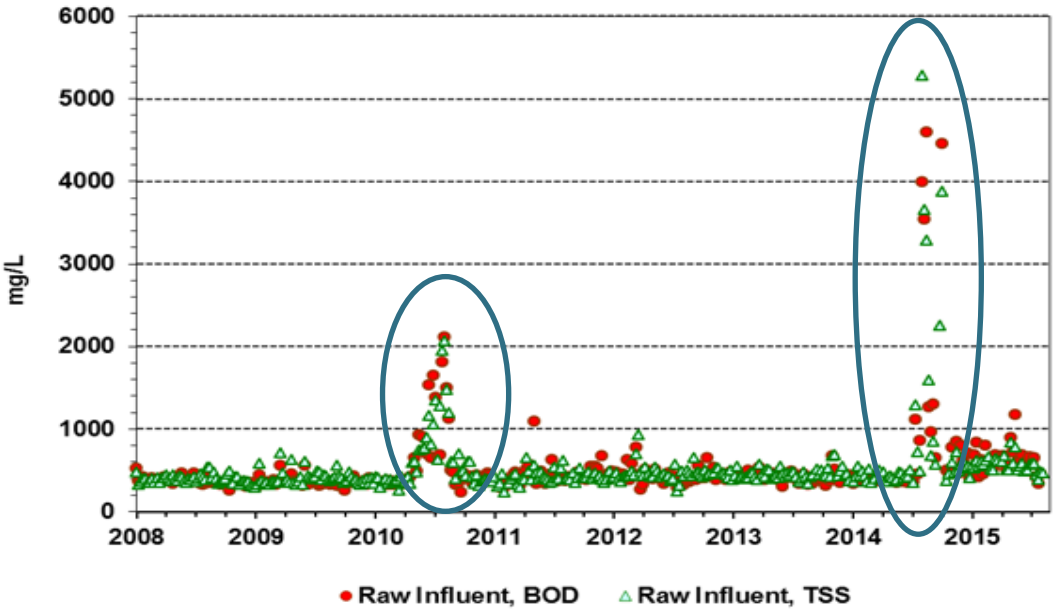


Figure 6-1: Influent TSS and BOD Concentrations with Inconsistent Data

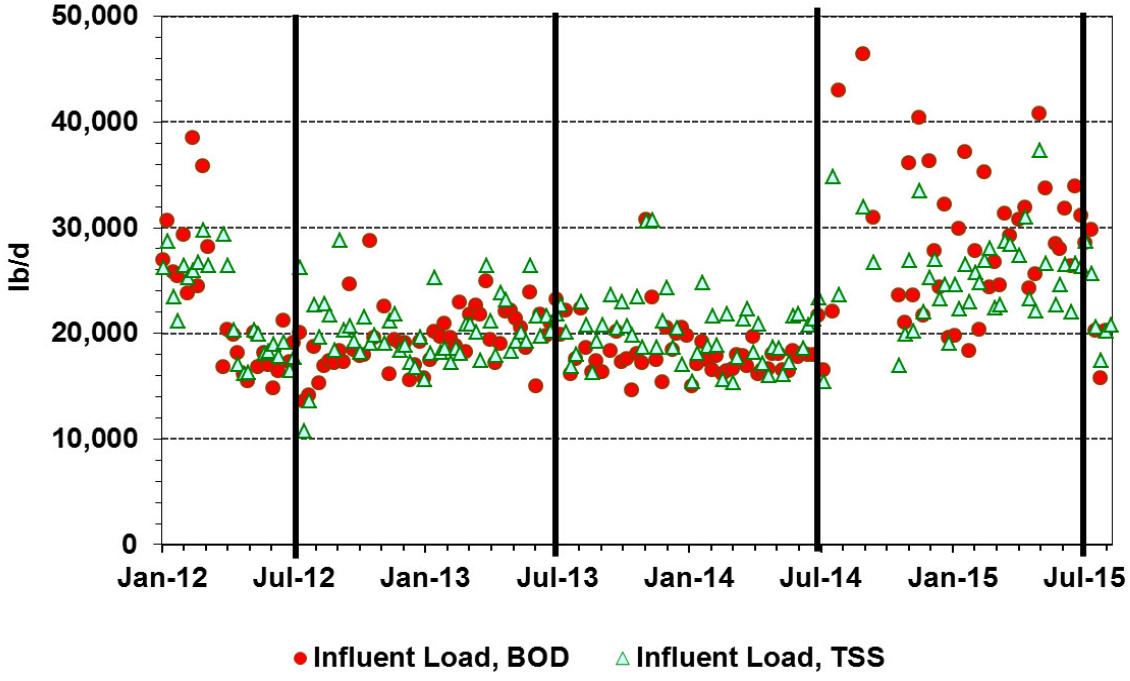


Figure 6-2: Influent TSS and BOD Loading (Removed Inconsistent Data)

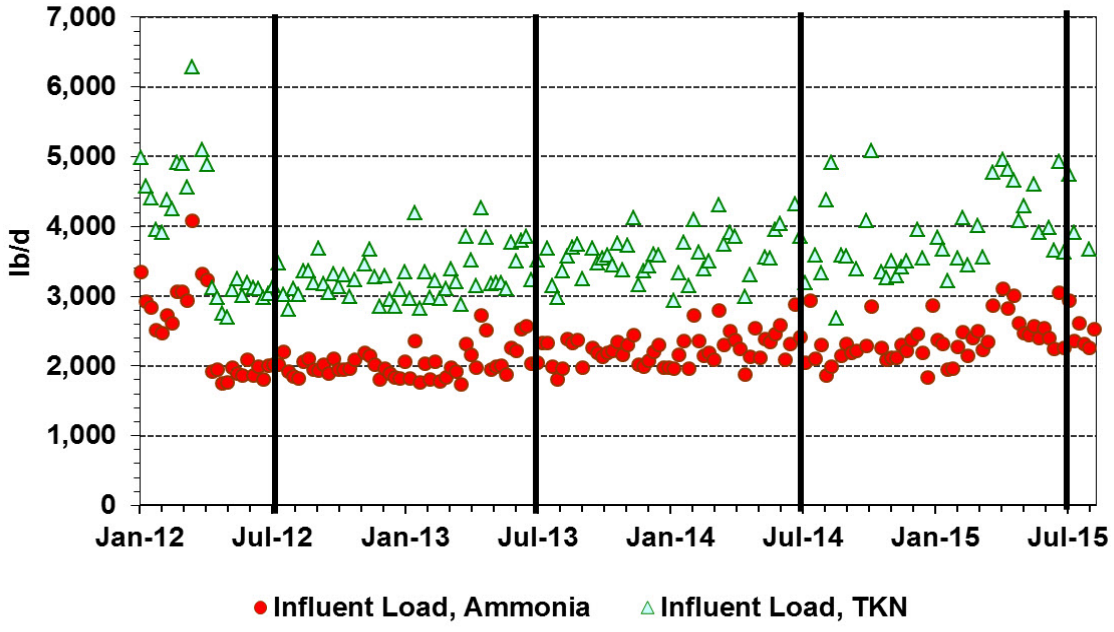


Figure 6-3: Influent Ammonia and TKN Loading (Removed Inconsistent Data)

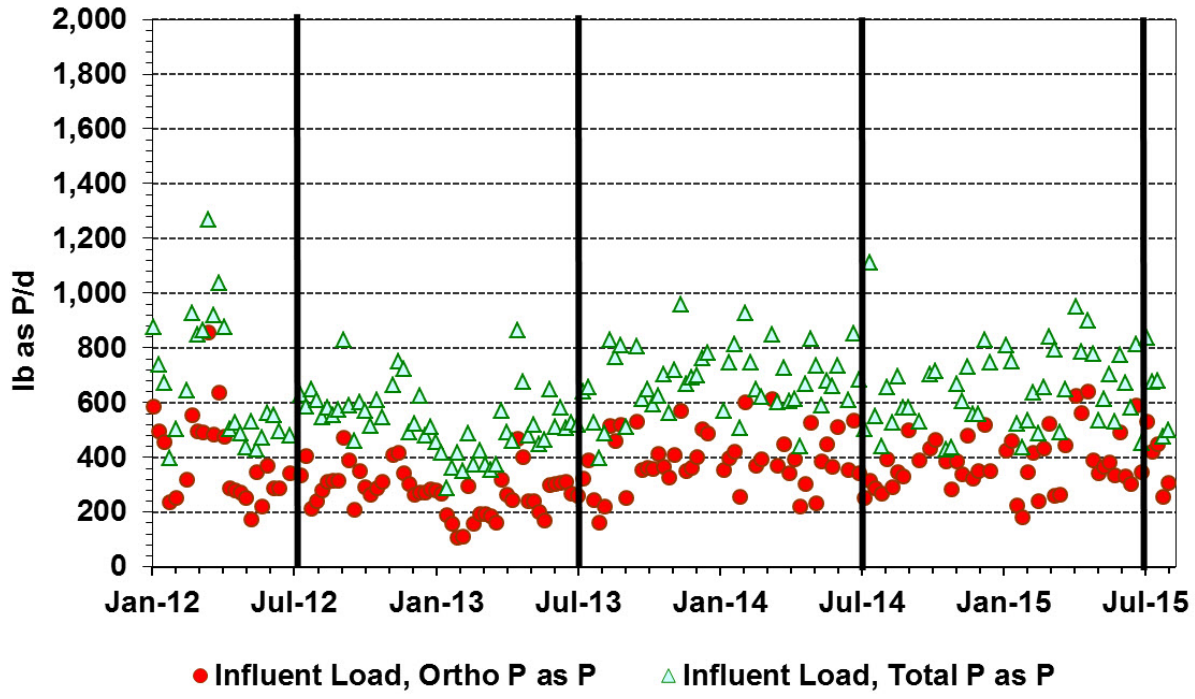


Figure 6-4: Influent Orthophosphate and Total Phosphorus Loading (Removed Inconsistent Data)

6.2 Raw Influent Data

As indicated previously, the influent sampler at the WWTP includes the combined flow of the raw influent from the collection system and the dewatering filtrate return stream from the WWTP. The dewatering filtrate only constitutes approximately four percent of the plant flow; however, it represents a significant portion of the combined influent nutrient loading. The dewatering return stream typically represents approximately 15 to 20 percent of the total nitrogen load for plants with digestion and dewatering. In order to develop accurate raw influent flows and loads, the filtrate flows and loads should be subtracted from the combined values (raw plus filtrate).

HDR requested filtrate data from the City to develop more accurate influent flows and loads, which was not available at the time of the request. Therefore, the City completed sampling and monitoring of belt filter press filtrate in December 2015. The results from three sampling events completed by the City are presented in Table 13. The first sampling event results had data that is not typical of what is observed at other plants. In addition, it was different from the subsequent sampling events. Therefore, the first sampling results were not considered when averaging the results of the various sampling events.

Table 13: Sidestream Sampling Results from December 2015 Sampling

Parameter	Units	Sample 1 (12/3/15)	Sample 2 (12/10/15)	Sample 3 (12/17/15)	Average of Samples 2 and 3
Flow *	gpm	60	60	60	60
Total Suspended Solids (TSS)	mg/L	5,260	1,213	1,038	1,126
Volatile Suspended Solids (VSS)	mg/L	3,880	907	800	854
BOD	mg/L		1,665	620	1,143
Ammonia Nitrogen	mg N/L	460	698	761	730
Total Kjeldahl Nitrogen	mg N/L	856	968	983	976
Orthophosphate	mg P/L	100	339	344	341
Total Phosphorus	mg P/L	42	299	303	301
Alkalinity	mg/L as $CaCO_3$	1,440	2,480	2,800	2,640
pH	s.u.	7.8	7.7	7.6	8
Temperature	degrees C	21	21	21	21

*Filtrate flow based on email correspondence with WWTP O&M staff.

A more detailed description of how the filtrate sampling results were subtracted from the combined influent is included in the following sections.

6.3 Wastewater Characteristics Peaking Factors

Similar to the approach utilized for developing peaking factors for flow, raw influent wastewater characteristic peaking factors were also compiled for each parameter on a yearly basis using the 12-month calendar method. The maximum peaking factor for maximum month, maximum week, and maximum day were used from the set of 12-month calendar values. As previously stated, the flow and nutrient loadings used data from July 2012 through June 2015 and the BOD and TSS loadings used data from July 2012 through June 2014.

When utilizing the 12-month calendar method for developing peaking factors for hydraulic loads, it is assumed that the quality of the water (e.g., concentration of the selected pollutants) and per capita flow rates remain relatively stable. Given that the City has already implemented aggressive water conservation and implemented improvements to the sewer collection system, such an approach is deemed reasonable as the per capita flows and concentrations are not expected to significantly change moving forward. A summary of the raw influent peaking factors for various wastewater characteristics are shown in Table 14.

Table 14: Summary of Peaking Factors for Influent Wastewater Characteristics

Parameter	Max Month	Max Week	Max Day
Biological Oxygen Demand (BOD) [1]	1.21	1.35	1.63
Chemical Oxygen Demand (COD) [1]	1.29	1.49	1.82
Total Suspended Solids (TSS) [1]	1.25	1.52	1.55
Ammonia Nitrogen [2]	1.19	1.30	1.45
Total Kjeldahl Nitrogen [2]	1.25	1.41	1.45
Orthophosphate [2]	1.41	1.97	2.73
Total Phosphorus [2]	1.30	1.62	2.00
Alkalinity [2]	1.19	1.30	1.44

1 Used data from July 2012 through June 2014 (2-consecutive years)

2 Used data from July 2012 through June 2015 (3-consecutive years)

6.4 Summary of Existing Flows and Loads

Flows and loads for the WWTP were determined based on the raw influent flows (i.e., subtracted the dewatering filtrate flows and loads). Maximum month, maximum week, and maximum day peaking factors from the combined influent flows were used. The current flows and loads for the City's WWTP are shown in Table 15.

Table 15: Summary of Existing Raw Influent Flows and Loads

Parameter	Units	Average Annual	Max Month	Max Week
Flow	MGD	5.5	6.0	6.2
BOD	lb/d	18,000	22,000	25,000
COD	lb/d	50,000	65,000	74,000
TSS	lb/d	20,000	25,000	30,000
Ammonia Nitrogen	lb N/d	1,700	2,100	2,200
Total Kjeldahl Nitrogen	lb N/d	3,100	3,800	4,300
Orthophosphate	lb P/d	190	270	370
Total Phosphorus	lb P/d	440	560	700
Alkalinity	lb $CaCO_3$/d	13,000	15,000	16,000
BOD	mg/L	400	450	480
COD	mg/L	1,100	1,300	1,400
TSS	mg/L	430	490	580
Ammonia Nitrogen	mg N/L	37	41	43
Total Kjeldahl Nitrogen	mg N/L	66	76	83

Table 15: Summary of Existing Raw Influent Flows and Loads

Parameter	Units	Average Annual	Max Month	Max Week
Orthophosphate	mg P/L	4	5	7
Total Phosphorus	mg P/L	9	11	14
Alkalinity	mg $CaCO_3$/L	270	300	310

6.5 Summary of Projected Flows and Loads

Based on the data review and analysis, the following summary of parameters is recommended for the development of the Wastewater Master Plan.

Existing Wastewater Flows (Year 2015)

- Average Annual Flow: 5.5 MGD – based on WWTP Influent Flow Meter Data
- Max Day Flow: 6.5 MGD – based on WWTP Influent Flow Meter Data
- Max Week Flow: 6.2 MGD – based on WWTP Influent Flow Meter Data
- Max Month Flow: 6.0 MGD – based on WWTP Influent Flow Meter Data
- Peak Wet Weather Flow: 11.26 MGD – based on 10/21/2015 storm event recorded by flow monitors

Wastewater Generation Rates for Wastewater Flow Projections based on Land use/Zoning

- Residential Land use
    - Maximum Density – As per City of Santa Fe Zoning Code
    - Estimated Flow per Capita for Determining ADWF: 78 gpcd
    - No. of Residents per Dwelling Unit: 2
- Non-Residential Land use
    - Business and Commercial: 1,200 gpd/acre***
    - Light Industrial: 500 gpd /acre***
    - Medium Industrial: 1,500 gpd/acre***
    - Heavy Industrial: 6,000 gpd/acre***

***Commercial/Industrial Land use Weighted Wastewater Flow Calculation

*ADWF = Gross Acres * Commercial-Industrial Wastewater Rate * 0.50 (Development factor)*

The peaking factors for flow and the other parameters are listed in Table 16. The peaking factors were used along with projected flows and 10- and 25-year planning periods to produce the projected raw influent flows and loads presented in .

Table 16: Peaking Factors for Wastewater Flows and Loads

Parameter	Max Month	Max Week	Max Day
Flow	1.08	1.13	1.18
Biological Oxygen Demand (BOD)	1.21	1.35	1.63
Chemical Oxygen Demand (COD)	1.29	1.49	1.82
Total Suspended Solids (TSS)	1.25	1.52	1.55
Ammonia Nitrogen	1.19	1.30	1.45
Total Kjeldahl Nitrogen	1.25	1.41	1.45
Orthophosphate	1.41	1.97	2.73
Total Phosphorus	1.30	1.62	2.00
Alkalinity	1.19	1.30	1.44

ADWF to PWWF Peaking Factor: 2.07

Table 17: Summary of Projected Wastewater Flows and Characteristics

Parameter	Units	Year 2025				Year 2040			
		Average Annual	Max Month	Max Week	Max Day	Average Annual	Max Month	Max Week	Max Day
Flow	MGD	7.4	8.0	8.4	8.7	8.5	9.2	9.6	10.0
BOD	lb/d	25,000	30,000	33,000	40,000	28,000	35,000	38,000	46,000
COD	lb/d	67,000	87,000	99,000	122,000	77,000	99,000	114,000	140,000
TSS	lb/d	26,000	33,000	40,000	41,000	30,000	38,000	46,000	47,000
Ammonia Nitrogen	lb N/d	2,300	2,800	3,000	3,400	2,700	3,200	3,500	3,900
TKN	lb N/d	4,100	5,100	5,800	6,600	4,700	5,900	6,600	7,600
Orthophosphate	lb P/d	250	350	490	680	290	410	570	790
Total Phosphorus	lb P/d	580	760	940	1,170	670	870	1,080	1,340
Alkalinity	lb $CaCO_3$/d	17,000	20,000	22,000	24,000	19,000	23,000	25,000	28,000
BOD	mg/L	400	450	480	560	400	450	480	560
COD	mg/L	1,100	1,300	1,400	1,700	1,100	1,300	1,400	1,700
TSS	mg/L	430	490	580	560	430	490	580	560
Ammonia Nitrogen	mg N/L	37	41	43	46	37	41	43	46
TKN	mg N/L	66	76	83	91	66	76	83	91
Orthophosphate	mg P/L	4	5	7	9	4	5	7	9
Total Phosphorus	mg P/L	9	11	14	16	9	11	14	16
Alkalinity	mg $CaCO_3$/L	270	300	310	330	270	300	310	330

7 Steady State Mass Balance

A steady state mass balance was developed for the Santa Fe WWTP using HDR's steady state mass balance program, ENVision. The ENVision program performs mass balance analysis for each major unit process at the plant (e.g., headworks, primary clarifiers, aeration basins, secondary clarifiers, etc.). For example, the mass balance analysis around the primary clarifiers is illustrated in Figure 14, where the primary influent load equals the sum of primary effluent and primary solids loads. The user has the ability to set the dimensions, the TSS removal across the primaries plus the primary solids thickness. Setting up a custom model for each unit process is critical for developing an integrated holistic plant wide mass balance. Once constructed, the mass balance provides a tool for determining unit process capacity, run simulations on projected flows and loads, and an unlimited amount of 'what-if' scenarios.

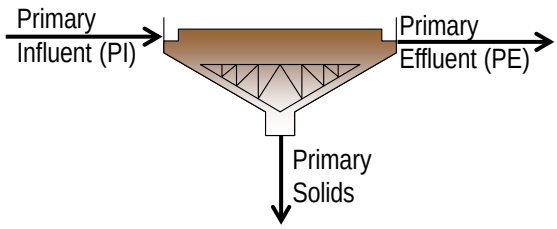


Figure 7-1: Primary Clarifier Mass Balance Process Schematic

The mass balance is used to evaluate the capacity of unit processes and evaluate WWTP process performance for 10-year and 25-year projected flows and loads. A screen capture of the ENVision model illustrating the Santa Fe WWTP processes is provided in Figure 15.

This section provides the approach used to calibrate the mass balance and the calibration results.

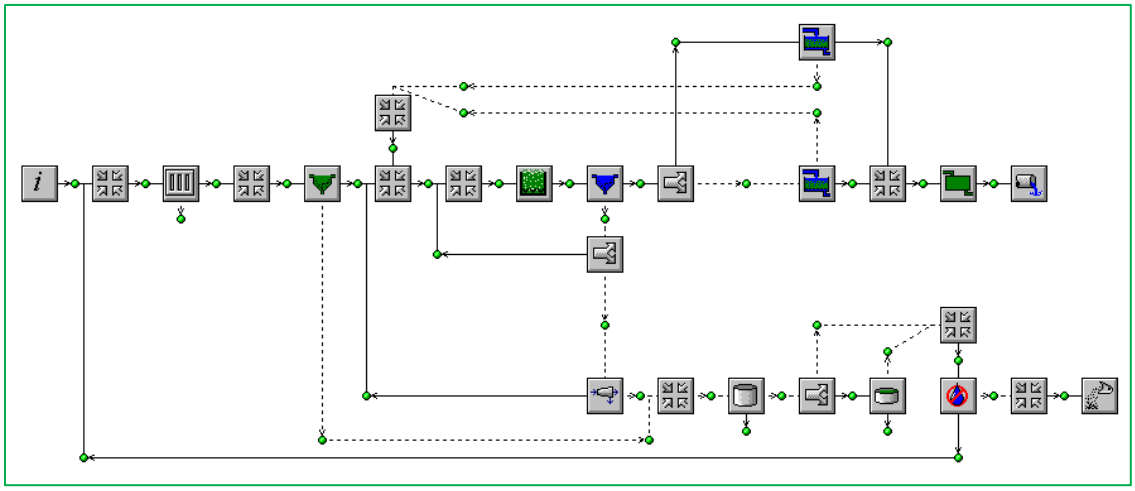


Figure 7-2: ENVision Sample Screen Capture Depicting Existing WWTP Unit Processes

7.1 Mass Balance Calibration

Following construction of a custom built mass balance specific for the WWTP, the user needs to define which dataset to calibrate against. Typically, the user selects the most recent dataset. The initial ENVision calibration applied this philosophy and used the most recent year of historical data (July 2014 through June 2015). Unfortunately, this resulted in a discrepancy in the solids balance. The approach to evaluate whether the discrepancy is model and/or historical plant data related was to investigate data trending at the raw influent, primary clarifiers, digester feed, and information gleaned from recent influent grab samples.

The solids discrepancy is thought to be due to the influent composite sampler (see Figure 11, Page 31) as the influent BOD and TSS values from July 2014 through June 2016 have considerable variability or scatter and increased overall. In order to investigate the viability of the influent July 2014 through 2015 influent TSS and BOD dataset, the historical raw influent TSS loads are compared against the primary effluent TSS levels as presented in Figure 16. The raw influent TSS has increased with more scatter over the last year; whereas, the primary clarifier effluent TSS load and concentration have remained relatively stable over the last few years. One would anticipate the primary clarifier effluent levels might increase with an increase in raw influent loads. Furthermore, the primary clarifier effluent concentrations would most likely not be as stable with such raw influent scatter from July 2014 through 2015.

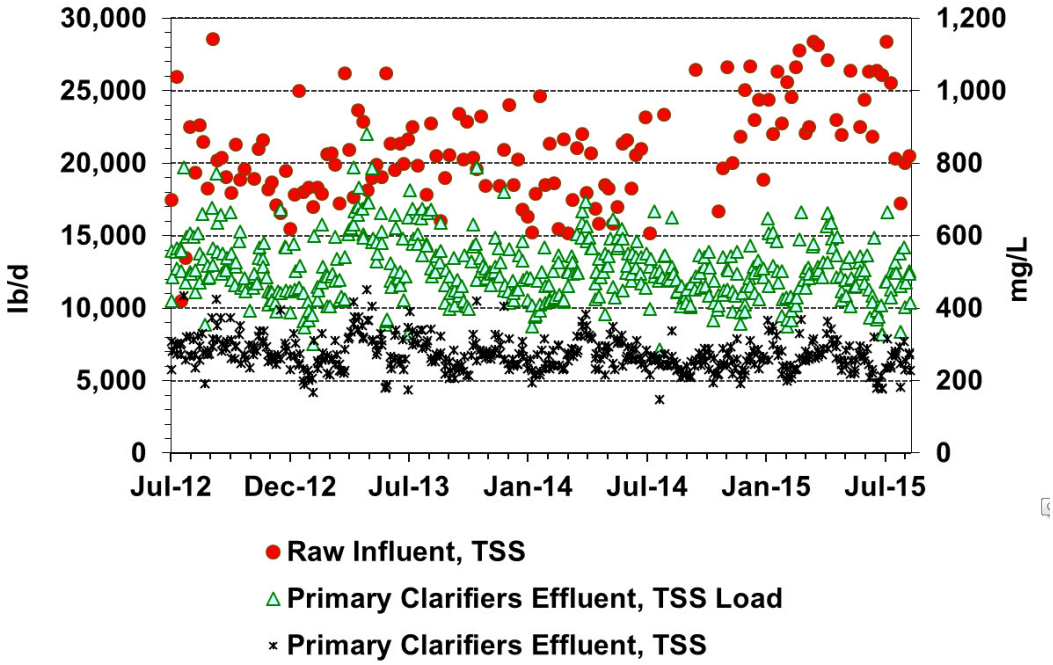


Figure 7-3: Raw Influent TSS and Primary Clarifier Effluent TSS Values over Time

Another dataset check was completed by plotting the raw influent TSS and digester feed total solids (TS) loads were compared over time as shown in Figure 17. Given that the primary effluent TSS is relatively stable over time (see Figure 16), the primary solids should increase with an increase in raw influent TSS loads. Despite an increase in raw influent TSS for July 2014 through June 2015, the digester feed TS is relatively stable over time.

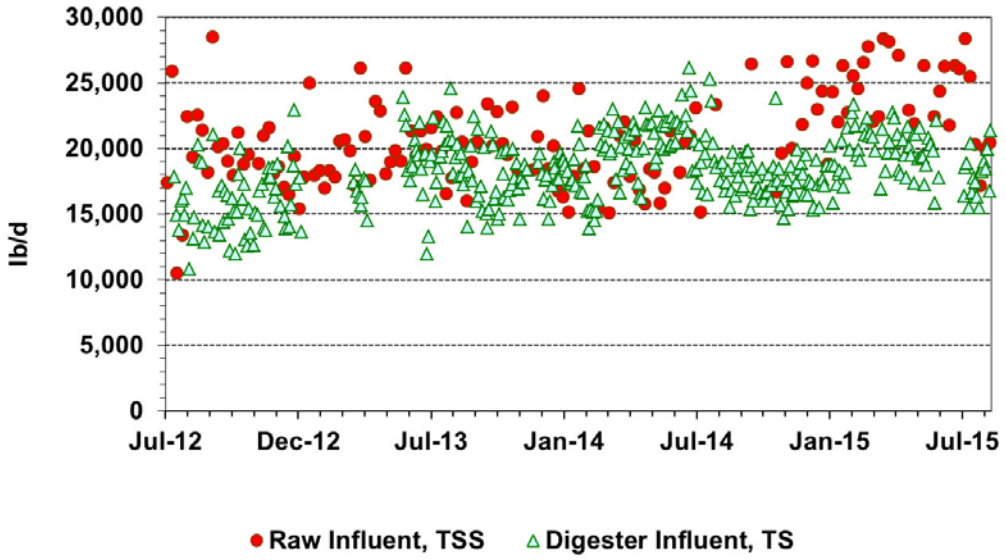


Figure 7-4: Raw Influent TSS and Digester Influent TSS Values over Time

The final check was to compare the composite sampler data against recent grab samples collected by the City. Samples taken at the influent sampler location (splitter box) were compared against samples taken at the grit tank effluent and the primary clarifier center tube. TSS and VSS were measured and the results suggest that the influent sampler values are approximately 100 to 130 mg/L greater than the grit tank effluent, whereas they should have the same value. The influent sampler values are approximately 50 mg/L greater than the primary clarifier center tube which includes the DAFT return stream. The influent sampler values are significantly greater than the other two sampling locations which further support the idea that the influent sampler most likely has sampling related issues.

Based on the data scatter and questions with the influent sampler, the most recent year of historical data (July 2014 through 2015) was replaced with data from previous years (July 2012 through July 2014) for calibrating the steady state mass balance.

7.2 Calibration: Liquid Stream

The steady state mass balance model was calibrated using historical plant performance data from 7/2012 through 6/2014. Table 18 presents a comparison of the historical WWTP performance data with the calibrated steady state mass balance. The accuracy of the calibration can be evaluated by a quantitative comparison of the actual and model values as the percent difference:

$$\text{Percent Difference} = \frac{\text{Mass Balance Data} - \text{Plant Data}}{\text{Plant Data}}$$

Typically, an accuracy of five percent or less is considered acceptable and values greater require further evaluation to determine reasons and any potential effect on model results. Detailed mass balance calibration results for existing and future conditions are included in Appendix F.

As discussed previously, the raw influent values from historical operations data had to be adjusted because the influent sampler includes the filtrate return sidestream. The adjusted raw influent was determined by subtracting the sidestream flows and loads from the influent sampler flows and loads.

Table 18: Historical Performance Data versus Mass Balance Values

Parameter	Units	WWTP Data	HDR Mass Balance	Delta, %
Raw Influent				
Flow	mgd	5.5	5.5	0%
BOD	lb/d	19,000	19,000	0%
TSS	lb/d	20,000	20,000	0%
Ammonia	lb N/d	1,800	1,800	0%
TKN	lb N/d	3,000	2,900	0%
Ortho P	lb P/d	190	190	-1%
Total P	lb P/d	450	450	0%
Primary Clarifier Effluent				
BOD	lb/d	15,700	15,700	0%
TSS	lb/d	12,800	13,300	4%
Ammonia	lb N/d	2,200	2,200	0%
TKN	lb N/d	3,500	3,000	-14%
TSS Removal	%			
Activated Sludge				
Anaerobic Selector Volume	MG	4at0.325Each	4at0.325Each	0%
Aeration Basins Volume	MG	6.52Total	6.52Total	0%
Aerobic SRT	d	9	9	0%
MLSS	mg/L	2,700	2,600	-4%
RAS, Flow	mgd	5.5	5.5	0%
RAS, TSS	mg/L	5,200	5,200	0%
Clarifier Effluent, Ammonia	mg N/L	1.1	1.2	5%
Clarifier Effluent, TSS	mg/L	10.1	10.1	0%
Effluent				
TSS	mg/L	1.79	1.79	0%
Total N	mg N/L	1.64	1.62	-1%
Total P	mg P/L	1.31	1.31	0%

In general, the steady state mass balance liquid stream calibration results were within acceptable ranges. All of the parameters were within the targeted five percent difference when comparing historical plant performance data and the mass balance with the exception of the primary effluent TKN. The TKN difference is 14 percent with a load difference of approximately 500 lb N/d. The

discrepancy is attributed to a combination of differences in the filtrate sidestream TKN load and TKN removal differences in the primary clarifiers. The difference will have minimal impact on the downstream aeration basins model.

A parameter that is important to note is solids capture in the primary clarifiers is lower than typical industry standard values. The historical primary solids capture from July 2012 through 2014 is on the order of 35 to 40 percent. The industry standard is on the order of 55 to 60 percent removal. The discrepancy is attributed to a combination of autosampler issues and/or the primary solids wasting strategy that is infrequent. Keeping dense primary solids blankets for a long duration can result in fermentation and subsequent hydrolysis of solids and re-suspension of solids that leave with primary effluent.

While the solids capture is less than ideal from a biogas and biosolids yield perspective, the aeration basins can currently handle the additional loading not removed in the primaries. In addition, the non removed loads are most likely assisting the WWTP with achieving such low discharge nitrogen levels as it requires soluble organics that are produced during fermentation.

7.3 Calibration: Solids Stream

The solids stream was also calibrated using historical plant performance data from 7/1/2012 through 6/30/2014. The calibration included solids stream from the primary and secondary clarifiers through the thickening, dewatering, digestion and disposal processes. The discrepancies between the historical data and model were more pronounced than liquid stream calibration. Solids measurement is typically less accurate than the liquid stream as it relies on grab samples plus flow meters are often impacted by scaling (grease, struvite). In situations where the difference between the historical data and model results were outside the five percent range, the more conservative value of the two was used while assigning capacity values. The discrepancies are discussed in the following sub-sections.

7.3.1 Primary Solids

The primary solids calibration is based on a simple mass balance where the primary solids loading is equal to the difference between influent and effluent solids loading. A graphical depiction of this is presented in Figure 14 (Page 37). Table 19 shows the comparison between historical primary solids performance data and predicted values from HDR’s mass balance.

Using historical primary influent and predicted effluent data the mass balance predicted primary solids loading is approximately 7,000 lb/d and historical performance data indicates 3,700 lb/d.

The discrepancy between the data and mass balance performance is significant. Given that the historical data inputs do not equal the outputs, it suggests a flow meter or sampler is not properly calibrated. The mass balance results are more conservative so that dataset will be used for sizing future facilities.

Table 19: Primary Solids Data versus Theoretical Solids Values

Parameter	Data (7/2012-6/2014)	HDR Mass Balance Results
Primary Influent	20,000 lb/d	20,000 lb/d
Primary Effluent	13,000 lb/d	13,000 lb/d
Solids Rem	36%	36%
Primary Solids Removed*	7,000 lb/d	7,000 lb/d
Primary Solids Data	3,700 lb/d	7,000 lb/d
Primary Solids Data	5.3%	5.3%
Primary Solids Data	0.009 mgd	0.017 mgd

*Primary Influent minus Primary Effluent

7.3.2 Waste Activated Sludge

The theoretical amount of sludge produced or yield during the biological secondary treatment process is a function of Mean Cell Residence Time (MCRT), also known as solids residence time (SRT), and the BOD loading into the aeration basins. The yield is quantified as follows:

$$\text{Yield} = \frac{\text{WAS Solids Load } (\frac{\text{lb}}{\text{d}})}{\text{BOD Fed in the Aeration Basins } (\frac{\text{lb}}{\text{d}})}$$

Figure 18 shows a graphical representation of the relationship between yield and the MCRT. Sludge production is inversely related to MCRT.

Neither the mass balance nor historical data track closely with the yield curve (Figure 18). The anticipated yield should be approximately 0.65 lb WAS per lb BOD but both are significantly higher. The higher values are attributed to the poor primary clarifier performance. Table 20 summarizes the discrepancy between the mass balance results and the historical data with regard to yield.

Similar to the primary solids, the difference between the historical data and mass balance performance is significant so the user has to be careful in how they interpret any solids stream scenarios. The more conservative values were used in the analysis.

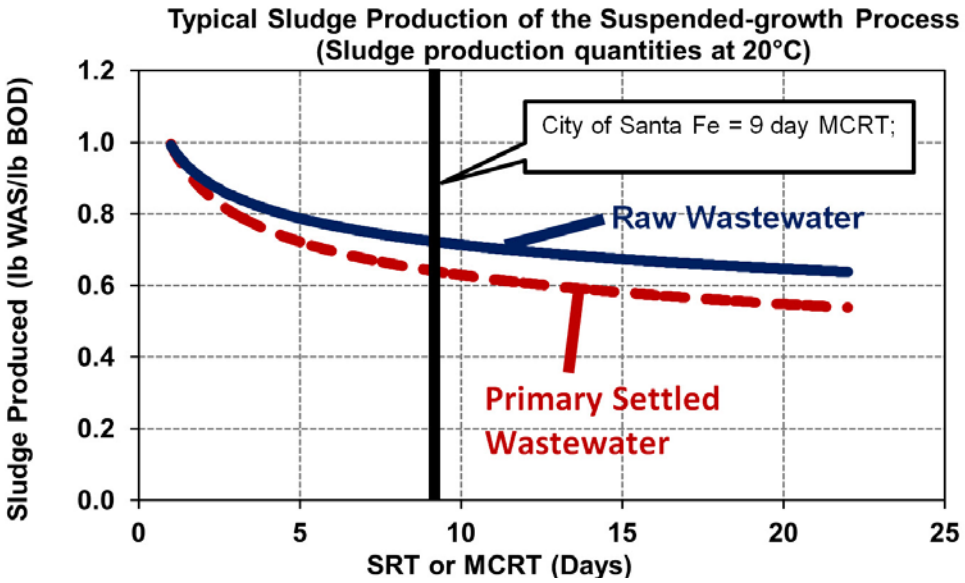


Figure 7-5: Typical Sludge Production of Suspended Growth Activated Sludge Processes (Benjes et al., 1995)

Table 20: Waste Activated Sludge Data versus Empirical Yield Values

Parameter	Data (7/2012-6/2014)	HDR Mass Balance Results
Feed Flow	5.5 mgd	5.6 mgd
MLSS	2,700 mg/L	2,600 mg/L
RAS Flow	5.5 mgd	5.5 mgd
WAS Flow	0.32 mgd	0.36 mgd
WAS TSS	5,200 mg/L	5,200 mg/L
Solids Yield* (lb TSS/lb BOD)	0.87	0.96

* HDR yield value is approximately 10 percent greater than City data

7.3.3 Digesters

Table 21 presents the digester steady state mass balance results calibrated against the historical plant performance data from 7/2012 to 6/2014. As expected, the upstream primary solids and WAS yield discrepancies impact the digesters calibration. The digester feed flows and corresponding loads are approximately 6 to 11 percent different. However, the historical digester feed and effluent concentrations are both within five percent of the mass balance. The key parameter associated with the variation is the flow which shows an 11 percent difference for the digester feed flow. The role of flow on digester capacity will be discussed further in the capacity section.

Table 21: Steady State Calibration at the Digester

Parameter	Units	Data (7/2012-6/2014)	HDR Mass Balance Results	Delta
Hydraulics				
Digester Flow (Total)	mgd	0.045	0.050	11%
Digester HRT (Total)	days	21	18	-10%
Feed Volatile Solids (VS)				
Digester Influent VS (Total)	lb/d	16,000	17,000	6%
Digester Influent VS (Total)	mg/L	42,600	40,800	-4%
Effluent Volatile Solids (VS)				
Digester Effluent VS (Total)	lb/d	7,400	7,800	5%
Digester Effluent VS (Total)	mg/L	19,700	18,700	-5%

8 Existing Plant Treatment Capacity

This section discusses the existing treatment plant capacity to identify if any unit processes are at or near capacity.

8.1 Approach

HDR's ENVision steady state mass balance program customized for the Santa Fe WWTP was used to evaluate the process loading and process performance. The calibrated model discussed in previous sections was used to rate the capacity of each major unit process. The calculated capacity was compared against future flow conditions as a means to identify if there are any limiting unit processes.

The individual treatment unit process capacities are based on typical industry standard design criteria and industry experience from HDR. A listing of typical liquid and solids stream criteria are provided in Table 22 and Table 23.

The calculated capacity values are translated to average annual (AA) values for processes governed by maximum month (MM), maximum week (MW), or maximum day (MD) averaging periods. The NDPES permit is based on a permitted capacity over a MM averaging period and the decision to translate to AA is because daily flow is most commonly recorded at the WWTP and referenced for

wastewater facility sizing. For example, the aeration system capacity is governed by MD and it is translated to AA using flow peaking factors. Hydraulic systems are governed by peak flows and the rated capacity values are listed as peak flow capacity. The pump station capacity is listed as the peak pumping capacity as another example.

Table 22: Liquid Stream Treatment Unit Capacity Criteria

Unit Process	Units	Capacity Criteria	Averaging Period	Source
Screens	mgd	Firm treatment capacity or ability to bypass/divert	Peak Flow	Engineer's Recommendation
Grit Removal	min	3	Peak Flow	Industry Standard
Primary Clarifiers – Detention Time	hr	2.0	AA	Engineer's Recommendation
Primary Clarifiers – Surface Overflow Rate	gpd/sf	1,250	MM	Engineer's Recommendation
Primary Clarifiers – Peak Surface Overflow Rate	gpd/sf	2,500	Peak Flow	Engineer's Recommendation
Aeration Basins – MLSS	mg/L	4,000	MM	Engineer's Recommendation
Aeration Basins – Oxygen Uptake Rate (OUR)	mg/L/hr	75	MM	Engineer's Recommendation
Secondary Clarifiers	gpd/sf	1,200	Max Day	Engineer's Recommendation
Secondary Clarifiers	lb/d/sf	30	MM	Engineer's Recommendation
Return Activated Sludge Pumping	%	100	MM	Engineer's Recommendation
Filtration – Average Loading Rate	gpm/sf	5	AA	For periods of water reclamation; 1 unit out of service
Filtration – Peak Loading Rate	gpm/sf	8	PH	For wet weather events; 1 unit out of service
Ultraviolet Disinfection	mgd	27	PH	Based on design to treat peak flows

Table 23: Solids Stream Treatment Unit Capacity Criteria

Unit Process	Units	Capacity Criteria	Averaging Period	Source
Dissolved Air Flotation Thickener	gpd/sf	400	MM	Industry Standard
Dissolved Air Flotation Thickener	lb/d/sf	20	MM	Industry Standard
Anaerobic Digester Hydraulic Residence Time	days	15	MM	USEPA 503 Regulations for Class B Biosolids
Belt Filter Press	hr/week	168	MM	Based on 24/7 operation
Belt Filter Press	gpm/m	100	AA	Engineer's Recommendation
Belt Filter Press	lb/hr/m	600	AA	Engineer's Recommendation

8.2 Results

The liquid and solids stream capacity analyses are summarized in the following sub-sections. The focus is on the major unit processes that would require significant capital improvement project funding.

8.2.1 Liquid Stream Capacity

The liquid stream capacity per major unit processes was evaluated based on the historical dataset used for the flows and loads. Figure 19 presents the loading and/or hydraulic based capacity for the major unit processes. The following sub-sections discuss details for unit processes presented in Figure 19.

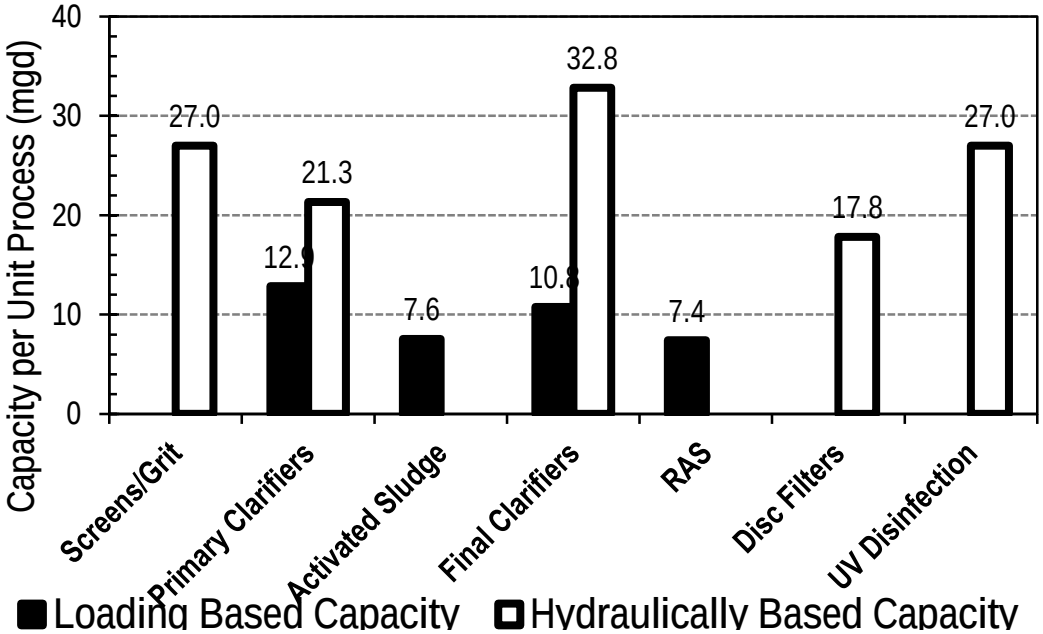


Figure 8-1: Liquid Stream Capacity Analysis

8.2.1.1 Headworks (Screens and Grit)

The screens and grit equipment are governed by hydraulic capacity. The screens (2 at 13.5 mgd capacity each) have a combined capacity of 27 mgd with the ability to manually bypass. This is sufficient capacity to handle the peak wet weather flows projected at the plant over this planning horizon.

The aerated grit equipment was evaluated using the Water Environment Federation Manual of Practice Number 8 (WEF MOP8) recommended 3 min HRT. The HRT at 27 mgd is approximately 3.5 minutes. As a result, the limiting equipment at the headworks is the screens. A picture of the existing grit classifier is provided in Figure 20.

Figure 8-2. Picture of the Existing Grit Classifier Equipment

8.2.1.2 Primary Clarifiers

Primary clarifiers do not have a “rated process capacity” in the traditional sense because they are not the final treatment process. A primary clarifier can be overloaded without compromising the ability of the plant to meet permit, provided that downstream processes can treat the increased load due to poorer primary removal efficiencies. The removal efficiency or targeted capacity of the primary clarifiers is therefore a process decision where one balances the cost of additional primary clarification with increased cost of secondary treatment.

A picture of the primary clarifiers and solids pumps used for solids separation is provided in Figure 21. The primaries were evaluated using a combination of HRT at 2 hr for average annual conditions and hydraulic loading criteria (1,250 and 2,500 gpd/sf for maximum month and peak wet weather flow, respectively). The criteria are based on engineer’s best judgment from previous project experiences.

The 2 hr HRT under average annual conditions translates to a capacity of 12.9 mgd. This value is represented by the filled in bar in Figure 19. The hydraulic loading is limited by the peak wet weather flow (2,500 gpd/sf for 27 mgd peak flow) which translates to 21.3 mgd.

While the ability to handle peak wet weather flow is limiting the overall process capacity in the traditional sense, this limitation is not sufficient to support recommending an additional primary

clarifier. The decision for not recommended an additional clarifier is based on the previous comment regarding primary clarifier treatment capacity. The modeled solids that might pass through the primaries during a peak event can be absorbed by the downstream activated sludge process.

Figure 8-3. Picture of the Existing Primary Clarifiers (Top) and Sludge Pumps (Bottom)

8.2.1.3 Activated Sludge Process

The activated sludge process includes the aeration basins, secondary clarifiers, aeration system, and return activated sludge (RAS) pumps. A picture of the aeration basins and final clarifiers is provided in Figure 22.

Figure 8-4. Picture of the Existing Aeration Basins (Top) and Final Clarifiers (Bottom)

The aeration basins and return activated sludge (RAS) pumps represent the liquid stream unit processes with the least amount of capacity. The limiting factor in the aeration basins is a combination of the mixed liquor suspended solids (MLSS) and oxygen uptake rate (OUR). The historical MLSS is plotted in Figure 23 where it averages approximately 2,600 mg/L. The capacity

criterion for MLSS is 4,000 mg/L, which will occur at approximately 7.6 mgd average annual flow conditions.

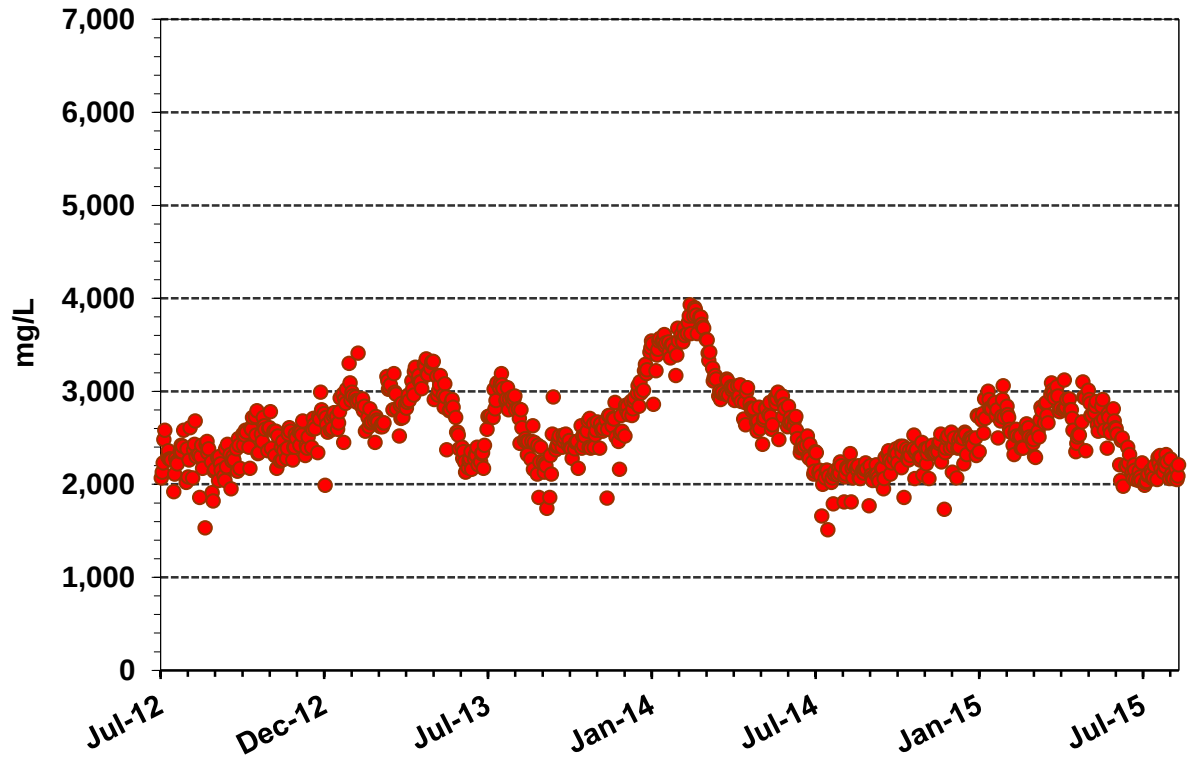


Figure 8-5. Historical Mixed Liquor Suspended Solids in the Aeration Basins

The 4,000 mg/L criterion is based on engineer's experience for carousal type activated sludge processes. The value is based on the ability to get oxygen into the basins, ability to mix, and the downstream solids separation. The WWTP does not appear to struggle with any of these so there might be potential to use a higher value than 4,000 mg/L.

It is recommended that the City consider adding a third aeration basin sometime between the 10-year and 25-year planning period. Both the MLSS and OUR criteria are based on industry standard values that in the case of OUR, could be challenged by actual OUR testing. The relationship between capacity and MLSS or OUR criterion is linear. For example, if either the MLSS or OUR criteria were 10 percent greater (e.g., OUR increased from 75 to 83 mg/L/hr) would result in 10 percent more aeration basin capacity. As a result, developing actual criterion values would serve the City well in identifying the actual year in which to implement a third aeration basin.

There are a couple strategies that could be implemented to cost effectively defer installation of a third basin. The strategies rely on reducing the loading to the aeration basins and in turn increasing the capacity. One such option is optimizing the primary clarifiers to capture more solids and organics. A potential strategy to facilitate that is to pump primary solids more frequently. HDR speculates that the primary solids blanket is so thick and dense that fermentation is occurring and in turn creating soluble organics and re-suspending previously settled material. Another option is implementing sidestream treatment. Such a strategy will reduce the loading and in turn overall solids production at the aeration basins. Implementation of either or both strategy will free up capacity and

defer installation of a third aeration basin to a later date. Of the two strategies, optimizing the primaries should be the most cost effective and result in the largest reduction in mixed liquor.

Using the RAS criteria (100 percent Maximum Month aeration basin feed flow), the RAS pumping capacity indicates the system is approaching capacity at approximately the 10-year planning period. The RAS capacity is coupled with the secondary clarifier capacity, which has surplus capacity. Therefore, the RAS pumping capacity has some flexibility with capacity because the secondary clarifiers can absorb additional solids not returned to the aeration basins as flows increase above 7.4 mgd. As a result, it is recommended that the RAS pumping station be monitored for capacity as flows increase but additional pumps are not required from a process operation perspective. Monitoring of the secondary clarifiers sludge blanket can be used as an indicator to determine when pumps are at capacity. If the sludge blanket increases above levels where solids start to re-suspend before the RAS pumps can reduce the blanket to a satisfactory level then the City should reevaluate the need for additional pumping capacity.

8.2.1.4 Filtration

The WWTP has a combination of granular media filters (2 in total) and disk filters (3 in total). The granular media filters are not in operation and the disk filters treat all the flow. A picture of the disk filter is provided in Figure 24.

Figure 8-6. Picture of the Existing Disk Filtration Equipment

A plot of the historical disk filter loading rate (gpm/sf) based on the assumption of two out of three units in service in provided in Figure 25. The highest loading rate with one unit out of service is 3.2 gpm/sf, which is well below the criterion.

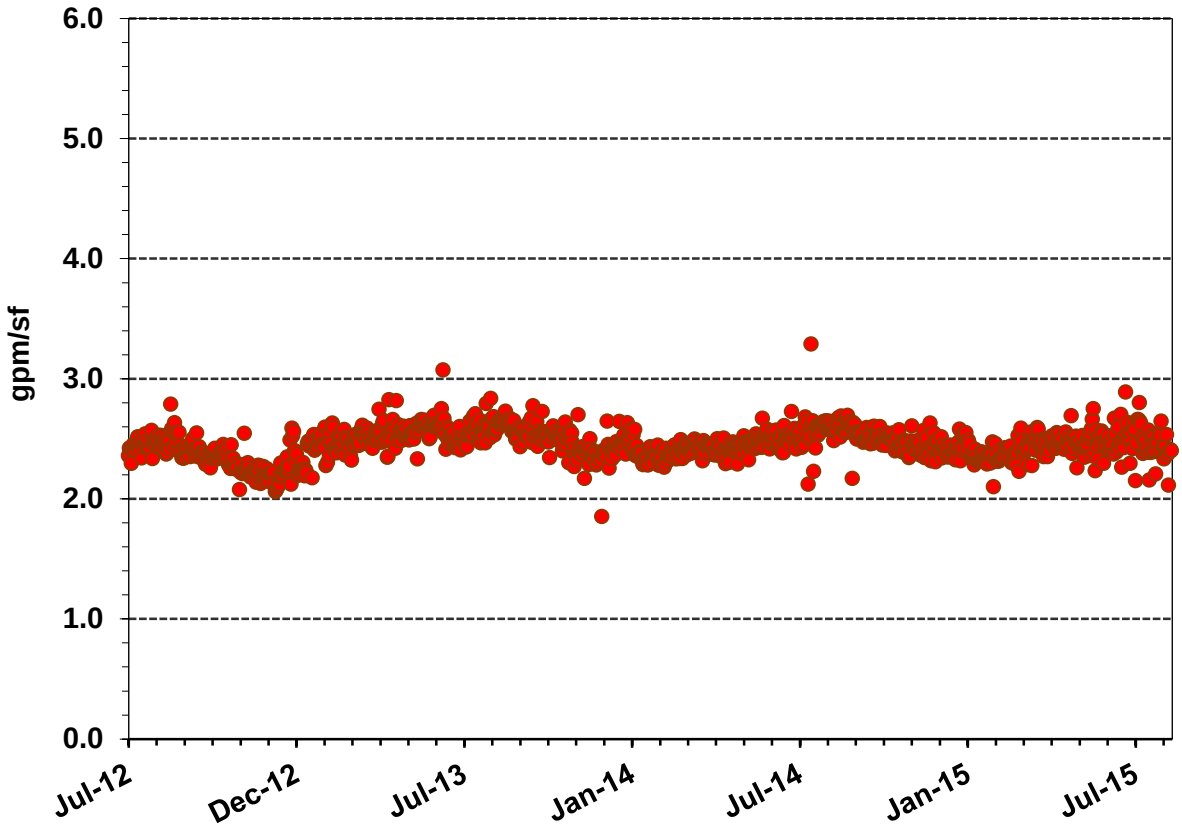


Figure 8-7. Historical Filtration Loading Based on 2 out of 3 Disk Filters in Service

The current loading rates are well below the criterion of 5 gpm/sf (with one unit out of service) for average annual) and 8 gpm/sf (with one unit out of service for peak flows). Of these criteria, the peak flows govern the capacity. The disk filters have a 17.8 mgd peak flow capacity which is well below the 27 mgd peak wet weather flow. However, the capacity is 27 mgd with all three units in service. Additionally, the WWTP could always bring the granular media filters back on-line if the disk filter performance declined over time. Rather than construct a fourth disk filter to satisfy the 8 gpm/sf (with one unit out of service at peak flows), the WWTP should consider a management strategy to operate all three units in service during peak events and/or have a strategy in place to bring the granular media filters online (if necessary).

8.2.1.5 Disinfection

A picture of the UV disinfection system is provided in Figure 26. The system was sized to treat a peak flow of 27 mgd based on previous planning documents completed for the facility. In general, the overall treatment performance of processes upstream of the UV system has improved resulting in a higher effluent quality, which also improves the potential UV capacity. Therefore, an increased capacity is anticipated for the UV system, which is represented by the greater than symbol in the capacity chart.

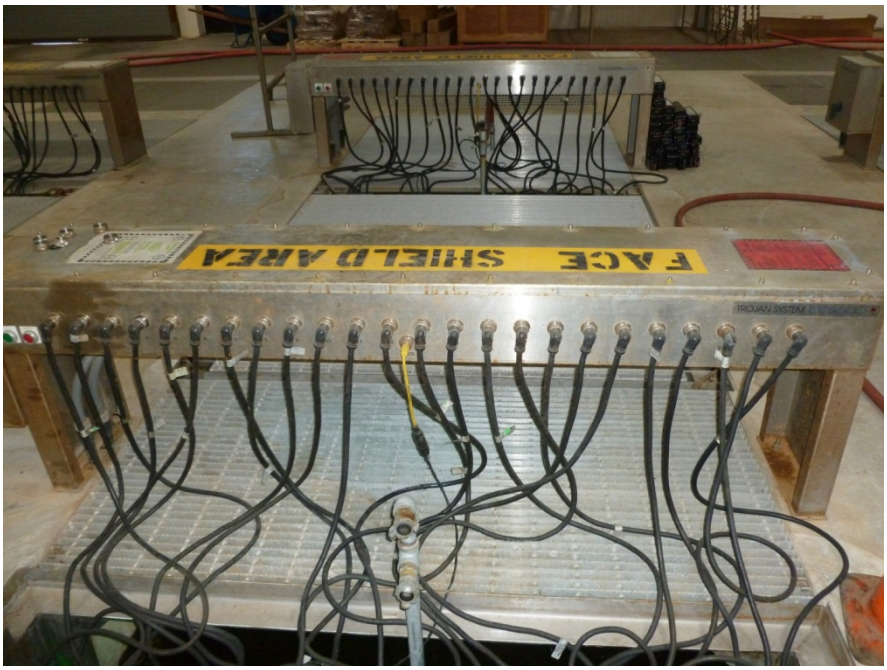


Figure 8-8. Picture of the Existing UV Disinfection Equipment

8.2.2 Solids Stream Capacity

Similar to the liquid stream, the solids stream capacity was evaluated for the major unit processes with the historical dataset used for the flows and loads. Figure 27 presents the capacity for thickening, digestion, and dewatering. The following sub-sections discuss details for the listed unit processes presented in Figure 27.

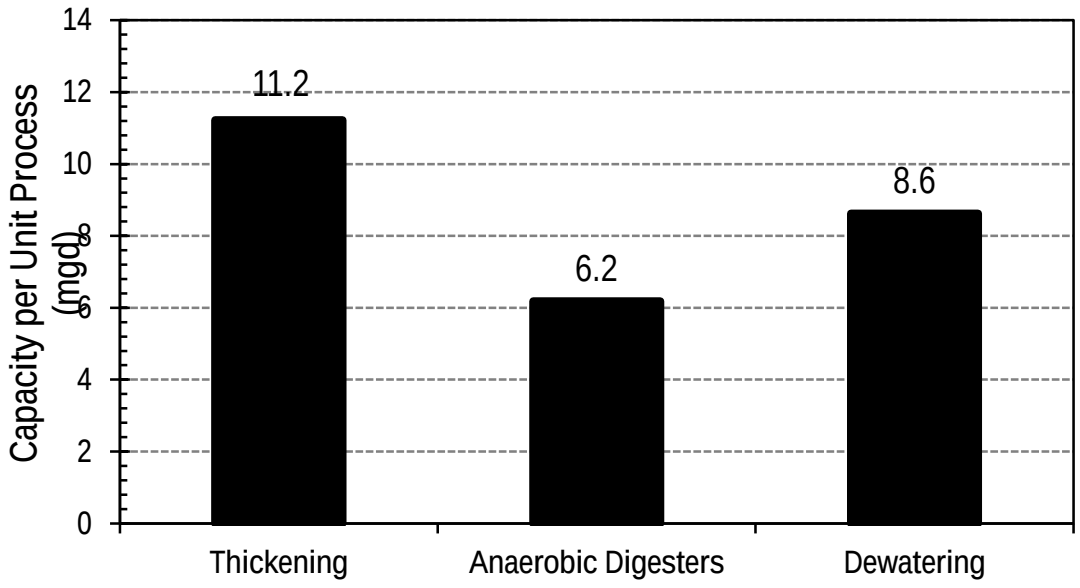


Figure 8-9: Solids Stream Capacity Analysis

8.2.2.6 Thickening

A picture of the dissolver air flotation thickening (DAFT) equipment used for thickening biosolids is provided in Figure 28. The DAFT was evaluated using a hydraulic loading criterion of 400 gpd/sf and a solids loading criterion of 20 lb/sf/d. Both criteria were based on values from WEF MOP8. The analysis was based on 24/7 operation.

The limiting factor was the solids loading rate. A plot of the historical unit solids loading rate (lb/d/sf) is presented in Figure 29. Based on the analysis, the WWTP has sufficient thickeners capacity past this Master Plan's planning period.

Figure 8-10. Picture of the Existing Dissolved Air Flotation Thickener

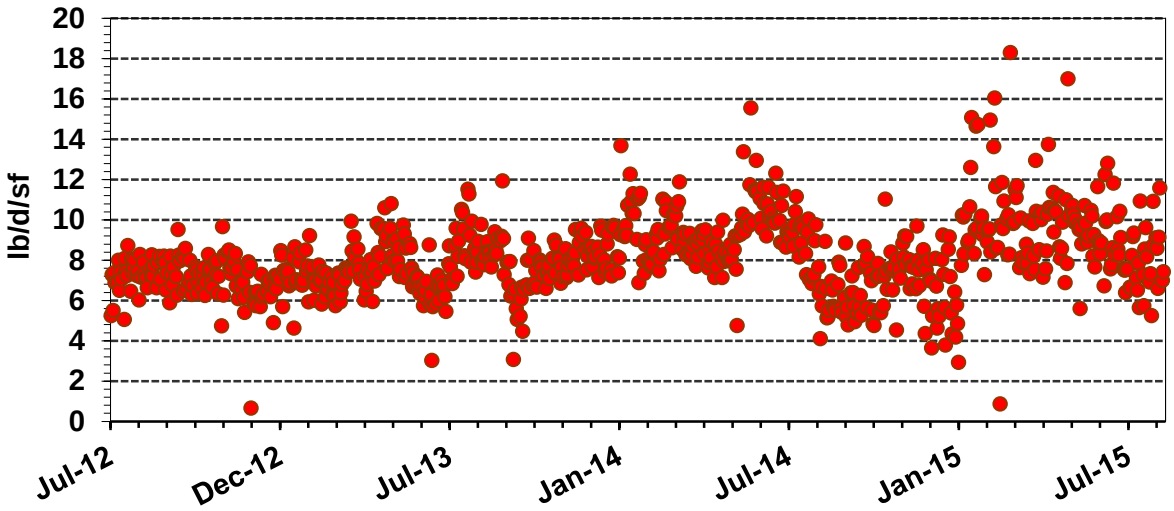


Figure 8-11. Historical Thickener Solids Loading Data

8.2.2.7 Digestion

A picture of the anaerobic digesters is provided in Figure 30. The digester analysis is focused on the hydraulic retention time (HRT) according to the USEPA 503 Regulations for Class B Biosolids. The regulations require a 15 day HRT for maximum month conditions. Based on the current peaking factors, this translates to a 16.2 days for average annual at the WWTP.

Figure 8-12. Existing Anaerobic Digesters and Sludge Holding Tank 2

A plot of historical digester HRT is provided in Figure 31. The analysis indicates the existing digester capacity satisfies the 503 HRT standard with both units in service (approximately 21 days for current average annual versus 15 days required for maximum month). An additional unit would be required immediately if an existing digester is taken out of service. A fourth digester in the near future is recommended as flows and loads increase and to provide system redundancy to allow the City to perform maintenance and rehabilitation of the existing digesters and meet 503 requirements.

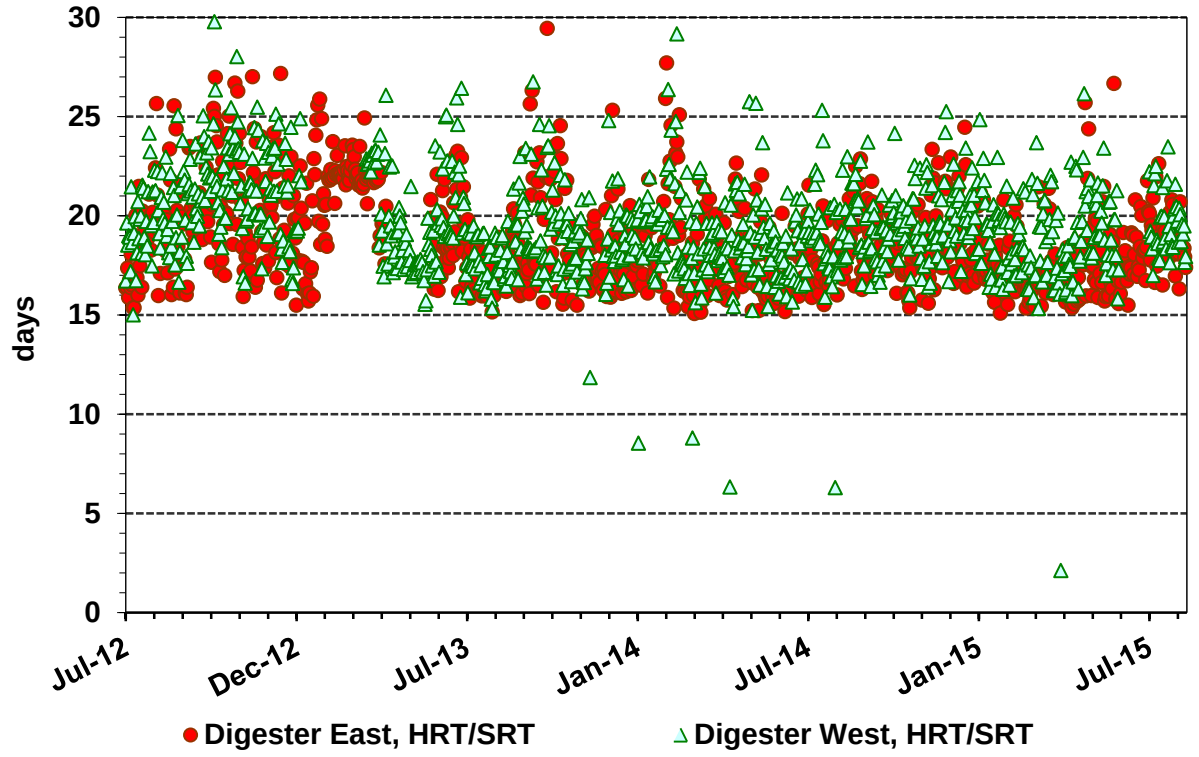


Figure 8-13. Historical Digestion Solids Loading Data

The mass balance was used in developing the capacity analysis as it is more conservative. The mass balance has even less HRT than the plant provided historical data. The mass balance was used in developing the capacity analysis as it is more conservative.

8.2.2.8 Dewatering

A picture of the belt filter press dewatering equipment used for dewatering biosolids is provided in Figure 32. The press was evaluated using a hydraulic loading criterion of 100 gpm/m and a solids loading criterion of 600 lb/hr/m. The analysis suggests the press is hydraulically limited with sufficient capacity assuming an operation of 24 hours per day for 7 days. Based on information from City staff, the dewatering facility is currently operated an average of 5 to 7 days per week during the daytime and graveyard shifts (8 to 10 hours per shift). The actual operational capacity using a staffing period of 7 days and 8 hours per shift for 2 shifts is 6.1 mgd. The capacity increases to 7.6 mgd if each shift increases from 8 to 10 hours. Therefore, the City will be able to meet future conditions if the belt press operation is increased to 10 hours per day for 2 shifts and capacity will increase further with 24

hour operation. The existing sludge storage capacity will also give the City flexibility with operation of the dewatering facility.

Figure 8-14. Picture of a Belt Filter Press Dewatering Equipment

9 Other Nutrient Removal Opportunities - Sidestream Treatment

A pragmatic first step in evaluating other nutrient load reduction opportunities is to consider the sidestream. The sidestream represent the biosolids return sidestreams that are typically returned to the liquid stream, commonly referred to as the sidestreams. The return sidestreams from digestion and dewatering are of interest since they are a source of high nitrogen and phosphorus loads. The sidestreams typically represent about 15 to 20 percent of the total nitrogen load discharged from a POTW (Fux and Siegriest, 2004). Furthermore, the sidestream is a low flow (typically less than 1 percent of raw influent) and highly concentrated with nutrients (>750 mg N/L), which is ideal for cost effective and compact nitrogen removal.

The WWTP currently operates the belt filter press based on sidestream loads. The sub-sections that follow separately discuss sidestream treatment for nitrogen and phosphorus.

9.1 Nitrogen Removal by Sidestream Treatment

Nitrogen removal in the sidestream using a compact activated sludge type technology is relevant to the WWTP since it would free up capacity in the aeration basins. This freed up capacity can be leveraged to defer the timeline for installing a third aeration basin.

The additional benefits of removing ammonia and/or total nitrogen in the filtrate sidestream are as follows:

- Warm water and concentrated nutrients (favorable kinetics; small footprint)
- Low flows (ability to equalize)
- More cost-effective as $/lb nutrient removed than liquid stream treatment
- Ability to implement more efficient nitrogen removal pathways (e.g., Deammonification)
- Easier to phase construction than liquid stream treatment
- The sidestream process can remain operational to provide additional reliability and reduce the overall nutrient removal cost if more stringent nitrogen limits are required in the future.

Given the potential benefits of sidestream treatment, a sidestream treatment for nitrogen evaluation was performed. Three technologies and/or operating strategies were evaluated for the WWTP:

1. Manage the existing filtrate
2. Established sidestream treatment technology: Nitrifying Sequencing Batch Reactor (NSBR). This represents an activated sludge type biological process.
3. Emerging sidestream treatment technology: Deammonification Technology (e.g., DEMON®). This represents an activated sludge type biological process that has some energy and chemical benefits over the NSBR.

9.1.1 Manage the Dewatering Filtrate

The belt filter presses currently operates five to seven days per week with both day and night shifts (eight-ten hours per shift). This strategy is in place to manage higher strength nutrient sidestream loads. Rather than spreading out operations, an operational strategy to manage filtrate loads is to store the filtrate and bleed back over time. The benefit in bleeding back filtrate is a more even distribution of the highly concentrated nutrients over time.

This strategy is relatively straightforward as it would require a tank to store filtrate while operating. The storage vessel would require mixers to keep the solution mixed.

9.1.2 Nitrifying Sequencing Batch Reactor

The nitrifying sequencing batch reactor (NSBR) is an established biological treatment technology that has been in use for decades since the first installations in the 1960s. It was not until the 1980s that NSBRs became widely accepted and implemented. The NSBR configuration has been the most commonly utilized reactor configuration for sidestream treatment.

The NSBR is a fill and draw activated sludge system for wastewater treatment. In this system, wastewater is added to a single "batch" reactor, treated to remove pollutants, and then discharged. Aeration and clarification can all be achieved using a single batch reactor. There are five operational steps in a NSBR: fill, react, settle, decant, and idle. Figure 33 displays the sequence of operational steps for a NBSR.

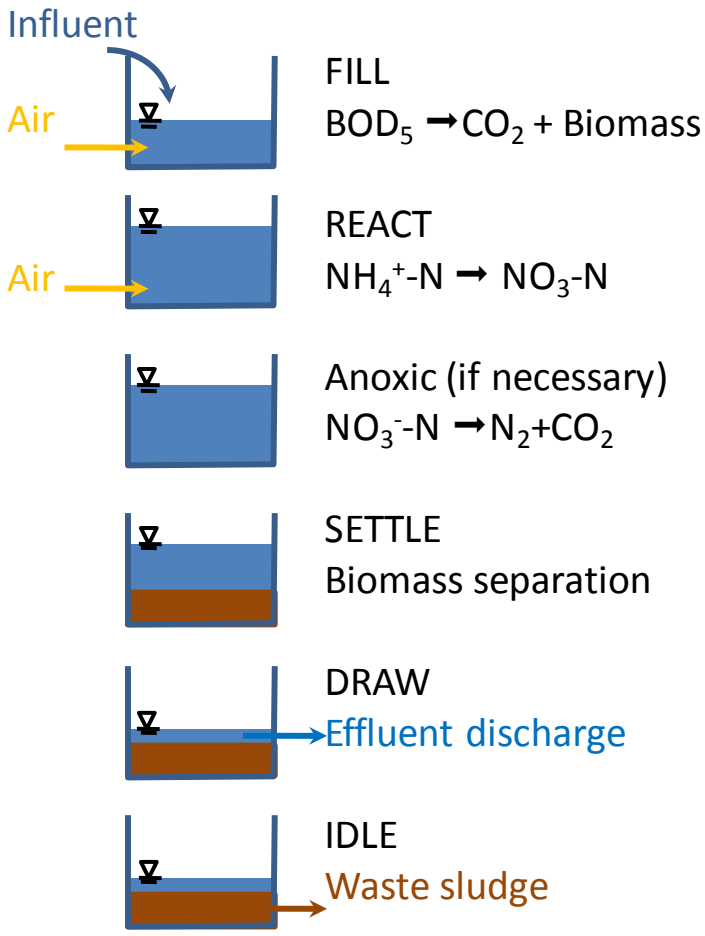


Figure 9-1: Nitrifying Sequencing Batch Reactor Operational Steps

Rather than denitrifying in the NSBR sidestream reactor, the nitrate produced in the sidestream process can be recycled to plant headworks to combat odors. Nitrate is preferentially reduced over sulfate and thus prevents formation of hydrogen sulfide (Zhang, et al., 2008). The reduced nitrate also produces oxygen which can oxidize odorous sulfides to sulfate. Any nitrate that bleeds through the headworks should be removed in the downstream primary clarifier using influent BOD as the carbon source. However, heavily loading the primaries with nitrate can result in flotation of solids in the primaries. A list of the advantages and disadvantages for implementing the NSBR technology at the WWTP is provided in Table 24. Most of the advantages relate to the simple reactor configuration. It is not necessary to pilot the NSBR for sidestream applications given that the NSBR is a well-understood, established technology.

Table 24: Nitrifying Sequencing Batch Reactor Technology Advantages and Disadvantages

Advantages	Disadvantages
• Established technology • Single reactor vessel with common wall construction • Operational flexibility and control • Modest footprint • Potential capital savings by incorporation of separation/other equipment within common basin • Reduce final effluent ammonia discharge concentration approximately 20 percent	• Similar energy requirements to liquid stream ammonia removal • Alkalinity addition required (if full ammonia removal desired) • Oxygen transfer limitations result in large reactor volume • Heavy reliance on automated systems to control process • Potential of washing out non-settled biomass during the decant phase • Potential to wash-out biomass during decant phase • Possible poor settling due to low heterotrophic population • Potential flotation of solids in primary from biological denitrification

9.1.3 Deammonification technology

Similar to the NSBR, deammonification is an established biological process technology that relies on a shortcut in the nitrogen metabolism pathway for efficient ammonia removal. It is carried out in two steps by two distinct groups of autotrophic organisms. In the first step, half of the ammonia is oxidized to nitrite (known as nitritation) by ammonia oxidizing organisms (AOOs) and in the second step the residual ammonia and nitrite are anaerobically converted to nitrogen gas by anaerobic ammonia oxidizing (anammox) bacteria.

Step 1 (oxidize half the ammonia load to nitrite):

$$NH_4^+ + 1.5O_2 \rightarrow NO_2^- + H_2O + 2H^+ \qquad (1)$$

Step 2: (convert ammonia and nitrite to nitrogen gas

$$NH_4^+ + NO_2^- \rightarrow N_{2(g)} + 2H_2O \qquad (2)$$

The sidestream alkalinity demand is roughly one-half the NSBR technology because only half the ammonia load is oxidized to nitrite during the first step. Additionally, the anammox second step relies on inorganic carbon for nitrogen removal.

Deammonification is a cost effective, efficient, and reliable option to treat high strength ammonia wastewater treatment streams, in particular to treat in-plant return sidestreams from dewatering of anaerobic digested sludge. The technology has been applied to more than 100 full scale facilities worldwide. These installations operate well and require a modest level of operator attention. The process can either be attached or suspended growth with single stage, dual stage, or a batch process. For each configuration, there are several vendors.

A list of the advantages and disadvantages for implementing a deammonification technology at the WWTP is provided in Table 25. The key advantages are the reduced energy and chemical demands, carbon management in the liquid stream, and a smaller footprint than NSBR. The primary disadvantage is it is a new technology for operators.

Table 25: Deammonification Technology Advantages and Disadvantages

Advantages	Disadvantages
• Smallest footprint compared to other biological processes evaluated • Only 50% of the ammonia load needs to be oxidized to nitrite • 60% energy reduction compared to full nitrification (due to reduced oxygen demand) • No carbon is required for anammox nitrogen removal • The alkalinity demand for nitrogen removal is reduced by approximately 45% • Relatively low sludge production • Remove total inorganic nitrogen (approximately 85%); approximately 15% of the ammonia is converted to nitrate • Reduce final effluent nitrogen discharge concentration up to the amount that is removed in the sidestream	• New technology for operators • Technology typically requires feed flow equalization and temperatures at least 18 degrees C •

9.2 Phosphorus Removal by Sidestream Treatment

Phosphorus removal in the sidestream typical relies on chemical precipitation. The chemical precipitation strategies are typically either a metal salt or through struvite crystals (magnesium ammonium phosphate (MAP)). The MAP crystals simultaneously remove ammonia and P (0.44 lb N per lb P removed), achieve near complete P removal with partial N removal in the sidestream. MAP is harvested and used for beneficial purposes, such as agricultural fertilizer.

These two chemical precipitation strategies are discussed in the following sub-sections.

9.2.1 Metal Salt Precipitation

Chemical phosphorus precipitation is one such alterative to facilitate improving dewaterability and removing phosphorus from the sidestream. The two metal salts most commonly used are alum and ferric. The metal salt can be added at various locations, such as in between digestion and dewatering. By adding the metal salt at this location should improve dewaterability (if desired). Another potential location is in the filtrate line.

A key factor in the evaluation of sidestream removal of phosphorus is the efficiency of the chemical coagulant in precipitating P. The precipitation reactions for ferric chloride, ferrous chloride, and alum are as follows:

$$FeCl_3 + PO_4^{-3} \rightarrow FePO_4 + 3Cl^- \quad (1)$$

$$3FeCl_2 + 2PO_4^{-3} \rightarrow Fe_3(PO_4)_2 + 6Cl^- \quad (2)$$

$$Al_2(SO_4)_3 \cdot 14H_2O + 2PO_4^{-3} \rightarrow 2AlPO_4 + 3SO_4^{-2} + 14H_2O \quad (3)$$

In theory, 1 mole of ferric chloride (FeCl) will remove 1 mole of phosphate (PO43-) (Equation 1), 3 moles of ferrous chloride (FeCl2) will remove 2 moles of phosphate (Equation 2), and 1 mole of Aluminum (Al) will also remove 1 mole of phosphate (Equation 3). However, when metal coagulants are added to water the metal ion, both iron (Fe) and aluminum (Al) hydrolyze rapidly, forming metal hydroxides (Fe(OH)3 of Al(OH)3). The hydrolysis process competes with the phosphate precipitation reaction and especially at very high metal dosages, a larger proportion of the precipitates formed are metal hydroxides.

To better understand the required applied dosage, jar testing is necessary as it is water specific.

9.2.2 Struvite Precipitation

Another chemical precipitation approach is to form magnesium ammonium phosphate (MAP) which is commonly referred to as struvite. Struvite formation in the sidestream typically requires magnesium addition (limiting constituent) and an increase in pH to precipitate struvite.

One such struvite precipitation technology is the Airprex® Technology, which precipitates magnesium, ammonium, and phosphate (i.e., MAP) out of digested solids. Thus, the Airprex® is located between the digester and dewatering. A photo of the Airprex® Technology is presented in Figure 34.

The precipitated MAP is considered a valuable slow release fertilizer that can be separated by degritting and recovered or included with the compost. It is inclusion in the compost should improve the overall compost quality. Pilot or demonstration testing would be required to confirm an improvement in compost quality.

Figure 9-2: Airprex Installation in Berlin, Germany

10 Future Conditions Process Evaluation

This section summarizes the future conditions evaluated for the City's WWTP. The evaluation is focused on anticipated future nutrient limits based on the following tiered approach:

- Tier 1: 6.9 mg N/L Total Nitrogen, 3.1 mg P/L Total Phosphorus
- Tier 2: 3 mg N/L Total Nitrogen, 1 mg P/L Total Phosphorus

A total of 12 scenarios were developed for the mass balance model, based on the following future conditions:

- 10-year and 25-year projected flows and loads
- Annual Average, Maximum Month and Peak flows for each alternative
- Number of Future Conditions (12) = # Projection Years (2) X 3 Ave Periods X 2 Tiers

Detailed mass balance results for the 10-year and 25-year projections are located in Appendices I and J, respectively.

10.1 Basis for Tier 1 Levels

The Tier 1 levels of 6.9 mg N/L total nitrogen and 3.1 mg P/L total phosphorus are based on the potential NPDES standards currently being discussed with EPA and NMED. The WWTP is currently meeting the proposed discharge limits as shown in Figure 35 and Figure 36, respectively. The average effluent total nitrogen is 2.3 mg N/L and periodically exceeds the 6.9 mg N/L level. The average effluent total phosphorus is 0.96 mg P/L and periodically exceeds the 3.1 mg P/L level.

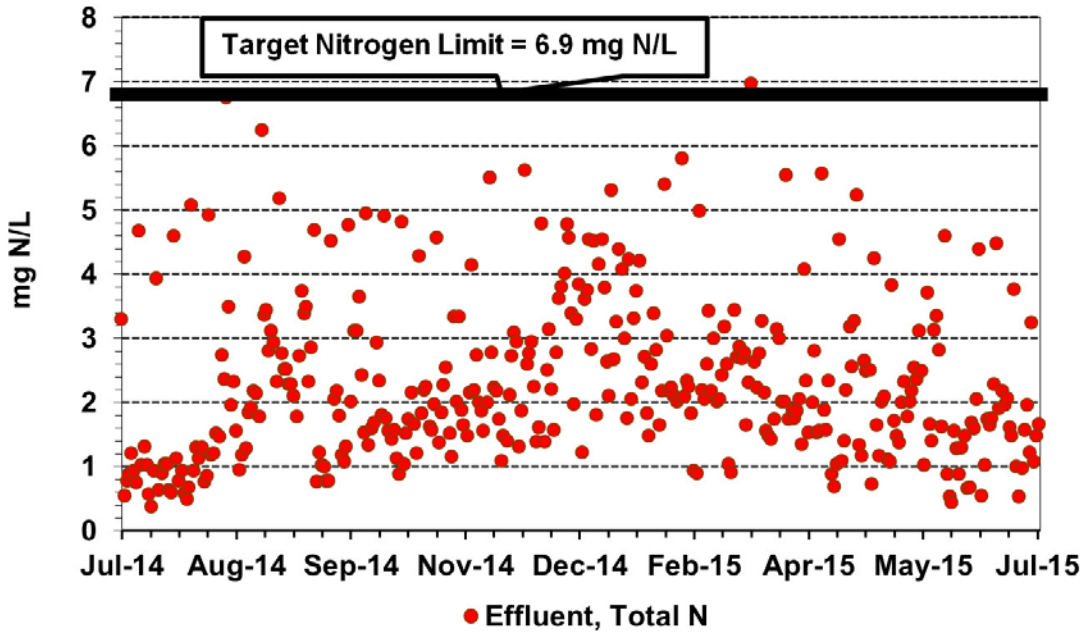


Figure 10-1: Historical Plant Performance Effluent Total N Concentration

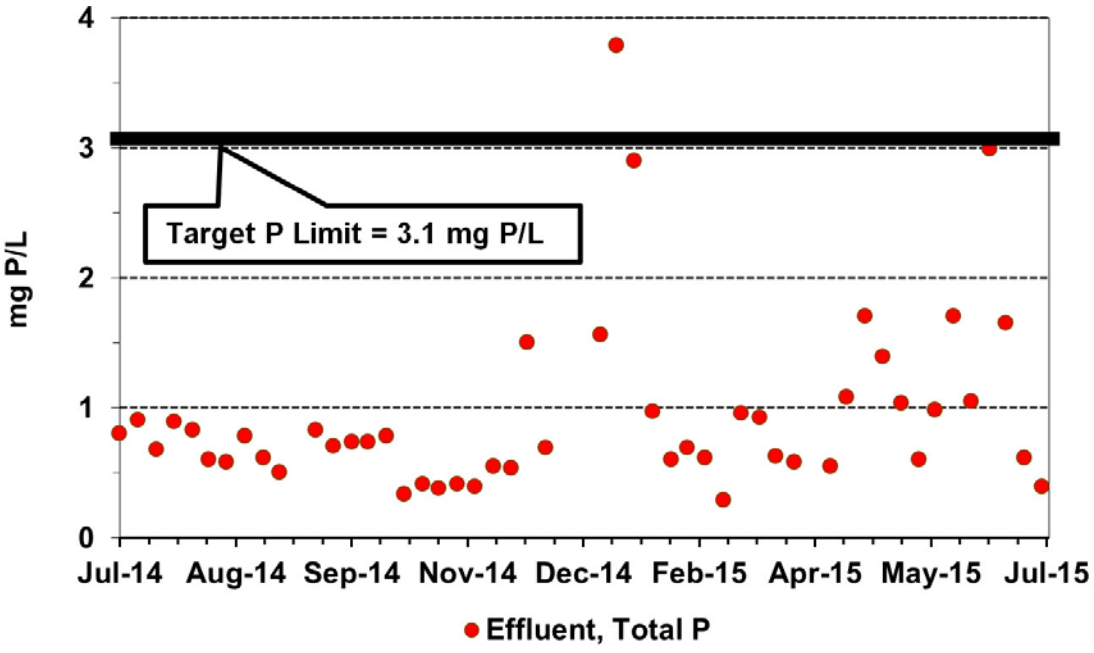


Figure 10-2: Historical Plant Performance Effluent Total P Concentration

The existing WWTP is currently meeting the Tier 1 levels the majority of the time and there is little concern for the existing process to meet these limits.

10.2 Basis for Tier 2

The Tier 2 levels of 3.0 mg N/L total nitrogen and 1.0 mg P/L total phosphorus are based on a combination of a logical step-wise reduction in limits from Tier 1 coupled with the limit of technology (LOT). It is well documented that LOT for total nitrogen limits is in the range of 3 to 4 mg N/L. Most of the existing plants located in areas with impaired waters such as the Chesapeake Bay are typically required to meet a total nitrogen discharge limit of 3 mg N/L. The LOT for nitrogen was deemed a worst-case scenario for the City and used as the Tier 2 limit.

The 1.0 mg P/L total phosphorus was selected for the following reasons:

1. It is a common discharge level that HDR sees nationally.
2. It is a reasonable step reduction from Tier 1 (3.1 mg P/L) to a more stringent level

The LOT for total phosphorus is approximately 0.02 mg P/L, which would result in a reduction of two orders of magnitude from the Tier 1 level of 3.1 mg P/L. The 0.02 mg P/L represents the amount of soluble non-reactive P in the stream. This amount will vary from plant to plant which is why the value was listed as approximately. A reduction of this magnitude is not considered practical or likely by regulatory agencies; therefore, 1.0 mg P/L total phosphorus will be used as a more likely next step in limits.

However, the City could likely meet the total phosphorus LOT using additional chemicals and flocculation step prior to the filters as follows;

1. Additional chemical feed facilities as metal salt and polymer demands would increase to levels that exceed existing facilities.
2. A pre-filtration rapid mix and flocculation tanks to condition the water prior to filtration.
3. Pilot testing to confirm whether the cloth media filters could reliably achieve such low limits. Anecdotal evidence suggests that a cloth media filter would struggle to reliably achieve such low limits; however, the City also has two sand filters that could be put back in operation as needed.

10.3 Scenario 1 (Tier 1, 10-Year Projection)

The Tier 1 nutrient effluent limits with 2025 projected flows and loads are discussed in this section and shown in Table 26. The additional facilities considered are another two digesters and potentially a third aeration basin. The mass balance runs include a third and fourth digester but not a third aeration basin as there are things the WWTP can do to defer the third aeration basin. For example, solids and organics capture in the primaries could be improved to free up capacity in the aeration basins and/or implementation of sidestream treatment. HDR recommends investigating means to improve primary solids removal, such as the use of baffles.

Table 26: Nutrient Loads and Limits for Tier 1, 10-Year Projections

Limit	Units	Annual Average	Maximum Month	Peak
Flow	mgd	7.4	8.0	27
Total Nitrogen, Influent	mg N / L	66	76	--
Total Nitrogen, Effluent	mg N / L	<6.9	<6.9	--
Total Nitrogen, percent removal	%	97%	97%	--
Total Phosphorus, Influent	mg P / L	9.0	11.0	--
Total Phosphorus, Effluent	mg P / L	<3.1	<3.1	--
Total Phosphorus, percent removal	%	89%	91%	--

10.4 Scenario 2 (Tier 2, 10-Year Projection)

The Tier 2 nutrient effluent limits with 2025 projected flows and loads is summarized in this section and shown in Table 27. The results indicate the plant can meet the nutrient limits using biological nutrient removal (BNR) but may require optimizing biological phosphorus removal and/or chemical phosphorus removal at the filters. Either option should be able to reliably meet the limit. Biological phosphorus removal should be operationally more cost effective than chemical phosphorus removal. HDR recommends optimizing the anaerobic selectors for biological phosphorus removal by turning off the mixed liquor return pumps and reducing the number of anaerobic selectors in service. Having too large of an anaerobic selector will result in more than necessary phosphate release in the selector coupled with selecting for glycogen accumulating organisms over phosphate accumulating organisms.

Table 27: Nutrient Loads and Limits for Tier 1, 10-Year Projections

Limit	Units	Annual Average	Maximum Month	Peak
Flow	mgd	7.4	8.0	27
Total Nitrogen, Influent	mg N / L	66	76	--
Total Nitrogen, Effluent	mg N / L	<3.0	<3.0	--
Total Nitrogen, percent removal	%	97%	97%	--
Total Phosphorus, Influent	mg P / L	9.0	11.0	--
Total Phosphorus, Effluent	mg P / L	<1	<1	--
Total Phosphorus, percent removal	%	92%	93%	--

If the LOT for phosphorus is implemented, chemical precipitation upstream of the filters would be required to trim any particulate bound phosphorus not removed with the optimized biological phosphorus process.

10.5 Scenario 3 (Tier 1, 25-Year Projection)

The Tier 1 nutrient effluent limits with 2040 projected flows and loads is summarized in this section and shown in Table 28. The additional facilities required for future conditions are two new digesters and a third aeration basin. The mass balance runs for Scenario 3 include a third aeration basin and two new digesters.

Table 28: Nutrient Loads and Limits for Tier 1, 25-Year Projections

Limit	Units	Annual Average	Maximum Month	Peak
Flow	mgd	8.5	9.2	27
Total Nitrogen, Influent	mg N / L	66	76	--
Total Nitrogen, Effluent	mg N / L	<6.9	<6.9	--
Total Nitrogen, percent removal	%	97%	97%	--
Total Phosphorus, Influent	mg P / L	9.0	11.0	--
Total Phosphorus, Effluent	mg P / L	<3.1	<3.1	--
Total Phosphorus, percent removal	%	89%	91%	--

10.6 Scenario 4 (Tier 2, 25-Year Projection)

The Tier 2 nutrient effluent limits with 2040 projected flows and loads is summarized in this section and shown in Table 29. Similar to Scenario 2 (Tier 2, 10-year projections) the plant with additional facilities can meet the nutrient limits with BNR. Similar to Scenario 2, satisfying the phosphorus limits is possible by optimizing the biological phosphorus removal and/or chemical phosphorus removal at the filters. Either option should be able to reliably meet the limit. Biological phosphorus removal should be operationally more cost effective than chemical phosphorus removal and it improves secondary clarifier settleability. HDR recommends optimizing the anaerobic selectors for biological phosphorus removal by turning off the mixed liquor return pumps and reducing the number of anaerobic selectors in service. Having too large of an anaerobic selector will result in more than necessary phosphate release in the selector coupled with selecting for glycogen accumulating organisms over phosphate accumulating organisms.

If the LOT for phosphorus is implemented, chemical precipitation upstream of the filters would be required to trim any particulate bound phosphorus not removed with the optimized biological phosphorus process.

Table 29: Nutrient Loads and Limits for Tier 1, 10-Year Projections

Limit	Units	Annual Average	Maximum Month	Peak
Flow	mgd	8.5	9.2	27
Total Nitrogen, Influent	mg N / L	66	76	--
Total Nitrogen, Effluent	mg N / L	<3.0	<3.0	--
Total Nitrogen, percent removal	%	97%	97%	--
Total Phosphorus, Influent	mg P / L	9.0	11.0	--
Total Phosphorus, Effluent	mg P / L	<1.0	<1.0	--
Total Phosphorus, percent removal	%	92%	93%	--

11 Asset Inventory and Condition Assessment

A database of existing process units including associated facilities and equipment was developed as part of the completion of the WWTP Master Plan. The goal of the database was to establish an asset inventory of key process systems to assist the City with tracking existing equipment and also to support the WWTP Computerized Maintenance Management System (CMMS).

A Level 1 (Qualitative) Condition Assessment of process equipment also completed as part of the asset inventory process. The assessment used a standard approach by evaluating the age of the equipment, maintenance history, visual observation and reliability of the equipment, which was based on backup or redundant systems.

A description of the approach for the asset inventory and condition assessment is described in the following sections.

11.1 Asset Inventory

The asset inventory was completed using Microsoft SQL Database Software, which is the same database software used for the City's existing CMMS (Antero by Allmax). Output tables of the asset inventory database are included as Appendix G. The primary objective was to develop an inventory limited to major process equipment and provide a system foundation to be further developed by City staff for other assets and updated as needed.

The asset inventory was developed using the following approach:

- In collaboration with City staff, the new dissolved air flotation (DAF) facility known as DAF Building 2 was used as prototype to determine the minimum information to be entered in the database because it was representative of the various types of process assemblies throughout the WWTP including buildings, basins, and process equipment (e.g., pumps, ancillary treatment equipment, etc.). Based on the prototype, HDR was asked to include related electrical and mechanical HVAC equipment as part of the initial database.
- A geographic based mobile application using an Ipad was developed to record process equipment information/data in the field. A web-based interface was also developed to enter data from existing City hard copy records using a computer workstation.

- A review of hard copy record documents (e.g., City equipment summary data, drawings and specifications) was completed for initial information entered in the database using the web-based interface. Age of the equipment was initially identified based on various projects and updated as needed during field visits.
- Field reconnaissance to obtain equipment nameplate information of existing process equipment was completed after the initial database entry. Equipment nameplate data was collected and recorded in the field using the IPAD mobile device. Photos of the existing equipment were also obtained as part of the field data collection effort.
- A review of hard copy operations and maintenance (O&M manuals) was used to complete any data gaps or missing information if it was not visible
- Discussions with City maintenance staff to fill in any data gaps to the extent possible was also completed

11.2 Condition Assessment

A Level 1 condition assessment was completed for the process equipment and was focused on the age of the equipment and visual observation of equipment by senior operations staff during field data collection for the asset inventory to note the general physical condition of equipment.

The process equipment condition assessment used a standard approach by evaluating the age of the equipment, maintenance history, criticality, and reliability (i.e., backup units) to evaluate remaining useful life and reliability.

Life expectancy of the process equipment was based on the following:

- Equipment manufacturers
- Water Environment Federation (WEF) and HDR Standard Practice life expectancy tables
- Trained professional judgment based on information from maintenance history through a review of Antero maintenance history and discussions with City staff.

The City schedules and performs regular maintenance using the City's CMMS Antero by Allmax, which increases the reliability of key process equipment. However, there is existing process equipment that received a favorable rating because of redundant units but is either at the end of the rated useful life or has a high maintenance history.

A qualitative assessment by visual observation of structural elements and electrical equipment directly related to the function of treatment process systems was also completed as part of the condition assessment. The assessment was limited to process basins, buildings, and motor control center (MCC) electrical equipment accessible during a field visit by senior technical staff.

Recommendations from the process analysis and the treatment process condition assessment are provided in the following section.

12 Conclusions and Recommendations

The City's WWTP is performing very well to meet current and anticipated future regulatory requirement trends focused on nitrogen and phosphorus removal. In addition, the WWTP has multiple process units and associated equipment to provide back-up in the event a process unit or related equipment is taken out of service for maintenance or repair. Recommended operational improvement opportunities and additional process facilities to meet Tier 1 and Tier 2 standards is summarized in this section. General recommendations from the asset inventory and condition assessment are also summarized in this section.

12.1 Operational Improvement Opportunities

The recommended operational improvement opportunities are focused on additional sampling, optimizing activated sludge, and solids handling.

12.1.1 Autosamplers Testing and General Maintenance

It is recommended that the City continue to investigate the influent autosampler results. As discussed in detail in the mass balance calibration section, the historical influent sampling results have been scattered over the last year (7/2014-6/2015). The analysis of influent, primary effluent, and primary solids suggests there are some potential issues with the influent autosampler.

It is well known that autosamplers struggle to provide accurate and reliable particulate based results, such as for TSS. HDR recommends that the WWTP further investigate this by doing a side by side comparison of grab samples versus the autosampler to identify whether the autosampler is the culprit in the data scatter. In many instances, resolving this issue requires a vigilant autosampler cleaning program to issue it functions as designed.

12.1.2 Primary Clarifiers

The primary clarifiers are currently under loaded. However, the solids and organics capture is below typical industry values. The historical primary solids capture from July 2012 through 2014 is on the order of 35 to 40 percent. The industry standard is on the order of 55 to 60 percent removal. This discrepancy is attributed to the primary solids wasting strategy that is too infrequent. Keeping dense primary solids blankets can result in fermentation and subsequent hydrolysis of solids and re-suspension of materials that leave as primary effluent.

While the solids capture is less than ideal from a biogas and biosolids yield perspective, the aeration basins can currently handle the additional loading not removed in the primaries. Furthermore, the non removed loads are most likely assisting the WWTP with achieving such low discharge nitrogen levels as it requires soluble organics that are produced during fermentation.

Additional solids and organics capture in the primaries will free up capacity in the aeration basins and in turn defer the schedule for installing a third aeration basin. Such an initiative might negatively impact the plants ability to reliably remove as much nitrogen. As a result, it is suggested that the WWTP optimize solids capture in the primaries once the aeration basins are nearing capacity under the current mode of operation.

12.1.3 Activated Sludge

The existing WWTP process is currently meeting existing and future nutrient standards and the City can improve the reliability of the nutrient removal by optimizing the biological process. The HDR Team has developed the following list of key items to assist the City with enhanced nutrient removal:

- Better understand the oxygen transfer efficiency
- High sludge blankets in the secondary clarifiers (by-product of high SVIs)
- Foaming in the biological process (most likely attributed to current operational strategy)
- Blower control strategy in the biological process (limited by pre-set conditions)

These key items have been developed through previous discussions with City operations, engineering, and management staff.

12.1.4 Oxygen Transfer Efficiency Testing

As discussed in previous section, OUR is one of two criteria (other is mixed liquor suspended solid) that governs aeration basin capacity. Based on HDR experience, off-gas testing to quantify the aeration basins OUR capacity will be more reliable than relying on typical published values. HDR recommends the City hire an off-gas testing specialist to perform the off-gas testing to better understand the actual values. Any increase in OUR compared to the 75 mg/L/hr industry standard value would result in a linear increase in capacity. For example, if actual testing results suggest a 10 percent higher OUR than industry (say 75 to 83 mg/L/hr) would result in a 10 percent increase in aeration basin capacity.

12.1.5 Foaming and High SVIs in the Biological Process (Historical Issue)

The City has historically encountered a seasonal increase with foaming in the aeration basins primarily in the winter time. HDR assisted the City with nutrient characterization testing throughout the WWTP in the spring of 2013 and the results of this testing helped get a better understanding of the City's nutrient removal process, which may help with improving the foaming issues. The nutrient testing results verified that the aeration basin and oxidation ditch configuration is performing simultaneous Nitrification/Denitrification (i.e., Total N Removal). Despite excellent total N performance (see Figure 25), the anoxic selectors located upstream of the aeration basis were designed to assist with total N removal.

However, the anoxic selectors are currently operating as anaerobic selectors for biological phosphorus removal (bio-P) since the aeration basin is performing both nitrification and denitrification. The treatment configuration is effective at bio-P but the selector is large and contributing to less than optimal phosphorus removal and high sludge volume indices (SVIs).

HDR recommends trying the following operational modifications to control the high SVI:

- Turn off the mixed liquor return (MLR) pumps as depicted in Figure 373. The WWTP should turn off these pumps all once with no gradual transition.
- Isolate some zones in the up-front selectors to reduce the residence time as there is too much phosphate release occurring.
- Implementation of these two strategies should assist with reducing SVIs and in turn improve the mixed liquor settleability and compaction.

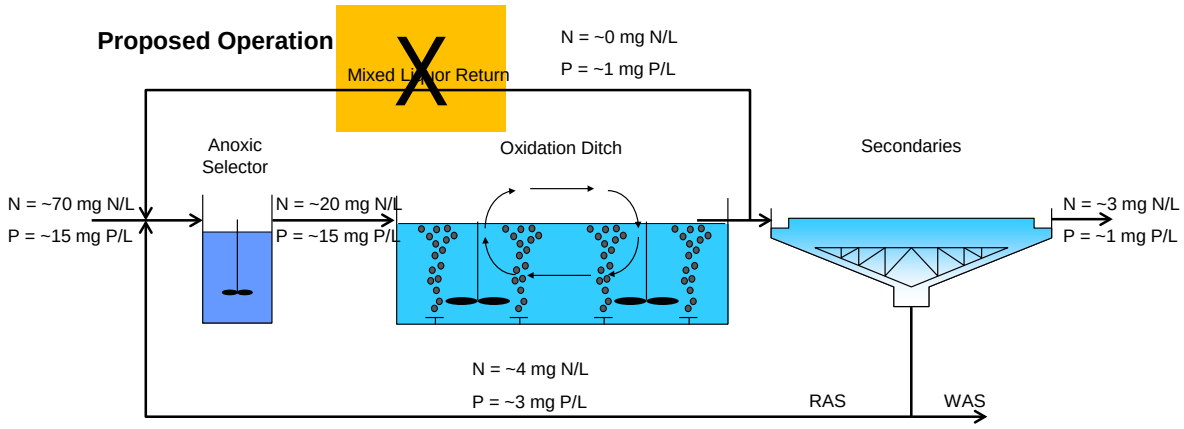


Figure 12-1: Proposed Operational Approach to Turn off Mixed Liquor Return Pumping

Rather than attempt to resolve the historical foaming issue simultaneously with the high SVIs, it is recommended that the WWTP implement the aforementioned SVI control measures and see how this impacts foaming. It is anticipated that this should improve the foaming situation. In addition, it is recommended that the HDR team walk the plant with WWTP Staff to determine if there are specific locations where foam entrapment is occurring.

12.1.6 Blower Control Strategy

The aeration basins with the oxidation ditch configuration currently operate with air on and off in particular zones. The blower controls are pre-set and do not modulate to account for diurnal variability. As a result, there are instances over a diurnal cycle where system is under aerated or over aerated. The existing aeration strategy occasionally results in ammonia and/or nitrate bleed through and the system can not accommodate the required aeration swings to consistently meet low level ammonia limits as illustrated in historical effluent ammonia data shown in Figure 38. The chart presents data that ranges between less than 1 to approximately 5 mg N/L.

A well operated nitrogen removal facility should reliably produce ammonia values less than 1 mg N/L. The use of ammonia based aeration control (ABAC) that relies on ammonia probes to modulate the blower valves could improve consistent ammonia control. The City is currently operating the amount of air manually by monitoring ammonia levels by obtaining grab samples; however, there are several benefits to automating the process.

The benefits of ABAC for the WWTP are as follows:

- Reduced effluent ammonia levels
- Energy savings – reduce aeration requirements because it is based solely on demand to avoid over aerating
- Chemical savings - a higher percentage of the BOD will be used for denitrification than currently practiced

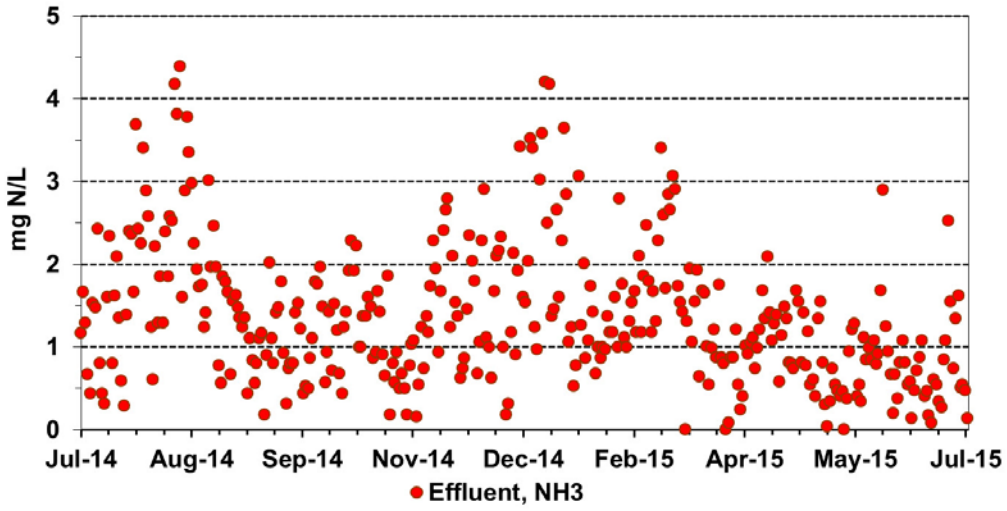


Figure 12-2: Historical Effluent Ammonia Data at the City of Santa Fe WWTP

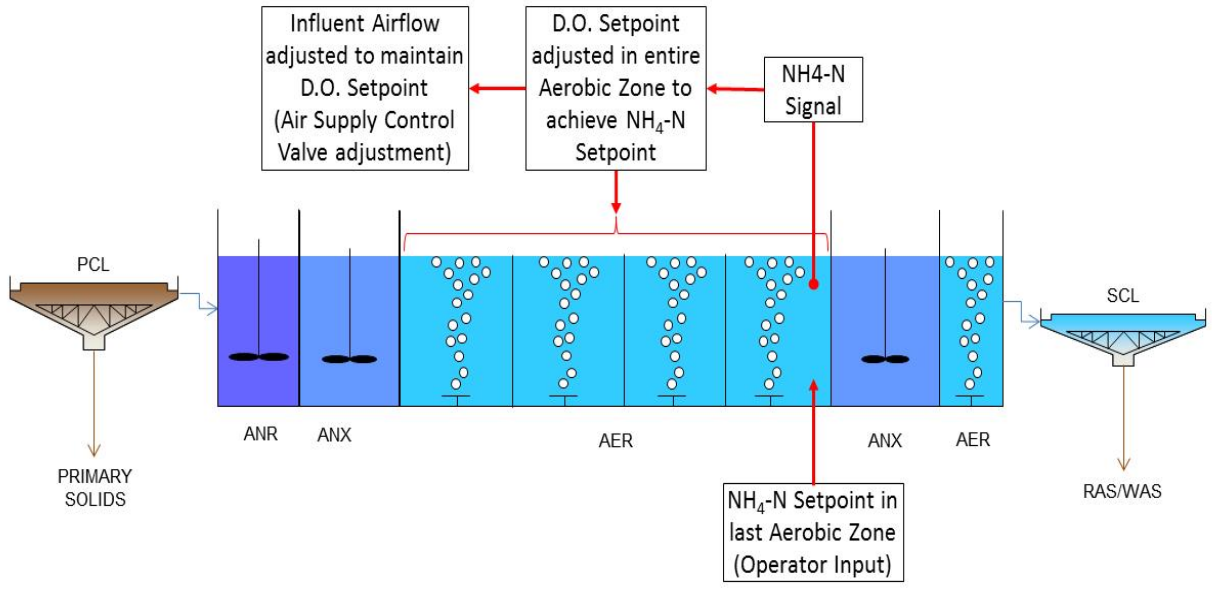


Figure 12-3: Graphic Depicting Ammonia Based Aeration Control

12.2 Dewaterability and Sidestream Phosphorus Recovery

The WWTP currently produces a sludge cake concentration of approximately 13 percent solids and a higher solids concentration of 20 percent or higher would be expected for a domestic wastewater facility. HDR has seen reduced dewaterability performance nationwide for plants that perform Bio-P. HDR is leading the industry on this topic and recently presented at Water Environment Federation (WEF) Biosolids Conference regarding the effect of Bio-P on cake solids concentration. There are several theories regarding this topic and HDR's research suggests this phenomenon is a result of surplus of mono-valent cations (e.g., potassium) following digestion. This surplus occurs as cells are

lysed during digestion as a means to offset all of the ortho-phosphate (PO43-) released during digestion. The surplus of potassium and other cations hinders the ability to dewater by antagonistically interacting with polymer.

Figure 40 shows research data from another WWTP illustrating the reduced cake solids concentration after Bio-P was implemented at the plant. In the summer of 2011, Bio-P was implemented and the cake solids concentration dropped from approximately 22 to 18 percent as a direct result of Bio-P. There are several ways to address this issue and potentially increase solids production by increase the cake concentration to more typical levels (e.g., 20 percent). The key element of any strategy is to reduce phosphate levels with the dewatering feed.

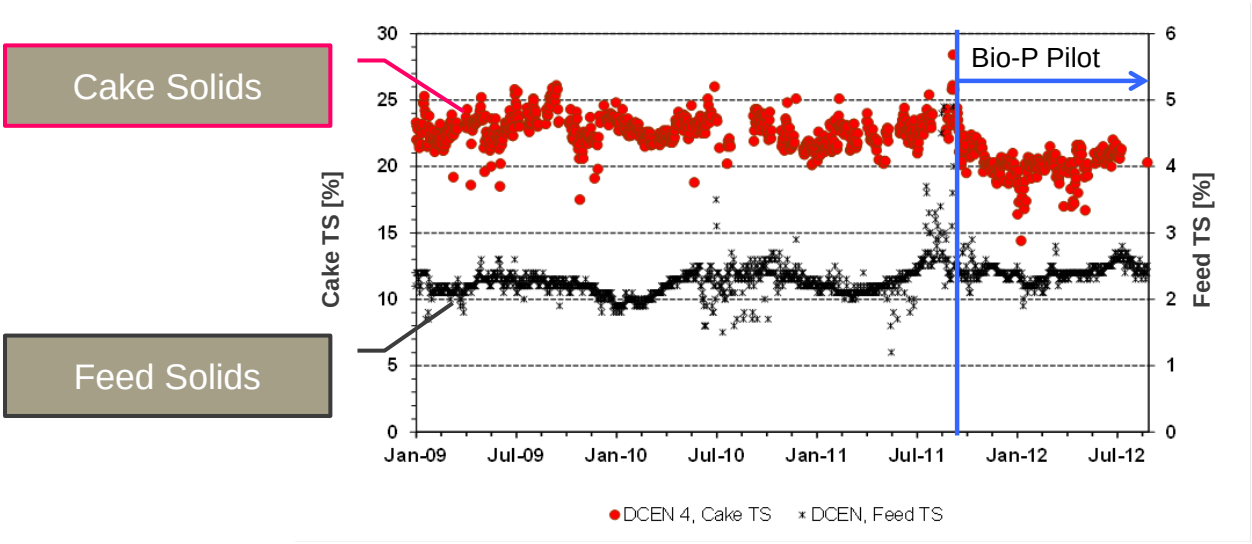


Figure 12-4: Cake Production Data from WWTP after Implementation

HDR can evaluate the dewaterability using a pneumatic press (shown graphically in Figure 41 and Figure 42, respectively). To effectively test this phenomenon, a side by side challenge test is recommended with the status quo compared against an upstream pilot technology, such as Airprex®. The Airprex® Technology represents just one representative technology of many. The status quo and Airprex® pilot effluent could be tested side by side with the pneumatic press to determine the impact on the dewatering process with and without phosphate removal upstream.

The benefit of such a test is to quantify the impact on dewatering coupled with the ability to recover phosphorus from digested solids. The recovered phosphorus has the potential to improve the compost value as struvite is a slow release fertilizer.

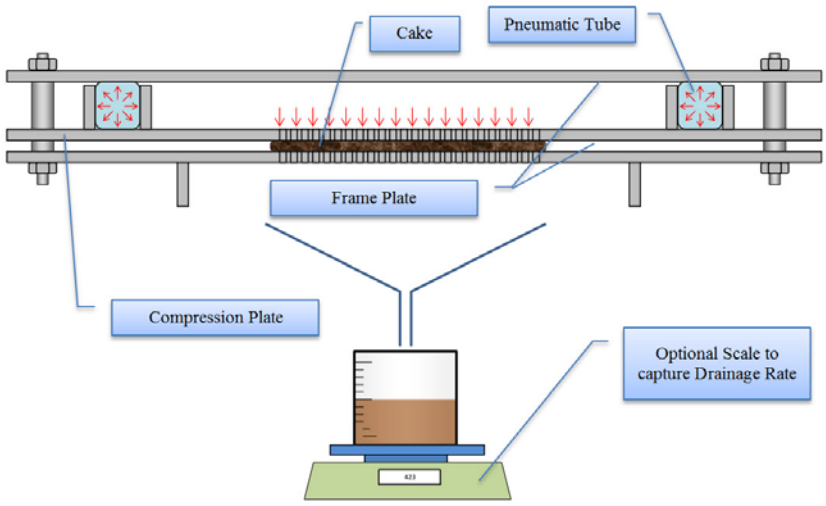


Figure 12-5: Visual Graphic Illustrating the Biomass Press to Test Dewaterability

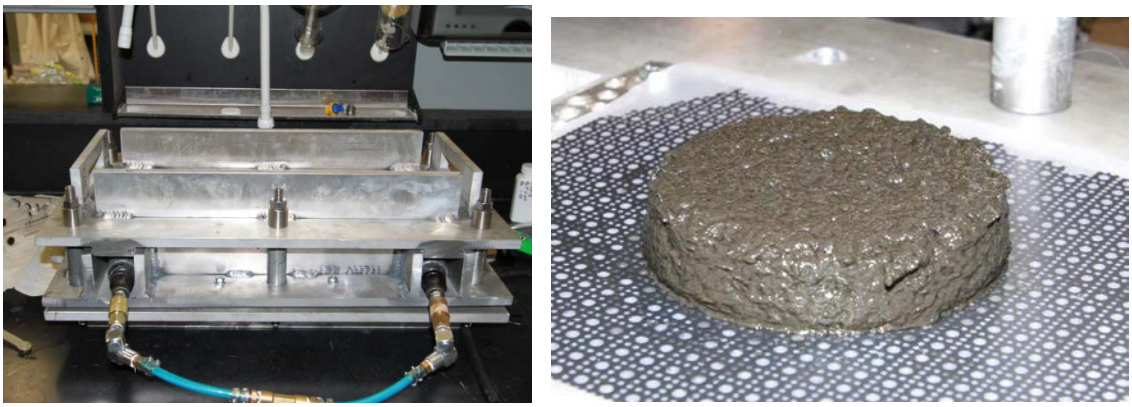


Figure 12-6: Image of the (Left) Pneumatic Press and a (Right) Biomass Press Sample

12.3 Sidestream Treatment: Nitrogen Removal

Sidestream treatment is an attractive option to defer installing a third aeration basin. Removing approximately 20 percent of the overall plant nitrogen load in the sidestream will free up approximately 10 percent capacity of the aeration basin blowers and a portion of the produced biomass.

Among the sidestream treatment options evaluated, initially starting with sidestream management, followed by full sidestream treatment in the future to defer oxygen demanding loads away from the aeration basin is the recommended approach. Removing the ammonia load at the sidestream will divert oxygen demanding loads upstream of the aeration basins and in turn increase the aeration basin capacity and defer the third aeration basin installation requirements.

The initial management options requires a wide-spot in the line so that the high strength ammonia load can be slowly bleed back over 24-hrs. This wide spot would be a tank or basin coupled with mixers to keep material in suspension. The next step would be to implement a sidestream

technology like the deammonification technology due to its low unit energy demand compared to conventional nitrifying SBR.

The deammonification technology is a biological process that would require the following elements:

1. Flow equalization to manage the sidestream loads that are dependent on belt filter press operation.
2. Pre-treatment screens to remove any particulate and debris from the filtrate.
3. Feed pumping station to lift the filtrate from the flow equalization tanks to the aeration basins.
4. Aeration basins to provide aeration to the biological process.
5. Blowers and diffusers to provide the necessary aeration.
6. Decanters within the aeration basin to separate settled biomass from treated effluent.
7. Treated water will flow by gravity back to the headworks.

12.4 Process Improvements

The results of the process analysis and associated capacity evaluation indicate the following process improvements should be considered by the City as short-term and long-term improvements:

1. Adding a third aeration basin. (long-term: 10-25 years)
2. Adding two new anaerobic digesters phased over time (near-term: 0-5 years).

The third aeration basin should be considered as loads increase at the plant. A systematic approach should be considered to defer the installation of an aeration basin by a combination of optimizing the primary clarifiers and installing sidestream management/treatment to manage nitrogen loads. .The estimated timing of the third basin will depend on whether the primary clarifiers are optimized and/or sidestream management/treatment is implemented. The most cost effective approach is sidestream management and primary clarifier optimization. This approach would require another unit process to operate as listed in detail under the Operational Improvement Opportunities Section. Instead of proceeding immediately to sidestream treatment, sidestream management via a wide-spot that includes a tank and mixers will assist the aeration basin by slowly bleeding back high strength ammonia.

The digester analysis and recommendation is based on HRT as discussed previously and the digester feed flow is the key criteria for determining this parameter. HDR has assisted the City with the emergency repairs of the fixed digester cover because of corrosion and pitting of the cover and it is our understanding the City had to recently complete emergency repairs on the floating cover. The current HRT is approximately 20 days and additional capacity may be needed in the short term to meet 503 standards. Based on discussions with City staff regarding the need to repair and rehabilitate the existing digesters is a priority and would prefer new digesters over the next 5 years. The additional digesters will give the City operational flexibility and provide system redundancy and reliability.

12.5 Asset Inventory and Condition Assessment Observations

As discussed previously, the WWTP has multiple process units and associated equipment to provide back-up in the event a process unit or related equipment is taken out of service for maintenance, repair, or replacement. Based on the age of the equipment, maintenance history, and visual observation of equipment the following list of recommendations were developed and should be programmed in the City's CIP or operations program:

- Aeration basin blowers-near-term (0-5 years)
- Return activated sludge (RAS) pumps-near term (0-5 years)
- Mixed liquor suspended solids (MLSS) pumps-near to short term (0-10 years)
- Central Supervisory Control and Data Acquisition (SCADA) system-near term (0-5 years) based on changing technology
- Electrical arch-flash hazard analysis- near term (0-5 years)
- Energy audit – near term (0-5 years)
- Primary clarifier mechanism coating rehabilitation- near-term (0-5 years)
- MCC-1, MCC-2 and MCC-3700 replacement-near to short-term (0-10 years)
- Headworks odor control evaluation – short to long term (5-10 years)
- DAF 1 Equipment:-near to short-term (0-10 years)
    - Basin 1 and 2 Sludge chain and flight collector
    - Pressure tank 2
- HVAC Equipment: (0-10 years)
    - Administration and Turblex Blower Buildings HVAC Equipment -near to short term
    - Digester building
    - DAF 2 Building
    - Dewatering building

13 Future Regulatory Trends

13.1 Contaminants of Emerging Concern

Contaminants or compounds from pharmaceuticals and/or personal care products are being discovered in watersheds at very low concentrations (e.g., ppb or ppt). Some of these contaminants have been determined to be endocrine disrupters (Kolpin et al, 2002). The contaminants mimic estrogen and, therefore, may disrupt the endocrine (hormone) system of both animals and humans. These contaminants are known in the water industry as contaminants of emerging concern (CECs). In response to concerns approximately the possible impacts of these CECs (pharmaceuticals,

detergents, hormones and other chemicals) on human health and aquatic organisms, the US EPA in 2010 conducted a literature search of numerous articles that referenced treatment of CECs. The EPA has classified the CECs as shown in Table 30.

Table 30: Contaminants of Emerging Concern Classifications

Nonlyphenols, octylphenol, and alkylphenol ethoxylate (APEs) compounds	NP/APEs
Polynuclear aromatic hydrocarbons	PAH
Polybrominated biphenyl ethers	PBDEs
Pesticide	Pesticide
Pharmaceuticals and personal care products	PPCP
Steroids and Hormones	S/H
Other	Other

It is well documented that as treatment plants improve treatment performance, specifically those that transition from secondary treatment to nitrogen removal (as already the case at the WWTP), the ability to remove overall CECs increases. This increase in removal is highly dependent on the CEC constituent of interest.

There is uncertainty on which CECs will be regulated in the future (if any). However, the existing unit processes at the WWTP provides a level of treatment for removing CECs that would rival other POTWs (except those with membranes or ozone treatment processes). The key unit processes at the WWTP for removing CECs is the activated sludge with the long solids residence time (SRT) for removing nitrogen coupled with the filtration.

The longer SRT for ammonia removal translates to an increased surface area on mixed liquor for sorption, elevated biomass concentration, and the enzymes that carry out nitrification (Horz et al., 2004). The enzyme responsible for the oxidation of ammonia to nitrite, ammonia monooxygenase, is commonly referred to as ‘promiscuous’ because it has the ability to assist in the biodegradation of a wide-range of compounds such as CECs (Vader et al., 2000).

Given that the WWTP is already operating at a relatively high SRT that reliably nitrifies, the facility is more than likely already removing more CECs than other plants that perform secondary treatment.

The City is currently developing a reuse feasibility study that will consider potable reuse opportunities and consideration of this reuse option will require a good understanding additional treatment processes for increased removal of CECs. A preferred treatment process option besides reverse osmosis is ozone treatment, followed by biofiltration (BAF) using activated carbon. The Buckman Direct Diversion Water Treatment Facility has Ozone/biofiltration with activated carbon and can be used if the City considers direct potable reuse in the future. This option will require careful consideration and an extensive public acceptance process.

In an ozone treatment system, ozone is generated from oxygen and injected into the liquid stream. Ozone is a powerful oxidant, breaking down organic material and heavy metals. Ozone is sometimes used in drinking water treatment plants as a form of disinfection since it typically creates less of the

regulated toxic byproducts, such as Trihalomethanes (THMs), which are formed during chlorine disinfection.

For the purposes of advanced wastewater treatment, the ozone treatment facility would primarily be used for the removal of organics upstream of filtration and/or reverse osmosis (RO). A graphical representation of the organic concentration in RO brine with and without upstream ozone/ BAF filter pretreatment is shown in Figure 43. Fluorescence, an indirect measurement of the total organic matter concentration, is shown to be significantly reduced in both the feed and the brine when pretreated with ozone.

A BAF filter is included in such a configuration for the sake of redundancy, water conditioning, and removal of degradable organics (if ozone is upstream). Ozone located upstream will produce degradable organics by oxidizing recalcitrant complex organics into simpler/degradable forms that are subsequently removed in the BAF filters.

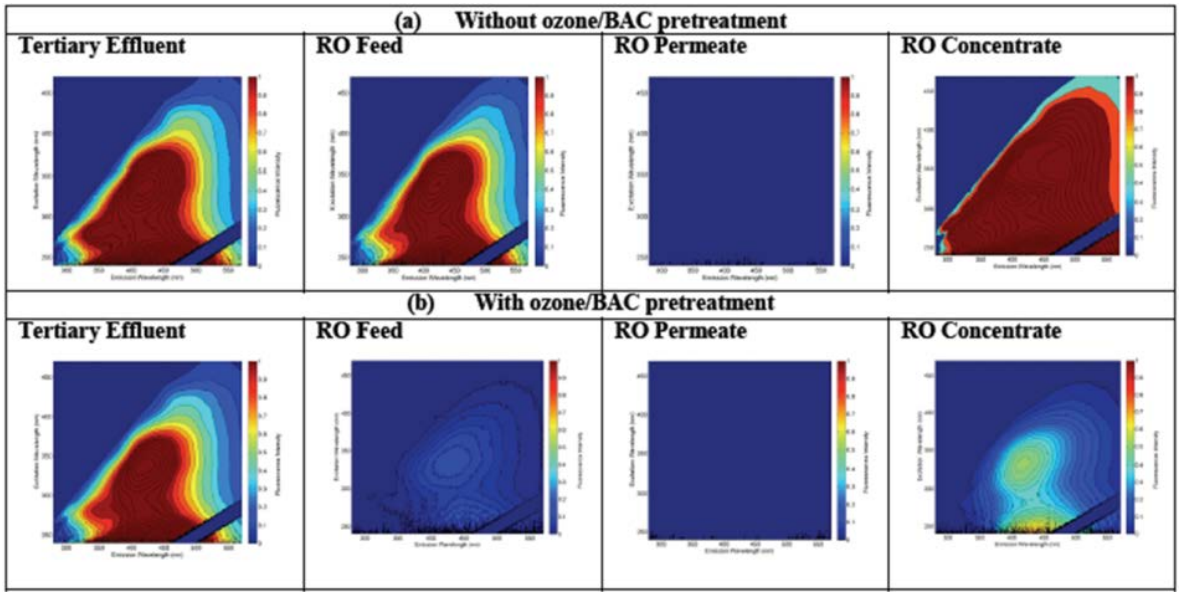


Figure 13-1: Effluent Organic Matter Transformation by Fluorescence (Source: Trussell et al., 2015)

14 References

Fux, C.; Lange, K; Faessler, A.; Huber, P.; Grueniger, B.; and Siegrist, H. (2003) Nitrogen removal from digester supernatant via nitritie-SBR or SHARON? Wat. Sci. & Technol., 48:9-18.

Fux, C and Siegrist, H. (2004) Nitrogen removal from sludge digester liquids by nitrification/denitrification or partial nitritation/anammox: environmental and economical considerations. Water Science & Technology. 50(10):19-26.

Hellinga, C.; Schellen, A.A.J.C., Mulder; J.W.; Van Loosdrecht, M.C.M.; and Heijnen, J.J. (1998) The SHARON process: an innovative method for nitrogen removal from ammonium-rich waste water. Wat. Sci. & Technol., 37:135-142.

Horz, H.-P., Barbrook, A., Field, C.B., Bohannan, B.J.M. (2004) Ammonia-oxidizing bacteria respond to multifactorial global change. Proceedings of the Nat. Acad. Sci., 101(42):15136-15141.

Kolpin, D.W., Furlong, E.T., Meyer, M.T., Thurman, E.M.; Zaugg, S.D.; Barber, L.B.; Buxton, H.T. (2002) Pharmaceuticals, hormones, and other organic wastewater contaminants in U.S. streams, 1999-2000: a national reconnaissance. Environ. Sci. Technol., 36(6):1202-1211.

Trussel et al. (2015) Demonstrating Redundancy and Monitoring to Achieve Reliable Potable Reuse. Direct Potable Reuse in California: Specialty Seminar at UC Berkeley in September 2015.

Turk, O. and Mavinic, D. (1989) Maintaining nitrite buildup in a system acclimated to free ammonia. Wat. Res., 23:1383-1388.

Vader, J.S., van Ginkel, C.G., Sperling, F., de Jong, J., de Boer, W., de Graaf, J. S., van der Most, M., Stokman, P.G.W. (2000) Degradation of ethinyl estradiol by nitrifying activated sludge. Chemosphere 41(8): 1239-1243.

Wett, B (2007) Development and implementation of a robust deammonification process. Wat. Sci. & Technol., 56:81-88.

Zhang, L., De Schryver, P., De Gusseme, B., De Muynck, W., Boon, N., & Verstraete, W. (2008). Chemical and biological technologies for hydrogen sulfide emission control in sewer systems: a review. Water Research, 42(1), 1-12

Appendix A. NPDES Permit

REGION 6
1445 ROSS AVENUE
DALLAS, TEXAS 75202-2733

NPDES Permit No NM0022292

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et. seq; the "Act"),

City of Santa Fe
73 Paseo Real
Santa Fe, NM 87507

is authorized to discharge to receiving waters named Santa Fe River, in Waterbody Segment Code No. 20.6.4.113, from a facility located at 73 Paseo Real, Santa Fe, Santa Fe County, New Mexico.

The discharge is located on that water at the following coordinates:

Outfall 001: Latitude 35° 37' 30" North, Longitude 106° 05' 19" West,

in accordance with this cover page and the effluent limitations, monitoring requirements, and other conditions set forth in Part I, Part II, Part III, and Part IV hereof.

This permit supersedes and replaces NPDES Permit No. NM0022292 issued July 31, 2006.

This permit shall become effective on August 1, 2010

This permit and the authorization to discharge shall expire at midnight, July 31, 2015

Issued on June 8, 2010

Miguel I. Flores
Division Director
Water Quality Protection Division (6WQ)

Prepared by

Laurence E. Giglio
Environmental Engineer
Permits & Technical Section (6WQ-PP)

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PART I – REQUIREMENTS FOR NPDES PERMITS

SECTION A. LIMITATIONS AND MONITORING REQUIREMENTS

1. OUTFALL 001: FINAL Effluent Limits – 13 MGD Design Flow

During the period beginning the effective date of the permit and lasting through the expiration date of the permit (unless otherwise noted), the permittee is authorized to discharge treated municipal wastewater to the Santa Fe River, in Segment Number 20.6.4.113, from Outfall 001. Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS		DISCHARGE LIMITATIONS Standard Units		MONITORING REQUIREMENTS	
POLLUTANT	STORET CODE	MINIMUM	MAXIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
pH	00400	6.6	9.0	Daily	Grab

EFFLUENT CHARACTERISTICS		DISCHARGE LIMITATIONS lbs/day, unless noted			DISCHARGE LIMITATIONS mg/l, unless noted (*1)			MONITORING REQUIREMENTS	
POLLUTANT	STORET CODE	30-DAY AVG	DAILY MAX	7-DAY AVG	30-DAY AVG	DAILY MAX	7-DAY AVG	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow	50050	Report MGD	Report MGD	Report MGD	***	***	***	Continuous	Totalizing Meter
Carbonaceous Biochemical Oxygen Demand, 5-day	80082	709 (*2)	N/A	Report	10	N/A	15	3 Days/Week	24-Hour Composite
Total Suspended Solids	00530	2127 (*2)	N/A	Report	30	N/A	45	3 Days/Week	24-Hour Composite
E. Coli Bacteria	51040	N/A	N/A	N/A	548 (*3)	2507 (*3)	N/A	3 Days/Week	Grab
Ammonia Nitrogen (Total as N)	00620	141.8 (*2)	Report	N/A	2	Report	N/A	Daily	24-Hour Composite
Nitrate-Nitrite (as N)	00630	212.7 (*2)	Report	N/A	3	Report	N/A	Daily	24-Hour Composite
Dissolved Oxygen	00300	Report	N/A	N/A	Minimum 5 mg/l (24-Hr. Average)			Daily	Grab
Total Residual Chlorine	50060	N/A	N/A	N/A	N/A	11 ug/l (*4)	N/A	Daily	Instantaneous Grab

EFFLUENT CHARACTERISTICS	DISCHARGE MONITORING		MONITORING REQUIREMENTS	
WHOLE EFFLUENT LETHALITY (22414) (7-Day NOEC) (*5)	30-DAY AVG MINIMUM 100%	7-DAY MINIMUM 100%	MEASUREMENT FREQUENCY	SAMPLE TYPE
Ceriodaphnia dubia	Report	Report	Once/Quarter	24-Hr Composite
Pimephales promelas	Report	Report	Once/Quarter	24-Hr Composite

Footnotes:

*1 See **Appendix A of Part II** of the permit for minimum quantification limits.

*2 Permit limits established by TMDLs for the Santa Fe River. Loading limits determined based on a design flow of 8.5 MGD.

*3 Colony forming units (cfu) per 100 ml.

*4 TRC shall be measured during periods when chlorine is used as either backup bacteria control, when disinfection of plant treatment equipment is required or when used for filamentaceous algae control. Regulations at 40 CFR Part 136 define "instantaneous grab" as analyzed within 15 minutes of collection. The effluent limitation for TRC is the instantaneous maximum and cannot be averaged for reporting purposes.

*5 Monitoring and reporting requirements begin on the effective date of this permit. See PART II, Whole Effluent Toxicity testing requirements for additional WET monitoring and reporting conditions.

FLOATING SOLIDS, VISIBLE FOAM AND/OR OILS

There shall be no discharge of floating solids or visible foam in other than trace amounts. There shall be no discharge of visible films of oil, globules of oil, grease or solids in or on the water, or coatings on stream banks.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the discharge from the final treatment unit prior to the receiving stream.

B. SCHEDULE OF COMPLIANCE

NONE

C. MONITORING AND REPORTING (MAJOR DISCHARGERS)

1. The permittee shall effectively monitor the operation and efficiency of all treatment and control facilities and the quantity and quality of the treated discharge.

2 Monitoring information required shall be submitted on Discharge Monitoring Report Form EPA 3320-1 to EPA and NMED as required in Part III, D.4.

   a. Reporting periods shall end on the last day of each month.

   b. The permittee is required to submit regular monthly reports as described above postmarked no later than the 15th day of the month following each reporting period.

   c. The annual sludge report required in Part IV of the permit is due on February 19 of each year and covers the previous calendar year from January 1 through December 31.

3 If any 30 day average, monthly average, 7 day average, weekly average, or daily maximum value exceeds the effluent limitations specified in Part I.A, the permittee shall report the excursion in accordance with the requirements of Part III.D.

4 Any 30 day average, monthly average, 7 day average, weekly average, or daily maximum value reported in the required Discharge Monitoring Report which is in excess of the effluent limitation specified in Part I.A shall constitute evidence of violation of such effluent limitation and of this permit.

5 Other measurements of oxygen demand (e.g., TOC and COD) may be substituted for five day Biochemical Oxygen Demand (BOD_5) or for five day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), as applicable, where the permittee can demonstrate long term correlation of the method with BOD_5 or $CBOD_5$ values, as applicable. Details of the correlation procedures used must be submitted and prior approval granted by the permitting authority for this procedure to be acceptable. Data reported must also include evidence to show that the proper correlation continues to exist after approval.

6. The permittee shall report all overflows with the Discharge Monitoring Report submittal. These reports shall be summarized and reported in tabular format. The summaries shall include: the date, time, duration, location, estimated volume, and cause of the overflow; observed environmental impacts from the overflow; actions taken to address the overflow; and ultimate discharge location if not contained (e.g., storm sewer system, ditch, tributary). Any noncompliance which may endanger health or the environment shall also be orally reported to the New Mexico Environment Department at (505) 827-0187, as soon as possible, but within 12 hours from the time the permittee becomes aware of the circumstance. A written report of overflows which endanger health or the environment shall be provided to EPA and New Mexico Environment Department within 5 days of the time the permittee becomes aware of the circumstance.

D. OVERFLOW REPORTING

The permittee shall report all overflows with the DMR submittal. These reports shall be summarized and reported in tabular format. The summaries shall include: date, time, duration, location, estimated volume, and cause of the overflow. They shall also include observed environmental impacts from the overflow; actions taken to address the overflow; and, the ultimate discharge location if not contained (e.g., storm sewer system, ditch, tributary).

Overflows that endanger health or the environment shall be orally reported to EPA at (214) 665-6595, and NMED Surface Water Quality Bureau at (505) 827-0187, within 24 hours from the time the permittee becomes aware of the circumstance. A written report of overflows that endanger health or the environment shall be provided to EPA and NMED Surface Water Quality Bureau within 5 days of the time the permittee becomes aware of the circumstance.

E. POLLUTION PREVENTION REQUIREMENTS

The permittee shall institute a program within 12 months of the effective date of the permit (or continue an existing one) directed towards optimizing the efficiency and extending the useful life of the facility. The permittee shall consider the following items in the program:

a. The influent loadings, flow and design capacity;
b. The effluent quality and plant performance;
c. The age and expected life of the wastewater treatment facility's equipment;
d. Bypasses and overflows of the tributary sewerage system and treatment works;
e. New developments at the facility;
f. Operator certification and training plans and status;
g. The financial status of the facility;
h. Preventative maintenance programs and equipment conditions and;
i. An overall evaluation of conditions at the facility.

PART II - OTHER CONDITIONS

A. MINIMUM QUANTIFICATION LEVEL (MQL)

See list of MQL's at Appendix A of Part II below. For pollutants listed on Appendix A of Part II below with MQL's, analyses must be performed to the listed MQL. If any individual analytical test result is less than the MQL listed, a value of zero (0) may be used for that pollutant result for the Discharge Monitoring Report (DMR) calculations and reporting requirements.

In addition, any additional pollutant sampling for purposes of this permit, including renewal applications or any other reporting, shall be tested to the MQL shown on the attached Appendix A of Part II. Results of analyses that are less than the listed MQL maybe reported as "non detect" (ND).

B. 24-HOUR ORAL REPORTING: DAILY MAXIMUM LIMITATION VIOLATIONS

Under the provisions of Part III.D.7.b.(3) of this permit, violations of daily maximum limitations for the following pollutants shall be reported orally to EPA Region 6, Compliance and Assurance Division, Water Enforcement Branch (6EN-W), Dallas, Texas, and NMED within 24 hours from the time the permittee becomes aware of the violation followed by a written report in five days.

E. Coli Bacteria
Total Residual Chlorine

C. PERMIT MODIFICATION AND REOPENER

In accordance with 40 CFR Part 122.44(d), the permit may be reopened and modified during the life of the permit if relevant portions of the New Mexico's Water Quality Standards for Interstate and Intrastate Streams are revised, or new State of New Mexico water quality standards are established and/or remanded.

In accordance with 40 CFR Part 122.62(s)(2), the permit may be reopened and modified if new information is received that was not available at the time of permit issuance that would have justified the application of different permit conditions at the time of permit issuance. Permit modifications shall reflect the results of any of these actions and shall follow regulations listed at 40 CFR Part 124.5.

D. WHOLE EFFLUENT TOXICITY TESTING (7 DAY CHRONIC NOEC FRESHWATER)

It is unlawful and a violation of this permit for a permittee or his designated agent, to manipulate test samples in any manner, to delay sample shipment, or to terminate or to cause to terminate a toxicity test. Once initiated, all toxicity tests must be completed unless specific authority has been granted by EPA Region 6 or the State NPDES permitting authority.

1. SCOPE AND METHODOLOGY

a. The permittee shall test the effluent for toxicity in accordance with the provisions in this section.

APPLICABLE TO FINAL OUTFALL(S): 001

REPORTED ON DMR AS FINAL OUTFALL: 001

CRITICAL DILUTION (%): 100%

EFFLUENT DILUTION SERIES (%): 32, 42, 56, 75,100%

COMPOSITE SAMPLE TYPE: Defined at PART I

TEST SPECIES/METHODS: 40 CFR Part 136

Ceriodaphnia dubia chronic static renewal survival and reproduction test, Method 1002.0, EPA-821-R-02-013, or the most recent update thereof. This test should be terminated when 60% of the surviving females in the control produce three broods or at the end of eight days, whichever comes first.

Pimephales promelas (Fathead minnow) chronic static renewal 7 day larval survival and growth test, Method 1000.0, EPA 821 R 02 013, or the most recent update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

b. The NOEC (No Observed Effect Concentration) is herein defined as the greatest effluent dilution at and below which toxicity that is statistically different from the control (0% effluent) at the 95% confidence level does not occur. Chronic lethal test failure is defined as a demonstration of a statistically significant lethal effect at test completion to a test species at or below the critical dilution. Chronic sub-lethal test failure is defined as a demonstration of a statistically significant sub-lethal effect (i.e., growth or reproduction) at test completion to a test species at or below the critical dilution.

c. The conditions of this item are effective beginning with the effective date of the WET limit. When the testing frequency stated above is less than monthly and the effluent fails the lethal or sub-lethal endpoint at or below the critical dilution, the permittee shall be considered in violation of this permit limit and the frequency for the affected species will increase to monthly until such time compliance with the No Observed Effect Concentration (NOEC) effluent limitation is demonstrated for a period of three consecutive months, at which time the permittee may return to the testing frequency stated in PART I of this permit. During the period the permittee is out of compliance, test results shall be reported on the DMR for that reporting period. The purpose of additional tests (also referred to as ‘retests’ or confirmation tests) is to determine the duration of a toxic event. A test that meets all test acceptability criteria and demonstrates significant toxic effects does not need additional confirmation. Such testing cannot confirm or disprove a previous test result.

d. This permit may be reopened to require chemical specific effluent limits, additional testing, and/or other appropriate actions to address toxicity.

2. REQUIRED TOXICITY TESTING CONDITIONS

a. Test Acceptance

The permittee shall repeat a test, including the control and all effluent dilutions, if the procedures and quality assurance requirements defined in the test methods or in this permit are not satisfied, including the following additional criteria:

i. The toxicity test control (0% effluent) must have survival equal to or greater than 80%.

ii. The mean number of Ceriodaphnia dubia neonates produced per surviving female in the control (0% effluent) must be 15 or more.

iii. 60% of the surviving control females must produce three broods.

iv. The mean dry weight of surviving Fathead minnow larvae at the end of the 7 days in the control (0% effluent) must be 0.25 mg per larva or greater.

v. The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent) for: the young of surviving females in the Ceriodaphnia dubia reproduction test, the growth and survival of the Fathead minnow test.

vi. The percent coefficient of variation between replicates shall be 40% or less in the critical dilution, unless significant lethal or nonlethal effects are exhibited for: the young of surviving females in the Ceriodaphnia dubia reproduction test; the growth and survival endpoints in the Fathead minnow test.

vii. A Percent Minimum Significant Difference (PMSD) range of 13 - 47 for Ceriodaphnia dubia reproduction;

viii. A PMSD range of 12 - 30 for Fathead minnow growth.

Test failure may not be construed or reported as invalid due to a coefficient of variation value of greater than 40%. A repeat test shall be conducted within the required reporting period of any test determined to be invalid.

b. Statistical Interpretation

i. For the Ceriodaphnia dubia survival test, the statistical analyses used to determine if there is a significant difference between the control and the critical dilution shall be Fisher's Exact Test as described in EPA 821-R-02-013 or the most recent update thereof.

ii. For the Ceriodaphnia dubia reproduction test and the Fathead minnow larval survival and growth test, the statistical analyses used to determine if there is a significant difference between the control and the critical dilution shall be in accordance with the methods for determining the No Observed Effect Concentration (NOEC) as described in EPA 821-R-02-013, or the most recent update thereof.

iii. If the conditions of Test Acceptability are met in Item 2.a above and the percent survival of the test organism is equal to or greater than 80% in the critical dilution concentration and all lower dilution concentrations, the test shall be considered to be a passing test, and the permittee shall report a survival NOEC of not less than the critical dilution for the DMR reporting requirements found in Item 3 below.

c. Dilution Water

i. Dilution water used in the toxicity tests will be receiving water collected as close to the point of discharge as possible but unaffected by the discharge. The permittee shall substitute synthetic dilution water of similar pH, hardness, and alkalinity to the closest downstream perennial water where the receiving stream is classified as intermittent or where the receiving stream has no flow due to zero flow conditions.

ii. If the receiving water is unsatisfactory as a result of instream toxicity (fails to fulfill the test acceptance criteria of Item 2.a), the permittee may substitute synthetic dilution water for the receiving water in all subsequent tests provided the unacceptable receiving water test met the following stipulations:

(A) a synthetic dilution water control which fulfills the test acceptance requirements of Item 2.a was run concurrently with the receiving water control;

(B) the test indicating receiving water toxicity has been carried out to completion (i.e., 7 days);

(C) the permittee includes all test results indicating receiving water toxicity with the full report and information required by Item 3.a below; and

(D) the synthetic dilution water shall have a pH, hardness, and alkalinity similar to that of the receiving water or closest downstream perennial water not adversely affected by the discharge, provided the magnitude of these parameters will not cause toxicity in the synthetic dilution water.

d. Samples and Composites

i. The permittee shall collect a minimum of three flow weighted composite samples from the outfall(s) listed at Item 1.a above.

ii. The permittee shall collect second and third composite samples for use during 24 hour renewals of each dilution concentration for each test. The permittee must collect the composite samples such that the effluent samples are representative of any periodic episode of chlorination, biocide usage or other potentially toxic substance discharged on an intermittent basis.

iii. The permittee must collect the composite samples so that the maximum holding time for any effluent sample shall not exceed 72 hours. The permittee must have initiated the toxicity test within 36 hours after the collection of the last portion of the first composite sample. Samples shall be chilled to 6 degrees Centigrade during collection, shipping, and/or storage.

iv. If the flow from the outfall(s) being tested ceases during the collection of effluent samples, the requirements for the minimum number of effluent samples, the minimum number of effluent portions and the sample holding time are waived during that sampling period. However, the permittee must collect an effluent composite sample volume during the period of discharge that is sufficient to complete the required toxicity tests with daily renewal of effluent. When possible, the effluent samples used for the toxicity tests shall be collected on separate days if the discharge occurs over multiple days. The effluent composite sample collection duration and the static renewal protocol associated with the abbreviated sample collection must be documented in the full report required in Item 3 of this section.

v. MULTIPLE OUTFALLS: If the provisions of this section are applicable to multiple outfalls, the permittee shall combine the composite effluent samples in proportion to the average flow from the outfalls listed in Item 1.a above for the day the sample was collected. The permittee shall perform the toxicity test on the flow weighted composite of the outfall samples.

3. REPORTING

a. The permittee shall prepare a full report of the results of all tests conducted pursuant to this section in accordance with the Report Preparation Section of EPA 821-R-02-013, or the most current publication, for every valid or invalid toxicity test initiated whether carried to completion or not. The permittee shall retain each full report pursuant to the provisions of PART III.C.3 of this permit. The permittee shall submit full reports upon the specific request of the Agency. For any test which fails, is considered invalid or which is terminated early for any reason, the full report must be submitted for agency review.

b. The permittee shall report the Whole Effluent Toxicity values for the 30 Day Average Minimum and the 7 Day Minimum under Parameter No. 22414 on the DMR for that reporting period in accordance with PART III.D.4 of this permit.

If more than one valid test for a species was performed during the reporting period, the test NOECs will be averaged arithmetically and reported as the DAILY AVERAGE MINIMUM NOEC for that reporting period.

If more than one species is tested during the reporting period, the permittee shall report the lowest 30 Day Average Minimum NOEC and the lowest 7 Day Minimum NOEC for Whole Effluent Toxicity.

A valid test for each species must be reported on the DMR during each reporting period specified in PART I of this permit. Only ONE set of biomonitoring data for each species is to be recorded on the DMR for each reporting period. The data submitted should reflect the LOWEST lethal and sub-lethal effects results for each species during the reporting period. All invalid tests, repeat tests (for invalid tests), and retests (for tests previously failed) performed during the reporting period must be attached to the DMR for EPA review.

c. The permittee shall submit the results of the valid toxicity test on the DMR for that reporting period in accordance with PART III.D.4 of this permit, as follows below. Submit retest information clearly marked as such with the following month's DMR. Only results of valid tests are to be reported on the DMR.

i. Pimephales promelas (Fathead Minnow)

A. If the No Observed Effect Concentration (NOEC) for lethal effects is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TLP6C

B. Report the NOEC value for survival, Parameter No. TOP6C

C. Report the Lowest Observed Effect Concentration (LOEC) value for survival, Parameter No. TXP6C

D. Report the NOEC value for growth, Parameter No. TPP6C

E. Report the LOEC value for growth, Parameter No. TYP6C

F. If the No Observed Effect Concentration (NOEC) for growth is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TGP6C

G. Report the highest (critical dilution or control) Coefficient of Variation, Parameter No. TQP6C

ii. Ceriodaphnia dubia

A. If the NOEC for lethal effects is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TLP3B

B. Report the NOEC value for survival, Parameter No. TOP3B

C. Report the LOEC value for survival, Parameter No. TXP3B

D. Report the NOEC value for reproduction, Parameter No. TPP3B

E. Report the LOEC value for reproduction, Parameter No. TYP3B

F. If the No Observed Effect Concentration (NOEC) for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TGP3B

G. Report the higher (critical dilution or control) Coefficient of Variation, Parameter No. TQP3B

E. CONTRIBUTING INDUSTRIES AND PRETREATMENT REQUIREMENTS

1. The permittee shall operate an industrial pretreatment program in accordance with Section 402(b)(8) of the Clean Water Act, the General Pretreatment Regulations (40 CFR Part 403) and the approved POTW pretreatment program submitted by the permittee. The pretreatment program was approved on December 20, 1984 and modified on March 1, 1994, September 26, 2006, and February 26, 2008. The POTW pretreatment program is hereby incorporated by reference and shall be implemented in a manner consistent with the following requirements:

   (a) Industrial user information shall be updated at a frequency adequate to ensure that all IUs are properly ` characterized at all times;

   (b) The frequency and nature of industrial user compliance monitoring activities by the permittee shall be commensurate with the character, consistency and volume of waste. The permittee must inspect and sample the effluent from each Significant Industrial User in accordance with 40 CFR 403.8(f)(2)(v). This is in addition to any industrial self-monitoring activities;

   (c) The permittee shall enforce and obtain remedies for noncompliance by any industrial users with applicable pretreatment standards and requirements;

   (d) The permittee shall control through permit, order, or similar means, the contribution to the POTW by each Industrial User to ensure compliance with applicable Pretreatment Standards and Requirements. In the case of Industrial Users identified as significant under 40 CFR 403.3 (v), this control shall be achieved through individual or general control mechanisms, in accordance with 40 CFR 403.8(f)(1)(iii). Both individual and general control mechanisms must be enforceable and contain, at a minimum, the following conditions:

      (i) Statement of duration (in no case more than five years);

      (ii) Statement of non-transferability without, at a minimum, prior notification to the POTW and provision of a copy of the existing control mechanism to the new owner or operator;

      (iii) Effluent limits, including Best Management Practices, based on applicable general Pretreatment Standards, categorical Pretreatment Standards, local limits, and State and local law;

      (iv) Self-monitoring, sampling, reporting, notification and recordkeeping requirements, including an identification of the pollutants to be monitored (including the process for seeking a waiver for a pollutant neither present nor expected to be present in the Discharge on accordance with § 403.12(e)(2), or a specific waiver for a pollutant in the case of an individual control mechanism), sampling location, sampling frequency, and sample type, based on the applicable general Pretreatment Standards in 40 CFR 403, categorical Pretreatment Standards, local limits, and State and local law;

      (v) Statement of applicable civil and criminal penalties for violation of Pretreatment Standards and requirements, and any applicable compliance schedule. Such schedules may not extend the

compliance date beyond federal deadlines; and

(vi) Requirements to control slug discharges, if determined by the POTW to be necessary.

(e) The permittee shall evaluate, whether each Significant Industrial User needs a plan or other action to control slug discharges, in accordance with 40 CFR 403.8(f)(2)(vi);

(f) The permittee shall provide adequate staff, equipment, and support capabilities to carry out all elements of the pretreatment program; and,

(g) The approved program shall not be modified by the permittee without the prior approval of the Agency.

2. The permittee shall establish and enforce specific limits to implement the provisions of 40 CFR Parts 403.5(a) and (b), as required by 40 CFR Part 403.5(c). POTWs may develop Best Management Practices (BMPs) to implement paragraphs 40 CFR 403.5 (c)(1) and (c)(2). Such BMPs shall be considered local limits and Pretreatment Standards. Each POTW with an approved pretreatment program shall continue to develop these limits as necessary and effectively enforce such limits.

   The permittee shall, within **sixty (60) days** of the effective date of this permit, (1) submit a **WRITTEN CERTIFICATION** that a technical evaluation has been demonstrated that the existing technically based local limits (TBLL) are based on current state water quality standards and are adequate to prevent pass through of pollutants, inhibition of or interference with the treatment facility, worker health and safety problems, and sludge contamination, **OR** (2) submit a **WRITTEN NOTIFICATION** that a technical evaluation revising the current TBLL and a draft sewer use ordinance which incorporates such revisions will be submitted within **12 months** of the effective date of this permit.

   All specific prohibitions or limits developed under this requirement are deemed to be conditions of this permit. The specific prohibitions set out in 40 CFR Part 403.5(b) shall be enforced by the permittee unless modified under this provision.

3. The permittee shall analyze the treatment facility influent and effluent for the presence of the toxic pollutants listed in 40 CFR 122 Appendix D (NPDES Application Testing Requirements) Table II at least **once/12 months** and the toxic pollutants in Table III at least **once/3 months**. If, based upon information available to the permittee, there is reason to suspect the presence of any toxic or hazardous pollutant listed in Table V, or any other pollutant, known or suspected to adversely affect treatment plant operation, receiving water quality, or solids disposal procedures, analysis for those pollutants shall be performed at least **once/3 months** on both the influent and the effluent.

   The influent and effluent samples collected shall be composite samples consisting of at least 12 aliquots collected at approximately equal intervals over a representative 24 hour period and composited according to flow. **Sampling and analytical procedures shall be in accordance with guidelines established in 40 CFR 136. The effluent samples shall be analyzed to a level at least as low as required in item (6) below**. Where composite samples are inappropriate, due to sampling, holding time, or analytical constraints, at least 4 grab samples, taken at equal intervals over a representative 24 hour period, shall be taken.

4. The permittee shall prepare annually a list of Industrial Users which during the preceding twelve months were in significant noncompliance with applicable pretreatment requirements. For the purposes of this Part, significant noncompliance shall be determined based upon the more stringent of either criteria established at 40 CFR Part 403.8(f)(2)(viii) [rev. 10/14/05] or criteria established in the approved POTW pretreatment program. This list is to be published annually in a newspaper of general circulation that provides meaningful public notice within the jurisdiction(s) served by the POTW during the month of **December**.

   In addition, during the month of **December** the permittee shall submit an updated pretreatment program status report to EPA and the State containing the following information:

   (a) An updated list of all significant industrial users and identify which Industrial Users are Non-Significant Categorical Industrial Users (NSCIUs) or Middle Tier CIUs. The list must also identify:

   - Industrial Users subject to categorical Pretreatment Standards that are subject to reduced monitoring and reporting requirements under 40 CFR 403.12(e)(2) & (3),

   - Industrial Users subject to the following categorical Pretreatment Standards [Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) (40 CFR part 414), Petroleum Refining (40 CFR part 419), and Pesticide Chemicals (40 CFR part 455)] and for which the Control Authority has chosen to use the concentration-based standards rather than converting them to flow-based mass standards as allowed at 40 CFR 403.6(c)(6).

   - Categorical Industrial Users subject to concentration-based standards for which the Control Authority has chosen to convert the concentration-based standards to equivalent mass limits, as allowed at 40 CFR 403.6(c)(5).

   - General Control Mechanisms used for similar groups of SIUs along with the substantially similar types of operations and the types of wastes that are the same, for each separate General Control Mechanism, as allowed at 40 CFR 403.8(f)(1)(iii).

   - Best Management Practices or Pollution Prevention alternatives required by a categorical Pretreatment Standard or as a local limit requirement that are implemented and documentation to demonstrate compliance, as required at 40 CFR 403.12 (b), (e) and (h).

   For each industrial user listed the following information shall be included:

   (i) Standard Industrial Classification (SIC) or NAISC code and categorical determination;

   (ii) Control document status. Whether the user has an effective control document, and the date such document was last issued, reissued, or modified, (indicate which industrial users were added to the system (or newly identified) within the previous 12 months);

(iii) A summary of all monitoring activities performed within the previous 12 months. The following information shall be reported:

* total number of inspections performed;
* total number of sampling visits made;

(iv) Status of compliance with both effluent limitations and reporting requirements. Compliance status shall be defined as follows:

* Compliant (C) - no violations during the previous 12 month period;

* Non-compliant (NC) - one or more violations during the previous 12 months but does not meet the criteria for significantly noncompliant industrial users;

* Significant Noncompliance (SNC) - in accordance with requirements described in 4. above; and

(v) For significantly noncompliant industrial users, indicate the nature of the violations, the type and number of actions taken (notice of violation, administrative order, criminal or civil suit, fines or penalties collected, etc.) and current compliance status. If ANY industrial user was on a schedule to attain compliance with effluent limits, indicate the date the schedule was issued and the date compliance is to be attained;

(b) A list of all significant industrial users whose authorization to discharge was terminated or revoked during the preceding 12 month period and the reason for termination;

(c) A report on any interference, pass through, upset or POTW permit violations known or suspected to be caused by industrial contributors and actions taken by the permittee in response;

(d) The results of all influent and effluent analyses performed pursuant to Part II(A)(3) above;

(e) A copy of the newspaper publication of the significantly noncompliant industrial users giving the name of the newspaper and the date published;

(f) The information requested may be submitted in tabular form as per the example tables provided for your convenience; and

(g) The monthly average water quality based effluent concentration necessary to meet the state water quality standards as developed in the approved technically based local limits.

5. The permittee shall provide adequate notice of the following:

(a) Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to Sections 301 and 306 of the Act if it were directly discharging those pollutants; and

(b) Any substantial change in the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of the permit.

Adequate notice shall include information on (i) the quality and quantity of effluent to be introduced into the treatment works, and (ii) any anticipated impact of the change on the quality or quantity of effluent to be discharged from the POTW.

6. All effluent monitoring conducted in accordance with Part (II)(A)(3) above shall meet the Minimum Quantification Levels (MQLs) shown in Part (II) Appendix A

MONITORING RESULTS[1] FOR THE ANNUAL PRETREATMENT REPORT, REPORTING YEAR: _____, 200__ TO _____, 200__
TREATMENT PLANT : _____ NPDES PERMIT NO.

POLLUTANT	MAHL, if applicable, in µg/L[2]	Influent Values (in µg/L) on Dates Sampled				Daily Average Effluent Limit in µg/L[3]	Effluent Values (in µg/L)on Dates Sampled			
Antimony (Total)										
Arsenic (Total)										
Beryllium (Total)										
Cadmium (Total)										
Chromium (Total)										
Copper (Total)										
Lead (Total)										
Mercury (Total)										
Molybdenum (Total)										
Nickel (Total)										
Selenium (Total)										
Silver (Total)										
Thallium (Total)										
Zinc (Total										
Cyanide (Total)										
4										

1 It is advised that the influent and effluent samples are collected considering flow detention time through each plant. Analytical MQLs should be used so that the data can also be used for Local Limits assessment and NPDES application purposes.
2 Maximum Allowable Headworks Loading limitation in µg/L. Only complete for pollutants that have approved Technically Based Local Limits.
3 Daily average effluent limit in the NPDES permit OR the applicable state Water Quality Standard calculated to an equivalent permit effluent limit.
4 Record the names of any pollutants [40 CFR 122, Appendix D, Table II and/or Table V] detected and the quantity in which they were detected.

PRETREATMENT PROGRAM STATUS REPORT
UPDATED SIGNIFICANT INDUSTRIAL USERS LIST

INDUSTRIAL USER	SIC CODE	CATE-GORICAL DETER-MINATION	CONTROL DOCUMENT		NEW USER	TIMES INSPECTED	TIMES SAMPLED	COMPLIANCE STATUS				
								REPORTS				EFFLUENT LIMITS
			Y/N	LAST ACTION				BMR	90-DAY COMPLIANCE	SEMI-ANNUAL	SELF MONITORING	

SIGNIFICANTLY NONCOMPLIANT USERS - ENFORCEMENT ACTIONS TAKEN

INDUSTRIAL USER	NATURE OF VIOLATION		NUMBER OF ACTIONS TAKEN					PENALTIES COLLECTED	COMPLIANCE SCHEDULE		CURRENT STATUS	COMMENTS
	REPORTS	LIMITS	NOV	A.O.	CIVIL	CRIMINAL	OTHER		DATE ISSUED	DATE DUE		

APPENDIX A of PART II

The following Minimum Quantification Levels (MQL's) are to be used for reporting pollutant data for NPDES permit applications and/or compliance reporting.

POLLUTANTS	MQL µg/l	POLLUTANTS	MQL µg/l
METALS, RADIOACTIVITY, CYANIDE and CHLORINE			
Aluminum	2.5	Molybdenum	10
Antimony	60	Nickel	0.5
Arsenic	0.5	Selenium	5
Barium	100	Silver	0.5
Beryllium	0.5	Thalllium	0.5
Boron	100	Uranium	0.1
Cadmium	1	Vanadium	50
Chromium	10	Zinc	20
Cobalt	50	Cyanide	10
Copper	0.5	Cyanide, weak acid dissociable	10
Lead	0.5	Total Residual Chlorine	33
Mercury *1	0.0005		
	0.005		
DIOXIN			
2,3,7,8-TCDD	0.00001		
VOLATILE COMPOUNDS			
Acrolein	50	1,3-Dichloropropylene	10
Acrylonitrile	20	Ethylbenzene	10
Benzene	10	Methyl Bromide	50
Bromoform	10	Methylene Chloride	20
Carbon Tetrachloride	2	1,1,2,2-Tetrachloroethane	10
Chlorobenzene	10	Tetrachloroethylene	10
Clorodibromomethane	10	Toluene	10
Chloroform	50	1,2-trans-Dichloroethylene	10
Dichlorobromomethane	10	1,1,2-Trichloroethane	10
1,2-Dichloroethane	10	Trichloroethylene	10
1,1-Dichloroethylene	10	Vinyl Chloride	10
1,2-Dichloropropane	10		
ACID COMPOUNDS			
2-Chlorophenol	10	2,4-Dinitrophenol	50
2,4-Dichlorophenol	10	Pentachlorophenol	5
2,4-Dimethylphenol	10	Phenol	10
4,6-Dinitro-o-Cresol	50	2,4,6-Trichlorophenol	10

POLLUTANTS	MQL µg/l	POLLUTANTS	MQL µg/l
	BASE/NEUTRAL		
Acenaphthene	10	Dimethyl Phthalate	10
Anthracene	10	Di-n-Butyl Phthalate	10
Benzidine	50	2,4-Dinitrotoluene	10
Benzo(a)anthracene	5	1,2-Diphenylhydrazine	20
Benzo(a)pyrene	5	Fluoranthene	10
3,4-Benzofluoranthene	10	Fluorene	10
Benzo(k)fluoranthene	5	Hexachlorobenzene	5
Bis(2-chloroethyl)Ether	10	Hexachlorobutadiene	10
Bis(2-chloroisopropyl)Ether	10	Hexachlorocyclopentadiene	10
Bis(2-ethylhexyl)Phthalate	10	Hexachloroethane	20
Butyl Benzyl Phthalate	10	Indeno(1,2,3-cd)Pyrene	5
2-Chloronapthalene	10	Isophorone	10
Chrysene	5	Nitrobenzene	10
Dibenzo(a,h)anthracene	5	n-Nitrosodimethylamine	50
1,2-Dichlorobenzene	10	n-Nitrosodi-n-Propylamine	20
1,3-Dichlorobenzene	10	n-Nitrosodiphenylamine	20
1,4-Dichlorobenzene	10	Pyrene	10
3,3'-Dichlorobenzidine	5	1,2,4-Trichlorobenzene	10
Diethyl Phthalate	10		
	PESTICIDES AND PCBS		
Aldrin	0.01	Beta-Endosulfan	0.02
Alpha-BHC	0.05	Endosulfan sulfate	0.02
Beta-BHC	0.05	Endrin	0.02
Gamma-BHC	0.05	Endrin Aldehyde	0.1
Chlordane	0.2	Heptachlor	0.01
4,4'-DDT and derivatives	0.02	Heptachlor Epoxide	0.01
Dieldrin	0.02	PCBs	0.2
Alpha-Endosulfan	0.01	Toxaphene	0.3

(MQL's Revised November 1, 2007)

Footnotes:

*1 Default MQL for Mercury is 0.005 unless Part I of your permit requires the more sensitive Method 1631 (Oxidation / Purge and Trap / Cold vapor Atomic Fluorescence Spectrometry), then the MQL shall be 0.0005.

PART III - STANDARD CONDITIONS FOR NPDES PERMITS

A. GENERAL CONDITIONS

1. INTRODUCTION
In accordance with the provisions of 40 CFR Part 122.41, et. seq., this permit incorporates by reference ALL conditions and requirements applicable to NPDES Permits set forth in the Clean Water Act, as amended, (hereinafter known as the "Act") as well as ALL applicable regulations.

2. DUTY TO COMPLY
The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

3. TOXIC POLLUTANTS

   a. Notwithstanding Part III.A.5, if any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition.

   b. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Act for toxic pollutants within the time provided in the regulations that established those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

4. DUTY TO REAPPLY
If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application shall be submitted at least 180 days before the expiration date of this permit. The Director may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date. Continuation of expiring permits shall be governed by regulations promulgated at 40 CFR Part 122.6 and any subsequent amendments.

5. PERMIT FLEXIBILITY
This permit may be modified, revoked and reissued, or terminated for cause in accordance with 40 CFR 122.62-64. The filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

6. PROPERTY RIGHTS
This permit does not convey any property rights of any sort, or any exclusive privilege.

7. DUTY TO PROVIDE INFORMATION
The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

8. CRIMINAL AND CIVIL LIABILITY
Except as provided in permit conditions on "Bypassing" and "Upsets", nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of the permit, the Act, or applicable regulations, which avoids or effectively defeats the regulatory purpose of the Permit may subject the Permittee to criminal enforcement pursuant to 18 U.S.C. Section 1001.

9. OIL AND HAZARDOUS SUBSTANCE LIABILITY
Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

10. STATE LAWS
Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

11. SEVERABILITY
The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

B. PROPER OPERATION AND MAINTENANCE

1. NEED TO HALT OR REDUCE NOT A DEFENSE
It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. The permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failure either by means of alternate power sources, standby generators or retention of inadequately treated effluent.

2. DUTY TO MITIGATE
The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

3. PROPER OPERATION AND MAINTENANCE

a. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by permittee as efficiently as possible and in a manner which will minimize upsets and discharges of excessive pollutants and will achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

b. The permittee shall provide an adequate operating staff which is duly qualified to carry out operation, maintenance and testing functions required to insure compliance with the conditions of this permit.

4. BYPASS OF TREATMENT FACILITIES

a. BYPASS NOT EXCEEDING LIMITATIONS
The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts III.B.4.b. and 4.c.

b. NOTICE

(1)ANTICIPATED BYPASS
If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(2)UNANTICIPATED BYPASS
The permittee shall, within 24 hours, submit notice of an unanticipated bypass as required in Part III.D.7.

c. PROHIBITION OF BYPASS

(1) Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

(a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and,

(c) The permittee submitted notices as required by Part III.B.4.b.

(2) The Director may allow an anticipated bypass after considering its adverse effects, if the Director determines that it will meet the three conditions listed at Part III.B.4.c(1).

5. UPSET CONDITIONS

   a. EFFECT OF AN UPSET
   An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Part III.B.5.b. are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

   b. CONDITIONS NECESSARY FOR A DEMONSTRATION OF UPSET
   A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

      (1) An upset occurred and that the permittee can identify the cause(s) of the upset;

      (2) The permitted facility was at the time being properly operated;

      (3) The permittee submitted notice of the upset as required by Part III.D.7; and,

      (4) The permittee complied with any remedial measures required by Part III.B.2.

   c. BURDEN OF PROOF
   In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

6. REMOVED SUBSTANCES
   Unless otherwise authorized, solids, sewage sludges, filter backwash, or other pollutants removed in the course of treatment or wastewater control shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

7. PERCENT REMOVAL (PUBLICLY OWNED TREATMENT WORKS)
   For publicly owned treatment works, the 30-day average (or Monthly Average) percent removal for Biochemical Oxygen Demand and Total Suspended Solids shall not be less than 85 percent unless otherwise authorized by the permitting authority in accordance with 40 CFR 133.103.

C. MONITORING AND RECORDS

1. INSPECTION AND ENTRY
   The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by the law to:

   a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

   b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

   c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

   d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

2. REPRESENTATIVE SAMPLING
   Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

3. RETENTION OF RECORDS
   The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of the Director at any time.

4. RECORD CONTENTS
   Records of monitoring information shall include:

   a. The date, exact place, and time of sampling or measurements;

b. The individual(s) who performed the sampling or measurements;

c. The date(s) and time(s) analyses were performed;

d. The individual(s) who performed the analyses;

e. The analytical techniques or methods used; and

f. The results of such analyses.

5. MONITORING PROCEDURES

a. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit or approved by the Regional Administrator.

b. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at intervals frequent enough to insure accuracy of measurements and shall maintain appropriate records of such activities.

c. An adequate analytical quality control program, including the analyses of sufficient standards, spikes, and duplicate samples to insure the accuracy of all required analytical results shall be maintained by the permittee or designated commercial laboratory.

6. FLOW MEASUREMENTS
Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10% from true discharge rates throughout the range of expected discharge volumes.

D. REPORTING REQUIREMENTS

1. PLANNED CHANGES

a. INDUSTRIAL PERMITS
The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

(1) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR Part 122.29(b); or,

(2) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements listed at Part III.D.10.a.

b. MUNICIPAL PERMITS
Any change in the facility discharge (including the introduction of any new source or significant discharge or significant changes in the quantity or quality of existing discharges of pollutants) must be reported to the permitting authority. In no case are any new connections, increased flows, or significant changes in influent quality permitted that will cause violation of the effluent limitations specified herein.

2. ANTICIPATED NONCOMPLIANCE
The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. TRANSFERS
This permit is not transferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Act.

4. DISCHARGE MONITORING REPORTS AND OTHER REPORTS
Monitoring results must be reported to EPA on either the electronic or paper Discharge Monitoring Report (DMR) approved formats. Monitoring results can be submitted electronically in lieu of the paper DMR Form. To submit electronically, access the NetDMR website at www.epa.gov/netdmr and contact the R6NetDMR.epa.gov in-box for further instructions. Until you

are approved for Net DMR, you must report on the Discharge Monitoring Report (DMR) Form EPA. No. 3320-1 in accordance with the "General Instructions" provided on the form. No additional copies are needed if reporting electronically, however when submitting paper form EPA No. 3320-1, the permittee shall submit the original DMR signed and certified as required by Part III.D.11 and all other reports required by Part III.D. to the EPA at the address below. Duplicate copies of paper DMR's and all other reports shall be submitted to the appropriate State agency (ies) at the following address (es):

EPA:
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-W)
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

New Mexico:
Program Manager
Surface Water Quality Bureau
New Mexico Environment Department
P.O. Box 5469
1190 Saint Francis Drive
Santa Fe, NM 87502-5469

5. ADDITIONAL MONITORING BY THE PERMITTEE
If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report (DMR). Such increased monitoring frequency shall also be indicated on the DMR.

6. AVERAGING OF MEASUREMENTS
Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

7. TWENTY-FOUR HOUR REPORTING

a. The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall be provided within 5 days of the time the permittee becomes aware of the circumstances. The report shall contain the following information:

(1) A description of the noncompliance and its cause;

(2) The period of noncompliance including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and,

(3) Steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

b. The following shall be included as information which must be reported within 24 hours:

(1) Any unanticipated bypass which exceeds any effluent limitation in the permit;

(2) Any upset which exceeds any effluent limitation in the permit; and,

(3) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in Part II (industrial permits only) of the permit to be reported within 24 hours.

c. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

8. OTHER NONCOMPLIANCE
The permittee shall report all instances of noncompliance not reported under Parts III.D.4 and D.7 and Part I.B (for industrial permits only) at the time monitoring reports are submitted. The reports shall contain the information listed at Part III.D.7.

9. OTHER INFORMATION
Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

10. CHANGES IN DISCHARGES OF TOXIC SUBSTANCES
All existing manufacturing, commercial, mining, and silvacultural permittees shall notify the Director as soon as it knows or has reason to believe:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant listed at 40 CFR Part 122, Appendix D, Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(1) One hundred micrograms per liter (100 µg/L);
(2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2, 4-dinitro-phenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

(3) Five (5) times the maximum concentration value reported for that pollutant in the permit application; or

(4) The level established by the Director.

b. That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(1) Five hundred micrograms per liter (500 µg/L);

(2) One milligram per liter (1 mg/L) for antimony;

(3) Ten (10) times the maximum concentration value reported for that pollutant in the permit application; or

(4) The level established by the Director.

11. SIGNATORY REQUIREMENTS
All applications, reports, or information submitted to the Director shall be signed and certified.

a. ALL PERMIT APPLICATIONS shall be signed as follows:

(1) FOR A CORPORATION - by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(a)A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation; or,

(b)The manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(2) FOR A PARTNERSHIP OR SOLE PROPRIETORSHIP - by a general partner or the proprietor, respectively.

(3) FOR A MUNICIPALITY, STATE, FEDERAL, OR OTHER PUBLIC AGENCY - by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(a)The chief executive officer of the agency, or

(b)A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

b. ALL REPORTS required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility, or an individual or position having overall responsibility for environmental

matters for the company. A duly authorized representative may thus be either a named individual or an individual occupying a named position; and,

(3) The written authorization is submitted to the Director.

c. CERTIFICATION
Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

12. AVAILABILITY OF REPORTS
Except for applications, effluent data permits, and other data specified in 40 CFR 122.7, any information submitted pursuant to this permit may be claimed as confidential by the submitter. If no claim is made at the time of submission, information may be made available to the public without further notice.

E. PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS

1. CRIMINAL

a. NEGLIGENT VIOLATIONS
The Act provides that any person who negligently violates permit conditions implementing Section 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both.

b. KNOWING VIOLATIONS
The Act provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or both.

c. KNOWING ENDANGERMENT
The Act provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 303, 306, 307, 308, 318, or 405 of the Act and who knows at that time that he is placing another person in imminent danger of death or serious bodily injury is subject to a fine of not more than $250,000, or by imprisonment for not more than 15 years, or both.

d. FALSE STATEMENTS
The Act provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the Act, shall upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or by both. (See Section 309.c.4 of the Clean Water Act)

2. CIVIL PENALTIES
The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed $27,500 per day for each violation.

3. ADMINISTRATIVE PENALTIES
The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to an administrative penalty, as follows:

a. CLASS I PENALTY
Not to exceed $11,000 per violation nor shall the maximum amount exceed $27,500.

b. CLASS II PENALTY
Not to exceed $11,000 per day for each day during which the violation continues nor shall the maximum amount exceed $137,500.

F. DEFINITIONS

All definitions contained in Section 502 of the Act shall apply to this permit and are incorporated herein by reference. Unless otherwise specified in this permit, additional definitions of words or phrases used in this permit are as follows:

1. ACT means the Clean Water Act (33 U.S.C. 1251 et. seq.), as amended.

2. ADMINISTRATOR means the Administrator of the U.S. Environmental Protection Agency.

3. APPLICABLE EFFLUENT STANDARDS AND LIMITATIONS means all state and Federal effluent standards and limitations to which a discharge is subject under the Act, including, but not limited to, effluent limitations, standards or performance, toxic effluent standards and prohibitions, and pretreatment standards.

4. APPLICABLE WATER QUALITY STANDARDS means all water quality standards to which a discharge is subject under the Act.

5. BYPASS means the intentional diversion of waste streams from any portion of a treatment facility.

6. DAILY DISCHARGE means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in terms of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the sampling day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the sampling day. "Daily discharge" determination of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the "daily discharge" determination of concentration shall be arithmetic average (weighted by flow value) of all samples collected during that sampling day.

7. DAILY MAXIMUM discharge limitation means the highest allowable "daily discharge" during the calendar month.

8. DIRECTOR means the U.S. Environmental Protection Agency Regional Administrator or an authorized representative.

9. ENVIRONMENTAL PROTECTION AGENCY means the U.S. Environmental Protection Agency.

10. GRAB SAMPLE means an individual sample collected in less than 15 minutes.

11. INDUSTRIAL USER means a non-domestic discharger, as identified in 40 CFR 403, introducing pollutants to a publicly owned treatment works.

12. MONTHLY AVERAGE (also known as DAILY AVERAGE) discharge limitations means the highest allowable average of "daily discharge(s)" over a calendar month, calculated as the sum of all "daily discharge(s)" measured during a calendar month divided by the number of "daily discharge(s)" measured during that month. When the permit establishes daily average concentration effluent limitations or conditions, the daily average concentration means the arithmetic average (weighted by flow) of all "daily discharge(s)" of concentration determined during the calendar month where C = daily concentration, F = daily flow, and n = number of daily samples; daily average discharge =

$$C_1F_1 + C_2F_2 + ... + C_nF_n$$

$$F_1 + F_2 + ... + F_n$$

13. NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the Act.

14. SEVERE PROPERTY DAMAGE means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

15. SEWAGE SLUDGE means the solids, residues, and precipitates separated from or created in sewage by the unit processes of a publicly owned treatment works. Sewage as used in this definition means any wastes, including wastes from humans, households, commercial establishments, industries, and storm water runoff that are discharged to or otherwise enter a publicly owned treatment works.

16. TREATMENT WORKS means any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage and industrial wastes of a liquid nature to implement Section 201 of the Act, or necessary to recycle or reuse water at

the most economical cost over the estimated life of the works, including intercepting sewers, sewage collection systems, pumping, power and other equipment, and their appurtenances, extension, improvement, remodeling, additions, and alterations thereof.

17. UPSET means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

18. FOR FECAL COLIFORM BACTERIA, a sample consists of one effluent grab portion collected during a 24-hour period at peak loads.

19. The term "MGD" shall mean million gallons per day.

20. The term "mg/L" shall mean milligrams per liter or parts per million (ppm).

21. The term "µg/L" shall mean micrograms per liter or parts per billion (ppb).

22. MUNICIPAL TERMS

    a. 7-DAY AVERAGE or WEEKLY AVERAGE, other than for fecal coliform bacteria, is the arithmetic mean of the daily values for all effluent samples collected during a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The 7-day average for fecal coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar week.

    b. 30-DAY AVERAGE or MONTHLY AVERAGE, other than for fecal coliform bacteria, is the arithmetic mean of the daily values for all effluent samples collected during a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month. The 30-day average for fecal coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar month.

    c. 24-HOUR COMPOSITE SAMPLE consists of a minimum of 12 effluent portions collected at equal time intervals over the 24-hour period and combined proportional to flow or a sample collected at frequent intervals proportional to flow over the 24-hour period.

    d. 12-HOUR COMPOSITE SAMPLE consists of 12 effluent portions collected no closer together than one hour and composited according to flow. The daily sampling intervals shall include the highest flow periods.

    e. 6-HOUR COMPOSITE SAMPLE consists of six effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.

    f. 3-HOUR COMPOSITE SAMPLE consists of three effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.

MAJOR - SEWAGE SLUDGE REQUIREMENTS

INSTRUCTIONS TO PERMITTEES

Select only those Elements and Sections which apply to your sludge reuse or disposal practice.

If your facility utilizes more than one type of disposal or reuse method (for example, Element I and Element II apply) or the quality of your sludge varies (for example, Section II and Section III of Element I apply) use a separate Discharge Monitoring Report (DMR) for each Section that is applicable.

The sludge DMRs shall be due by February 19th of each year and shall cover the previous January through December time period. (The sludge DMRs for permits in Texas shall be due by September 1 of each year, with the reporting period of August 1 to July 31)

The sludge conditions do not apply to wastewater treatment lagoons where sludge is not wasted for final reuse/disposal. If the sludge is not removed, the permittee shall indicate on the DMR "No Discharge".

ELEMENT 1 - LAND APPLICATION

ELEMENT 2 - SURFACE DISPOSAL

ELEMENT 3 - MUNICIPAL SOLID WASTE LANDFILL DISPOSAL

ELEMENT 1 - LAND APPLICATION

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE LAND APPLICATION

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge in accordance with Section 405 of the Clean Water Act and all other applicable Federal regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants which may be present in the sludge.

2. If requirements for sludge management practices or pollutant criteria become more stringent than the sludge pollutant limits or acceptable management practices in this permit, or control a pollutant not listed in this permit, this permit may be modified or revoked and reissued to conform to the requirements promulgated at Section 405(d)(2) of the Clean Water Act. If new limits for Molybdenum are promulgated prior to permit expiration, then those limits shall become directly enforceable.

3. In all cases, if the person (permit holder) who prepares the sewage sludge supplies the sewage sludge to another person for land application use or to the owner or lease holder of the land, the permit holder shall provide necessary information to the parties who receive the sludge to assure compliance with these regulations.

4. The permittee shall give prior notice to EPA (Chief, Permits Branch, Water Management Division, Mail Code 6W-P, EPA Region 6, 1445 Ross Avenue, Dallas, Texas 75202) of any planned changes in the sewage sludge disposal practice, in accordance with 40 CFR Part 122.41(l)(1)(iii). These changes may justify the application of permit conditions that are different from or absent in the existing permit. Change in the sludge use or disposal practice may be cause for modification of the permit in accordance with 40 CFR Part 122.62(a)(1).

B. Testing Requirements

1. Sewage sludge shall be tested once during the life of the permit within one year from the effective date of the permit in accordance with the method specified at 40 CFR 268, Appendix I (Toxicity Characteristic Leaching Procedure (TCLP)) or other approved methods. Sludge shall be tested after final treatment prior to leaving the POTW site. Sewage sludge determined to be a hazardous waste in accordance with 40 CFR Part 261, shall be handled according to RCRA standards for the disposal of hazardous waste in accordance with 40 CFR Part 262. The disposal of sewage sludge determined to be a hazardous waste, in other than a certified hazardous waste disposal facility shall be prohibited. The Information Management Section, telephone no. (214) 665-6750, and the appropriate state agency shall be notified of test failure within 24 hours. A written report shall be provided to this office within 7 days after failing the TCLP. The report will contain test results, certification that unauthorized disposal has not occurred and a summary of alternative disposal plans that comply with RCRA standards for the disposal of hazardous waste. The report shall be addressed to: Director, Multimedia Planning and Permitting Division, EPA Region 6, Mail Code 6PD, 1445 Ross Avenue, Dallas, Texas 75202. A copy of this report shall be sent to the Chief, Water Enforcement Branch, Compliance Assurance and Enforcement Division, Mail Code 6EN-W, at the same street address.

2. Sewage sludge shall not be applied to the land if the concentration of the pollutants exceed the pollutant concentration criteria in Table 1. The frequency of testing for pollutants in Table 1 is found in Element 1, Section I.C.

TABLE 1

Pollutant	Ceiling Concentration (milligrams per kilogram)*
Arsenic	75
Cadmium	85
Copper	4300
Lead	840
Mercury	57
Molybdenum	75

Nickel	420
PCBs	49
Selenium	100
Zinc	7500

* Dry weight basis

3. Pathogen Control

All sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by either the Class A or Class B pathogen requirements. Sewage sludge that is applied to a lawn or home garden shall be treated by the Class A pathogen requirements. Sewage sludge that is sold or given away in a bag shall be treated by Class A pathogen requirements.

a. Six alternatives are available to demonstrate compliance with Class A sewage sludge. All 6 options require either the density of fecal coliform in the sewage sludge be less than 1000 Most Probable Number (MPN) per gram of total solids (dry weight basis), or the density of Salmonella sp. bacteria in the sewage sludge be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed; at the time the sewage sludge is prepared for sale or given away in a bag or other container for application to the land. Below are the additional requirements necessary to meet the definition of a Class A sludge. Alternatives 5 and 6 are not authorized to demonstrate compliance with Class A sewage sludge in Texas permits.

Alternative 1 - The temperature of the sewage sludge that is used or disposed shall be maintained at a specific value for a period of time. See 503.32(a)(3)(ii) for specific information. This alternative is not applicable to composting.

Alternative 2 - The pH of the sewage sludge that is used or disposed shall be raised to above 12 and shall remain above 12 for 72 hours. The pH shall be defined as the logarithm of the reciprocal of the hydrogen ion concentration measured at 25°C or measured at another temperature and then converted to an equivalent value at 25°C.

The temperature of the sewage sludge shall be above 52 degrees Celsius for 12 hours or longer during the period that the pH of the sewage sludge is above 12.

At the end of the 72 hour period during which the pH of the sewage sludge is above 12, the sewage sludge shall be air dried to achieve a percent solids in the sewage sludge greater than 50 percent.

Alternative 3 - The sewage sludge shall be analyzed for enteric viruses prior to pathogen treatment. The limit for enteric viruses is one Plaque-forming Unit per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 503.32(a)(5)(ii) for specific information. The sewage sludge shall be analyzed for viable helminth ova prior to pathogen treatment. The limit for viable helminth ova is less than one per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 503.32(a)(5)(iii) for specific information.

Alternative 4 - The density of enteric viruses in the sewage sludge shall be less than one Plaque-forming Unit per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed or at the time the sludge is prepared for sale or give away in a bag or other container for application to the land.

The density of viable helminth ova in the sewage sludge shall be less than one per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed or at the time the sewage sludge is prepared for sale or give away in a bag or other container for application to the land.

Alternative 5 - Sewage sludge shall be treated by one of the Processes to Further Reduce Pathogens (PFRP) described in 503 Appendix B. PFRPs include composting, heat drying, heat treatment, and thermophilic aerobic digestion.

Alternative 6 - Sewage sludge shall be treated by a process that is equivalent to a Process to Further Reduce Pathogens, if individually approved by the Pathogen Equivalency Committee representing the EPA.

b. Three alternatives are available to demonstrate compliance with Class B sewage sludge. Alternatives 2 and 3 are not authorized to demonstrate compliance with Class B sewage sludge in Texas permits.

Alternative 1 - (i) Seven representative samples of the sewage sludge that is used shall be collected for one monitoring episode at the time the sewage sludge is used or disposed.

(ii) The geometric mean of the density of fecal coliform in the samples collected shall be less than either 2,000,000 MPN per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis).

Alternative 2 - Sewage sludge shall be treated in one of the Processes to significantly Reduce Pathogens described in 503 Appendix B.

Alternative 3 - Sewage sludge shall be treated in a process that is equivalent to a PSRP, if individually approved by the Pathogen Equivalency Committee representing the EPA.

In addition, the following site restrictions must be met if Class B sludge is land applied:

i. Food crops with harvested parts that touch the sewage sludge/soil mixture and are totally above the land surface shall not be harvested for 14 months after application of sewage sludge.

ii. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of sewage sludge when the sewage sludge remains on the land surface for 4 months or longer prior to incorporation into the soil.

iii. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of sewage sludge when the sewage sludge remains on the land surface for less than 4 months prior to incorporation into the soil.

iv. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of sewage sludge.

v. Animals shall not be grazed on the land for 30 days after application of sewage sludge.

vi. Turf grown on land where sewage sludge is applied shall not be harvested for 1 year after application of the sewage sludge when the harvested turf is placed on either land with a high potential for public exposure or a lawn, unless otherwise specified by the permitting authority.

vii. Public access to land with a high potential for public exposure shall be restricted for 1 year after application of sewage sludge.

viii. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of sewage sludge.

4. Vector Attraction Reduction Requirements

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by one of the following alternatives 1 through 10 for Vector Attraction Reduction. If bulk sewage sludge is applied to a home garden, or bagged sewage sludge is applied to the land, only alternative 1 through alternative 8 shall

be used.

Alternative 1 - The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38 percent.

Alternative 2 - If Alternative 1 cannot be met for an anaerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30 and 37 degrees Celsius. Volatile solids must be reduced by less than 17 percent to demonstrate compliance.

Alternative 3 - If Alternative 1 cannot be met for an aerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge with a percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20 degrees Celsius. Volatile solids must be reduced by less than 15 percent to demonstrate compliance.

Alternative 4 - The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20 degrees Celsius.

Alternative 5 - Sewage sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge shall be higher than 40 degrees Celsius and the average temperature of the sewage sludge shall be higher than 45 degrees Celsius.

Alternative 6 - The pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali shall remain at 12 or higher for two hours and then at 11.5 or higher for an additional 22 hours at the time the sewage sludge is used or disposed; at the time the sewage sludge is prepared for sale or given away in a bag or other container.

Alternative 7 - The percent solids of sewage sludge that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75 percent based on the moisture content and total solids prior to mixing with other materials at the time the sludge is used. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 8 - The percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90 percent based on the moisture content and total solids prior to mixing with other materials at the time the sludge is used. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 9 - (i) Sewage sludge shall be injected below the surface of the land.

(ii) No significant amount of the sewage sludge shall be present on the land surface within one hour after the sewage sludge is injected.

(iii) When sewage sludge that is injected below the surface of the land is Class A with respect to pathogens, the sewage sludge shall be injected below the land surface within eight hours after being discharged from the pathogen treatment process.

Alternative 10 - (i) Sewage sludge applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within six hours after application to or placement on the land.

(ii) When sewage sludge that is incorporated into the soil is Class A with respect to pathogens, the sewage sludge shall be applied to or placed on the land within

eight hours after being discharged from the pathogen treatment process.

C. Monitoring Requirements

Toxicity Characteristic Leaching Procedure (TCLP) Test - Once/Permit Life, performed within one year from the effective date of the permit

PCBs - Once/Year

All other pollutants shall be monitored at the frequency shown below:

Amount of sewage sludge* (metric tons per 365 day period)	Frequency
0 ≤ Sludge < 290	Once/Year
290 ≤ Sludge < 1,500	Once/Quarter
1,500 ≤ Sludge < 15,000	Once/Two Months
15,000 ≤ Sludge	Once/Month

* Either the amount of bulk sewage sludge applied to the land or the amount of sewage sludge received by a person who prepares sewage sludge that is sold or given away in a bag or other container for application to the land (dry weight basis).

Representative samples of sewage sludge shall be collected and analyzed in accordance with the methods referenced in 40 CFR 503.8(b).

SECTION II. REQUIREMENTS SPECIFIC TO BULK SEWAGE SLUDGE FOR APPLICATION TO THE LAND MEETING CLASS A or B PATHOGEN REDUCTION AND THE CUMULATIVE LOADING RATES IN TABLE 2, OR CLASS B PATHOGEN REDUCTION AND THE POLLUTANT CONCENTRATIONS IN TABLE 3

For those permittees meeting Class A or B pathogen reduction requirements and that meet the cumulative loading rates in Table 2 below, or the Class B pathogen reduction requirements and contain concentrations of pollutants below those listed in Table 3 found in Element I, Section III, the following conditions apply:

1. Pollutant Limits

Table 2

Pollutant	Cumulative Pollutant Loading Rate (kilograms per hectare)
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Molybdenum	Report
Nickel	420
Selenium	100
Zinc	2800

2. Pathogen Control

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, or lawn or home garden shall be treated by either Class A or Class B pathogen reduction requirements as defined above in Element 1, Section I.B.3.

3. Management Practices

a. Bulk sewage sludge shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the bulk sewage sludge enters a wetland or other waters of the U.S., as defined in 40 CFR 122.2, except as provided in a permit issued pursuant to section 404 of the CWA.

b. Bulk sewage sludge shall not be applied within 10 meters of a water of the U.S.

c. Bulk sewage sludge shall be applied at or below the agronomic rate in accordance with recommendations from the following references:

i. STANDARDS 1992, Standards, Engineering Practices and Data, 39th Edition (1992) American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MI 49085-9659.

ii. National Engineering Handbook Part 651, Agricultural Waste Management Field Handbook (1992), P.O. Box 2890, Washington, D.C. 20013.

iii. Recommendations of local extension services or Soil Conservation Services.

iv. Recommendations of a major University's Agronomic Department.

d. An information sheet shall be provided to the person who receives bulk sewage sludge sold or given away. The information sheet shall contain the following information:

i. The name and address of the person who prepared the sewage sludge that is sold or given away in a bag or other container for application to the land.

ii. A statement that application of the sewage sludge to the land is prohibited except in accordance with the instructions on the label or information sheet.

iii. The annual whole sludge application rate for the sewage sludge that does not cause any of the cumulative pollutant loading rates in Table 2 above to be exceeded, unless the pollutant concentrations in Table 3 found in Element I, Section III below are met.

4. Notification requirements

a. If bulk sewage sludge is applied to land in a State other than the State in which the sludge is prepared, written notice shall be provided prior to the initial land application to the permitting authority for the State in which the bulk sewage sludge is proposed to be applied. The notice shall include:

i. The location, by either street address or latitude and longitude, of each land application site.

ii. The approximate time period bulk sewage sludge will be applied to the site.

iii. The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who prepares the bulk sewage sludge.

iv. The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who will apply the bulk sewage sludge.

b. The permittee shall give 60 days prior notice to the Director of any change planned in the sewage sludge practice. Any change shall include any planned physical alterations or additions to the permitted treatment works, changes in the permittee's sludge use or disposal practice, and also alterations, additions, or deletions of disposal sites. These changes may justify the application of permit conditions that are different from or absent in the existing permit, including notification of

additional disposal sites not reported during the permit application process or absent in the existing permit. Change in the sludge use or disposal practice may be cause for modification of the permit in accordance with 40 CFR 122.62(a)(1).

c. The permittee shall provide the location of all new sludge disposal/use sites where previously undisturbed ground is proposed for disturbance to the State Historical Commission within 90 days of the effective date of this permit. In addition, the permittee shall provide the location of any new disposal/use site to the State Historical Commission prior to use of the site.

The permittee shall within 30 days after notification by the State Historical Commission that a specific sludge disposal/use area will adversely effect a National Historic Site, cease use of such area.

5. Recordkeeping Requirements - The sludge documents will be retained on site at the same location as other NPDES records.

The person who prepares bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information for five years. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for recordkeeping found in 40 CFR 503.17 for persons who land apply.

a. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 3 found in Element I, Section III and the applicable pollutant concentration criteria (mg/Kg), or the applicable cumulative pollutant loading rate and the applicable cumulative pollutant loading rate limit (kg/ha) listed in Table 2 above.

b. A description of how the pathogen reduction requirements are met (including site restrictions for Class B sludges, if applicable).

c. A description of how the vector attraction reduction requirements are met.

d. A description of how the management practices listed above in Section II.3 are being met.

e. The recommended agronomic loading rate from the references listed in Section II.3.c. above, as well as the actual agronomic loading rate shall be retained.

f. A description of how the site restrictions in 40 CFR Part 503.32(b)(5) are met for each site on which Class B bulk sewage sludge is applied.

g. The following certification statement:

"I certify, under penalty of law, that the information that will be used to determine compliance with the management practices in §503.14 have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

h. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 40 CFR 503.17(a)(4)(i)(B) or 40 CFR Part 503.17(a)(5)(i)(B) as applicable to the permittees sludge treatment activities.

i. The permittee shall maintain information that describes future geographical areas where sludge may be land applied.

j. The permittee shall maintain information identifying site selection criteria regarding land application sites not identified at the time of permit application submission.

k. The permittee shall maintain information regarding how future land application sites will be managed.

The person who prepares bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information indefinitely. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for recordkeeping found in 40 CFR 503.17 for persons who land apply.

a. The location, by either street address or latitude and longitude, of each site on which sludge is applied.

b. The number of hectares in each site on which bulk sludge is applied.

c. The date and time sludge is applied to each site.

d. The cumulative amount of each pollutant in kilograms/hectare listed in Table 2 applied to each site.

e. The total amount of sludge applied to each site in metric tons.

f. The following certification statement:

"I certify, under penalty of law, that the information that will be used to determine compliance with the requirements to obtain information in §503.12(e)(2) have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the requirements to obtain information have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

g. A description of how the requirements to obtain information in §503.12(e)(2) are met.

6. Reporting Requirements - The permittee shall report annually on the DMR the following information:

a. Pollutant Table (2 or 3) appropriate for permittee's land application practices.

b. The frequency of monitoring listed in Element 1, Section I.C. which applies to the permittee.

c. Toxicity Characteristic Leaching Procedure (TCLP) results (Pass/Fail).

d. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 1 (defined as a monthly average) as well as the applicable pollutant concentration criteria (mg/Kg) listed in Table 3 found in Element 1, Section III, or the applicable pollutant loading rate limit (kg/ha) listed in Table 2 above if it exceeds 90% of the limit.

e. Level of pathogen reduction achieved (Class A or Class B).

f. Alternative used as listed in Section I.B.3.(a. or b.). Alternatives describe how the pathogen reduction requirements are met. If Class B sludge, include information on how site restrictions were met in the DMR comment section or attach a separate sheet to the DMR.

g. Vector attraction reduction alternative used as listed in Section I.B.4.

h. Annual sludge production in dry metric tons/year.

i. Amount of sludge land applied in dry metric tons/year.

j. Amount of sludge transported interstate in dry metric tons/year.

k. The certification statement listed in 503.17(a)(4)(i)(B) or 503.17(a)(5)(i)(B) whichever applies to the

permittees sludge treatment activities shall be attached to the DMR.

l. When the amount of any pollutant applied to the land exceeds 90% of the cumulative pollutant loading rate for that pollutant, as described in Table 2, the permittee shall report the following information as an attachment to the DMR.

i. The location, by either street address or latitude and longitude.

ii. The number of hectares in each site on which bulk sewage sludge is applied.

iii. The date and time bulk sewage sludge is applied to each site.

iv. The cumulative amount of each pollutant (i.e., kilograms/hectare) listed in Table 2 in the bulk sewage sludge applied to each site.

v. The amount of sewage sludge (i.e., metric tons) applied to each site.

vi. The following certification statement:

"I certify, under penalty of law, that the information that will be used to determine compliance with the requirements to obtain information in 40 CFR 503.12(e)(2) have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the requirements to obtain information have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

vii. A description of how the requirements to obtain information in 40 CFR 503.12(e)(2) are met.

SECTION III. REQUIREMENTS SPECIFIC TO BULK OR BAGGED SEWAGE SLUDGE MEETING POLLUTANT CONCENTRATIONS IN TABLE 3 AND CLASS A PATHOGEN REDUCTION REQUIREMENTS

For those permittees with sludge that contains concentrations of pollutants below those pollutant limits listed in Table 3 for bulk or bagged (containerized) sewage sludge and also meet the Class A pathogen reduction requirements, the following conditions apply (Note: All bagged sewage sludge must be treated by Class A pathogen reduction requirements.):

1. Pollutant limits - The concentration of the pollutants in the municipal sewage sludge is at or below the values listed.

Table 3

Pollutant	Monthly Average Concentration (milligrams per kilogram)*
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Molybdenum	Report
Nickel	420
Selenium	100
Zinc	2800

* Dry weight basis

2. Pathogen Control

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, or lawn or home garden shall be treated by the Class A pathogen reduction requirements as defined above in Element I, Section I.B.3. All bagged sewage sludge must be treated by Class A pathogen reduction requirements.

3. Management Practices - None.

4. Notification Requirements - None.

5. Recordkeeping Requirements - The permittee shall develop the following information and shall retain the information for five years. The sludge documents will be retained on site at the same location as other NPDES records.

   a. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 3 and the applicable pollutant concentration criteria listed in Table 3.

   b. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 503.17(a)(1)(ii) or 503.17(a)(3)(i)(B), whichever applies to the permittees sludge treatment activities.

   c. A description of how the Class A pathogen reduction requirements are met.

   d. A description of how the vector attraction reduction requirements are met.

6. Reporting Requirements - The permittee shall report annually on the DMR the following information:

   a. Pollutant Table 3 appropriate for permittee's land application practices.

   b. The frequency of monitoring listed in Element 1, Section I.C. which applies to the permittee.

   c. Toxicity Characteristic Leaching Procedure (TCLP) results. (Pass/Fail).

   d. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 1 (defined as a monthly average) found in Element 1, Section I. In addition, the applicable pollutant concentration criteria listed in Table 3 should be included on the DMR.

   e. Pathogen reduction Alternative used for Class A bagged or bulk sludge as listed in Section I.B.3.a.

   f. Vector attraction reduction Alternative used as listed in Section I.B.4.

   g. Annual sludge production in dry metric tons/year.

   h. Amount of sludge land applied in dry metric tons/year.

   i. Amount of sludge transported interstate in dry metric tons/year.

   j. The certification statement listed in 503.17(a)(1)(ii) or 503.17(a)(3)(i)(B), whichever applies to the permittees sludge treatment activities, shall be attached to the DMR.

SECTION IV. REQUIREMENTS SPECIFIC TO SLUDGE SOLD OR GIVEN AWAY IN A BAG OR OTHER CONTAINER FOR APPLICATION TO THE LAND THAT DOES NOT MEET THE MINIMUM POLLUTANT CONCENTRATIONS

1. Pollutant Limits

Table 4

Pollutant	Annual Pollutant Loading Rate (kilograms per hectare per 365 day period)
Arsenic	2
Cadmium	1.9
Copper	75
Lead	15
Mercury	0.85
Molybdenum	Report
Nickel	21
Selenium	5
Zinc	140

2. Pathogen Control

All sewage sludge that is sold or given away in a bag or other container for application to the land shall be treated by the Class A pathogen requirements as defined in Section I.B.3.a.

3. Management Practices

Either a label shall be affixed to the bag or other container in which sewage sludge that is sold or given away for application to the land, or an information sheet shall be provided to the person who receives sewage sludge sold or given away in an other container for application to the land. The label or information sheet shall contain the following information:

a. The name and address of the person who prepared the sewage sludge that is sold or given away in a bag or other container for application to the land.

b. A statement that application of the sewage sludge to the land is prohibited except in accordance with the instructions on the label or information sheet.

c. The annual whole sludge application rate for the sewage sludge that will not cause any of the annual pollutant loading rates in Table 4 above to be exceeded.

4. Notification Requirements - None.

5. Recordkeeping Requirements - The sludge documents will be retained on site at the same location as other NPDES records.

The person who prepares sewage sludge or a sewage sludge material shall develop the following information and shall retain the information for five years.

a. The concentration in the sludge of each pollutant listed above in found in Element I, Section I, Table 1.

b. The following certification statement found in 503.17(a)(6)(iii).

"I certify, under penalty of law, that the information that will be used to determine compliance with the management practices in §503.14(e), the Class A pathogen requirement in §503.32(a), and the vector attraction reduction requirement in (insert vector attraction reduction option) have been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices, pathogen requirements, and vector attraction reduction requirements have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment".

c. A description of how the Class A pathogen reduction requirements are met.

d. A description of how the vector attraction reduction requirements are met.

e. The annual whole sludge application rate for the sewage sludge that does not cause the annual pollutant loading rates in Table 4 to be exceeded. See Appendix A to Part 503 - Procedure to Determine the Annual Whole Sludge Application Rate for a Sewage Sludge.

6. Reporting Requirements - The permittee shall report annually on the DMR the following information:

a. List Pollutant Table 4 appropriate for permittee's land application practices.

b. The frequency of monitoring listed in Element 1, Section I.C. which applies to the permittee.

c. Toxicity Characteristic Leaching Procedure (TCLP) results (Pass/Fail).

d. The concentration (mg/Kg) in the sludge of each pollutant listed above in Table 1 (defined as a monthly average) found in Element 1, Section I.

e. Class A pathogen reduction Alternative used as listed in Section I.B.3.a. Alternatives describe how the pathogen reduction requirements are met.

f. Vector attraction reduction Alternative used as listed in Section I.B.4.

g. Annual sludge production in dry metric tons/year.

h. Amount of sludge land applied in dry metric tons/year.

i. Amount of sludge transported interstate in dry metric tons/year.

j. The following certification statement found in § 503.17(a)(6)(iii) shall be attached to the DMR.

"I certify, under penalty of law, that the information that will be used to determine compliance with the management practice in §503.14(e), the Class A pathogen requirement in §503.32(a), and the vector attraction reduction requirement (insert appropriate option) have been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel gather and evaluate the information used to determine that the management practice, pathogen requirements, and vector attraction reduction requirements have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

ELEMENT 2- SURFACE DISPOSAL

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE SURFACE DISPOSAL

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge in accordance with Section 405 of the Clean Water Act and all other applicable Federal regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants which may be present.

2. If requirements for sludge management practices or pollutant criteria become more stringent than the sludge pollutant limits or acceptable management practices in this permit, or control a pollutant not listed in this permit, this permit may be modified or revoked and reissued to conform to the requirements promulgated at Section 405(d)(2) of the Clean Water Act.

3. In all cases, if the person (permit holder) who prepares the sewage sludge supplies the sewage sludge to another person (owner or operator of a sewage sludge unit) for disposal in a surface disposal site, the permit holder shall provide all necessary information to the parties who receive the sludge to assure compliance with these regulations.

4. The permittee shall give prior notice to EPA (Chief, Permits Branch, Water Management Division, Mail Code 6W-P, EPA Region 6, 1445 Ross Avenue, Dallas, Texas 75202) of any planned changes in the sewage sludge disposal practice, in accordance with 40 CFR Part 122.41(l)(1)(iii). These changes may justify the application of permit conditions that are different from or absent in the existing permit. Change in the sludge use or disposal practice may be cause for modification of the permit in accordance with 40 CFR Part 122.62(a)(1).

5. The permittee or owner/operator shall submit a written closure and post closure plan to the permitting authority 180 days prior to the closure date. The plan shall include the following information:

   (a) A discussion of how the leachate collection system will be operated and maintained for three years after the surface disposal site closes if it has a liner and leachate collection system.

   (b) A description of the system used to monitor continuously for methane gas in the air in any structures within the surface disposal site. The methane gas concentration shall not exceed 25% of the lower explosive limit for methane gas for three years after the sewage sludge unit closes. A description of the system used to monitor for methane gas in the air at the property line of the site shall be included. The methane gas concentration at the surface disposal site property line shall not exceed the lower explosive limit for methane gas for three years after the sewage sludge unit closes.

   (c) A discussion of how public access to the surface disposal site will be restricted for three years after it closes.

B. Management Practices

1. An active sewage sludge unit located within 60 meters of a fault that has displacement in Holocene time shall close by March 22, 1994.

2. An active sewage sludge unit located in an unstable area shall close by March 22, 1994.

3. An active sewage sludge unit located in a wetland shall close by March 22, 1994.

4. Surface disposal shall not restrict the flow of the base 100-year flood.

5. The run-off collection system for an active sewage sludge unit shall have the capacity to handle run-off from a 25-year, 24-hour storm event.

6. A food crop, feed crop, or a fiber crop shall not be grown on a surface disposal site.

7. Animals shall not be grazed on a surface disposal site.

8. Public access shall be restricted on the active surface disposal site and for three years after the site closes.

9. Placement of sewage sludge shall not contaminate an aquifer. This shall be demonstrated through one of the following:

   (a) Results of a ground-water monitoring program developed by a qualified ground-water scientist.

   (b) A certification by a qualified ground-water scientist may be used to demonstrate that sewage sludge placed on an active sewage sludge unit does not contaminate an aquifer.

10. When a cover is placed on an active surface disposal site, the concentration of methane gas in air in any structure within the surface disposal site shall not exceed 25 percent of the lower explosive limit for methane gas during the period that the sewage sludge unit is active. The concentration of methane gas in air at the property line of the surface disposal site shall not exceed the lower explosive limit for methane gas during the period that the sewage sludge unit is active. Monitoring shall be continuous.

C. Testing Requirements

1. Sewage sludge shall be tested once during the life of the permit within one year from the effective date of the permit in accordance with the method specified at 40 CFR 268, Appendix I (Toxicity Characteristic Leaching Procedure (TCLP)) or other approved methods. Sludge shall be tested after final treatment prior to leaving the POTW site. Sewage sludge determined to be a hazardous waste in accordance with 40 CFR Part 261, shall be handled according to RCRA standards for the disposal of hazardous waste in accordance with 40 CFR Part 262. The disposal of sewage sludge determined to be a hazardous waste, in other than a certified hazardous waste disposal facility shall be prohibited. The Information Management Section, telephone no. (214) 665-6750, and the appropriate state agency shall be notified of test failure within 24 hours. A written report shall be provided to this office within 7 days after failing the TCLP. The report will contain test results, certification that unauthorized disposal has not occurred and a summary of alternative disposal plans that comply with RCRA standards for the disposal of hazardous waste. The report shall be addressed to: Director, Multimedia Planning and Permitting Division, EPA Region 6, Mail Code 6PD, 1445 Ross Avenue, Dallas, Texas 75202. A copy of this report shall be sent to the Chief, Water Enforcement Branch, Compliance Assurance and Enforcement Division, Mail Code 6EN-W, at the same street address.

2. Sewage sludge shall be tested at the frequency show below in Element 2, Section I.D. for PCBs. Any sludge exceeding a concentration of 50 mg/Kg shall not be surface disposed.

3. Pathogen Control

All sewage sludge that is disposed of in a surface disposal site shall be treated by either the Class A or Class B pathogen requirements unless sewage sludge is placed on an active surface disposal site and is covered with soil or other material at the end of each operating day. When reporting on the DMR, list pathogen reduction level attained as A, B, or C (daily cover). When reporting <u>how</u> compliance was met, list Alternative 1, 2, 3, 4, 5 or 6 for Class A, or Alternative Number 1, 2, 3, or 4 for Class B, on DMR.

(a) Six alternatives are available to demonstrate compliance with Class A sewage sludge. All 6 alternatives require either the density of fecal coliform in the sewage sludge be less than 1000 MPN per gram of total solids (dry weight basis), or the density of <u>Salmonella</u> sp. bacteria in the sewage sludge be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed; at the time the sewage sludge is prepared for sale or given away in a bag or other container for application to the land. Below are the <u>additional</u> requirements necessary to meet the definition of a Class A sludge. Alternatives 5 and 6 are not authorized to demonstrate compliance with Class A sewage sludge in Texas permits.

<u>Alternative 1</u> - The temperature of the sewage sludge that is used or disposed shall be maintained at a specific value for a period of time. See 503.32(a)(3)(ii) for specific information. This alternative is not applicable to composting

<u>Alternative 2</u> - The pH of the sewage sludge that is used or disposed shall be raised to above 12 and shall remain above 12 for 72 hours. The pH shall be defined as the logarithm of the reciprocal of the hydrogen ion concentration measured at 25°C or measured at another temperature and then converted to an equivalent value at 25°C.

The temperature of the sewage sludge shall be above 52 degrees Celsius for 12 hours or longer during the period that the pH of the sewage sludge is above 12.

At the end of the 72 hour period during which the pH of the sewage sludge is above 12, the sewage sludge shall be air dried to achieve a percent solids in the sewage sludge greater than 50 percent.

<u>Alternative 3</u> - The sewage sludge shall be analyzed for enteric viruses prior to pathogen treatment. The limit for enteric viruses is one Plaque-forming Unit per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 503.32(a)(5)(ii) for specific information. The sewage sludge shall be analyzed for viable helminth ova prior to pathogen treatment. The limit for viable helminth ova is less than one per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 503.32(a)(5)(iii) for specific information.

<u>Alternative 4</u> - The density of enteric viruses in the sewage sludge shall be less than one Plaque-forming Unit

per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed or at the time the sludge is prepared for sale or give away in a bag or other container for application to the land.

The density of viable helminth ova in the sewage sludge shall be less than one per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed or at the time the sewage sludge is prepared for sale or give away in a bag or other container for application to the land.

Alternative 5 - Sewage sludge shall be treated by one of the Processes to Further Reduce Pathogens (PFRP) described in 503 Appendix B. PFRPs include composting, heat drying, heat treatment, and thermophilic aerobic digestion.

Alternative 6 - Sewage sludge shall be treated by a process that is equivalent to a Process to Further Reduce Pathogens, if individually approved by the Pathogen Equivalency Committee representing the EPA.

(b) Four alternatives are available to demonstrate compliance with Class B sewage sludge. Alternatives 2, 3, and 4 are not authorized to demonstrate compliance with Class B sewage sludge in Texas permits.

Alternative 1 - (i) Seven representative samples of the sewage sludge that is disposed shall be collected for one monitoring episode at the time the sewage sludge is used or disposed.

(ii) The geometric mean of the density of fecal coliform in the samples collected shall be less than either 2,000,000 Most Probable Number per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis).

Alternative 2 - Sewage sludge shall be treated in one of the Processes to significantly Reduce Pathogens described in 503 Appendix B.

Alternative 3 - Sewage sludge shall be treated in a process that is equivalent to a PSRP, if individually approved by the Pathogen Equivalency Committee representing the EPA.

Alternative 4 - Sewage sludge placed on an active surface disposal site is covered with soil or other material at the end of each operating day.

4. Vector Attraction Reduction Requirements

All sewage sludge that is disposed of in a surface disposal site shall be treated by one of the following alternatives 1 through 11 for Vector Attraction Reduction.

Alternative 1 - The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38 percent.

Alternative 2 - If Alternative 1 cannot be met for an anaerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30 and 37 degrees Celsius. Volatile solids must be reduced by less than 17 percent to demonstrate compliance.

Alternative 3 - If Alternative 1 cannot be met for an aerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge with a percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20 degrees Celsius. Volatile solids must be reduced by less than 15 percent to demonstrate compliance.

Alternative 4 - The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20 degrees Celsius.

Alternative 5 - Sewage sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge shall be higher than 40 degrees Celsius and the average temperature of the sewage sludge shall be higher than 45 degrees Celsius.

Alternative 6 - The pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali shall remain at 12 or higher for two hours and then at 11.5 or higher for an additional 22 hours at the time the sewage sludge is disposed.

Alternative 7 - The percent solids of sewage sludge that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75 percent based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or an anaerobic treatment process at the time the sewage sludge is disposed.

Alternative 8 - The percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90 percent based on the moisture content and total solids prior to mixing with other materials at the time the sewage sludge is disposed. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or an anaerobic treatment process.

Alternative 9 -

(i) Sewage sludge shall be injected below the surface of the land.

(ii) No significant amount of the sewage sludge shall be present on the land surface within one hour after the sewage sludge is injected.

(iii) When sewage sludge that is injected below the surface of the land is Class A with respect to pathogens, the sewage sludge shall be injected below the land surface within eight hours after being discharged from the pathogen treatment process.

Alternative 10 -

(i) Sewage sludge applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within six hours after application to or placement on the land.

(ii) When sewage sludge that is incorporated into the soil is Class A with respect to pathogens, the sewage sludge shall be applied to or placed on the land within eight hours after being discharged from the pathogen treatment process.

Alternative 11 - Sewage sludge placed on an active sewage sludge unit shall be covered with soil or other material at the end of each operating day.

5. Methane Gas Control Within a Structure On Site

When cover is placed on an active surface disposal site, the methane gas concentration in the air in any structure shall not exceed 25% of the lower explosive limit (LEL) for methane gas during the period that the disposal site is active.

6. Methane Gas Control at Property Line

The concentration of methane gas in air at the property line of the surface disposal site shall not exceed the LEL for methane gas during the period that the disposal site is active.

D. Monitoring Requirements

Toxicity Characteristic Leaching Procedure (TCLP) Test - Once/Permit Life, performed within one year from the effective date of the permit

PCBs - Once/Year

Methane Gas in covered structures on site - Continuous

Methane Gas at property line - Continuous

All other pollutants shall be monitored at the frequency shown below:

Amount of sewage sludge* (metric tons per 365 day period)	Frequency
0 ≤ Sludge < 290	Once/Year
290 ≤ Sludge < 1,500	Once/Quarter
1,500 ≤ Sludge < 15,000	Once/Two Months
15,000 ≤ Sludge	Once/Month

* Amount of sewage sludge placed on an active sewage sludge unit (dry weight basis).

Representative samples of sewage sludge shall be collected and analyzed in accordance with the methods referenced in 40 CFR 503.8(b).

SECTION II. REQUIREMENTS SPECIFIC TO SURFACE DISPOSAL SITES WITHOUT A LINER AND LEACHATE COLLECTION SYSTEM.

1. Pollutant limits - Sewage sludge shall not be applied to a surface disposal site if the concentration of the listed pollutants exceed the corresponding values based on the surface disposal site boundary to the property line distance:

TABLE 5

Unit boundary to property line distance (meters)	Pollutant Concentrations* Arsenic (mg/kg)	Chromium (mg/kg)	Nickel (mg/kg)	PCB's (mg/kg)
0 to less than 25	30	200	210	49
25 to less than 50	34	220	240	49
50 to less than 75	39	260	270	49
75 to less than 100	46	300	320	49
100 to less than 125	53	360	390	49
125 to less than 150	62	450	420	49
≥ 150	73	600	420	49

* Dry weight basis

2. Management practices - Listed in Section I.B. above.

3. Notification requirements -

a. The permittee shall assure that the owner of the surface disposal site provide written notification to the subsequent site owners that sewage sludge was placed on the land.

b. The permittee shall provide the location of all new sludge disposal/use sites where previously undisturbed ground is proposed for disturbance to the State Historical Commission within 90 days of the effective date of this permit. In addition, the permittee shall provide the location of any new disposal/use site to the State Historical Commission prior to use of the site.

The permittee shall within 30 days after notification by the State Historical Commission that a specific sludge disposal/use area will adversely affect a National Historic Site, cease use of such area.

4. Recordkeeping requirements - The permittee shall develop the following information and shall retain the information for five years. The sludge documents will be retained on site at the same location as other NPDES records.

a. The distance of the surface disposal site from the property line and the concentration (mg/Kg) in the sludge of each pollutant listed above in Table 5, as well as the applicable pollutant concentration criteria listed in Table 5.

b. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 503.27(a)(1)(ii) or 503.27(a)(2)(ii) as applicable to the permittees sludge disposal activities.

c. A description of how either the Class A or Class B pathogen reduction requirements are met, or whether sewage sludge placed on a surface disposal site is covered with soil or other material at the end of each operating day.

d. A description of how the vector attraction reduction requirements are met.

e. Results of a groundwater monitoring program developed by a qualified ground-water scientist, or a certification by a qualified groundwater scientist may be used to demonstrate that sewage sludge placed on an active sewage sludge unit does not contaminate an aquifer. A qualified groundwater scientist is an individual with a baccalaureate or post graduate degree in the natural sciences or engineering who has sufficient training and experience in groundwater hydrology and related fields, as may be demonstrated by State registration, professional certification or completion of accredited university programs, to make sound professional judgements regarding groundwater monitoring, pollutant fate and transport, and corrective action.

5. Reporting Requirements - The permittee shall report annually on the DMR the following information:

a. Report No for no liner and leachate collection system at surface disposal site.

b. The frequency of monitoring listed in Element II, Section I.D. which applies to the permittee.

c. Toxicity Characteristic Leaching Procedure (TCLP) results (Pass/Fail).

d. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 5 as well as the applicable pollutant concentration criteria listed in Table 5.

e. The concentration (mg/Kg) of PCB's in the sludge.

f. The distance between the property line and the surface disposal site boundary.

g. Level of pathogen reduction achieved (Class A or Class B), unless Vector attraction reduction alternative no. 11 is utilized.

h. List Alternative used as listed in Section I.C.3.(a. or b.). Alternatives describe how the pathogen reduction requirements are met.

i. Vector attraction reduction Alternative used as listed in Section I.C.4.

j. Annual sludge production in dry metric tons/year.

k. Amount of sludge surface disposed in dry metric tons/year.

l. Amount of sludge transported interstate in dry metric tons/year.

m. A narrative description explaining how the management practices in §503.24 are met shall be attached to the DMR.

n. The certification statement listed in 503.27(a)(1)(ii) or 503.27(a)(2)(ii) as applicable to the permittees sludge disposal activities, shall be attached to the DMR.

SECTION III. REQUIREMENTS SPECIFIC TO SURFACE DISPOSAL SITES WITH A LINER AND LEACHATE COLLECTION SYSTEM.

1. Pollutant limits - None.

2. Management Practices - Listed in Section I.B. above.

3. Notification requirements -

a. The permittee shall assure that the owner of the surface disposal site provide written notification to the subsequent owner of the site that sewage sludge was placed on the land.

b. The permittee shall provide the location of all new sludge disposal/use sites where previously undisturbed ground is proposed for disturbance to the State Historical Commission within 90 days of the effective date of this permit. In addition, the permittee shall provide the location of any new disposal/use site to the State Historical Commission prior to use of the site.

The permittee shall within 30 days after notification by the State Historical Commission that a specific sludge disposal/use area will adversely affect a National Historic Site, cease use of such area.

4. Recordkeeping requirements - The permittee shall develop the following information and shall retain the information for five years. The sludge documents will be retained on site at the same location as other NPDES records.

a. The following certification statement found in 503.27(a)(1)(ii):

"I certify, under penalty of law, that the information that will be used to determine compliance with the pathogen requirements (define option used) and the vector attraction reduction requirements (define option used) have been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine the (pathogen requirements and vector attraction reduction requirements, if appropriate) have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

b. A description of how either the Class A or Class B pathogen reduction requirements are met or whether sewage sludge placed on a surface disposal site is covered with soil or other material at the end of each operating day.

c. A description of how the vector attraction reduction requirements are met.

d. Results of a ground-water monitoring program developed by a qualified ground-water scientist. A certification by a qualified ground-water scientist may be used to demonstrate that sewage sludge

placed on an active sewage sludge unit does not contaminate an aquifer.

5. Reporting Requirements - The permittee shall report annually on the DMR the following information:

   a. Report YES for liner and leachate collection system at surface disposal site.

   b. The frequency of monitoring listed in Element 2, Section I.D. which applies to the permittee.

   c. Toxicity Characteristic Leaching Procedure (TCLP) results (Pass/Fail).

   d. The concentration (mg/Kg) in the sludge of PCBs.

   e. Level of pathogen reduction achieved (Class A or Class B), unless Vector attraction reduction alternative no. 11 is used.

   f. List Alternative used as listed in Section I.C.3.(a. or b.). Alternatives describe how the pathogen reduction requirements are met.

   g. Vector attraction reduction Alternative used as listed in Section I.B.4.

   h. Annual sludge production in dry metric tons/year.

   i. Amount of sludge surface disposed in dry metric tons/year.

   j. Amount of sludge transported interstate in dry metric tons/year.

   k. A narrative description explaining how the management practices in §503.24 are met shall be attached to the DMR.

   l. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment (See 503.27(a)(1)(ii) or 503.27(a)(2)(ii) whichever applies to the permittees sludge disposal activities) shall be attached to the DMR.

ELEMENT 3 - MUNICIPAL SOLID WASTE LANDFILL DISPOSAL

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE DISPOSED IN A MUNICIPAL SOLID WASTE LANDFILL

1. The permittee shall handle and dispose of sewage sludge in accordance with Section 405 of the Clean Water Act and all other applicable Federal regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present. The permittee shall ensure that the sewage sludge meets the requirements in 40 CFR 258 concerning the quality of the sludge disposed in the municipal solid waste landfill unit.

2. If requirements for sludge management practices or pollutant criteria become more stringent than the sludge pollutant limits or acceptable management practices in this permit, or control a pollutant not listed in this permit, this permit may be modified or revoked and reissued to conform to the requirements promulgated at Section 405(d)(2) of the Clean Water Act.

3. If the permittee generates sewage sludge and supplies that sewage sludge to the owner or operator of a MSWLF for disposal, the permittee shall provide to the owner or operator of the MSWLF appropriate information needed to be in compliance with the provisions of this permit.

4. The permittee shall give prior notice to EPA (Chief, Permits Branch, Water Management Division, Mail Code 6W-P, EPA Region 6, 1445 Ross Avenue, Dallas, Texas 75202) of any planned changes in the sewage sludge disposal practice, in accordance with 40 CFR Part 122.41(l)(1)(iii). These changes may justify the application of permit conditions that are different from or absent in the existing permit. Change in the sludge use or

disposal practice may be cause for modification of the permit in accordance with 40 CFR Part 122.62(a)(1).

5. The permittee shall provide the location of all new sludge disposal/use sites where previously undisturbed ground is proposed for disturbance to the State Historical Commission within 90 days of the effective date of this permit. In addition, the permittee shall provide the location of any new disposal/use site to the State Historical Commission prior to use of the site.

   The permittee shall within 30 days after notification by the State Historical Commission that a specific sludge disposal/use area will adversely affect a National Historic Site, cease use of such area.

6. Sewage sludge shall be tested once during the life of the permit within one year from the effective date of the permit in accordance with the method specified at 40 CFR 268, Appendix I (Toxicity Characteristic Leaching Procedure (TCLP)) or other approved methods. Sludge shall be tested after final treatment prior to leaving the POTW site. Sewage sludge determined to be a hazardous waste in accordance with 40 CFR Part 261, shall be handled according to RCRA standards for the disposal of hazardous waste in accordance with 40 CFR Part 262. The disposal of sewage sludge determined to be a hazardous waste, in other than a certified hazardous waste disposal facility shall be prohibited. The Information Management Section, telephone no. (214) 665-6750, and the appropriate state agency shall be notified of test failure within 24 hours. A written report shall be provided to this office within 7 days after failing the TCLP. The report will contain test results, certification that unauthorized disposal has not occurred and a summary of alternative disposal plans that comply with RCRA standards for the disposal of hazardous waste. The report shall be addressed to: Director, Multimedia Planning and Permitting Division, EPA Region 6, Mail Code 6PD, 1445 Ross Avenue, Dallas, Texas 75202. A copy of this report shall be sent to the Chief, Water Enforcement Branch, Compliance Assurance and Enforcement Division, Mail Code 6EN-W, at the same street address.

7. Sewage sludge shall be tested as needed, or at a minimum, once/year in accordance with the method 9095 (Paint Filter Liquids Test) as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods" (EPA Pub. No. SW-846).

8. Recordkeeping requirements - The permittee shall develop the following information and shall retain the information for five years.

   a. The description, including procedures followed, and results of the Paint Filter Tests performed.

   b. The description, including procedures followed, and results of the TCLP Test.

9. Reporting requirements - The permittee shall report annually on the Discharge Monitoring Report the following information:

   a. Results of the Toxicity Characteristic Leaching Procedure Test conducted on the sludge to be disposed (Pass/Fail).

   b. Annual sludge production in dry metric tons/year.

   c. Amount of sludge disposed in a municipal solid waste landfill in dry metric tons/year.

   d. Amount of sludge transported interstate in dry metric tons/year.

   e. A certification that sewage sludge meets the requirements in 40 CFR 258 concerning the quality of the sludge disposed in a municipal solid waste landfill unit shall be attached to the DMR.

Appendix B. NMED Groundwater Discharge Permit – Effluent Reuse

NEW MEXICO
ENVIRONMENT DEPARTMENT

Harold Runnels Building
1190 South St. Francis Drive (87505)
P.O. Box 5469, Santa Fe, New Mexico 87502-5469
Phone (505) 827-2900 Fax (505) 827-2965
www.env.nm.gov

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

CERTIFIED MAIL – RETURN RECEIPT REQUEST

February 18, 2016

Shannon Jones, Director
Wastewater Management Division
City of Santa Fe
73 Paseo Real
Santa Fe, NM 87507

RE: Draft Discharge Permit Renewal, DP-289, City of Santa Fe Wastewater Treatment Facility

Dear Mr. Jones:

Notice is hereby given pursuant to Subsection H of 20.6.2.3108 NMAC that Ground Water Discharge Permit Renewal, DP-289, to the City of Santa Fe, has been proposed for approval (copy enclosed). The New Mexico Environment Department (NMED) will publish notice of the availability of the draft Discharge Permit in the near future and will forward a copy of the notice to you.

Prior to making a final ruling on the proposed Discharge Permit, NMED will allow 30 days from the date the public notice is published during which time written comments can be submitted and/or a public hearing requested. Comments and/or hearing requests may be submitted by any interested person, including the Discharge Permit applicant. Written comments and/or hearing requests must be submitted to the Ground Water Quality Bureau at the address above and shall set forth the reasons why a hearing is requested. A hearing will be held only if hearing requests are received from the public and/or the Discharge Permit applicant during the 30-day comment period and NMED determines there is substantial public interest in the proposed Discharge Permit. Hearings are presided over by the NMED Secretary or a hearing officer appointed by the Secretary.

Please review the enclosed draft Discharge Permit carefully to understand your responsibilities pursuant to the Discharge Permit. Please be aware that this Discharge Permit may contain conditions that require the permittee to implement operational, monitoring or closure actions by a

specified deadline. Please note any inaccuracies or concerns, and submit any comments to NMED Ground Water Quality Bureau.

A copy of the Water Quality Control Commission (WQCC) Regulations, 20.6.2 NMAC, is available at http://www.nmcpr.state.nm.us/nmac/_title20/T20C006.htm.

If you have any comments, questions, or concerns, please contact me at (505) 827-2978. If written comments and/or a written request for hearing are not received during the public comment period, the draft Discharge Permit will become final. Thank you for your cooperation during the review process.

Sincerely,

Russell A. Isaac

Russell A. Isaac, Ph.D.
Environmental Scientist

enc: Draft Discharge Permit Renewal, DP-289
Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions, Revision 1.1, March 2011

cc: Luis Orozco, Plant Superintendent, 73 Paseo Real, Santa Fe, NM 87507
Carl Dickens, La Cienega Valley Association 48A Paseo C de Baca, La Cienega NM, 87507
Bart Vanden Plas, Pueblo of Santa Ana, Bart.VandenPlas@santaana-nsn.gov (electronic copy)
Alan Hatch, Pueblo of Santa Ana, Department of Natural Resources, 02 Dove Rd., Santa Ana Pueblo, NM 87004

GROUND WATER DISCHARGE PERMIT RENEWAL
City of Santa Fe Wastewater Treatment Facility, DP-289

I. INTRODUCTION

The New Mexico Environment Department (NMED) issues this Discharge Permit Renewal (Discharge Permit), DP-289, to the City of Santa Fe (permittee) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations, 20.6.2 NMAC.

NMED's purpose in issuing this Discharge Permit Renewal, and in imposing the requirements and conditions specified herein, is to control the discharge of water contaminants from the City of Santa Fe's Wastewater Treatment Facility (WWTF) (facility) into ground and surface waters, so as to protect ground and surface waters for present and potential future use as domestic and agricultural water supply and other uses and protect public health. In issuing this Discharge Permit, NMED has determined that the requirements of Subsection C of 20.6.2.3109 NMAC have been or will be met. Pursuant to Section 20.6.2.3104 NMAC, it is the responsibility of the permittee to comply with the terms and conditions of this Discharge Permit; failure may result in an enforcement action(s) by NMED (20.6.2.1220 NMAC).

The activities that produce the discharge, the location of the discharge, and the quantity, quality and flow characteristics of the discharge are briefly described as follows:

The City of Santa Fe WWTF is authorized to receive, treat and discharge up to 13 million gallons per day (MGD) of domestic wastewater using an activated sludge treatment system with UV disinfection. Treated wastewater is discharged to the Santa Fe River in accordance NPDES Permit NM0022292 and this Discharge Permit. Reclaimed domestic wastewater is authorized for use in accordance with this Discharge Permit as follows: for wash, process and irrigation water at the City of Santa Fe WWTF; for ornamental impoundments and irrigation at the Municipal Recreation Complex (MRC), located west of NM Highway 599 in Sections 21, 22, 26, 27 and 35, T17N, R8E; and for temporary uses in and around the City of Santa Fe including, but not limited to, dust control, wildlife watering, construction purposes, fire suppression and flood irrigation of non-food crops. The authorized delivery point for these discharges is at the WWTF stand-pipe.

The City of Santa Fe WWTF is authorized to transfer reclaimed domestic wastewater for reuse at other facilities that are permitted by NMED to receive and discharge reclaimed wastewater.

The facility is located at 73 Paseo Real, Santa Fe near the intersection of Airport Road and NM Highway 599, in Section 10, Township 16N, Range 8E, Santa Fe County. Groundwater most likely to be affected is at a depth of approximately 116 feet and has a total dissolved solids concentration of approximately 250 milligrams per liter.

The original Discharge Permit was issued on February 13, 1984 and subsequently renewed, modified and/or amended on April 10, 1989, July 29, 1991 October 4, 1991, January 18, 1996, December 10, 1996, August 22, 2000, June 8, 2006, June 11, 2002, October 8, 2002, September 24, 2004, and March 17, 2010. The application (i.e., discharge plan) consists of the materials

submitted by the permittee dated September 12, 2014, and materials contained in the administrative record prior to issuance of this Discharge Permit. The discharge shall be managed in accordance with all conditions and requirements of this Discharge Permit.

Pursuant to Section 20.6.2.3109 NMAC, NMED reserves the right to require a Discharge Permit Modification in the event NMED determines that the requirements of 20.6.2 NMAC are being or may be violated or the standards of Section 20.6.2.3103 NMAC are being or may be violated. This may include a determination that structural controls and/or management practices approved under this Discharge Permit are not protective of groundwater quality, and that more stringent requirements to protect groundwater quality may be required by NMED. The permittee may be required to implement abatement of water pollution and remediate groundwater quality.

Issuance of this Discharge Permit does not relieve the permittee of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

The following acronyms and abbreviations may be used in this Discharge Permit:

Abbreviation	Explanation	Abbreviation	Explanation
BOD_5	biochemical oxygen demand (5-day)	NMED	New Mexico Environment Department
CFR	Code of Federal Regulations	NMSA	New Mexico Statutes Annotated
CFU	Colony Forming Unit	NO_3-N	nitrate-nitrogen
Cl	chloride	NTU	nephelometric turbidity units
EPA	United States Environmental Protection Agency	TDS	total dissolved solids
gpd	gallons per day	TKN	total Kjeldahl nitrogen
LAA	land application area	total nitrogen	= TKN + NO_3-N
LADS	land application data sheet(s)	TRC	Total Residual Chlorine
mg/L	milligrams per liter	TSS	total suspended solids
mL	milliliters	WQA	New Mexico Water Quality Act
MPN	Most Probable Number	WQCC	Water Quality Control Commission
NMAC	New Mexico Administrative Code	WWTF	Wastewater Treatment Facility

II. FINDINGS

In issuing this Discharge Permit, NMED finds:

1. The permittee is discharging effluent or leachate from the facility so that such effluent or leachate may move directly or indirectly into groundwater within the meaning of Section 20.6.2.3104 NMAC.

2. The permittee is discharging effluent or leachate from the facility so that such effluent or

leachate may move into groundwater of the State of New Mexico that has an existing concentration of 10,000 mg/L or less of TDS within the meaning of Subsection A of 20.6.2.3101 NMAC.

3. The discharge from the facility is not subject to any of the exemptions of Section 20.6.2.3105 NMAC.

III. AUTHORIZATION TO DISCHARGE

Pursuant to 20.6.2.3104 NMAC, it is the responsibility of the permittee to ensure that discharges authorized by this Discharge Permit are consistent with the terms and conditions herein.

The permittee is authorized to receive, treat and discharge up to 13 MGD of domestic wastewater using an activated sludge treatment system with UV disinfection. Treated wastewater is discharged to the Santa Fe River in accordance with NPDES Permit NM0022292 and this Discharge Permit. Reclaimed domestic wastewater is authorized for use in accordance with this Discharge Permit as follows:

- For wash, process and irrigation water (Class 1B) at the City of Santa Fe WWTF;
- For temporary uses in and around the City of Santa Fe including, but not limited to, dust control, wildlife watering, construction purposes, fire suppression and flood irrigation of non-food crops;
- For ornamental impoundments and irrigation at the Municipal Recreation Complex (MRC), located west of NM Highway 599 in Sections 21, 22, 26, 27 and 35, T17N, R8E and
- For transfer for reuse to other facilities operating under separate Discharge Permits (Class 1B).

[20.6.2.3104 NMAC, Subsection C of 20.6.2.3106 NMAC, Subsection C of 20.6.2.3109 NMAC]

IV. CONDITIONS

NMED issues this Discharge Permit for the discharge of water contaminants subject to the following conditions:

A. OPERATIONAL PLAN

#	Terms and Conditions
1.	The permittee shall implement the following operational plan to ensure compliance with Title 20, Chapter 6, Parts 1 and 2 NMAC. [Subsection C of 20.6.2.3109 NMAC]
2.	The permittee shall operate in a manner such that standards and requirements of Sections

#	**Terms and Conditions**
	20.6.2.3101 and 20.6.2.3103 NMAC are not violated. [20.6.2.3101 NMAC, 20.6.2.3103 NMAC, Subsection C of 20.6.2.3109 NMAC]
3.	The permittee shall utilize operators, certified by the State of New Mexico at the appropriate level, to operate the wastewater collection, treatment and disposal systems. The operations and maintenance of all or any part of the wastewater system shall be performed by, or under the direct supervision of, a certified operator. [Subsection C of 20.6.2.3109 NMAC, 20.7.4 NMAC]
4.	The permittee shall maintain fences around the WWTF to control public access. The fences shall be constructed in a manner which prevents access by the general public and animals such as dogs (e.g., chain link, field fencing or locking lids) and shall be maintained throughout the term of this Discharge Permit. [20.6.2.3109 NMAC]
5.	The permittee shall remove solids from the treatment facility as needed, depending on process control testing such as: the 30-minute settleometer test, the Mixed Liquor Suspended Solids concentration or the Mean Cell Residence Time. The solids shall be contained, transported, and disposed of in accordance with all local, state, and federal (40 CFR Part 503) regulations. [20.6.2.3109 NMAC]
6.	The permittee shall meet the following general requirements for above-ground use of reclaimed domestic wastewater. a) The permittee shall maintain signs in English and Spanish at all re-use areas such that they are visible and legible for the term of this Discharge Permit. The signs shall be posted at the entrance to re-use areas and at other locations where public exposure to reclaimed wastewater may occur. The signs shall state: **NOTICE: THIS AREA IS IRRIGATED WITH RECLAIMED WASTEWATER - DO NOT DRINK. AVISO: ESTA ÁREA ESTÁ REGADA CON AGUAS NEGRAS RECOBRADAS - NO TOMAR.** Alternate wording and/or graphics may be submitted to NMED for approval. b) The reclaimed wastewater systems shall have no direct or indirect cross connections with public water systems or irrigation wells pursuant to the latest revision of the New Mexico Plumbing Code (14.8.2 NMAC) and New Mexico Mechanical Code (14.9.2 NAMC). c) Above-ground use of reclaimed wastewater shall not result in excessive ponding of wastewater, and shall not exceed the water consumptive needs of the crop. Re-use shall not be conducted at times when the re-use area is saturated or frozen. d) The discharge of reclaimed wastewater shall be confined to the re-use area. e) The discharge of reclaimed domestic wastewater to crops for human consumption is

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	prohibited. f) Water supply wells within 200 feet of a re-use area shall have adequate wellhead construction pursuant to 19.27.4 NMAC. Re-use shall be managed to ensure protection of groundwater quality. g) Existing and accessible portions of the reclaimed wastewater distribution system (with the exception of application equipment such as sprinklers or pivots) shall be colored purple or clearly labeled as being part of a reclaimed wastewater distribution system. Piping, valves and outlets that are installed during the term of this Discharge Permit shall be colored purple pursuant to the latest revision of the New Mexico Plumbing Code (14.8.2 NMAC) and New Mexico Mechanical Code (14.9.2 NAMC) to differentiate piping or fixtures used to convey reclaimed wastewater from those intended for potable or other uses. Valves, outlets, and sprinkler heads used in reclaimed wastewater systems shall be accessible only to authorized personnel. [Subsections B and C of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.D]
7.	Prior to transferring reclaimed wastewater to a newly authorized location for the first time, the permittee shall give written notification to NMED stating the date the transfer is to commence, the discharge permit number of the recipient, and to what location. [20.6.2.3109.H NMAC]

Operating Conditions

#	Terms and Conditions
8.	Treated wastewater discharged from WWTF outfall to the Santa Fe River shall not exceed the following discharge limit: • **Total Nitrogen: 10 mg/L** All samples shall be collected following UV disinfection. [20.6.2.3109 NMAC]
9.	Reclaimed wastewater discharged from the WWTF for use at the facility and the MRC, to other facilities with separate NMED Ground Water Discharge Permits authorizing receipt of Class 1B reclaimed wastewater and for temporary purposes that do not require a Discharge Permit (stand-pipe delivery) shall not exceed the following discharge limits.

Test	30-Day Geometric Mean	30-Day Average	Maximum
Total Nitrogen			**10 mg/L**
Fecal coliform bacteria:	**100 Org/100 mL**	**N/A**	**200 Org/100 mL**
BOD_5:	**N/A**	**30 mg/L**	**45 mg/L**
TSS:	**N/A**	**30 mg/L**	**45 mg/L**

	Turbidity	N/A	**Monitor Only**	**Monitor Only**
	UV Transmissivity:	N/A	**Monitor Only**	**Monitor Only**
	All samples shall be collected following UV disinfection except for turbidity which is measured prior to UV disinfection. [20.6.2.3109 NMAC]			
10.	The permittee shall meet the following setbacks, access restrictions and equipment requirements for spray irrigation using reclaimed wastewater for all areas authorized for use at the facility and the MRC. a) A minimum 100-foot set-back shall be maintained between any dwellings or occupied establishments and the edge of any area receiving reclaimed wastewater. b) Irrigation shall be postponed at times when windy conditions may result in drift of reclaimed wastewater outside the designated area of application. c) Whenever reclaimed wastewater is used in areas with public access it shall be applied at times and in a manner that minimizes public contact. d) The spray irrigation system shall utilize only low trajectory spray nozzles. [20.6.2.3109 NMAC]			

B. MONITORING AND REPORTING

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11.	The permittee shall conduct the following monitoring, reporting, and other requirements listed below in accordance with the monitoring requirements of this Discharge Permit. [Subsection A of 20.6.2.3107 NMAC, Subsection C of 20.6.2.3109 NMAC]
12.	METHODOLOGY – Unless otherwise approved in writing by NMED, the permittee shall conduct sampling and analysis in accordance with the most recent edition of the following documents. a) American Public Health Association, Standard Methods for the Examination of Water and Wastewater (18th, 19th or current) b) U.S. Environmental Protection Agency, Methods for Chemical Analysis of Water and Waste c) U.S. Geological Survey, Techniques for Water Resources Investigations of the U.S. Geological Survey d) American Society for Testing and Materials, Annual Book of ASTM Standards, Part 31. Water e) U.S. Geological Survey, et al., National Handbook of Recommended Methods for Water Data Acquisition f) Federal Register, latest methods published for monitoring pursuant to Resource Conservation and Recovery Act regulations g) Methods of Soil Analysis: Part 1. Physical and Mineralogical Methods; Part 2. Microbiological and Biochemical Properties; Part 3. Chemical Methods, American

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	Society of Agronomy [Subsection B of 20.6.2.3107 NMAC]
13.	The permittee shall submit quarterly monitoring reports to NMED for the most recently completed quarterly period by the 1st of February, May, August and November each year. Quarterly monitoring shall be performed during the following periods and submitted as follows: • January 1st through March 31st (first quarter) – **due by May 1st;** • April 1st through June 30th (second quarter) – **due by August 1st;** • July 1st through September 30th (third quarter) – **due by November 1st; and** • October 1st through December 31st (fourth quarter) – **due by February 1st.** [Subsection A of 20.6.2.3107 NMAC]
14.	Once prior to the date that the term of this Discharge Permit ends, NMED shall have the option to perform downhole inspections of all monitoring wells identified in this Discharge Permit. For monitoring wells with dedicated pumps, NMED shall establish the inspection date and provide at least 60-days-notice to the permittee by certified mail. The permittee shall have any existing dedicated pumps removed at least 48 hours prior to NMED inspection to allow adequate settling time of sediment agitated from pump removal. Should a facility not have existing dedicated pumps, but decide to install pumps in any of the monitoring wells, NMED shall be notified at least 90 days prior to pump installation so that a downhole well inspection(s) can be scheduled prior to pump placement. [Subsections A and D of 20.6.2.3107 NMAC]
15.	The permittee shall submit copies of the completed Discharge Monitoring Reports (DMRs) required by NPDES Permit NM0022292 in the quarterly monitoring reports. [40.503(17) CFR, 74-6-5(E)(1) WQA, 74-6-5(K) WQA]

Groundwater Monitoring Conditions

#	**Terms and Conditions**
16.	The permittee shall perform quarterly groundwater sampling in the following monitoring well and analyze the samples for dissolved TKN, NO_3-N, TDS and Cl. • MW-4A, located approximately 240 ft. west of the WWTF outfall and along the

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	discharge channel to the Santa Fe River and intended to be located hydrologically downgradient of the outfall Groundwater sample collection, preservation, transport and analysis shall be performed according to the following procedure. a) Measure the depth-to-most-shallow groundwater from the top of the well casing to the nearest hundredth of a foot. b) Purge three well volumes of water from the well prior to sample collection. c) Obtain samples from the well for analysis. d) Properly prepare, preserve and transport samples. e) Analyze samples in accordance with the methods authorized in this Discharge Permit. Depth-to-most-shallow groundwater measurements, analytical results, including the laboratory QA/QC summary report, and a facility layout map showing the location and number of each well shall be submitted to NMED in the quarterly monitoring reports. [Subsection A of 20.6.2.3107 NMAC]

Facility Monitoring Conditions

#	Terms and Conditions
17.	The permittee shall measure the total daily volume and peak flow of wastewater discharged to the treatment facility each month using a Parshall flume equipped with head sensing, totalizing and data logging mechanism located after the influent bar screen. The average daily and peak daily discharge volumes for each month shall be submitted to NMED in the quarterly monitoring reports. [Subsection A of 20.6.2.3107 NMAC, Subsections C and H of 20.6.2.3109 NMAC]
18.	The permittee shall measure the monthly volume discharged to *each* recipient of reclaimed wastewater using a totalizing flow meter. The meter shall be located on the transfer line between the diversion point and the recipient of reclaimed wastewater. The permittee shall maintain a log that records the date that discharges occur to *each* recipient of reclaimed wastewater, monthly totalizing meter readings and units of measurement. The log shall be used to calculate the total monthly volume of reclaimed wastewater discharged to *each* recipient of reclaimed wastewater. A copy of the log shall be submitted to NMED in the quarterly monitoring reports. [Subsection A of 20.6.2.3107 NMAC, Subsections C and H of 20.6.2.3109 NMAC]
19.	All flow meters shall be capable of having their accuracy ascertained under actual

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	working (field) conditions. A field calibration method shall be developed for each flow meter and that method shall be used to check the accuracy of each respective meter. Field calibrations shall be performed upon repair or replacement of a flow measurement device and, at a minimum, within 90 days of the effective date of this Discharge Permit **(by DATE)**, and then on an annual basis. Flow meters shall be calibrated to within plus or minus 10 percent of actual flow, as measured under field conditions. Field calibrations shall be performed by an individual knowledgeable in flow measurement and in the installation/operation of the particular device in use. A flow meter calibration report shall be prepared for each flow measurement device at the frequency calibration is required. The flow meter calibration report shall include the following information. a) The location and meter identification. b) The method of flow meter field calibration employed. c) The measured accuracy of each flow meter prior to adjustment indicating the positive or negative offset as a percentage of actual flow as determined by an in-field calibration check. d) The measured accuracy of each flow meter following adjustment, if necessary, indicating the positive or negative offset as a percentage of actual flow of the meter. e) Any flow meter repairs made during the previous year or during field calibration. The permittee shall maintain records of flow meter calibration(s) at a location accessible for review by NMED during facility inspections. [Subsection A of 20.6.2.3107 NMAC, Subsections C and H of 20.6.2.3109 NMAC]
20.	The permittee shall visually inspect flow meters on a monthly basis for evidence of malfunction. If a visual inspection indicates a flow meter is not functioning as required by this Discharge Permit, the permittee shall repair or replace the meter within 30 days of discovery. For *repaired* meters, the permittee shall submit a report to NMED with the next monitoring report following the repair that includes a description of the malfunction; a statement verifying the repair; and a flow meter field calibration report completed in accordance with the requirements of this Discharge Permit. For *replacement* meters, the permittee shall submit a report to NMED with the next monitoring report following the replacement that includes a design schematic for the device and a flow meter field calibration report completed in accordance with the requirements of this Discharge Permit. [Subsection A of 20.6.2.3107 NMAC, Subsection C of 20.6.2.3109 NMAC]
21.	The permittee shall collect samples of treated wastewater after the UV disinfection unit on a quarterly basis and analyze the samples for TKN, NO_3-N, TDS and Cl. Samples shall be properly prepared, preserved, transported and analyzed in accordance with the methods authorized in this Discharge Permit. Analytical results shall be submitted to

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	NMED in the quarterly monitoring reports. [Subsection A of 20.6.2.3107 NMAC, Subsections C and H of 20.6.2.3109 NMAC]
22.	During any week that the discharge of reclaimed wastewater occurs, the permittee shall perform the following analyses on reclaimed wastewater samples collected after the UV disinfection unit (with the exception of turbidity) from the reclaimed effluent reuse distribution tank using the following sampling method and frequency: • Fecal coliform bacteria: grab sample at peak daily flow three times per week; • BOD_5: six-hour composite sample three times per week; • Turbidity: continuously monitor reclaimed wastewater for turbidity after the final treatment process but prior to UV disinfection and while discharging; record the average and maximum turbidity values for each calendar month; and • UV transmissivity values record whenever fecal coliform samples are collected. Samples shall be properly prepared, preserved, transported and analyzed in accordance with the methods authorized in this Discharge Permit. Analytical results, monthly average and maximum turbidity values, and a copy of the log of UV transmissivity values shall be submitted to NMED in the quarterly monitoring reports. [Subsection A of 20.6.2.3107 NMAC, Subsections B, C and H of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.D]
23.	On an annual basis, the permittee shall collect a 24-hour flow weighted composite sample (except where noted) of reclaimed wastewater after the UV disinfection unit from the reclaimed effluent reuse distribution tank and analyze the sample for the following inorganic constituents: • aluminum • arsenic • barium • boron • cadmium • chromium • cobalt • copper • cyanide • fluoride • iron • lead • manganese • molybdenum • mercury • pH (instantaneous) • nickel • radioactivity: combined radium-226 & radium-228 • selenium • silver • sulfate • uranium • zinc Samples shall be properly prepared, preserved, transported and analyzed in accordance with the methods authorized in this Discharge Permit. Analytical results shall be

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	submitted to NMED in the monitoring reports due by August 1st each year. [Subsection A of 20.6.2.3107 NMAC, Subsections C and H of 20.6.2.3109 NMAC]
24.	On an annual basis, the permittee shall collect a grab sample of reclaimed wastewater after the UV disinfection unit from the reclaimed effluent reuse distribution tank and analyze the sample for the following organic constituents: • benzene • benzo-a-pyrene • carbon tetrachloride • chloroform • 1,1-dichloroethane • 1,2-dichloroethane (DCE) • 1,1-dichloroethylene (1,1-DCE) • ethylbenzene • ethylene dibromide (EDB) • methylene chloride • PAHs: total naphthalene plus monomethylnaphthalenes • Phenols • Polychlorinated biphenyls (PCBs) • toluene • 1,1,2,2-tetrachloroethane • 1,1,2,2-tetrachloroethylene (PCE) • 1,1,1-trichloroethane • 1,1,2-trichloroethane • 1,1,2-trichloroethylene (TCE) • vinyl chloride • xylenes (total) Samples shall be properly prepared, preserved, transported and analyzed in accordance with the methods authorized in this Discharge Permit. Analytical results shall be submitted to NMED in the monitoring reports due by August 1st each year. [Subsection A of 20.6.2.3107 NMAC, Subsections C and H of 20.6.2.3109 NMAC]
25.	Records of solids disposal, including a copy of all Discharge Monitoring Reports (i.e., DMRs) required to be submitted to the EPA pursuant to 40 CFR 503 for the previous calendar year, shall be submitted to NMED annually in the monitoring report due by August 1st each year. [Subsection A of 20.6.2.3107 NMAC]

C. CONTINGENCY PLAN

#	Terms and Conditions
26.	In the event that groundwater monitoring indicates that a groundwater quality standard identified in Section 20.6.2.3103 NMAC is exceeded; the total nitrogen concentration in groundwater is greater than 10 mg/L; or a toxic pollutant (defined in Subsection WW of

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	20.6.2.7 NMAC) is present in a groundwater sample and in any subsequent groundwater sample collected from a monitoring well required by this Discharge Permit, the permittee shall enact the following contingency plan. Within 60 days of the subsequent sample analysis date, the permittee shall propose measures to ensure that the exceedance of the standard or the presence of a toxic pollutant will be mitigated by submitting a corrective action plan to NMED for approval. The corrective action plan shall include a description of the proposed actions to control the source and an associated completion schedule. The plan shall be enacted as approved by NMED. Once invoked (whether during the term of this Discharge Permit, or after the term of this Discharge Permit and prior to the completion of the Discharge Permit closure plan requirements), this condition shall apply until the permittee has fulfilled the requirements of this condition and groundwater monitoring confirms for a minimum of two years of consecutive groundwater sampling events that the standards of Section 20.6.2.3103 NMAC are not exceeded and toxic pollutants are not present in groundwater. The permittee may be required to abate water pollution pursuant to Sections 20.6.2.4000 through 20.6.2.4115 NMAC, should the corrective action plan not result in compliance with the standards and requirements set forth in Section 20.6.2.4103 NMAC within 180 days of confirmed groundwater contamination. [Subsection A of 20.6.2.3107 NMAC, Subsection E of 20.6.2.3109 NMAC]
27.	In the event that information available to NMED indicates that a well(s) is not constructed in a manner consistent with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.1, March 2011; contains insufficient water to effectively monitor groundwater quality; or is not completed in a manner that is protective of groundwater quality, the permittee shall install a replacement well(s) within 120 days following notification from NMED. Replacement well location(s) shall be approved by NMED prior to installation and completed in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.1, March 2011. The permittee shall submit construction and lithologic logs to NMED within 60 days following well completion. Upon completion of the replacement monitoring well(s), the monitoring well(s) requiring replacement shall be properly plugged and abandoned. Well plugging, abandonment and documentation of the abandonment procedures shall be completed in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.1, March 2011, and all applicable local, state, and federal regulations. The well abandonment documentation shall be submitted to NMED

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	within 60 days of completion of well plugging activities. [Subsection A of 20.6.2.3107 NMAC]
28.	In the event that groundwater flow information obtained pursuant to this Discharge Permit indicates that a monitoring well(s) is not located hydrologically downgradient of the discharge location(s) it is intended to monitor, the permittee shall install a replacement well(s) within 120 days following notification from NMED. The permittee shall survey the replacement monitoring well(s) within 150 days following notification from NMED. Replacement well location(s) shall be approved by NMED prior to installation and completed in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 11, March 2011. The permittee shall submit construction and lithologic logs, survey data and a groundwater elevation contour map within 30 days following well completion. [Subsection A of 20.6.2.3107 NMAC]
29.	In the event that analytical results of a quarterly treated wastewater sample indicate an exceedance of the total nitrogen discharge limit set in this Discharge Permit, the permittee shall collect and analyze a second sample within 30 days of the first sample analysis date. In the event the second sample results indicate that the discharge limit is continuing to be exceeded, the following contingency plan shall be enacted. a) Within 15 days of the second sample analysis date indicating that the discharge limit is continuing to be exceeded, the permittee shall: i) notify NMED that the contingency plan is being enacted; and ii) submit a copy of the first and second analytical results indicating an exceedance to NMED. b) The permittee shall increase the frequency of total nitrogen wastewater sampling and analysis of treated wastewater to once per month. c) The permittee shall examine the operation and maintenance log, required by the Record Keeping conditions of this Discharge Permit, for improper operational procedures. d) The permittee shall conduct a physical inspection of the treatment system to detect abnormalities. Any abnormalities discovered shall be corrected. A report detailing the corrections made shall be submitted to NMED within 30 days of correction. e) In the event that any analytical results from monthly wastewater sampling indicate an exceedance of the total nitrogen discharge limit, the permittee shall propose to modify operational procedures and/or upgrade the treatment process to achieve the total nitrogen limit by submitting a corrective action plan to NMED for approval. The plan shall include a schedule for completion of corrective actions and shall be submitted within 90 days of the second sample analysis date indicating that the discharge limit is continuing to be exceeded. The permittee shall initiate

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	implementation of the plan following approval by NMED. When analytical results from three consecutive months of wastewater sampling do not exceed the discharge limits, the permittee is authorized to return to a quarterly monitoring frequency. [Subsection A of 20.6.2.3107 NMAC, Subsection C of 20.6.2.3109 NMAC]
30.	In the event that analytical results of a reclaimed domestic wastewater sample indicates an exceedance of any of the maximum discharge limits for BOD_5, TSS or turbidity, or fecal coliform bacteria set by this Discharge Permit, the permittee shall collect and analyze a second sample within 24 hours after becoming aware of the exceedance. In the event the second sample results indicate that any maximum discharge limit is continuing to be exceeded (i.e., confirmed exceedance), the contingency plan below shall be enacted. **AND / OR** In the event that analytical results of a reclaimed domestic wastewater sample indicates an exceedance of any of the 30-day average discharge limits for BOD_5, TSS or turbidity, or fecal coliform bacteria set by this Discharge Permit (i.e., confirmed exceedance), the contingency plan below shall be enacted. <u>Contingency Plan</u> a) Within 24 hours of becoming aware of a confirmed exceedance (as identified above), the permittee shall: i) notify NMED that the contingency plan is being enacted; and ii) submit copies of the recent analytical results indicating an exceedance to NMED. b) The permittee shall immediately cease discharging reclaimed domestic wastewater to the re-use users authorized under this Discharge Permit c) The permittee shall examine the operation and maintenance log, required by the Record Keeping conditions of this Discharge Permit, for improper operational procedures. d) The permittee shall conduct a physical inspection of the treatment system to detect abnormalities. Any abnormalities discovered shall be corrected. A report detailing the corrections made shall be submitted to NMED within 30 days following correction. When the analytical results from samples of reclaimed domestic wastewater, sampled as required by this Discharge Permit, no longer indicate an exceedance of any of the maximum discharge limits, the permittee may resume discharging reclaimed wastewater to the re-use area. If a facility is required to enact the contingency plan more than two times in a 12-month

#	**Terms and Conditions**
	period, the permittee shall propose to modify operational procedures and/or upgrade the treatment process to achieve consistent compliance with the maximum and 30-day average discharge limits by submitting a corrective action plan for NMED approval. The plan shall include a schedule for completion of corrective actions and shall be submitted within 60 days following the second sample analysis date. The permittee shall initiate implementation of the plan following approval by NMED. Prior to recommencing discharge to the re-use area, additional sampling of any stored reclaimed wastewater may be required by NMED in response to the submitted corrective action plan. [Subsection A of 20.6.2.3107 NMAC, Subsection C of 20.6.2.3109 NMAC]
31.	In the event that a release (commonly known as a "spill") occurs that is not authorized under this Discharge Permit, the permittee shall take measures to mitigate damage from the unauthorized discharge and initiate the notifications and corrective actions required in Section 20.6.2.1203 NMAC and summarized below. Within 24 hours following discovery of the unauthorized discharge, the permittee shall verbally notify NMED and provide the following information. a) The name, address, and telephone number of the person or persons in charge of the facility, as well as of the owner and/or operator of the facility. b) The name and address of the facility. c) The date, time, location, and duration of the unauthorized discharge. d) The source and cause of unauthorized discharge. e) A description of the unauthorized discharge, including its estimated chemical composition. f) The estimated volume of the unauthorized discharge. g) Any actions taken to mitigate immediate damage from the unauthorized discharge. Within one week following discovery of the unauthorized discharge, the permittee shall submit written notification to NMED with the information listed above and any pertinent updates. Within 15 days following discovery of the unauthorized discharge, the permittee shall submit a corrective action report/plan to NMED describing any corrective actions taken and/or to be taken relative to the unauthorized discharge that includes the following information. a) A description of proposed actions to mitigate damage from the unauthorized discharge. b) A description of proposed actions to prevent future unauthorized discharges of this nature. c) A schedule for completion of proposed actions. In the event that the unauthorized discharge causes or may with reasonable probability cause water pollution in excess of the standards and requirements of Section 20.6.2.4103

#	Terms and Conditions
	NMAC, and the water pollution will not be abated within 180 days after notice is required to be given pursuant to Paragraph (1) of Subsection A of 20.6.2.1203 NMAC, the permittee may be required to abate water pollution pursuant to Sections 20.6.2.4000 through 20.6.2.4115 NMAC. Nothing in this condition shall be construed as relieving the permittee of the obligation to comply with all requirements of Section 20.6.2.1203 NMAC. [20.6.2.1203 NMAC]
32.	In the event that NMED or the permittee identifies any failures of the discharge plan or this Discharge Permit not specifically noted herein, NMED may require the permittee to submit a corrective action plan and a schedule for completion of corrective actions to address the failure(s). Additionally, NMED may require a Discharge Permit modification to achieve compliance with 20.6.2 NMAC. [Subsection A of 20.6.2.3107 NMAC, Subsection E of 20.6.2.3109 NMAC]

D. CLOSURE PLAN

#	Terms and Conditions
33.	In the event the facility, or a component of the facility, is proposed to be permanently closed, upon ceasing discharging, the permittee shall perform the following closure measures. Within 90 days of ceasing discharging to the treatment system, the permittee shall complete the following closure measures. a) The line leading to the system shall be plugged so that a discharge can no longer occur. b) Wastewater shall be drained or evaporated from the system components and it shall be disposed of in accordance with all local, state, and federal regulations or discharged from the system to the re-use users, as authorized by this Discharge Permit. c) Solids removed from the treatment system shall be contained, transported, and disposed of in accordance with all local, state, and federal regulations, including 40 CFR Part 503. The permittee shall maintain a record of all solids transported for off-site disposal. Within 180 days of ceasing discharging to the treatment system (or unit), the permittee shall complete the following closure measures. a) Remove all lines leading to and from the treatment system, or permanently plug them and abandon them in place.

#	Terms and Conditions
	b) Remove or demolish all treatment system components, and re-grade area with suitable fill to blend with surface topography, promote positive drainage and prevent ponding. The permittee shall continue groundwater monitoring until the requirements of this condition have been met and groundwater monitoring confirms for a minimum of two years of consecutive groundwater sampling events that the standards of Section 20.6.2.3103 NMAC are not exceeded and toxic pollutants are not present in groundwater. If monitoring results show that a groundwater quality standard in Section 20.6.2.3103 NMAC is exceeded; the total nitrogen concentration in groundwater is greater than 10 mg/L; or a toxic pollutant (defined in Subsection WW of 20.6.2.7 NMAC) is present in groundwater, the permittee shall implement the contingency plan required by this Discharge Permit. Following notification from NMED that post-closure monitoring may cease, the permittee shall plug and abandon the monitoring well(s) in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.1, March 2011. When all closure and post-closure requirements have been met, the permittee may submit a written request for termination of the Discharge Permit to NMED. [Subsection A of 20.6.2.3107 NMAC, 40 CFR Part 503]

E. GENERAL TERMS AND CONDITIONS

#	Terms and Conditions
34.	RECORD KEEPING - The permittee shall maintain a written record of: • information and data used to complete the application for this Discharge Permit; • any releases (commonly known as "spills") not authorized under this Discharge Permit and reports submitted pursuant to 20.6.2.1203 NMAC; • the operation, maintenance, and repair of all facilities/equipment used to treat, store or dispose of wastewater; • facility record drawings (plans and specifications) showing the actual construction of the facility and bear the seal and signature of a licensed New Mexico professional engineer; • copies of monitoring reports completed and/or submitted to NMED pursuant to this Discharge Permit; • the volume of wastewater or other wastes discharged pursuant to this Discharge Permit;

#	**Terms and Conditions**
	• groundwater quality and wastewater quality data collected pursuant to this Discharge Permit; • copies of construction records (well log) for all groundwater monitoring wells required to be sampled pursuant to this Discharge Permit; • the maintenance, repair, replacement or calibration of any monitoring equipment or flow measurement devices required by this Discharge Permit; and • data and information related to field measurements, sampling, and analysis conducted pursuant to this Discharge Permit including: o the dates, location and times of sampling or field measurements; o the name and job title of the individuals who performed each sample collection or field measurement; o the sample analysis date of each sample o the name and address of the laboratory, and the name of the signatory authority for the laboratory analysis; o the analytical technique or method used to analyze each sample or collect each field measurement; o the results of each analysis or field measurement, including raw data; o the results of any split, spiked, duplicate or repeat sample; and o a copy of the laboratory analysis chain-of-custody as well as a description of the quality assurance and quality control procedures used. The written record shall be maintained by the permittee at a location accessible during a facility inspection by NMED for a period of at least five years from the date of application, report, collection or measurement and shall be made available to the department upon request. [Subsections A and D of 20.6.2.3107 NMAC]
35.	INSPECTION and ENTRY – The permittee shall allow inspection by NMED of the facility and its operations that are subject to this Discharge Permit and the WQCC regulations. NMED may upon presentation of proper credentials, enter at reasonable times upon or through any premises in which a water contaminant source is located or in which are located any records required to be maintained by regulations of the federal government or the WQCC. The permittee shall allow NMED to have access to and reproduce for their use any copy of the records, and to perform assessments, sampling or monitoring during an inspection for the purpose of evaluating compliance with this Discharge Permit and the WQCC regulations. Nothing in this Discharge Permit shall be construed as limiting in any way the inspection and entry authority of NMED under the WQA, the WQCC Regulations, or any other local, state or federal regulations.

#	**Terms and Conditions**
	[Subsection D of 20.6.2.3107 NMAC, NMSA 1978, §§ 74-6-9.B and 74-6-9.E]
36.	DUTY to PROVIDE INFORMATION - The permittee shall, upon NMED's request, allow for NMED's inspection/duplication of records required by this Discharge Permit and/or furnish to NMED copies of such records. [Subsection D of 20.6.2.3107 NMAC]
37.	MODIFICATIONS and/or AMENDMENTS – In the event the permittee proposes a change to the facility or the facility's discharge that would result in a change in the volume discharged; the location of the discharge; or in the amount or character of water contaminants received, treated or discharged by the facility, the permittee shall notify NMED prior to implementing such changes. The permittee shall obtain approval (which may require modification of this Discharge Permit) by NMED prior to implementing such changes. [Subsection C of 20.6.2.3107 NMAC, Subsections E and G of 20.6.2.3109 NMAC]
38.	PLANS and SPECIFICATIONS – In the event the permittee is proposing to construct a wastewater system or change a process unit of an existing system such that the quantity or quality of the discharge will change substantially from that authorized by this Discharge Permit, the permittee shall submit construction plans and specifications to NMED for the proposed system or process unit prior to the commencement of construction. In the event the permittee implements changes to the wastewater system authorized by this Discharge Permit that result in only a minor effect on the character of the discharge, the permittee shall report such changes (including the submission of record drawings, where applicable) as of January 1 and June 30 of each year to NMED. [Subsections A and C of 20.6.2.1202 NMAC, NMSA 1978, §§ 61-23-1 through 61-23-32]
39.	CIVIL PENALTIES - Any violation of the requirements and conditions of this Discharge Permit, including any failure to allow NMED staff to enter and inspect records or facilities, or any refusal or failure to provide NMED with records or information, may subject the permittee to a civil enforcement action. Pursuant to WQA 74-6-10(A) and (B), such action may include a compliance order requiring compliance immediately or in a specified time, assessing a civil penalty, modifying or terminating the Discharge Permit, or any combination of the foregoing; or an action in district court seeking injunctive relief, civil penalties, or both. Pursuant to WQA 74-6-10(C) and 74-6-10.1, civil penalties of up to $15,000 per day of noncompliance may be assessed for each violation of the WQA 74-6-5, the WQCC Regulations, or this Discharge Permit, and civil penalties of up to $10,000 per day of noncompliance may be assessed for each

#	**Terms and Conditions**
	violation of any other provision of the WQA, or any regulation, standard, or order adopted pursuant to such other provision. In any action to enforce this Discharge Permit, the permittee waives any objection to the admissibility as evidence of any data generated pursuant to this Discharge Permit. [20.6.2.1220 NMAC, NMSA 1978, §§ 74-6-10 and 74-6-10.1]
40.	CRIMINAL PENALTIES – No person shall: • make any false material statement, representation, certification or omission of material fact in an application, record, report, plan or other document filed, submitted or required to be maintained under the WQA; • falsify, tamper with or render inaccurate any monitoring device, method or record required to be maintained under the WQA; or • fail to monitor, sample or report as required by a permit issued pursuant to a state or federal law or regulation. Any person who knowingly violates or knowingly causes or allows another person to violate the requirements of this condition is guilty of a fourth degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who is convicted of a second or subsequent violation of the requirements of this condition is guilty of a third degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who knowingly violates the requirements of this condition or knowingly causes another person to violate the requirements of this condition and thereby causes a substantial adverse environmental impact is guilty of a third degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who knowingly violates the requirements of this condition and knows at the time of the violation that he is creating a substantial danger of death or serious bodily injury to any other person is guilty of a second degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. [20.6.2.1220 NMAC, NMSA 1978, §§ 74-6-10.2.A through 74-6-10.2.F]
41.	COMPLIANCE with OTHER LAWS - Nothing in this Discharge Permit shall be construed in any way as relieving the permittee of the obligation to comply with all applicable federal, state, and local laws, regulations, permits or orders. [NMSA 1978, § 74-6-5.L]
42.	RIGHT to APPEAL - The permittee may file a petition for review before the WQCC on this Discharge Permit. Such petition shall be in writing to the WQCC within thirty days of the receipt of postal notice of this Discharge Permit and shall include a statement of the issues to be raised and the relief sought. Unless a timely petition for review is made, the decision of NMED shall be final and not subject to judicial review.

#	**Terms and Conditions**
	[20.6.2.3112 NMAC, NMSA 1978, § 74-6-5.O]
43.	TRANSFER of DISCHARGE PERMIT - Prior to the transfer of any ownership, control, or possession of this facility or any portion thereof, the permittee shall: • notify the proposed transferee in writing of the existence of this Discharge Permit; • include a copy of this Discharge Permit with the notice; and • deliver or send by certified mail to NMED a copy of the notification and proof that such notification has been received by the proposed transferee. Until both ownership and possession of the facility have been transferred to the transferee, the permittee shall continue to be responsible for any discharge from the facility. [20.6.2.3111 NMAC]
44.	PERMIT FEES - Payment of permit fees is due at the time of Discharge Permit approval. Permit fees shall be paid in a single payment or shall be paid in equal installments on a yearly basis over the term of the Discharge Permit. Single payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date. Initial installment payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date; subsequent installment payments shall be remitted to NMED no later than the anniversary of the Discharge Permit effective date. Permit fees are associated with issuance of this Discharge Permit. Nothing in this Discharge Permit shall be construed as relieving the permittee of the obligation to pay all permit fees assessed by NMED. A permittee that ceases discharging or does not commence discharging from the facility during the term of the Discharge Permit shall pay all permit fees assessed by NMED. An approved Discharge Permit shall be suspended or terminated if the facility fails to remit an installment payment by its due date. [Subsection F of 20.6.2.3114 NMAC, NMSA 1978, § 74-6-5.K]

V. PERMIT TERM & SIGNATURE

EFFECTIVE DATE: [effective date]
TERM ENDS: [expiration date

[Subsection H of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.I]

MICHELLE HUNTER
Chief, Ground Water Quality Bureau
New Mexico Environment Department

New Mexico Environment Department Ground Water Quality Bureau
Discharge Permit Summary

Facility Information

Facility Name	City of Santa Fe Wastewater Treatment Facility
Discharge Permit Number	DP-289
Legally Responsible Party	Mr. Shannon Jones, Director City of Santa Fe Wastewater Management Division 73 Paseo Real Santa Fe, NM 87507 (505) 955-4650

Treatment, Disposal and Site Information

Primary Waste Type	Domestic
Facility Type	MUNI-Wastewater

Treatment Methods

Treatment Type	Designation	Description & Comments
Headworks	HW	Reinforced concrete – 61,200 gallons
Primary Clarification	PC	Reinforced concrete – 1,161,200 gallons
Bio Selectors	BioS	Reinforced concrete – 1,240,000 gallons
Aeration Basin	AB	Reinforced concrete – 5,600,000 gallons
Final Clarification (old and new)	FC	Reinforced concrete – 3,000,000 gallons
Sand Filters and 3 disc filters	SF	Reinforced concrete – 6272 square feet
UV Disinfection Building	UV	Reinforced concrete – 23,427 gallons
Anaerobic Digesters (old and new)	E.-Dig., W.-Dig.	Reinforced Concrete, metal covers, 1 fixed, 1 floating - E.-Dig. 417,601 gallons, W.-Dig. 435,169 gallons
Outfall re-aeration Unit	Outfall	Reinforced concrete - 102,046 gallons capacity
Dissolved Air Floatation Units (old and new)	DAF New, DAF Existing	Reinforced concrete – New = 28,723 gallons capacity; Existing = 68,936 gallons capacity.
Sludge Composting Facility	SCF	Reinforced concrete floor, metal sides and roof - 90,257.22 square feet
Sludge High Lime Treatment Unit	SHLTU	Reinforced concrete - 43,088 gallons capacity

Discharge Locations

Discharge Type	Designation	Description & Comments
Watercourse	Santa Fe River Outfall	NPDES Permit No. NM0022292
Land Application	Treatment plant	Wash, process, and irrigation uses
Land Application	Temporary use – Stand-pipe delivery	Temporary and/or as needed uses in and around Santa Fe for construction, dust control, wildlife watering, and flood irrigation of non-food crops
Land Application	MRC; NM Game and Fish	SF Municipal Recreation Complex – Aesthetics, ponds, and 130 acres of irrigation.
Transfer	Transfers-other Discharge Permits	Transfers of reclaimed wastewater to the following facilities permitted by NMED: • Up to 10,000 gpd for ornamental impoundments and

		irrigation at the New Mexico Game and Fish Headquarters, DP-1254; • up to 700,000 gpd to Santa Fe Country Club, DP-1407; • up to 500,000 gpd to Caja del Rio Landfill, DP-1120; • up to 416,200 gpd to Santa Fe Downs, DP-265; • up to 400,000 gpd to Santa Fe Horse Park, DP-78; • up to 16,000 gpd to Cerrito Pelado Scoria Mine, DP-1576; • up to 210,000 gpd to SWAN Park Santa Fe DP-1824; and • to other entities that are permitted by NMED to discharge reclaimed wastewater.

Ground Water Monitoring Locations

Type	Designation	Description & Comments
Monitoring Well	MW-4A	Located approximately 240 ft. west of the WWTF outfall and along the discharge channel to the Santa Fe River and intended to be located hydrologically downgradient of the outfall

Depth-to-Ground Water 120 - 300 feet
Total Dissolved Solids (TDS) 250 mg/L

Permit Information

Application Received September 12, 2014
Public Notice Published date
Discharge Permit Issued date
Discharge Permit Expires date
Permitted Discharge Volume 13,000,000 gallons per day

NMED Contact Information

Mailing Address Ground Water Quality Bureau
P.O. Box 5469
Santa Fe, New Mexico 87502-5469

GWQB Telephone Number (505) 827-2900

NMED Lead Staff Russell A. Isaac
Lead Staff Telephone Number (505) 827-2978
Lead Staff Email russell.isaac@state.nm.us

Appendix C. NMED Groundwater Discharge Permit – Subsurface Sludge Injection

NM
Hari
P.O. Box 5469
Santa Fe, New Mexico 87502-5469

LACE STICKER AT TOP OF ENVELOPE TO THE RIGHT
OF THE RETURN ADDRESS, FOLD AT DOTTED LINE

CERTIFIED MAIL™

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11/28/20

Mailed From 87

US POSTA

Mr. Bryan Romero, Acting Director
City of Santa Fe Wastewater Management
Division
73 Paseo Real
Santa Fe, NM 87507

NEW MEXICO
ENVIRONMENT DEPARTMENT

Ground Water Quality Bureau

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

Harold Runnels Building
1190 St. Francis Drive
P.O. Box 5469, Santa Fe, NM 87502-5469
Phone (505) 827-2918 Fax (505) 827-2965
www.nmenv.state.nm.us

DAVE MARTIN
Secretary

BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

November 23, 2011

Mr. Bryan Romero, Acting Director
City of Santa Fe Wastewater Management Division
73 Paseo Real
Santa Fe, NM 87507

RE: Discharge Permit Renewal, DP-135, City of Santa Fe - Sludge Disposal Facility

Dear Mr. Romero:

The New Mexico Environment Department (NMED) issues the enclosed Discharge Permit Renewal, DP-135, to the City of Santa Fe (permittee) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations, 20.6.2 NMAC.

NMED received additional comments from the City of Santa Fe on September 14, 2011 concerning revisions to the draft Discharge Permit issued to the City on August 17, 2011. In summary, for the permittee's edification, NMED's responses to these comments are as follows:

1) NMED is agreeable with the comments and/or timeline modification requests related to Items #10, #11, #17, #18, #25, and #28, and has incorporated changes herein to the final Discharge Permit.
2) With respect to Item #19, the monitoring well survey needs to be conducted within 14 months of the effective date of the Discharge Permit (i.e., by January 23, 2013). The reason for this is the need to incorporate the new monitoring well (MW-6) as part of the monitoring well survey.
3) With respect to Item #37, NMED has reviewed the permittee's comments, agrees with them, and has removed the specific closure conditions for Disposal Area 2 from the final

Discharge Permit. The closure items in Item #38 (i.e., Condition 37 in the final permit) will remain.

4) With respect to Item #38 (Condition 37 in the final Discharge Permit), the need to establish vegetative cover is independent of drought conditions. NMED recognizes that it may take numerous attempts to successfully establish a vegetative cover.
5) With respect to the "General" comments made by the City of Santa Fe, all references to "cell" within the Discharge Permit have been changed to "area". NMED has also resolved the discrepancy related to the DMR submittal date.

The Discharge Permit contains terms and conditions that shall be complied with by the permittee and are enforceable by NMED pursuant to Section 20.6.2.3104 NMAC, WQA, NMSA 1978 §74-6-5 and §74-6-10. Please be aware that this Discharge Permit may contain conditions that require the permittee to implement operational, monitoring or closure actions by a specified deadline. Such conditions are listed at the beginning of the operational, monitoring and closure plans of this Discharge Permit.

Issuance of this Discharge Permit does not relieve the permittee of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

Pursuant to Paragraph (4) of Subsection H of 20.6.2.3109 NMAC, the term of the Discharge Permit shall be five years from the effective date. The term of this Discharge Permit will end on November 23, 2016.

NMED requests that the permittee submit an application for renewal (or renewal and modification) at least 180 days prior to the date the Discharge Permit term ends.

An invoice for the Discharge Permit Fee of $2,300.00 is being sent under separate cover. Payment of the Discharge Permit Fee must be received by NMED within 30 days of the date the Discharge Permit is issued.

If you have any questions, please contact Brad Reid at (505) 827-2963. Thank you for your cooperation and comments during this Discharge Permit review.

Sincerely,

Jerry Schoeppner, Acting Chief
Ground Water Quality Bureau

JS:BR/br

Encs: Discharge Permit Renewal, DP-135
Ground Water Discharge Permit Conditions for Synthetically Lined Lagoons – Liner Material and Site Preparation, Revision 0.0, May 2007
Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions, Revision 1.1, March 2011
Surface Disposal Data Sheet (SDDS; also available at the following website: http://www.nmenv.state.nm.us/gwb/forms/NewMexicoEnvironmentDepartment-GroundWaterQualityBureau-Forms.htm)

cc: Robert Italiano, District Manager, NMED District II (permit – electronic copy)
NMED Santa Fe Field Office (permit)
John Romero, Office of the State Engineer (permit – electronic copy)
Luis Orozco, Plant Superintendent, (permit – electronic copy to lgorozco@ci.santa-fe.nm.us)

GROUND WATER DISCHARGE PERMIT RENEWAL
City of Santa Fe - Sludge Disposal Facility, DP-135

I. INTRODUCTION

The New Mexico Environment Department (NMED) issues this Discharge Permit Renewal (Discharge Permit), DP-135, to the City of Santa Fe (permittee) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations, 20.6.2 NMAC.

NMED's purpose in issuing this Discharge Permit, and in imposing the requirements and conditions specified herein, is to control the discharge of water contaminants from the City of Santa Fe - Sludge Disposal Facility (facility) into ground and surface water, so as to protect ground and surface water for present and potential future use as domestic and agricultural water supply and other uses and protect public health. In issuing this Discharge Permit, NMED has determined that the requirements of Subsection C of 20.6.2.3109 NMAC have been met.

The activities which produce the discharge, the location of the discharge, and the quantity, quality and flow characteristics of the discharge are briefly described as follows:

Up to 28,000 gpd on an annual average, not to exceed 10,220,000 gallons per year, of liquid, and/or dewatered domestic wastewater treatment facility (WWTF) sludge is discharged in a rotational manner to three authorized disposal areas totaling 42.48 acres (Disposal Area 1 = 6.2 acres; Disposal Area 2 = Closed (Solar Array); Disposal Area 3 = 19.0 acres; Disposal Area 4 = 17.28 acres).

The discharge contains water contaminants or toxic pollutants which may be elevated above the standards of Section 20.6.2.3103 NMAC. The facility is located approximately 0.5 mile west of the intersection of Paseo Real and Highway 599 in Santa Fe in Section 10, T16N, R08E, Santa Fe County. Ground water below the site ranges in depths from approximately 130 to 190 feet and has a total dissolved solids concentration of approximately 125 milligrams per liter.

The original Discharge Permit was issued on June 8, 1984 and subsequently renewed and/or modified on April 10, 1989, October 18, 1993, January 27, 1995, December 2, 1996, and December 30, 2002. The permittee's application consists of the materials submitted by the permittee dated June 18, 2007, December 3, 2010 and materials contained in the administrative record prior to issuance of this Discharge Permit. The discharge shall be managed in accordance with all conditions and requirements of this Discharge Permit.

Pursuant to Section 20.6.2.3109 NMAC, NMED reserves the right to require a Discharge Permit Modification in the event NMED determines that the requirements of 20.6.2 NMAC are being or may be violated or the standards of Section 20.6.2.3103 NMAC are being or may be violated. This may include a determination that structural controls and/or management practices approved under this Discharge Permit are not protective of ground water quality, and that more stringent requirements to protect and/or remediate ground water quality may be required by NMED. These requirements may include: lining/relining lagoons/retention ponds; expanding surface disposal

areas; ceasing discharging to surface disposal areas, changing waste management practices; expanding monitoring requirements; and/or implementing abatement of water pollution.

Issuance of this Discharge Permit does not relieve the permittee of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

The following abbreviations may be used in this Discharge Permit:

Abbreviation	Explanation		Abbreviation	Explanation
BOD_5	biochemical oxygen demand (5-day)		NO_3-N	nitrate-nitrogen
CFR	Code of Federal Regulations		NTU	nepholometric turbidity units
CFU	colony forming units		SDDS	Surface Disposal Data Sheet
Cl	chloride		TDS	total dissolved solids
EPA	United States Environmental Protection Agency		TKN	total Kjeldahl nitrogen
Mg/kg	Milligrams per kilogram			
mg/L	milligrams per liter		TPH	total petroleum hydrocarbons
mL	milliliters		TSS	total suspended solids
NMAC	New Mexico Administrative Code		total nitrogen	TKN+NO_3-N
NMED	New Mexico Environment Department		WQCC	Water Quality Control Commission
NMSA	New Mexico Statutes Annotated			

II. FINDINGS

In issuing this Discharge Permit, NMED finds:

1. The permittee is discharging effluent or leachate from the facility so that such effluent or leachate may move directly or indirectly into ground water within the meaning of Section 20.6.2.3104 NMAC.

2. The permittee is discharging effluent or leachate from the facility so that such effluent or leachate may move into ground water of the State of New Mexico which has an existing concentration of 10,000 milligrams per liter or less of total dissolved solids within the meaning of Subsection A of 20.6.2.3101 NMAC.

3. The discharge from the facility is not subject to any of the exemptions of Section 20.6.2.3105 NMAC.

III. CONDITIONS

The following conditions shall be complied with by the permittee and are enforceable by NMED. The permittee is authorized to discharge water contaminants subject to the following conditions:

OPERATIONAL PLAN

#	**Terms and Conditions**
1.	The permittee shall implement the following operational plan to ensure compliance with Title 20, Chapter 6, Parts 1 and 2 NMAC. [20.6.2.3106.C NMAC, 20.6.2.3107 NMAC]
2.	The permittee shall operate in a manner such that standards and requirements of Sections 20.6.2.3101 NMAC and 20.6.2.3103 NMAC are not violated. [20.6.2.3103 NMAC]
3.	The permittee is authorized to discharge up to 28,000 gpd on an annual average, not to exceed 10,220,000 gallons per year, of liquid, and/or dewatered domestic WWTF sludge in a rotational manner to three authorized disposal areas totaling 42.48 acres (Disposal Area 1 = 6.2 acres; Disposal Area 2 = Closed (Solar Array); Disposal Area 3 = 19.0 acres; Disposal Area 4 = 17.28 acres). Waste types that are not specifically authorized to be received by this Discharge Permit shall not be received at the facility. [20.6.2.3104 NMAC]
4.	The permittee shall reduce the volume of liquid, and/or dewatered domestic WWTF sludge discharged to the authorized disposal areas according to the following schedule over the five year permit term: End of Year 1 (i.e., by December 31, 2012) = Reduce discharge volume by 30% to 19,600 gpd on an annual average, not to exceed 7,154,000 gallons per year End of Year 2 (i.e., by December 31, 2013) = Reduce discharge volume by 41% to 16,520 gpd on an annual average, not to exceed 6,029,800 gallons per year End of Year 3 (i.e., by December 31, 2014) = Reduce discharge volume by 49% to 14,280 gpd on an annual average, not to exceed 5,212,200 gallons per year End of Year 4 (i.e., by December 31, 2015) = Reduce discharge volume by 57% to 12,040 gpd on an annual average, not to exceed 4,394,600 gallons per year End of Year 5 (i.e., by Permit Term End Date, 2016) = Reduce discharge volume by 65% to 9,800 gpd on an annual average, not to exceed 3,577,000 gallons per year [20.6.2.3109 NMAC]
5.	The permittee shall maintain fences around the entire disposal facility to prevent unrestricted access. A minimum of a three-strand barbed wire fence and locked gate shall surround the facility. [20.6.2.3109 NMAC]
6.	The permittee shall maintain the following signs at the following locations: • Signs in both English and Spanish that state: "Notice: Waste Disposal Area - KEEP OUT" and "Aviso: Área de Disposición - NO ENTAR" posted at the facility entrance and every 500 feet along the facility boundary. • A sign with the name of the facility's contact person, office phone number of the contact person, emergency contact phone number for the facility, and physical location of the facility including township, range, and section(s) posted at the entrance gate. • A sign on each tank with the name of the tank contents. Tanks containing contaminated water should be labeled "Not Potable Water" and "el agua no es potable". • A sign to identify each disposal area by number and the waste type authorized to be

	discharged in each disposal area. All signs shall be weatherproof and posted at the boundary of each disposal area to facilitate a rotational disposal schedule as required in conditions below. All signs shall remain legible for the term of this Discharge Permit. [20.6.2.3109 NMAC]
7.	To prevent run-on and run-off from a storm event, the permittee shall maintain a minimum 24-inch earthen berm surrounding the perimeter of the facility. The berm shall be inspected on a regular basis and after any major rainfall event and repaired as necessary. In place of a berm across the facility entrance, the permittee shall construct and maintain shallow (minimum depth of six inches) stormwater diversion bar trenches parallel to and on each side of the facility entrance gate. [20.6.2.3107 NMAC, 20.6.2.3109 NMAC]
8.	The permittee shall inspect the facility weekly and collect any residual solid waste (trash) on the facility site. The collected materials shall be disposed of in a manner consistent with all local, state and federal regulations. [20.6.2.3109 NMAC]
9.	The permittee shall not discharge liquid sludge during periods of precipitation or when surface soils are frozen or saturated. Wastes may be stored during these periods. [20.6.2.3109 NMAC]
10.	Within 17 months of the effective date of this Discharge Permit (by April 23, 2013), the permittee shall install synthetic liners in the two existing stormwater retention impoundments. Construction plans and specifications of the proposed synthetic liner design for the stormwater retention impoundments shall be submitted to NMED for approval within 10 months of the effective date of this Discharge Permit (by September 23, 2012). The impoundment liners shall be constructed in accordance with the attachment titled *Ground Water Discharge Permit Conditions for Synthetically Lined Lagoons – Liner Material and Site Preparation*, Revision 0.0, May 2007. The permittee shall notify NMED at least five working days prior to liner installation to allow NMED personnel to be onsite for inspection. Record drawings of the impoundments, impoundment liners, and final impoundment capacity calculations shall be submitted to NMED within 30 days of liner installation. A licensed New Mexico professional engineer shall certify construction plans and specifications, supporting design calculations, and record drawings of the impoundment and liner. [20.6.2.3109 NMAC]
11.	The impoundment liners shall be maintained in such a manner as to avoid conditions which could affect the structural integrity of the lined stormwater retention impoundments and/or impoundment liners. Such conditions include, but are not limited to: • Erosion damage; • Animal activity/damage; • The presence of vegetation, such as; aquatic plants, weeds, woody shrubs or trees growing within five feet of the impoundment edge or within the impoundment itself; • Evidence of seepage; • Evidence of berm subsidence; and/or • The presence of large pieces or large quantities of debris in the impoundment. The permittee shall visually inspect the stormwater retention impoundments and surrounding berms on a quarterly basis to ensure proper maintenance. Vegetation growing around the stormwater retention impoundments shall be routinely controlled by mechanical removal in a manner that is protective of the lagoon liner. Any evidence of damage to the impoundment berm or liner shall be reported to NMED immediately upon discovery.

	[20.6.2.3107 NMAC]
12.	The permittee shall apply liquid, and/or dewatered domestic WWTF sludge in a rotational manner to three disposal areas totaling 42.48 acres. The sludge shall be evenly distributed throughout the individual disposal areas in use. Ponding of liquid sludge shall be minimized. Treatment, storage and disposal of sludge shall be in accordance with requirements set forth in 40 CFR Part 503. [20.6.2.3104 NMAC]
13.	The permittee shall monitor the facility's stormwater retention impoundments for the presence of standing liquid after every precipitation event. Should standing liquid be noted in the facility's stormwater retention impoundments, it shall be removed as soon as practicable to minimize the potential for movement to ground water and disposed of in accordance with all local, state and federal regulations. [20.6.2.3109 NMAC]

MONITORING, REPORTING, AND OTHER REQUIREMENTS

#	**Terms and Conditions**
14.	The permittee shall conduct the monitoring, reporting, and other requirements listed below. [20.6.2.3107 NMAC]
15.	METHODOLOGY - Unless otherwise approved in writing by NMED, the permittee shall conduct sampling and analysis in accordance with the most recent edition of the following documents: a) American Public Health Association, Standard Methods for the Examination of Water and Wastewater (18th, 19th or current) b) U.S. Environmental Protection Agency, Methods for Chemical Analysis of Water and Waste c) U.S. Geological Survey, Techniques for Water Resources Investigations of the U.S. Geological Survey d) American Society for Testing and Materials, Annual Book of ASTM Standards, Part 31.Water e) Federal Register, latest methods published for monitoring pursuant to Resources Conservation Recovery Act regulations f) U.S. Geological Survey, et al., National Handbook of Recommended Methods for Water Data Acquisition g) Methods of Soil Analysis: Part 1. Physical and Mineralogical Methods; Part 2. Microbiological and Biochemical Properties; and Part 3. Chemical Methods, American Society of Agronomy. [20.6.2.3107.B NMAC]
16.	The permittee shall submit quarterly monitoring reports to NMED for the most recently completed quarterly period by the 1st of February, May, August and November each year. Quarterly monitoring shall be performed during the following periods: • January 1st through March 31st (first quarter) – **due by May 1st**; • April 1st through June 30th (second quarter) – **due by August 1st**; • July 1st through September 30th (third quarter) – **due by November 1st**; and • October 1st through December 31st (fourth quarter) – **due by February 1st**.

	Monitoring requirements detailed in this Discharge Permit are summarized on the sheet titled *Summary of Required Actions, Monitoring and Reporting*. [20.6.2.3107 NMAC]
17.	Within one year of the effective date of this Discharge Permit (by November 23, 2012), the permittee shall install the following new monitoring well: • One monitoring well (MW-6) located 20 to 50 feet hydrologically downgradient of Disposal Area 4 and in an alternative location from MW-1. All monitoring well locations shall be approved by NMED prior to installation. The well shall be completed in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.1, March 2011. Construction and lithologic logs shall be submitted to NMED within 14 months of the effective date of this Discharge Permit (by January 23, 2013). [20.6.2.3107 NMAC]
18.	Following installation of the new monitoring well (MW-6) required by this Discharge Permit and within 60 days of completion of the well, the permittee shall sample ground water in the new well for the following dissolved (except where noted) constituents: • aluminum • arsenic • barium • boron • cadmium • chromium • cobalt • copper • cyanide • fluoride • iron • lead • manganese • molybdenum • mercury (total unfiltered) • pH • nickel • selenium • silver • sulfate • zinc • Polychlorinated biphenyls • (PCBs) (total unfiltered) Ground water sample collection, preservation, transport and analysis shall be performed according to the following procedure: a) Measure the depth-to-ground water from the top of well casing to the nearest hundredth of a foot. b) Purge three well volumes of water from the well prior to sample collection. c) Obtain samples from the well for analysis. d) Properly prepare, preserve and transport samples. e) Analyze samples in accordance with the methods authorized in this Discharge Permit. Depth-to-water measurements, analytical results, including laboratory QA/QC summary report, and a facility layout map showing the location and number of each well shall be submitted to NMED within 90 days of the installation of the monitoring well. [20.6.2.3107 NMAC]

19.	Within 14 months of the effective date of this Discharge Permit (by January 23, 2013), the permittee shall survey all wells approved by NMED for Discharge Permit monitoring purposes to a U.S. Geological Survey (USGS) or other permanent benchmark. Survey data shall include northing, easting and elevation to the nearest hundredth of a foot or in accordance with the "Minimum Standards for Surveying in New Mexico" (12.8.2 NMAC). A survey elevation shall be established at the top-of-casing, with a permanent marking indicating the point of survey. The survey shall be completed and certified by a licensed New Mexico professional surveyor. Depth-to-water shall be measured to the nearest hundredth of a foot in all surveyed wells, and the data shall be used to develop a map showing the location of all monitoring wells and the direction and gradient of ground water flow at the facility. The data and map of ground water flow direction at the facility shall be submitted to NMED within 14 months for the effective date of this Discharge Permit (by January 23, 2013). [20.6.2.3107 NMAC]
20.	The permittee shall measure and record the volume and dry weight of domestic wastewater treatment facility sludge discharged to each surface disposal area each month by tracking the volume of the loads received and the percent total solids as determined by sampling each type of sludge (i.e., liquid or dewatered). Records of the volume and dry weight of the sludge discharged shall be submitted to NMED in the quarterly monitoring reports. [20.6.2.3107 NMAC]
21.	The permittee shall sample each sludge type (liquid or dewatered) transported to the surface disposal facility on a monthly basis and analyze the sample(s) for percent total solids (%TS). Samples shall be properly prepared, preserved, transported and analyzed in accordance with the methods authorized in this Discharge Permit. Analytical results, reported as %TS for each sludge type, shall be submitted to NMED in the quarterly monitoring reports. [20.6.2.3107 NMAC]
22.	The permittee shall sample each sludge type (liquid or dewatered) transported to the surface disposal facility on a monthly basis and analyze the samples for TKN and NO_3-N. Samples shall be properly prepared, preserved, transported and analyzed in accordance with the methods authorized in this Discharge Permit. Analytical results, reported as mg/kg for TKN and NO_3-N (dry weight basis), shall be submitted to NMED in the quarterly monitoring reports. [20.6.2.3107 NMAC]
23.	The permittee shall submit copies of the completed Discharge Monitoring Reports (DMR) required by 40 CFR Part 503 to NMED in the quarterly monitoring report due by May 1st. [40.503(17) CFR, 74-6-5(E)(1) WQA, 74-6-5(K) WQA]
24.	The permittee shall complete a SDDS to document the amount of nitrogen applied to each surface disposal area, each month. A SDDS shall be completed for each sludge type (liquid or dewatered) associated with each disposal area, and shall reflect the nitrogen concentration from the monthly sludge analysis and the total number of dry tons discharged each month. Nitrogen content shall not be adjusted to account for volatilization or mineralization processes. The SDDS, or a statement that no surface disposal occurred within the specific disposal area, shall be submitted to NMED in the quarterly monitoring reports. [20.6.2.3107 NMAC]
25.	The permittee shall perform two ground water sampling events, one in 2013 and one in 2015, in five monitoring wells and analyze the samples for the following dissolved (except where noted) constituents:

	• aluminum • arsenic • barium • boron • cadmium • chromium • cobalt • copper • cyanide • fluoride • iron • lead • manganese • molybdenum • mercury (total unfiltered) • pH • nickel • selenium • silver • sulfate • zinc • Polychlorinated biphenyls (PCBs) (total unfiltered) The permittee shall sample the following wells: • MW-1, intended to be located hydrologically downgradient of Disposal Area 4 and just west of Huey Road. • MW-2, intended to be located hydrologically downgradient of Disposal Area 1 and Disposal Area 3 and located in the middle of the entire disposal area. • MW-3, intended to be located hydrologically upgradient of the facility and along Paseo Real. • MW-5, intended to be located hydrologically downgradient of Disposal Area 3. • MW-6, intended to be located hydrologically downgradient of Disposal Area 4. Ground water sample collection, preservation, transport and analysis shall be performed according to the following procedure: a) Measure the depth to ground water from the top of well casing to the nearest hundredth of a foot. b) Purge three well volumes of water from the well prior to sample collection. c) Obtain samples from the well for analysis. d) Properly prepare, preserve and transport samples. e) Analyze samples in accordance with the methods authorized in this Discharge Permit. Depth-to-water measurements, analytical results, including the laboratory QA/QC summary report, and a facility layout map showing the location and number of each well shall be submitted to NMED in the quarterly monitoring report due by November 1st in 2013 and 2015. [20.6.2.3107 NMAC]
26.	The permittee shall perform quarterly ground water sampling in five monitoring wells and analyze the samples for dissolved TKN, NO_3-N, TDS and Cl. The permittee shall sample the following wells: • MW-1, intended to be located hydrologically downgradient of Disposal Area 4 and just west of Huey Road. • MW-2, intended to be located hydrologically downgradient of Disposal Area 1 and

	Disposal Area 3 and located in the middle of the entire disposal area. • MW-3, intended to be located hydrologically upgradient of the facility and along Paseo Real. • MW-5, intended to be located hydrologically downgradient of Disposal Area 3. • MW-6, intended to be located hydrologically downgradient of Disposal Area 4. Ground water sample collection, preservation, transport and analysis shall be performed according to the following procedure: f) Measure the depth to ground water from the top of well casing to the nearest hundredth of a foot. g) Purge three well volumes of water from the well prior to sample collection. h) Obtain samples from the well for analysis. i) Properly prepare, preserve and transport samples. j) Analyze samples in accordance with the methods authorized in this Discharge Permit. Depth-to-water measurements, analytical results, including the laboratory QA/QC summary report, and a facility layout map showing the location and number of each well shall be submitted to NMED in the quarterly monitoring reports. [20.6.2.3107 NMAC]
27.	The permittee shall perform annual soil testing at the sludge disposal facility. The permittee shall collect three aliquots at depths of 2 ft and 5 ft from each active disposal area (Disposal Area 1, Disposal Area 3, and Disposal Area 4). The three aliquots from each disposal area shall be combined into composite samples (i.e., 2 ft and 5 ft composite samples from each disposal area). The total concentration of aluminum, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, and zinc shall be determined for each composite sample. The analytical results and a map showing the sampling locations within each disposal area shall be submitted to NMED in the quarterly monitoring report due by November 1st. [20.6.2.3107(A)3 NMAC, 20.6.2.3103 NMAC]
28.	Within 150 days of the effective date of this Discharge Permit (by April 21, 2012), the permittee shall perform a one-time background soil testing event in an area that is located hydrologically upgradient of the sludge disposal facility and which has never received sludge applications. The sampling location area shall be approved by NMED prior to sample collection. The permittee shall collect three aliquots at depths of 2 ft and 5 ft from the background testing area. The three aliquots from each depth in the background testing area shall be combined into composite samples (i.e., 2 ft and 5 ft composite samples from the background testing area). The total concentration of aluminum, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, and zinc shall be determined for each composite sample. The analytical results and a map showing the sampling locations shall be submitted to NMED within 180 days of the date of this Discharge Permit (by May 21, 2012). [20.6.2.3107(A)3 NMAC, 20.6.2.3103 NMAC]

CONTINGENCY PLAN

#	Terms and Conditions
29.	In the event that ground water monitoring indicates that a ground water quality standard identified in Section 20.6.2.3103 NMAC is exceeded; the total nitrogen concentration in ground water is greater than 10 mg/L; or a toxic pollutant (defined in Subsection WW of 20.6.2.7 NMAC) is present in a ground water sample and in any subsequent ground water sample collected from a monitoring well required by this Discharge Permit, the permittee shall enact the following contingency plan: Within 60 days of the subsequent sample analysis date, the permittee shall propose measures to ensure that the exceedance of the standard or the presence of a toxic pollutant will be mitigated by submitting a corrective action plan to NMED for approval. The corrective action plan shall include a description of the proposed actions to control the source and an associated completion schedule. The plan shall be enacted as approved by NMED. Once invoked (whether during the term of this Discharge Permit; or after the term of this Discharge Permit and prior to the completion of the Discharge Permit closure plan requirements), this condition shall apply until the permittee has fulfilled the requirements of this condition and ground water monitoring confirms for a minimum of two years of consecutive ground water sampling events that the standards of Section 20.6.2.3103 NMAC are not exceeded and toxic pollutants are not present in ground water. The permittee may be required to abate water pollution pursuant to Sections 20.6.2.4000 though 20.6.2.4115 NMAC, should the corrective action plan not result in compliance with the standards and requirements set forth in Section 20.6.2.4103 NMAC within 180 days of confirmed ground water contamination. [NMSA 1978, § 74-6-5.D, Subsection B of 20.6.2.3109 NMAC, Subsection A of 20.6.2.3107 NMAC]
30.	In the event that information available to NMED indicates that a well(s) is not constructed in a manner consistent with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.1, March 2011; contains insufficient water to effectively monitor ground water quality; or is not completed in a manner that is protective of ground water quality, the permittee shall install a replacement well(s) within 120 days following notification from NMED. The permittee shall survey the replacement monitoring well(s) within 150 days following notification from NMED. Replacement well location(s) shall be approved by NMED prior to installation and completed in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.1, March 2011. The permittee shall submit construction and lithologic logs, and survey data and a ground water elevation contour map to NMED within 60 days following well completion.

	Upon completion of the replacement monitoring well(s), the monitoring well(s) requiring replacement shall be properly plugged and abandoned. Well plugging, abandonment and documentation of the abandonment procedures shall be completed in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.1, March 2011, and all applicable local, state, and federal regulations. The well abandonment documentation shall be submitted to NMED within 60 days of completion of well plugging activities. [NMSA 1978, § 74-6-5.D, Subsection B of 20.6.2.3109 NMAC]
31.	In the event that ground water flow information obtained pursuant to this Discharge Permit indicates that a monitoring well(s) is not located hydrologically downgradient of the discharge location(s) it is intended to monitor, the permittee shall install a replacement well(s) within 120 days following notification from NMED. The permittee shall survey the replacement monitoring well(s) within 150 days following notification from NMED. Replacement well location(s) shall be approved by NMED prior to installation and completed in accordance with the attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.1, March 2011. The permittee shall submit construction and lithologic logs, and survey data and a ground water elevation contour map within 30 days following well completion. [NMSA 1978, § 74-6-5.D, Subsection B of 20.6.2.3109 NMAC]
32.	In the event that three years past the effective date of this Discharge Permit (by November 23, 2014), the permittee is not consistently meeting the reductions to the volume of liquid and/or dewatered domestic WWTF sludge discharged to the authorized disposal areas in accordance with the conditions of this Discharge Permit, the permittee shall submit a corrective action plan (CAP) that outlines how the reduction in volume will be achieved to NMED for approval. The CAP shall include: a) The method (or methods) to be employed to ultimately reduce the volume of liquid and/or dewatered domestic WWTF sludge discharged to the authorized disposal areas to 9,800 gpd on an annual average, not to exceed 3,577,000 gallons per year. b) An implementation schedule, including a deadline by which time the reduced discharge volume will be consistently met. NMED reserves the right to alter and/or deny the proposed CAP and require that the permittee achieve the reduction of discharge volumes as required by this Discharge Permit or in a shorter period of time than proposed by the permittee in the CAP. Upon NMED approval, the permittee shall commence implementation of the CAP. [NMSA 1978, § 74-6-5.D, Subsection B of 20.6.2.3109 NMAC, Subsection A of 20.6.2.3107 NMAC]
33.	In the event that inspection findings reveal significant damage likely to affect the structural integrity of the lined stormwater retention impoundments or its ability to contain

	contaminants, the permittee shall propose the repair or replacement of the impoundment liner(s) by submitting a corrective action plan to NMED for approval. The plan shall be submitted to NMED within 30 days after discovery by the permittee or following notification from NMED that significant liner damage is evident. The corrective action plan shall include a schedule for completion of corrective actions and the permittee shall initiate implementation of the plan following approval by NMED. [NMSA 1978, § 74-6-5.D, Subsection B of 20.6.2.3109 NMAC, Subsection A of 20.6.2.3107 NMAC]
34.	In the event that a release (commonly known as a "spill") occurs that is not authorized under this Discharge Permit, the permittee shall take measures to mitigate damage from the unauthorized discharge and initiate the notifications and corrective actions required in Section 20.6.2.1203 NMAC and summarized below. Within 24 hours following discovery of the unauthorized discharge, the permittee shall verbally notify NMED and provide the following information: a) The name, address, and telephone number of the person or persons in charge of the facility, as well as of the owner and/or operator of the facility. b) The name and address of the facility. c) The date, time, location, and duration of the unauthorized discharge. d) The source and cause of unauthorized discharge. e) A description of the unauthorized discharge, including its estimated chemical composition. f) The estimated volume of the unauthorized discharge. g) Any actions taken to mitigate immediate damage from the unauthorized discharge. Within one week following discovery of the unauthorized discharge, the permittee shall submit written notification to NMED with the information listed above and any pertinent updates. Within 15 days following discovery of the unauthorized discharge, the permittee shall submit a corrective action plan to NMED describing any corrective actions taken and/or to be taken relative to the unauthorized discharge that includes the following: a) A description of proposed actions to mitigate damage from the unauthorized discharge. b) A description of proposed actions to prevent future unauthorized discharges of this nature. c) A schedule for completion of proposed actions. In the event that the unauthorized discharge causes or may with reasonable probability cause water pollution in excess of the standards and requirements of Section 20.6.2.4103 NMAC, and the water pollution will not be abated within 180 days after notice is required to be given pursuant to Paragraph (1) of Subsection A of 20.6.2.1203 NMAC, the permittee may be required to abate water pollution pursuant to Sections 20.6.2.4000 though 20.6.2.4115 NMAC.

	Nothing in this condition shall be construed as relieving the permittee of the obligation to comply with all requirements of Section 20.6.2.1203 NMAC. [NMSA 1978, § 74-6-5.D, Subsection B of 20.6.2.3109 NMAC, 20.6.2.1203 NMAC]
35.	In the event that the sludge storage capacity of the wastewater treatment facility has been exceeded and the permittee cannot discharge liquid sludge to the sludge disposal area because it is saturated, frozen or covered with snow, the permittee shall obtain NMED approval for a temporary alternative. [Subsection A(10) of 20.6.2.3107 NMAC]
36.	In the event that NMED or the permittee identifies any failures of the discharge plan or this Discharge Permit not specifically noted herein, NMED may require the permittee to submit a corrective action plan and a schedule for completion of corrective actions to address the failure(s). Additionally, NMED may require a Discharge Permit modification to achieve compliance with 20.6.2 NMAC. [NMSA 1978, § 74-6-5.D, Subsections B and E of 20.6.2.3109 NMAC, Subsection A of 20.6.2.3107 NMAC]

CLOSURE PLAN

37.	Upon closure of the facility, the permittee shall perform the following closure measures: a) Complete the installation of all monitoring wells as required by this Discharge Permit. b) Remove all stormwater collected in the lined stormwater retention impoundments and then perforate or remove the lagoon liners and re-grade the ponds with clean fill to blend with surface topography and prevent ponding. c) Backfill each of the disposal areas with clean fill (as necessary) and contour to provide for positive stormwater drainage. d) Re-vegetate the disposal areas and disturbed areas at the facility by establishing a vegetative cover equal to 70% of the native perennial vegetative cover consisting of at least three native plant species including at least one grass, but not including noxious weeds. The permittee shall maintain the vegetative cover through two consecutive growing seasons. e) Following final grading and re-seeding of the facility, the permittee shall maintain the perimeter fencing and security gate for a minimum of three years to prevent unauthorized access. f) Submit proof to NMED that all closure activities set forth for the facility under 40 CFR 503 have been completed. g) Following completion of the closure activities above, continue ground water monitoring as required by this Discharge Permit for two years to confirm the absence of ground water contamination. If monitoring results show that the ground water standards in Section 20.6.2.3103 NMAC are being violated, the permittee shall implement the contingency plan required by this Discharge Permit. h) Following notification from NMED that post-closure monitoring may cease, the permittee shall plug and abandon the monitoring well(s) in accordance with the

	attachment titled *Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions*, Revision 1.1, March 2011. When all closure and post-closure requirements have been met, the permittee may request to terminate the Discharge Permit. [20.6.2.3107.A(11) NMAC]

GENERAL TERMS AND CONDITIONS

#	Terms and Conditions
38.	RECORD KEEPING - The permittee shall maintain a written record of the following information: a) Information and data used to complete the application for this Discharge Permit. b) Records of any releases (commonly known as "spills") not authorized under this Discharge Permit and reports submitted pursuant to 20.6.2.1203 NMAC. c) Records of the operation, maintenance, and repair of all facilities/equipment used to treat, store or dispose of wastewater. d) Facility record drawings (plans and specifications) showing the actual construction of the facility and bear the seal and signature of a licensed New Mexico professional engineer. e) Copies of monitoring reports completed and/or submitted to NMED pursuant to this Discharge Permit. f) The volume of wastewater or other wastes discharged pursuant to this Discharge Permit. g) Ground water quality and wastewater quality data collected pursuant to this Discharge Permit. h) Copies of construction records (well log) for all ground water monitoring wells required to be sampled pursuant to this Discharge Permit. i) Records of the maintenance, repair, replacement or calibration of any monitoring equipment or flow measurement devices required by this Discharge Permit. j) Data and information related to field measurements, sampling, and analysis conducted pursuant to this Discharge Permit. The following information shall be recorded and shall be made available to NMED upon request: i) The dates, location and times of sampling or field measurements; ii) The name and job title of the individuals who performed each sample collection or field measurement; iii) The sample analysis date of each sample; iv) The name and address of the laboratory, and the name of the signatory authority for the laboratory analysis; v) The analytical technique or method used to analyze each sample or collect each field measurement; vi) The results of each analysis or field measurement, including raw data; vii) The results of any split, spiked, duplicate or repeat sample; and viii) A copy of the laboratory analysis chain-of-custody as well as a description of the quality assurance and quality control procedures used.

	The written record shall be maintained by the permittee at a location accessible during a facility inspection by NMED for a period of at least five years from the date of application, report, collection or measurement and shall be made available to the department upon request. [NMSA 1978, § 74-6-5.D, Subsection B of 20.6.2.3109 NMAC, Subsection A of 20.6.2.3107 NMAC]
39.	INSPECTION and ENTRY – The permittee shall allow inspection by NMED of the facility and its operations which are subject to this Discharge Permit and the WQCC regulations. NMED may upon presentation of proper credentials, enter at reasonable times upon or through any premises in which a water contaminant source is located or in which are located any records required to be maintained by regulations of the federal government or the WQCC. The permittee shall allow NMED to have access to and reproduce for their use any copy of the records, and to perform assessments, sampling or monitoring during an inspection for the purpose of evaluating compliance with this Discharge Permit and the WQCC regulations. Nothing in this Discharge Permit shall be construed as limiting in any way the inspection and entry authority of NMED under the WQA, the WQCC Regulations, or any other local, state or federal regulations. [Subsection D of 20.6.2.3107 NMAC, NMSA 1978, §§ 74-6-9.B and 74-6-9.E]
40.	DUTY to PROVIDE INFORMATION - The permittee shall, upon NMED's request, allow NMED's inspection/duplication of records required by this Discharge Permit and/or furnish to NMED copies of such records. [NMSA 1978, § 74-6-5.D, Subsection B of 20.6.2.3109 NMAC 20.6.2.3107.D NMAC, NMSA 1978, §§ 74-6-9.B and 74-6-9.E]
41.	MODIFICATIONS and/or AMENDMENTS – In the event the permittee proposes a change to the facility or the facility's discharge that would result in a change in the volume discharged; the location of the discharge; or in the amount or character of water contaminants received, treated or discharged by the facility, the permittee shall notify NMED prior to implementing such changes. The permittee shall obtain approval (which may require modification of this Discharge Permit) by NMED prior to implementing such changes. [NMSA 1978, § 74-6-5.D, Subsection E of 20.6.2.3109 NMAC, Subsection C of 20.6.2.3107 NMAC]
42.	PLANS and SPECIFICATIONS – In the event the permittee is proposing to construct a wastewater system or change a process unit of an existing system such that the quantity or quality of the discharge will change substantially from that authorized by this Discharge Permit, the permittee shall submit construction plans and specifications to NMED for the proposed system or process unit prior to the commencement of construction.

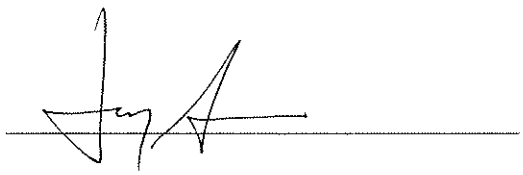
	In the event the permittee implements changes to the wastewater system authorized by this Discharge Permit which result in only a minor effect on the character of the discharge, the permittee shall report such changes (including the submission of record drawings, where applicable) as of January 1 and June 30 of each year to NMED. [NMSA 1978, § 74-6-5.D, Subsection B of 20.6.2.3109 NMAC, 20.6.2.1202 NMAC]
43.	CIVIL PENALTIES - Any violation of the requirements and conditions of this Discharge Permit, including any failure to allow NMED staff to enter and inspect records or facilities, or any refusal or failure to provide NMED with records or information, may subject the permittee to a civil enforcement action. Pursuant to WQA 74-6-10(A) and (B), such action may include a compliance order requiring compliance immediately or in a specified time, assessing a civil penalty, modifying or terminating the Discharge Permit, or any combination of the foregoing; or an action in district court seeking injunctive relief, civil penalties, or both. Pursuant to WQA 74-6-10(C) and 74-6-10.1, civil penalties of up to $15,000 per day of noncompliance may be assessed for each violation of the WQA 74-6-5, the WQCC Regulations, or this Discharge Permit, and civil penalties of up to $10,000 per day of noncompliance may be assessed for each violation of any other provision of the WQA, or any regulation, standard, or order adopted pursuant to such other provision. In any action to enforce this Discharge Permit, the permittee waives any objection to the admissibility as evidence of any data generated pursuant to this Discharge Permit. [NMSA 1978, §§ 74-6-10 and 74-6-10.1,]
44.	CRIMINAL PENALTIES – No person shall: 1) make any false material statement, representation, certification or omission of material fact in an application, record, report, plan or other document filed, submitted or required to be maintained under the WQA; 2) falsify, tamper with or render inaccurate any monitoring device, method or record required to be maintained under the WQA; or 3) fail to monitor, sample or report as required by a permit issued pursuant to a state or federal law or regulation. Any person who knowingly violates or knowingly causes or allows another person to violate the requirements this condition is guilty of a fourth degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who is convicted of a second or subsequent violation of the requirements this condition is guilty of a third degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who knowingly violates the requirements this condition or knowingly causes another person to violate the requirements this condition and thereby causes a substantial adverse environmental impact is guilty of a third degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who knowingly violates the requirements this condition and knows at the time of the violation that he is creating a substantial danger of death or serious bodily injury to any other person is guilty of a second degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15.

	[NMSA 1978, §§ 74-6-10.2.A through 74-6-10.2.F]
45.	COMPLIANCE WITH OTHER LAWS - Nothing in this Discharge Permit shall be construed in any way as relieving the permittee of the obligation to comply with all applicable federal, state, and local laws, regulations, permits or orders. [20.6.2 NMAC]
46.	RIGHT to APPEAL - The permittee may file a petition for review before the WQCC on this Discharge Permit. Such petition shall be in writing to the WQCC within thirty days of the receipt of postal notice of this Discharge Permit and shall include a statement of the issues to be raised and the relief sought. Unless a timely petition for review is made, the decision of NMED shall be final and not subject to judicial review. [NMSA 1978, § 74-6-5.O]
47.	TRANSFER of DISCHARGE PERMIT - Prior to the transfer of any ownership, control, or possession of this facility or any portion thereof, the permittee shall: 1) notify the proposed transferee in writing of the existence of this Discharge Permit; 2) include a copy of this Discharge Permit with the notice; and 3) deliver or send by certified mail to NMED a copy of the notification and proof that such notification has been received by the proposed transferee. Until both ownership and possession of the facility have been transferred to the transferee, the permittee shall continue to be responsible for any discharge from the facility. [20.6.2.3111 NMAC]
48.	PERMIT FEES - Payment of permit fees is due at the time of Discharge Permit approval. Permit fees shall be paid in a single payment or shall be paid in equal installments on a yearly basis over the term of the Discharge Permit. Single payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date. Initial installment payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date; subsequent installment payments shall be remitted to NMED no later than the anniversary of the Discharge Permit effective date. Permit fees are associated with issuance of this Discharge Permit. Nothing in this Discharge Permit shall be construed as relieving the permittee of the obligation to pay all permit fees assessed by NMED. A permittee that ceases discharging or does not commence discharging from the facility during the term of the Discharge Permit shall pay all permit fees assessed by NMED. An approved Discharge Permit shall be suspended or terminated if the facility fails to remit an installment payment by its due date. [Subsection F of 20.6.2.3114 NMAC, NMSA 1978, § 74-6-5.K]

PERMIT TERM & SIGNATURE

EFFECTIVE DATE: November 23, 2011
TERM ENDS: November 23, 2016

[Subsection H of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.I]



JERRY SCHOEPPNER
Acting Chief, Ground Water Quality Bureau
New Mexico Environment Department

New Mexico Environment Department Ground Water Quality Bureau
Discharge Permit Summary

Facility Information

Facility Name City of Santa Fe – Sludge Disposal Facility
Discharge Permit Number DP-135

Legally Responsible Party
Mr. Bryan Romero, Acting Director
City of Santa Fe Wastewater Management Division
73 Paseo Real
Santa Fe, NM 87507
505-955-4650

Treatment, Disposal and Site Information

Primary Waste Type Domestic
Facility Type MUNI-Sludge Disposal Facility

Treatment Methods

Treatment Type	Designation	Description & Comments
Anaerobic Digesters (old and new)	E.-Dig., W.-Dig.	Reinforced Concrete, metal covers, 1 fixed, 1 floating - E.-Dig. 417,601 gallons, W.-Dig. 435,169 gallons
Dissolved Air Floatation Units	DAF	Reinforced concrete – 99,698 gallons capacity
Sludge Composting Facility	SCF	Reinforced concrete floor, metal sides and roof - 90,257.22 square feet
Sludge/Septage High Lime Treatment Unit	SSHLTU	Reinforced concrete - 43,088 gallons capacity
Sludge Storage Tanks	SST	Reinforced concrete – 2,277,923 gallons capacity

Discharge Locations

Discharge Type	Designation	Description & Comments
Land Disposal	Sludge Disposal	42.48 Total Acres: Disposal Area 1 = 6.2 acres; Disposal Area 2 = Closed (Solar Array); Disposal Area 3 = 19.0 acres; Disposal Area 4 = 17.28 acres.

Ground Water Monitoring Locations

Type	Designation	Description & Comments
Monitoring Well	MW-1	Intended to be hydrologically downgradient of Disposal Area 4 and just west of Huey Road
Monitoring Well	MW-2	Intended to be hydrologically downgradient of Disposal Area 1 and Disposal Area 3 and located in the middle of the entire disposal area
Monitoring Well	MW-3	Intended to be hydrologically upgradient of the facility and along Paseo Real
Monitoring Well	MW-5	Intended to be hydrologically downgradient of Disposal Area 3
Monitoring Well	MW-6	Intended to be hydrologically downgradient of Disposal Area 4 (To be installed)

Depth-to-Ground Water 130 - 190 feet
Total Dissolved Solids (TDS) 125 mg/L

Permit Information

Application Received	June 18, 2007 and December 3, 2010
Public Notice Published	August 19, 2011
Discharge Permit Issued	November 23, 2011
Discharge Permit Expires	November 23, 2016
Permitted Discharge Volume	28,000 gallons per day

NMED Contact Information

Mailing Address	Ground Water Quality Bureau P.O. Box 5469 Santa Fe, New Mexico 87502-5469
GWQB Telephone Number	(505) 827-2900
NMED Lead Staff	Brad Reid
Lead Staff Telephone Number	(505) 827-2963
Lead Staff Email	brad.reid@state.nm.us

City of Santa Fe – Sludge Disposal Facility, DP-135
Effective Date: November 23, 2011

REQUIRED ACTIONS

#	Description of Required Actions	Due Date
1.	**Synthetic Lining of Stormwater Retention Impoundments**	
	Submit plans and specifications of the synthetically lined storm water impoundment design.	within 10 months of effective date (by September 23, 2012)
	Notify NMED prior to impoundment liner installation.	at least 5 days prior to installation
	Complete installation of synthetic liners in two stormwater retention impoundments.	within 17 months of effective date (by April 23, 2013)
	Submit record drawings for impoundment liners, certified by licensed New Mexico P.E.	within 30 days of impoundment completion
2.	**Installation of Monitoring Well:**	
	Obtain NMED approval of well location.	prior to installation
	Install the following monitoring well: • MW-6, intended to be hydrologically downgradient of Disposal Area 4	within 1 year of effective date (by November 23, 2012)
	Submit monitoring well construction and lithologic logs.	within 14 months of effective date (by January 23, 2013)
3.	**Initial Ground Water Sampling:**	
	Measure depth to water and analyze initial ground water samples from one monitoring well (MW-6) for all constituents listed under Condition 18 of the Discharge Permit.	Within 60 days of well completion
	Submit depth-to-water measurements, analytical results, and facility map with MW locations.	within 90 days of well installation
4.	**Monitoring Well Survey and Ground Water Flow Determination:**	
	Survey all monitoring wells to a U.S. Geological Survey (USGS) or other permanent benchmark.	within 14 months of effective date (by January 23, 2013)
	Submit survey data and map of ground water flow direction and gradient.	within 14 months of effective date (by January 23, 2013)
5.	**One-time background soil sampling event:**	
	Obtain NMED approval of sampling location.	prior to sampling event

#	Description of Required Actions	Due Date
	Sample soil at depths of 2 and 5 feet for aluminum, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, and zinc. Submit analytical results.	within 150 days of effective date (by April 21, 2012) within 180 days of effective date (by May 21, 2012)

MONITORING AND REPORTING REQUIREMENTS

Quarterly monitoring shall be performed during the following calendar quarters:

- January 1st through March 31st (first quarter) – **report due by May 1st**
- April 1st through June 30th (second quarter) – **report due by August 1st**
- July 1st through September 30th (third quarter) – **report due by November 1st**
- October 1st through December 31st (fourth quarter) – **report due by February 1st**

Submit **quarterly** reports by the 1st of February, May, August and November of each year containing items specified in the table below.

#	Description of Monitoring and Reporting Requirements	Monitoring Frequency	Reporting Schedule
1.	Inspect stormwater retention ponds and berms and dewater as needed. Notify NMED immediately upon discovery of pond berm or liner damage.	Quarterly and after every precipitation event	As needed
2.	Record the volume and dry weight of domestic wastewater treatment facility sludge discharged to the surface disposal cells each month. Submit records.	monthly	quarterly
3.	Analyze each sludge type for percent total solids (%TS). Submit analytical results. [20.6.2.3107 NMAC]	monthly	quarterly
4.	Analyze each sludge type for TKN & NO_3-N. Submit analytical results. [20.6.2.3107 NMAC]	monthly	quarterly
5.	Submit SDDS	monthly	quarterly
6.	Submit copy of DMR	NA	By May 1st
7.	Measure depth-to-water and analyze ground water samples from 5 monitoring wells (MW-1, MW-2, MW-3, MW-5, and MW-6) for all contaminants listed under Condition 25 of the Discharge Permit. Submit measurements and analytical results.	2013 and 2015	By Nov 1st 2013 and 2015
8.	Measure depth-to-water and analyze ground water samples from 5 monitoring wells (MW-1, MW-2, MW-3, MW-5, and MW-6) for TKN, NO_3-N, TDS, and Cl. Submit measurements and analytical results.	quarterly	quarterly

#	Description of Monitoring and Reporting Requirements	Monitoring Frequency	Reporting Schedule
9.	Sample soil from each surface disposal area at depths of 2 and 5 feet for aluminum, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, and zinc. Submit analytical results.	annually	By November 1st
10.	Inspect berms around the surface disposal area and repair as necessary.	regularly and after every precipitation event	NA
11.	Inspect facility and collect residual solid waste.	weekly	NA

NOTE: See Discharge Permit for full requirement details.

Submit all reports to:

NMED Ground Water Quality Bureau
P.O. Box 5469
Santa Fe, New Mexico 87502-5469

Surface Disposal Data Sheet (SDDS)
Sludge

New Mexico Environment Department
Ground Water Quality Bureau

DATE: _____ DP#: _____ MONITORING REPORT DUE DATE: _____

FACILITY NAME: _____ REPORTING PERIOD (i.e., from ___ to ___): _____

SLUDGE SOURCE:[1] _____ DISCHARGE CELL DESIGNATION:[1] _____ # ACRES IN CELL: _____

MONTH & YEAR OF DISCHARGE[2]	A WEIGHT OF SLUDGE DISCHARGED metric tons dry weight[3]	B SLUDGE SAMPLE: TOTAL NITROGEN CONCENTRATION[4] (TKN + NO3-N) mg/kg	C SLUDGE DISCHARGED: TOTAL NITROGEN ((A x B) ÷ 1,000) kg N	D SLUDGE DISCHARGED: TOTAL NITROGEN (C x 2.2) lbs N	E NITROGEN LOADING (D ÷ # acres) lbs N/acre	NOTES[5]
example assuming a 50-acre cell: *MM - YY*	*125 metric tons*	*2063 mg/kg TKN + 687 mg/kg NO3-N = 2750 mg/kg N*	*(125 metric tons x 2750 mg/kg) ÷ 1,000 = 343.8 kg N*	*(343.8 kg N/metric ton) x 2.2 = 756 lbs N*	*756 lbs N ÷ 50 acres = 15.1 lbs N/ac*	
			TOTALS			

[1]One SDDS form should be used for *each* cell designation and *each* sludge source. Examples of "Sludge Source" include: thickened solids, non-thickened solids, multiple treatment facilities, liquid sludge, dry sludge, etc.

[2]Each form must reflect the *most recent* 12 months of sludge discharge.

[3]One metric ton = 2,200 lbs

[4]This information should be obtained from the *most recent* laboratory analysis. Note: If quarterly sampling is required, record the same data for the three months of that monitoring quarter.

[5]In the event discharge did not occur, please report "no discharge" in the NOTES column.

Last Updated: September 22, 2011

Ground Water Discharge Permit Monitoring Well Construction and Abandonment Conditions

These conditions identify construction and abandonment requirements for installation of water table monitoring wells under ground water Discharge Permits issued by the NMED's Ground Water Quality Bureau (GWQB). Proposed locations of monitoring wells required under Discharge Permits and requests to use alternate installation and/or construction methods for water table monitoring wells shall be submitted to the GWQB for approval prior to drilling and construction.

General Drilling Specifications:

1. All well drilling activities shall be performed by an individual with a current and valid well driller license issued by the State of New Mexico in accordance with 19.27.4 NMAC.
2. Drilling methods that allow for accurate determinations of water table locations shall be employed. All drill bits, drill rods, and down-hole tools shall be thoroughly cleaned immediately prior to the start of drilling. The borehole diameter shall be drilled a minimum of 4 inches larger than the casing diameter to allow for the emplacement of sand and sealant.
3. After completion, the well shall be allowed to stabilize for a minimum of 12 hours before development is initiated.
4. The well shall be developed so that formation water flows freely through the screen and is not turbid, and all sediment and drilling disturbances are removed from the well.

Well Specifications (see attached monitoring well schematic):

5. Schedule 40 (or heavier) polyvinyl chloride (PVC) pipe, stainless steel pipe, carbon steel pipe, or pipe of an alternate appropriate material that has been approved for use by NMED shall be used as casing. The casing shall have an inside diameter not less than 2 inches. The casing material selected for use shall be compatible with the anticipated chemistry of the ground water and appropriate for the contaminants of interest at the facility. The casing material and thickness selected for use shall have sufficient collapse strength to withstand the pressure exerted by grouts used as annular seals and thermal properties sufficient to withstand the heat generated by the hydration of cement-based grouts. Casing sections shall be joined using welded, threaded, or mechanically locking joints; the method selected shall provide sufficient joint strength for the specific well installation. The casing shall extend from the top of the screen to at least one foot above ground surface. The top of the casing shall be fitted with a removable cap, and the exposed casing shall be protected by a locking steel well shroud. The shroud shall be large enough in diameter to allow easy access for removal of the cap. Alternatively, monitoring wells may be completed below grade. In this case, the casing shall extend from the top of the screen to 6 to 12 inches below the ground surface; the monitoring wells shall be sealed with locking, expandable well plugs; a flush-mount, watertight well vault that is rated to withstand traffic loads shall be emplaced around the wellhead; and the cover shall be secured with at least one bolt. The vault cover shall indicate that the wellhead of a monitoring well is contained within the vault.
6. A 20-foot section (maximum) of continuous-slot, machine slotted, or other manufactured PVC or stainless steel well screen or well screen of an alternate appropriate material that has been approved for use by NMED shall be installed across the water table. Screens created by cutting slots into solid casing with saws or other tools shall not be used. The screen material selected for use shall be compatible with the anticipated chemistry of the ground water and appropriate for the contaminants of interest at the facility. Screen sections shall be joined using welded, threaded, or mechanically locking joints; the method selected shall provide sufficient joint strength for the specific well installation and shall not introduce constituents that may reasonably be considered contaminants of interest at the facility. A cap shall be attached to the bottom of the well screen; sumps (i.e., casing attached to the bottom of a well screen) shall not be installed. The bottom of the screen shall be installed no more than 15 feet below the water table; the top of the well screen shall be positioned not

less than 5 feet above the water table. The well screen slots shall be appropriately sized for the formation materials and shall be selected to retain 90 percent of the filter pack.

7. Casing and well screen shall be centered in the borehole by placing centralizers near the top and bottom of the well screen.
8. A filter pack shall be installed around the screen by filling the annular space from the bottom of the screen to 2 feet above the top of the screen with clean silica sand. The filter pack shall be properly sized to prevent fine particles in the formation from entering the well. For wells deeper than 30 feet, the sand shall be emplaced by a tremmie pipe. The well shall be surged or bailed to settle the filter pack and additional sand added, if necessary, before the bentonite seal is emplaced.
9. A bentonite seal shall be constructed immediately above the filter pack by emplacing bentonite chips or pellets (3/8-inch in size or smaller) in a manner that prevents bridging of the chips/pellets in the annular space. The bentonite seal shall be 3 feet in thickness and hydrated with clean water. Adequate time shall be allowed for expansion of the bentonite seal before installation of the annular space seal.
10. The annular space above the bentonite seal shall be sealed with cement grout or a bentonite-based sealing material acceptable to the State Engineer pursuant to 19.27.4 NMAC. A tremmie pipe shall be used when placing sealing materials at depths greater than 20 feet below the ground surface. Annular space seals shall extend from the top of the bentonite seal to the ground surface (for wells completed above grade) or to a level 3 to 6 inches below the top of casing (for wells completed below grade).
11. A concrete pad (2-foot minimum radius, 4-inch minimum thickness) shall be poured around the shroud or well vault and wellhead. The concrete and surrounding soil shall be sloped to direct rainfall and runoff away from the wellhead.

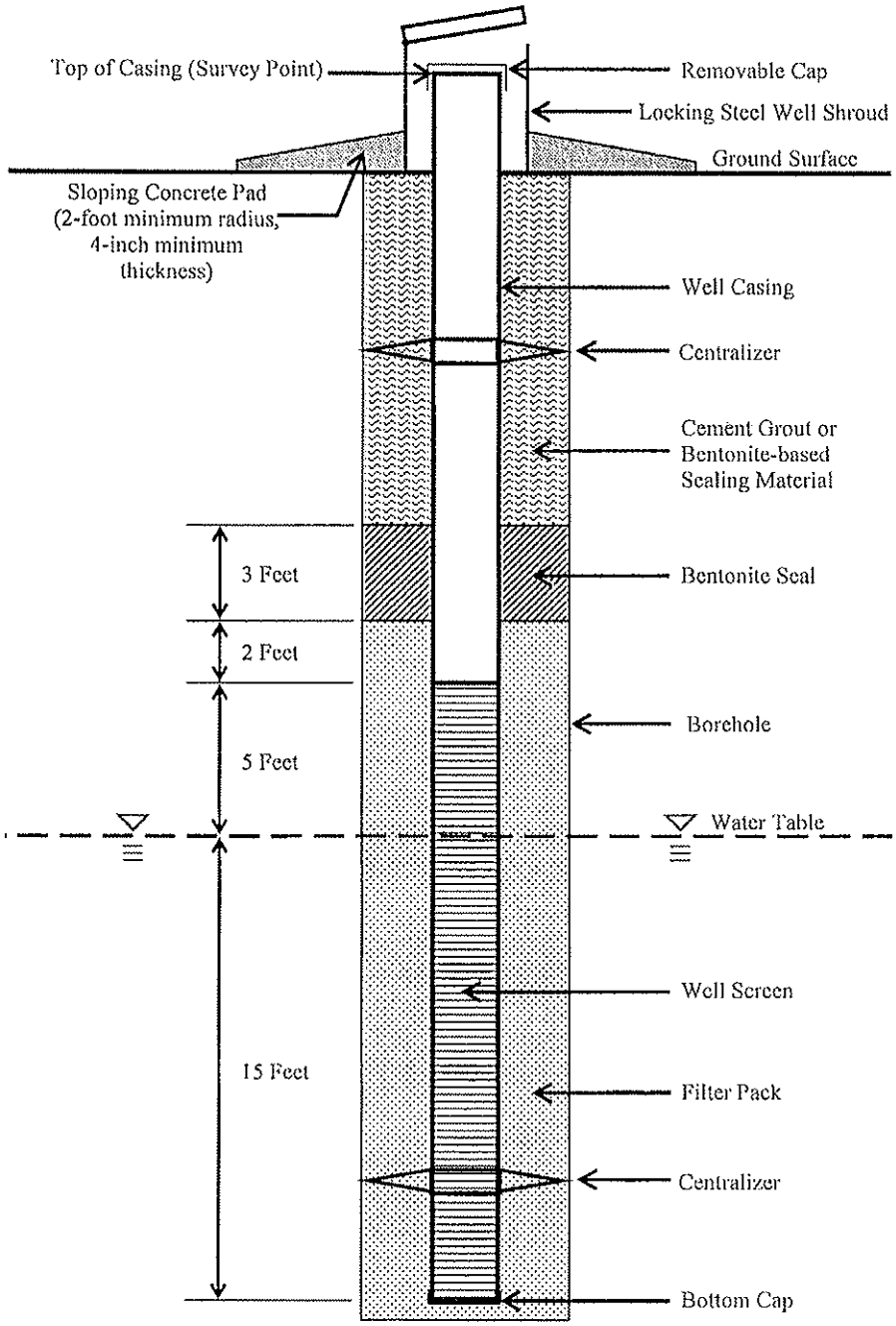
Abandonment:

12. Approval for abandonment of monitoring wells used for ground water monitoring in accordance with Discharge Permit requirements shall be obtained from NMED prior to abandonment.
13. Well abandonment shall be accomplished by removing the well casing and placing neat cement grout, bentonite-based plugging material, or other sealing material approved by the State Engineer for wells that encounter water pursuant to 19.27.4 NMAC from the bottom of the borehole to the ground surface using a tremmie pipe. If the casing cannot be removed, neat cement grout, bentonite-based plugging material, or other sealing material approved by the State Engineer shall be placed in the well using a tremmie pipe from the bottom of the well to the ground surface.
14. After abandonment, written notification describing the well abandonment shall be submitted to the NMED. Written notification of well abandonment shall consist of a copy of the well plugging record submitted to the State Engineer in accordance with 19.27.4 NMAC, or alternate documentation containing the information to be provided in a well plugging record required by the State Engineer as specified in 19.27.4 NMAC.

Deviation from Monitoring Well Construction and Abandonment Requirements: Requests to construct water table monitoring wells or other types of monitoring wells for ground water monitoring under ground water Discharge Permits in a manner that deviates from these requirements shall be submitted in writing to the GWQB. Each request shall state the rationale for the proposed deviation from these requirements and provide detailed evidence supporting the request. The GWQB will approve or deny requests to deviate from these requirements in writing.

MONITORING WELL SCHEMATIC

(Not to Scale)



Ground Water Discharge Permit Conditions for Synthetically Lined Lagoons – Liner Material and Site Preparation

These Conditions represent minimum liner material and site preparation requirements for wastewater treatment, storage and evaporation lagoons. These requirements do not apply to lagoons storing hazardous wastes or high strength waste. The Ground Water Quality Bureau may impose additional requirements (e.g., double-lined lagoons with leak detection) for facilities discharging hazardous or high strength waste to lagoons through the development of specific Discharge Permit conditions for such facilities.

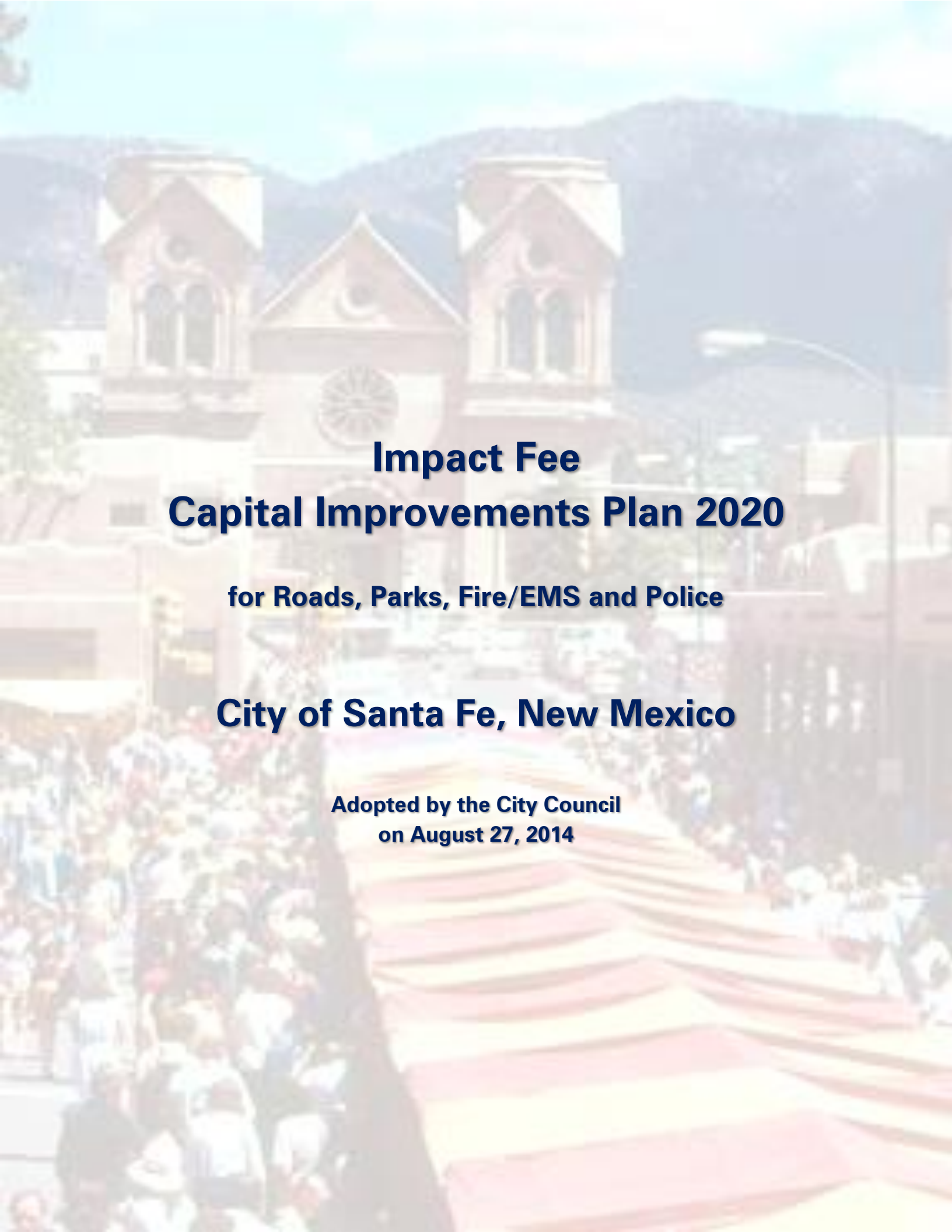
Liner Material Requirements:

1. The liner shall be chemically compatible with any material that will contact the liner.
2. The liner material shall be resistant to deterioration by sunlight if any portion of the liner will be exposed.
3. Synthetic liner material shall be of sufficient thickness to have adequate tensile strength and tear and puncture resistance. Under no circumstances shall a synthetic liner material less than 40 mils in thickness be accepted. Any liner material shall be certified by a licensed New Mexico professional engineer and approved by the New Mexico Environment Department (NMED) prior to its installation.

Lagoon Design and Site Preparation Requirements:

1. The system shall be certified by a licensed New Mexico professional engineer and approved by NMED prior to installation.
2. Inside slopes shall be a maximum of 3 (horizontal): 1 (vertical), and a minimum of 4 (horizontal); 1 (vertical).
3. Lagoon volume shall be designed to allow for a minimum of 24 inches of freeboard.
4. The liner shall be installed with sufficient liner material to accommodate shrinkage due to temperature changes. Folds in the liner are not acceptable.
5. To a depth of at least six inches below the liner, the sub-grade shall be free of sharp rocks, vegetation and stubble. In addition, liners shall be placed on a sub-grade of sand or fine soil. The surface in contact with the liner shall be smooth to allow for good contact between liner and sub-grade. The surface shall be dry during liner installation.
6. Sub-grade shall be compacted to a minimum of 90% of standard proctor density.
7. The minimum dike width shall be eight feet to allow vehicle traffic for maintenance.
8. The base of the pond shall be as uniform as possible and shall not vary more than three inches from the average finished elevation.
9. Synthetic liners shall be anchored in an anchor trench in the top of the berm. The trench shall be a minimum of 12 inches wide, 12 inches deep and shall be set back at least 24 inches from the inside edge of the berm.
10. If the lagoon is installed over areas of decomposing organic materials or shallow ground water, a liner vent system shall be installed.
11. Any opening in the liner through which a pipe or other fixture protrudes shall be properly sealed. Liner penetrations shall be detailed in the construction plans and record drawings.
12. A synthetic liner shall not be installed in temperatures below freezing.
13. The liner shall be installed or supervised by an individual that has the necessary training and experience as required by the liner manufacturer.
14. All manufacturer's installation and field seaming guidelines shall be followed.
15. All synthetic liner seams shall be field tested by the installer and verification of the adequacy of the seams shall be submitted to NMED along with the record drawings.
16. Concrete slabs installed on top of the synthetic liner for operational purposes shall be completed in accordance with manufacturer and installer recommendations to ensure liner integrity.

Appendix D. City Land Use Population Data



Impact Fee
Capital Improvements Plan 2020

for Roads, Parks, Fire/EMS and Police

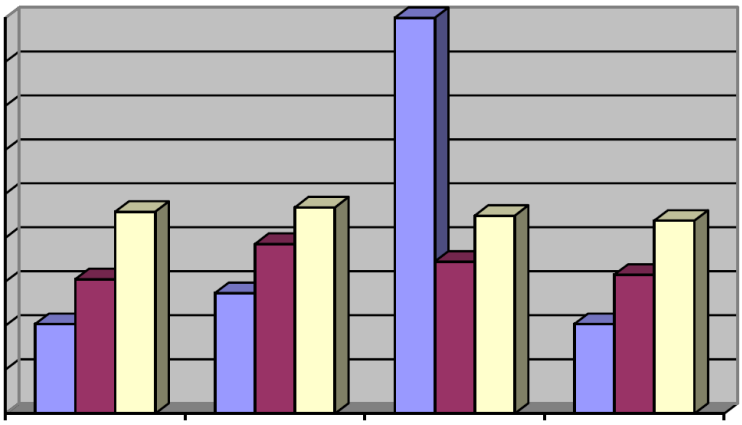
City of Santa Fe, New Mexico

Adopted by the City Council
on August 27, 2014

APPENDIX F: LAND USE ASSUMPTIONS

Santa Fe Urban Area

Impact Fee Land Use Assumptions
2014–2020



City of Santa Fe
Housing & Community Development Department
Long Range Planning Division

August, 2013

INTRODUCTION

This report provides land use assumptions (growth projections) for the Santa Fe Urban Area, a unified service area, within which the city is planning to annex land and therefore expend impact fee monies for eligible capital improvement projects (see map). The New Mexico *Development Fees Act (§§ 5-8-1 through 5-8-43, NMSA 1978),* specifies that land use assumptions must be adopted for a period of at least five years. These land use assumptions cover a period of seven years from the beginning of 2014 through the end of 2020.

The projections assume that urban area growth through 2020 will generally reflect slower growth than occurred during the last decade (2000-2010), due to the slow recovery from the depth of the Great Recession and slower population growth.

Residential and Non-Residential Development, 2014–2020

The following table summarizes anticipated growth from the beginning of 2014 through 2020.

Table 1. Residential & Non-Residential Development, 2014–2020

Housing Units

	2014	Added	2020	(Annual Avg.)
City/Urban Area Total	**44,400**	**2,100**	**46,500**	**300**

Population

	2014	Added	2020	(Annual Avg.)
City/Urban Area Total	**86,500**	**3,500**	**90,000**	**500**

Housing Units, By Type

	2014	Added	2020	(Annual Avg.)
Single-Family (Detached; Attached)	29,500	1,750	31,250	250
Multi-Family	9,700	350	10,050	50
Mobile Homes	5,200	0	5,200	0
City/Urban Area Total	**44,400**	**2,100**	**46,500**	**300**

Commercial Development (square feet of gross floor area)

Land Use Category	2014	Added	2020	(Annual Avg.)
Retail	10,198,000	700,000	10,898,000	100,000
Office	8,972,000	350,000	9,322,000	50,000
Industrial	4,360,000	105,000	4,465,000	15,000
Institutional	2,960,000	70,000	3,030,000	10,000
Commercial Total	**26,490,000**	**1,225,000**	**27,715,000**	**175,000**

Source: *Santa Fe Trends, 2013*; city and county building permit data through July, 2013.

1.

Housing & Population Assumptions

Housing in the city/urban area will continue to grow slowly based on continued lower demand for new housing both from within the community and from those moving here from other places. Larger master-planned developments in the city will continue to account for much of the new housing. Projections of population growth are based on assumptions about the average number of new housing units built each year and the number of occupants in each new unit. The overall average number of occupants in each new housing unit is projected to be 1.67.

Commercial Assumptions

Commercial construction, which for these purposes includes all non-residential construction, is projected to continue at a modest, but healthy, annual average of 175,000 square feet. This represents the annual average of new commercial development from 2006-2012. Though much of this period includes the Great Recession, it is anticipated that an oversupply of commercial floor area leading up to the recession and the increase of computer-based retail sales will keep the annual levels of construction of commercial space moderate through the rest of the decade.

Historical Housing and Population Growth, 2000-2010

From 2000–2010, city population growth represented nearly all of the urban area growth, a dramatic change from the 1990s when the city accounted for less than half of the total urban area population growth. Meanwhile, city housing growth represented 97% of total urban area housing growth from 2000–2010 (compared to only 73% during the 1990s). When comparing the 2000 and 2010 Census, the city and urban area experienced the following population and housing growth:

Note: In the future, comparisons between the "city" and "urban area" may be unnecessary as the city annexes most of the urban area. The Agua Fria Traditional Historic Community (2,800 residents and 1,134 housing units; 2010 Census) located within the urban area is expected to remain part of county jurisdiction.

Table 2. Population & Housing Growth, 2000-2010

	Total Population 2000	Total Population 2010	2000-2010 Growth	Annual Average	Urban Area Growth
City of Santa Fe	62,203	67,947	+5,744	574	99%
Outside the City	16,897	16,930	+ 33	3	1%
Urban Area Total	79,100	84,877	+5,777	577	100%

	Total Housing Units 2000	Total Housing Units 2010	2000-2010 Growth	Annual Average	Urban Area Growth
City of Santa Fe	30,533	37,200	+6,667	667	97%
Outside the City	6,046	6,205	+ 159	16	3%
Urban Area Total	36,579	43,405	+6,826	683	100%

	Persons per Housing Unit 2000	Persons per Housing Unit 2010
City of Santa Fe	2.04	1.82
Outside the City	2.79	2.73
Urban Area Total	2.16	1.95

(not Persons-per-Household)

Source: U.S. Census

Attachment ‘E’
Historical Influent Flow Data

Appendix E. Wastewater Sewer Collection Flow Monitoring Study

Technical Memo

Date:	Monday, June 20, 2016
Project:	City of Santa Fe – Paseo Real WWTP Master Plan
To:	Kathleen Garcia, PE Shannon Jones Luis Orozco
From:	Chris Rodriguez, PE Gabriel Alvarado, PE
Subject:	Sanitary Sewer Collection System Flow Monitoring Summary

Introduction and Background

In conjunction with the development of the Master Plan for the Paseo Real WWTP facility, the City requested that HDR also complete a flow monitoring study to provide supplemental data for the City's Wastewater Management Division staff for their use in completing a Master Plan for the Sanitary Sewer Collection System.

The flow monitoring data was collected to obtain flow data for dry and wet weather conditions as needed to determine:

- Flow rates and diurnal patterns throughout the City.
- Actual flows for the 11 major sewer basins established by the City's Wastewater Management Division staff and strategically selected trunk sewer lines.
- Average flow rates for the various types of land use within the City including residential (single and multi-family), hotel/motel, commercial, and industrial.

Flow Monitor Locations and Installation Schedule

City staff identified the manholes for flow monitoring and provided HDR with the desired locations for installing the flow monitoring equipment. HDR subcontracted with Utility Systems, Science and Software (US Cubed) to complete the installation of 14 flow monitors placed throughout the sewer collection system. US Cubed also provided real-time monitoring of the flow monitors via an internet interface.

No rain gauges were installed in conjunction with the flow monitors. Instead, rainfall data was obtained from existing NOAA rain gauges. Figure 1 shows the location of the flow monitors and rain gauges.

The flow monitors were installed on August 7, 2015 and were removed on November 23, 2015 for a monitoring period of approximately 3 months. It is important to note, the City's sewer collection system includes 4 splitter boxes that can be used to divert and route flows through various sewer interceptors. During the completion of flow monitoring, the City made adjustments at the splitter boxes and re-routed flows. As a result of the adjustments to the splitter boxes there were 4 distinct flow scenarios that were captured during the flow monitoring period. Information provided by the City regarding the 4

different flow scenarios is included in Attachment 1. Based on information provided by the City, the corresponding dates for the 4 flow scenarios were as follows:

- Scenario 1 – August 8, 2015 to September 9, 2015
- Scenario 2 – September 10, 2015 to October 9, 2015
- Scenario 3 – October 10, 2015 to November 19, 2015
- Scenario 4 – November 20, 2015 to November 23, 2015

Flow Monitoring Data and Analysis

Following the completion of the flow monitoring period, HDR compared the flow monitoring data with the flow data for the WWTP influent flow meter. The flow monitoring data was then used to determine wastewater flow rates and diurnal patterns throughout the City including the average dry weather flow (ADWF), peak dry weather flow (PDWF), peak wet weather flow (PWWF) and peaking factors (PF) for the system as discussed in the sections below.

Comparison of WWTP Influent Flow Meter Data vs. Flow Monitoring Data

First a comparison was made between the data from the influent flow meter at the WWTP vs. the flow monitors in the collection system. A table showing a comparison of the data is included in Attachment 2. The comparison of the data identified some inconsistencies which are discussed in the following paragraphs.

The average flow for the WWTP was 5.42 MGD for the Year 2015 based on data provided by the City. The average flow recorded by the influent flow meter at the WWTP was 5.30 MGD based on the corresponding period for the flow monitoring study (August 8, 2015 through November 23, 2015).

The total flow conveyed to the WWTP from the flow monitoring data requires adding the flows from two of the flow monitoring manholes: MH TC656 and MH AA49. The data recorded by the flow monitors indicates the average flow being conveyed to the WWTP is 4.80 MGD for the same period.

Table 1 provides an additional comparison of the two data sources based on the four distinct flow scenarios that resulted from making adjustments to the splitter boxes.

Table 1: Comparison of Flow Monitors vs. WWTP Influent Flow Meter

Monitoring Period	Average Flow (MGD)	
	WWTP Influent FM	Flow Monitors
Flow Scenario 1	5.46	4.57
Flow Scenario 2	5.29	5.45
Flow Scenario 3	5.19	4.60
Flow Scenario 4	5.12	4.56

A review of the table in Attachment 2 shows the flow monitors and WWTP influent flow meter most closely matches during Flow Scenario 2. During this period, the flow monitors recorded an average dry weather flow of 5.45 MGD being conveyed to the WWTP, which compares well to the 2015 average flow of 5.42 MGD calculated from the WWTP influent flow meter data and the average flow of 5.30 MGD recorded by the WWTP influent flow meter for the period that coincides with the flow monitoring study.

A comparison of the daily measurements for both data sources shows the flow recorded by the flow monitors is less than that recorded by the WWTP influent flow meter during Flow Scenarios 1, 3, and 4. The difference between the two is typically greater than 10 percent and in many cases is at least 15 percent or 20 percent. Conversely, during Flow Scenario 2, for most days the flow recorded by the flow monitors is within 5 percent or 10 percent of the flow recorded by the WWTP influent flow meter.

The placement of the flow monitors within MH TC656 and MH AA49 was selected as these MHs were presumed to be far enough downstream in the system to capture all incoming wastewater flows to the WWTP. However, from the noted discrepancies it appears that the adjustments made at the splitter boxes may have resulted in some of the flow circumventing the flow monitors. Further analysis will be required to confirm this and resolve the discrepancies.

Sanitary Sewer Collection System Diurnal Pattern and Peaking Factors

The flow monitoring data was reviewed to develop the diurnal pattern (i.e. hourly variation in flow over the course of a day) and determine the typical ADWF, PDWF, PWWF, and the associated peaking factors for the City's sanitary sewer collection system.

Figure 2 provides an illustration of the diurnal flow pattern for the system based on the combined flows observed at MH TC656 and MH AA49.

As shown in Figure 22, the diurnal pattern for the City's system is typical of most municipal wastewater systems. Low flows are observed in the early morning hours between 2 AM and 7 AM and flows peak at approximately 11 AM and also in the evening hours at approximately 9 PM.

As previously discussed, the flow monitoring data for Flow Scenario 2 had the best correlation with influent flow meter at the WWTP. As such, only the data for this period was used in determining the ADWF and PDWF. Based on the data, the ADWF was determined to be 5.45 MGD and the PDWF was determined to be 8.51 MGD. From these values, a peaking factor of 1.56 was calculated.

To determine the PWWF, it was first necessary to review the rain gauge data to identify wet weather events that occurred during the flow monitoring period. The rainfall data recorded by the rain gauges is included in Attachment 3. The rain gauge data shows that a total of 40 rain events were recorded during the flow monitoring period with the total recorded rainfall varying between a minimum of 0.01 inches on several days and a maximum of 1.71 inches that occurred on October 21, 2015.

Reviewing the flow monitoring data in conjunction with the rain gauge data shows a noticeable increase in the overall flow was observed with the October 21, 2015 rain event. As shown in Figure 2, the flow in the system increased to 11.26 MGD at approximately 6 PM as a result of this rain event.

For other days when rainfall occurred, a review of the flow monitoring data does not show any discernible flow response to the other rain events. Since the increase in the total flow was a direct result of a rain event, the peak flow of 11.26 MGD was selected as the PWWF for the system. Based on comparison of the ADWF to the PWWF, a PF of 2.07 was calculated.

Actual Wastewater Flow Rates for Various Land Use Types

As stated above, one of the goals for the flow monitoring study was to obtain data for use in determining typical average flow rates for the various types of land use within the City, (i.e. residential, hotel/motel, commercial, industrial, etc.). A review of the data determined this could not be completed.

Developing flow estimates for each land use type would require installing a flow monitor in an area of homogenous land use. This was not possible due to the manner in which the zoning categories are distributed throughout the City. There are few areas of the City where only one particular type of zoning exists. In most areas of the City, the wastewater is generated from a combination of all land use types.

More accurate estimates of the wastewater generation rates for the City's commercial and industrial customers could be developed through completing a comprehensive evaluation of the water billing records for individual customers. However, that is beyond the scope of work for this project.

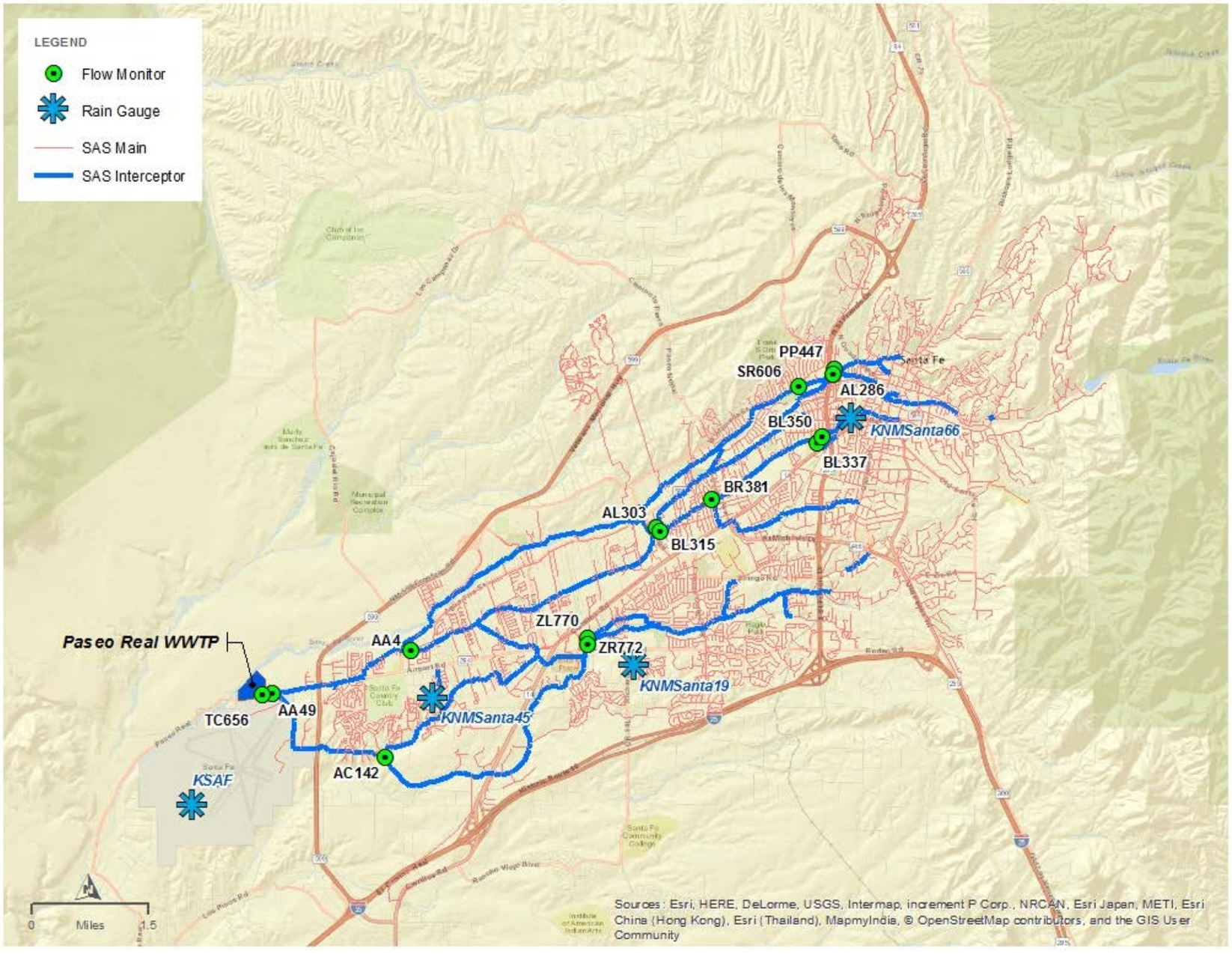


Figure 1: Location of Flow Monitors and Rain Gauges

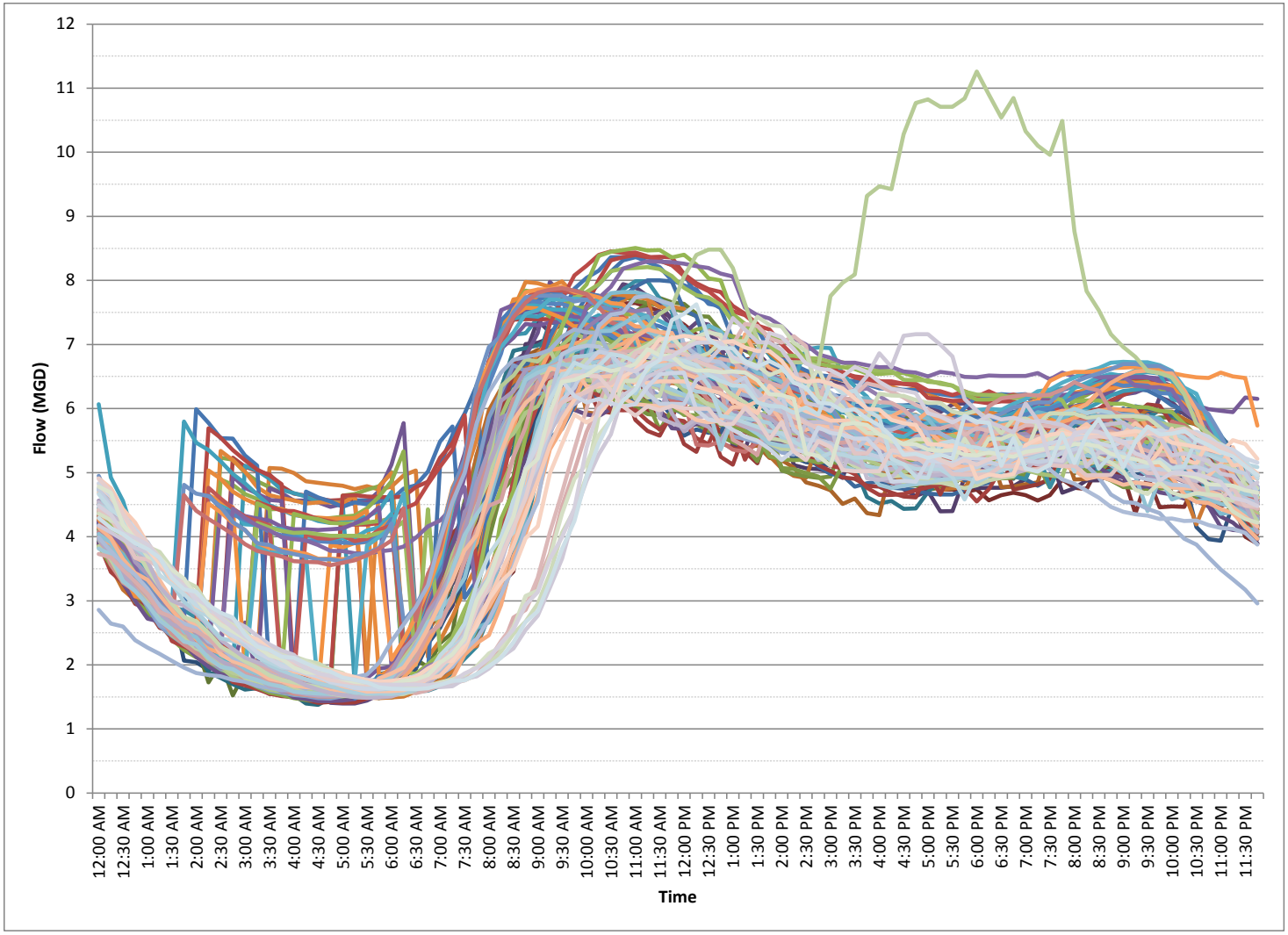


Figure 2: Diurnal Flow Pattern for City of Santa Fe Sanitary Sewer Collection System

	Precipitation (in)					
Date	KSAF	KNMSanta45	KNMSanta19	KNMSanta66	Max Precipitation	Location
8/1/2015	0	0	0	0.17	0.17	KNMSanta66
8/2/2015	0	0.13	0.09	0.11	0.13	KNMSanta45
8/3/2015	0.03	0.03	0.03	0.15	0.15	KNMSanta66
8/4/2015	0	0	0	0	0	KSAF
8/5/2015	0	0	0	0	0	KSAF
8/6/2015	0	0	0	0	0	KSAF
8/7/2015	0.04	0.13	0.04	0.06	0.13	KNMSanta45
8/8/2015	0	0	0.01	0	0.01	KNMSanta19
8/9/2015	0	0	0	0	0	KSAF
8/10/2015	0.03	0.04	0.06	0.13	0.13	KNMSanta66
8/11/2015	0	0	0	0.01	0.01	KNMSanta66
8/12/2015	0	0	0	0	0	KSAF
8/13/2015	0	0	0	0	0	KSAF
8/14/2015	0	0	0	0.06	0.06	KNMSanta66
8/15/2015	0	0	0	0	0	KSAF
8/16/2015	0.01	0	0	0	0.01	KSAF
8/17/2015	0.01	0	0	0	0.01	KSAF
8/18/2015	0	0	0	0	0	KSAF
8/19/2015	0	0	0	0	0	KSAF
8/20/2015	0	0	0	0	0	KSAF
8/21/2015	0.06	0.01	0	0	0.06	KSAF
8/22/2015	0	0	0	0	0	KSAF
8/23/2015	0	0	0	0	0	KSAF
8/24/2015	0.04	0.03	0	0	0.04	KSAF
8/25/2015	0	0	0	0	0	KSAF
8/26/2015	0.08	0.07	0.08	0.09	0.09	KNMSanta66
8/27/2015	0	0	0	0.11	0.11	KNMSanta66
8/28/2015	0	0	0	0	0	KSAF
8/29/2015	0.25	0.08	0.03	0.1	0.25	KSAF
8/30/2015	0.02	0	0	0	0.02	KSAF
8/31/2015	0	0	0	0	0	KSAF
9/1/2015	0	0	0	0	0	KSAF
9/2/2015	0	0	0	0	0	KSAF
9/3/2015	0	0	0	0	0	KSAF
9/4/2015	0.07	0.09	0.06	0.08	0.09	KNMSanta45
9/5/2015	0.01	0.02	0.02	0.03	0.03	KNMSanta66
9/6/2015	0	0	0	0	0	KSAF
9/7/2015	0.01	0	0.03	0.02	0.03	KNMSanta19
9/8/2015	0.01	0.01	0	0	0.01	KSAF
9/9/2015	0	0	0	0.18	0.18	KNMSanta66
9/10/2015	0	0	0	0	0	KSAF
9/11/2015	0	0	0	0	0	KSAF
9/12/2015	0	0	0	0	0	KSAF
9/13/2015	0	0	0	0	0	KSAF
9/14/2015	0	0	0	0	0	KSAF
9/15/2015	0	0	0	0	0	KSAF
9/16/2015	0	0	0	0	0	KSAF
9/17/2015	0	0	0	0	0	KSAF
9/18/2015	0	0	0	0	0	KSAF
9/19/2015	0	0	0	0	0	KSAF
9/20/2015	0	0	0	0	0	KSAF
9/21/2015	0	0	0	0	0	KSAF
9/22/2015	0.31	0.34	0.39	0.48	0.48	KNMSanta66
9/23/2015	0.1	0.05	0.24	0.17	0.24	KNMSanta19
9/24/2015	0	0	0	0	0	KSAF
9/25/2015	0	0	0	0	0	KSAF
9/26/2015	0	0	0	0	0	KSAF
9/27/2015	0	0	0	0	0	KSAF
9/28/2015	0	0	0	0	0	KSAF
9/29/2015	0	0	0	0	0	KSAF
9/30/2015	0	0	0	0	0	KSAF
10/1/2015	0	0	0	0	0	KSAF
10/2/2015	0.01	0	0	0	0.01	KSAF
10/3/2015	0.09	0.05	0.06	-	0.09	KSAF
10/4/2015	0	0.01	0	-	0.01	KNMSanta45
10/5/2015	0.07	0.05	0	0	0.07	KSAF

	Precipitation (in)					
Date	KSAF	KNMSanta45	KNMSanta19	KNMSanta66	Max Precipitation	Location
10/6/2015	0	0.03	0.21	0.5	0.5	KNMSanta66
10/7/2015	0	0	0	0	0	KSAF
10/8/2015	0	0	0	0	0	KSAF
10/9/2015	0	0	0	0	0	KSAF
10/10/2015	0	0	0	0	0	KSAF
10/11/2015	0	0	0	0	0	KSAF
10/12/2015	0	0	0	0	0	KSAF
10/13/2015	0	0	0	0	0	KSAF
10/14/2015	0	0	0	0	0	KSAF
10/15/2015	0	0	0	0	0	KSAF
10/16/2015	0	0	0	0	0	KSAF
10/17/2015	0	0	0	0	0	KSAF
10/18/2015	0.1	0.19	0.22	0.24	0.24	KNMSanta66
10/19/2015	0	0	0	0.01	0.01	KNMSanta66
10/20/2015	0.1	0.09	0.28	0.05	0.28	KNMSanta19
10/21/2015	1.55	1.71	1.38	1.4	1.71	KNMSanta45
10/22/2015	0	0.01	0.01	0.01	0.01	KNMSanta45
10/23/2015	0.03	0.13	0.04	0.01	0.13	KNMSanta45
10/24/2015	0	0.01	0	0	0.01	KNMSanta45
10/25/2015	0	0	0	0	0	KSAF
10/26/2015	0	0	0	0	0	KSAF
10/27/2015	0	0	0	0	0	KSAF
10/28/2015	0	0	0	0	0	KSAF
10/29/2015	0.21	0.14	0.17	0.22	0.22	KNMSanta66
10/30/2015	0.46	0.2	0.13	0.11	0.46	KSAF
10/31/2015	0	0.01	0	0	0.01	KNMSanta45
11/1/2015	0	0	0	0	0	KSAF
11/2/2015	0	0	0	0	0	KSAF
11/3/2015	0	0	0	0	0	KSAF
11/4/2015	0.07	0.13	0.1	0.11	0.13	KNMSanta45
11/5/2015	0.1	0.1	0.06	0.04	0.1	KSAF
11/6/2015	0	0	0	0	0	KSAF
11/7/2015	0	0	0	0	0	KSAF
11/8/2015	0	0	0	0	0	KSAF
11/9/2015	0	0	0	0	0	KSAF
11/10/2015	0	0	0	0	0	KSAF
11/11/2015	0	0	0	0	0	KSAF
11/12/2015	0	0	0	0	0	KSAF
11/13/2015	0	0	0	0	0	KSAF
11/14/2015	0	0	0	0	0	KSAF
11/15/2015	0.24	0.32	0.3	0.37	0.37	KNMSanta66
11/16/2015	0.43	0.4	0.29	0.35	0.43	KSAF
11/17/2015	0	0.04	0.11	0.16	0.16	KNMSanta66
11/18/2015	0	0	0	0.01	0.01	KNMSanta66
11/19/2015	0	0	0	0	0	KSAF
11/20/2015	0	0	0	0	0	KSAF
11/21/2015	0	0	0	0	0	KSAF
11/22/2015	0	0	0	0	0	KSAF
11/23/2015	0	0	0	0	0	KSAF
11/24/2015	0	0	0	0	0	KSAF
11/25/2015	0	0	0	0	0	KSAF
11/26/2015	0	0	0	0	0	KSAF
11/27/2015	0	0	0	0	0	KSAF
11/28/2015	0	0	0	0	0	KSAF
11/29/2015	0.02	0	0	0	0.02	KSAF
11/30/2015	0	0	0	0	0	KSAF

	Date	FM TC656 (gallons)	FM AA49 (gallons)	TC656 + AA49 (gallons)	TC656 + AA49 (MGD)	WWTP Influent Meter (MGD)	Difference (MGD)	Difference (%)
Scenario 3	10/9/2015	1,331,615	3,312,441	4,644,056	4.64	5.16	0.52	10.1%
	10/10/2015	1,389,918	3,308,065	4,697,983	4.70	5.28	0.58	11.0%
	10/11/2015	1,370,259	3,281,674	4,651,933	4.65	5.42	0.77	14.1%
	10/12/2015	1,485,519	3,267,805	4,753,324	4.75	5.44	0.69	12.7%
	10/13/2015	1,314,380	3,250,435	4,564,815	4.56	5.38	0.81	15.1%
	10/14/2015	1,307,782	3,226,198	4,533,980	4.53	5.54	1.00	18.1%
	10/15/2015	1,338,617	3,217,110	4,555,726	4.56	5.05	0.50	9.8%
	10/16/2015	1,399,209	3,198,461	4,597,669	4.60	5.07	0.48	9.4%
	10/17/2015	1,404,393	3,203,375	4,607,768	4.61	5.42	0.81	15.0%
	10/18/2015	1,371,134	3,285,511	4,656,646	4.66	5.35	0.70	13.0%
	10/19/2015	1,353,967	3,218,389	4,572,355	4.57	5.23	0.65	12.5%
	10/20/2015	1,430,851	3,245,857	4,676,709	4.68	5.34	0.66	12.4%
	10/21/2015	2,064,309	3,993,498	6,057,807	6.06	6.23	0.17	2.8%
	10/22/2015	1,364,065	3,288,070	4,652,135	4.65	5.33	0.68	12.7%
	10/23/2015	1,377,867	3,258,582	4,636,448	4.64	5.40	0.76	14.1%
	10/24/2015	1,307,714	3,205,328	4,513,042	4.51	5.17	0.66	12.7%
	10/25/2015	1,273,379	3,204,251	4,477,630	4.48	5.33	0.85	15.9%
	10/26/2015	1,366,085	3,176,109	4,542,194	4.54	5.15	0.61	11.8%
	10/27/2015	1,342,925	3,122,990	4,465,915	4.47	5.00	0.53	10.6%
	10/28/2015	1,349,860	3,130,328	4,480,188	4.48	4.86	0.38	7.8%
	10/29/2015	1,355,380	3,145,543	4,500,924	4.50	4.91	0.41	8.4%
	10/30/2015	1,358,477	3,178,465	4,536,943	4.54	5.26	0.73	13.8%
	10/31/2015	1,333,365	3,114,507	4,447,872	4.45	4.65	0.20	4.4%
	11/1/2015	1,334,308	3,101,378	4,435,686	4.44	5.37	0.93	17.3%
	11/2/2015	1,378,877	3,035,400	4,414,277	4.41	4.93	0.51	10.4%
	11/3/2015	1,358,679	3,040,180	4,398,860	4.40	5.02	0.62	12.4%
	11/4/2015	1,376,924	3,109,794	4,486,718	4.49	5.07	0.58	11.5%
	11/5/2015	1,353,495	3,177,927	4,531,422	4.53	4.79	0.26	5.4%
	11/6/2015	1,396,987	3,178,263	4,575,250	4.58	5.36	0.79	14.7%
	11/7/2015	1,410,452	3,222,226	4,632,678	4.63	4.77	0.14	2.8%
	11/8/2015	1,418,127	3,236,836	4,654,963	4.65	5.31	0.66	12.4%
	11/9/2015	1,344,339	3,186,679	4,531,018	4.53	5.01	0.48	9.6%
	11/10/2015	1,389,716	3,139,686	4,529,402	4.53	5.01	0.48	9.5%
	11/11/2015	1,355,448	3,217,648	4,573,096	4.57	5.15	0.58	11.2%
	11/12/2015	1,345,012	3,161,836	4,506,848	4.51	4.89	0.38	7.7%
	11/13/2015	1,357,535	3,143,052	4,500,587	4.50	5.03	0.53	10.5%
	11/14/2015	1,277,014	3,152,411	4,429,425	4.43	5.22	0.79	15.1%
	11/15/2015	1,378,877	3,238,115	4,616,992	4.62	5.13	0.51	9.9%
	11/16/2015	1,342,521	3,332,235	4,674,756	4.67	5.30	0.62	11.8%
	11/17/2015	1,489,020	3,218,658	4,707,678	4.71	5.18	0.47	9.0%
	11/18/2015	1,394,025	3,125,077	4,519,102	4.52	5.09	0.57	11.3%
	11/19/2015	1,350,668	3,154,094	4,504,761	4.50	5.27	0.76	14.5%

	Flow Monitors	WWTP Influent Meter	% Difference
Average	4.60	5.19	11.3%
Min	4.40	4.65	2.8%
Max	6.06	6.23	18.1%

	Date	FM TC656 (gallons)	FM AA49 (gallons)	TC656 + AA49 (gallons)	TC656 + AA49 (MGD)	WWTP Influent Meter (MGD)	Difference (MGD)	Difference (%)
Scenario 4	11/20/2015	1,436,574	3,157,797	4,594,371	4.59	4.95	0.35	7.2%
	11/21/2015	1,404,123	3,186,208	4,590,331	4.59	5.23	0.64	12.2%
	11/22/2015	1,309,128	3,201,019	4,510,147	4.51	5.19	0.68	13.1%

	Flow Monitors	WWTP Influent Meter	% Difference
Average	4.56	5.12	
Min	4.51	4.95	
Max	4.59	5.23	

	Date	FM TC656 (gallons)	FM AA49 (gallons)	TC656 + AA49 (gallons)	TC656 + AA49 (MGD)	WWTP Influent Meter (MGD)	Difference (MGD)	Difference (%)
Scenario 1	8/9/2015	1,120,013	3,181,495	4,301,508	4.30	4.79	0.49	10.2%
	8/10/2015	1,250,287	3,240,404	4,490,691	4.49	5.44	0.95	17.4%
	8/11/2015	1,264,896	3,252,792	4,517,688	4.52	5.46	0.94	17.3%
	8/12/2015	1,310,407	3,243,434	4,553,841	4.55	5.44	0.89	16.3%
	8/13/2015	1,457,512	3,232,998	4,690,510	4.69	5.55	0.86	15.5%
	8/14/2015	1,307,243	3,232,998	4,540,241	4.54	5.76	1.22	21.1%
	8/15/2015	1,422,570	3,226,266	4,648,836	4.65	5.10	0.45	8.8%
	8/16/2015	1,492,117	3,267,132	4,759,249	4.76	5.41	0.65	12.1%
	8/17/2015	1,346,763	3,274,268	4,621,031	4.62	5.48	0.86	15.7%
	8/18/2015	1,349,658	3,276,288	4,625,946	4.63	5.34	0.71	13.3%
	8/19/2015	1,131,526	3,285,444	4,416,970	4.42	5.68	1.26	22.2%
	8/20/2015	1,389,649	3,303,622	4,693,270	4.69	5.36	0.67	12.5%
	8/21/2015	1,382,916	3,258,245	4,641,161	4.64	5.40	0.76	14.0%
	8/22/2015	1,428,024	3,330,552	4,758,575	4.76	5.59	0.83	14.8%
	8/23/2015	1,467,880	3,328,667	4,796,546	4.80	5.61	0.81	14.4%
	8/24/2015	1,459,262	3,275,682	4,734,944	4.73	5.58	0.84	15.1%
	8/25/2015	1,407,202	3,205,462	4,612,664	4.61	5.22	0.61	11.7%
	8/26/2015	1,378,809	3,238,048	4,616,857	4.62	5.47	0.85	15.6%
	8/27/2015	1,397,189	3,249,291	4,646,480	4.65	5.41	0.76	14.1%
	8/28/2015	1,247,930	3,164,260	4,412,190	4.41	5.97	1.55	26.1%
	8/29/2015	1,377,059	3,144,870	4,521,929	4.52	5.24	0.72	13.7%
	8/30/2015	1,261,530	3,121,711	4,383,240	4.38	5.19	0.80	15.5%
	8/31/2015	1,400,959	3,092,896	4,493,855	4.49	5.29	0.79	15.0%
	9/1/2015	1,384,599	3,049,740	4,434,340	4.43	5.29	0.86	16.2%
	9/2/2015	1,321,583	3,096,464	4,418,047	4.42	5.55	1.13	20.3%
	9/3/2015	1,337,876	3,084,480	4,422,356	4.42	5.40	0.98	18.1%
	9/4/2015	1,236,754	3,125,413	4,362,168	4.36	5.35	0.99	18.5%
	9/5/2015	1,397,256	3,197,653	4,594,909	4.59	6.75	2.16	32.0%
	9/6/2015	1,358,477	3,093,434	4,451,911	4.45	5.41	0.96	17.7%
	9/7/2015	1,420,012	3,189,035	4,609,047	4.61	5.49	0.88	16.0%
	9/8/2015	1,331,617	3,067,514	4,399,131	4.40	5.27	0.87	16.5%
	9/9/2015	1,269,474	3,177,388	4,446,862	4.45	5.15	0.70	13.6%
	9/10/2015	791,132	4,068,767	4,859,899	4.86	5.89	1.03	17.4%
	9/11/2015	606,124	4,339,547	4,945,671	4.95	5.29	0.34	6.4%

	Flow Monitors	WWTP Influent Meter	% Difference
Average	4.57	5.46	16.0%
Min	4.30	4.79	6.4%
Max	4.95	6.75	32.0%

	Date	FM TC656 (gallons)	FM AA49 (gallons)	TC656 + AA49 (gallons)	TC656 + AA49 (MGD)	WWTP Influent Meter (MGD)	Difference (MGD)	Difference (%)
Scenario 2	9/12/2015	1,047,437	4,305,559	5,352,996	5.35	4.91	-0.44	-9.0%
	9/13/2015	918,511	4,379,403	5,297,913	5.30	5.26	-0.04	-0.7%
	9/14/2015	981,863	4,350,049	5,331,912	5.33	5.43	0.10	1.8%
	9/15/2015	965,638	4,367,419	5,333,057	5.33	5.18	-0.15	-2.9%
	9/16/2015	1,001,724	4,394,887	5,396,611	5.40	5.43	0.03	0.6%
	9/17/2015	927,936	4,435,956	5,363,892	5.36	4.91	-0.45	-9.2%
	9/18/2015	1,020,642	4,477,495	5,498,137	5.50	5.50	0.00	0.0%
	9/19/2015	1,215,614	4,471,099	5,686,713	5.69	5.45	-0.24	-4.4%
	9/20/2015	1,204,304	4,516,947	5,721,251	5.72	5.15	-0.57	-11.0%
	9/21/2015	1,081,773	4,514,523	5,596,296	5.60	5.65	0.06	1.0%
	9/22/2015	749,458	4,519,977	5,269,435	5.27	5.05	-0.22	-4.3%
	9/23/2015	1,134,017	4,544,348	5,678,365	5.68	5.49	-0.19	-3.5%
	9/24/2015	978,699	4,497,490	5,476,189	5.48	5.26	-0.22	-4.1%
	9/25/2015	566,672	4,548,320	5,114,992	5.11	5.40	0.29	5.3%
	9/26/2015	1,103,855	4,546,907	5,650,762	5.65	5.65	-0.01	-0.1%
	9/27/2015	939,449	4,526,642	5,466,090	5.47	5.11	-0.36	-7.0%
	9/28/2015	968,129	4,440,938	5,409,066	5.41	5.21	-0.20	-3.8%
	9/29/2015	999,906	4,449,151	5,449,057	5.45	5.28	-0.17	-3.2%
	9/30/2015	805,001	4,423,299	5,228,300	5.23	5.24	0.01	0.2%
	10/1/2015	964,291	4,430,300	5,394,592	5.39	5.30	-0.10	-1.8%
	10/2/2015	908,008	4,452,517	5,360,525	5.36	5.23	-0.13	-2.5%
	10/3/2015	923,560	4,507,454	5,431,014	5.43	5.17	-0.26	-5.0%
	10/4/2015	1,062,922	4,593,159	5,656,081	5.66	5.36	-0.30	-5.6%
	10/5/2015	809,849	4,611,538	5,421,387	5.42	5.30	-0.12	-2.3%
	10/6/2015	935,005	4,686,673	5,621,678	5.62	5.30	-0.32	-6.1%
	10/7/2015	1,005,090	4,604,537	5,609,627	5.61	5.21	-0.40	-7.6%
	10/8/2015	1,435,766	3,783,647	5,219,413	5.22	5.41	0.19	3.4%

	Flow Monitors	WWTP Influent Meter	% Difference
Average	5.45	5.29	-3.0%
Min	5.11	4.91	-11.0%
Max	5.72	5.65	5.3%

SEWER FLOW SCENARIOS TIMELINES

SCENARIO ONE: AUGUST 9, 2015 TO SEPTEMBER 9, 2015

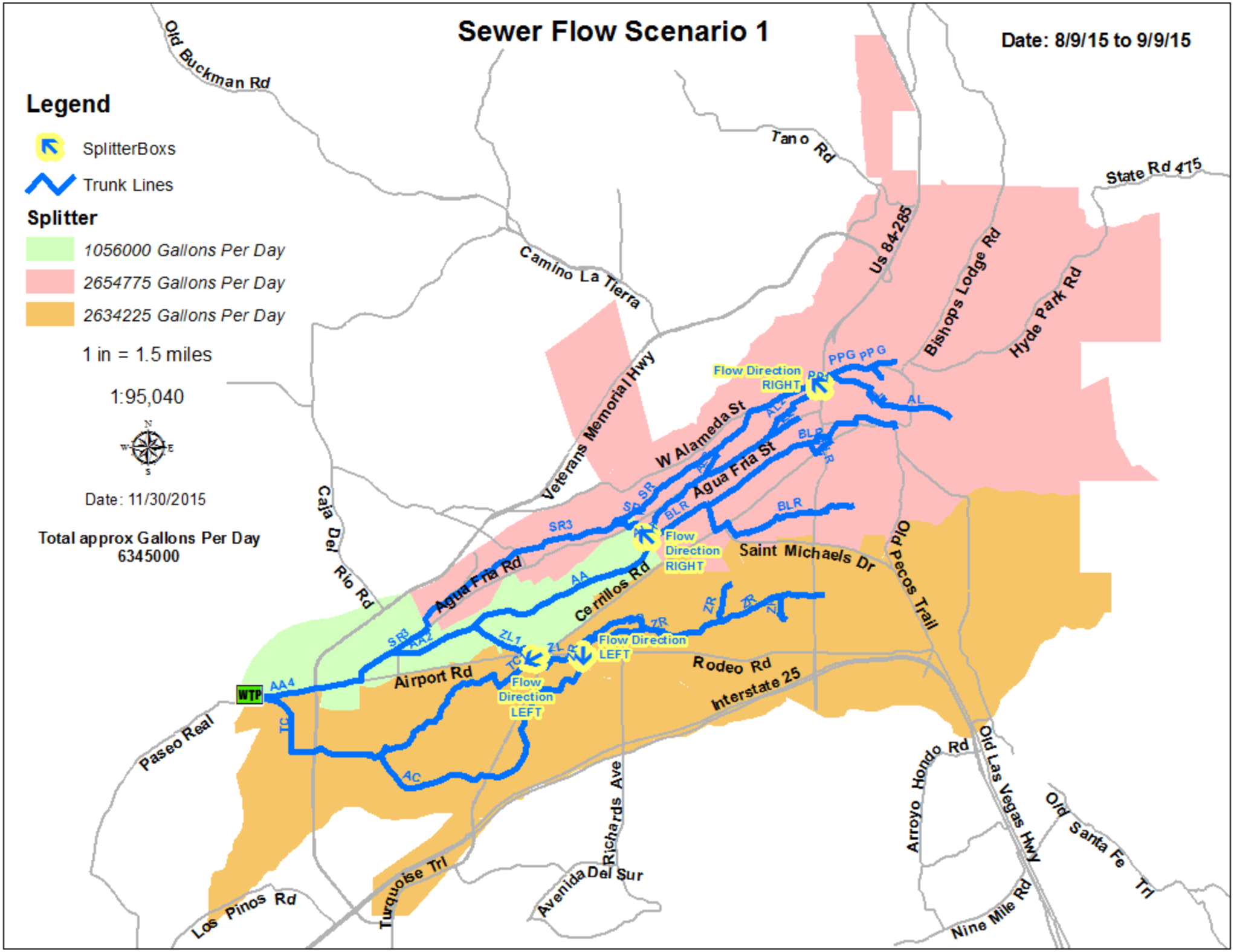
SCENARIO TWO: SEPTEMBER 9, 2015 TO OCTOBER 8 & 9, 2015

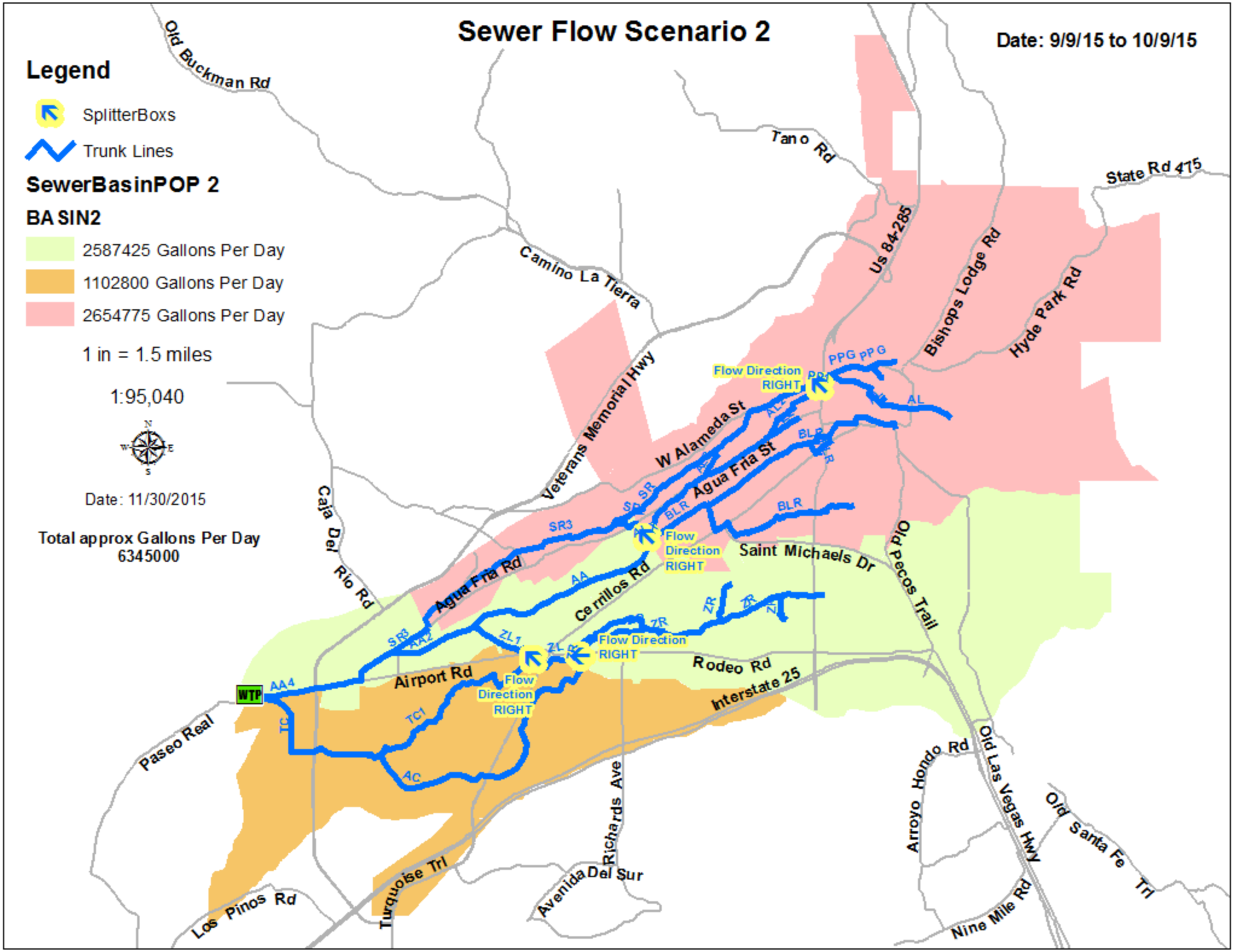
SCENARIO THREE: OCTOBER 9, 2015 to 11-19-15

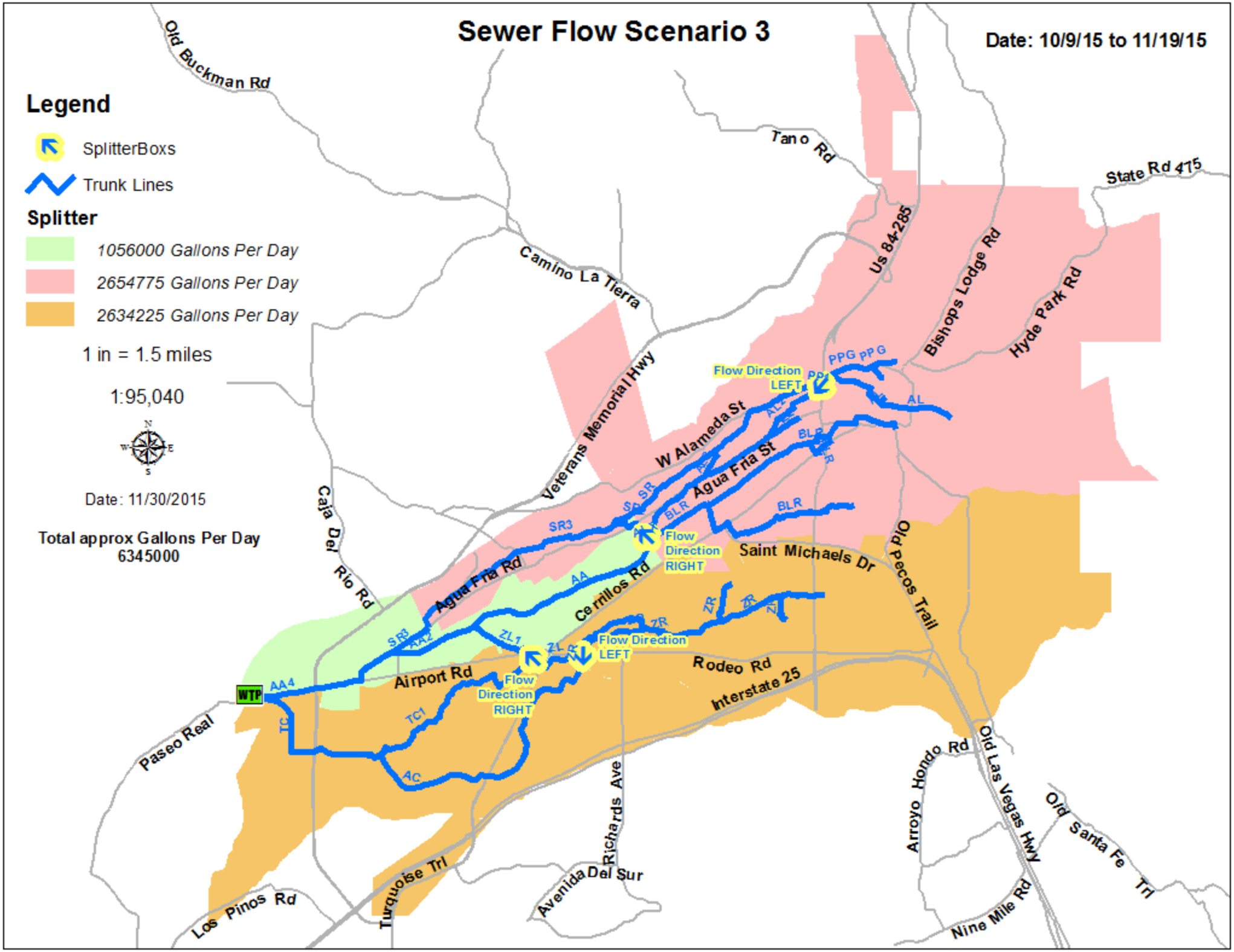
SCENARIO FOUR: On 11-19-2015 the splitter box at Siler was switched to divert all flow to the Rufina Sewer Line. All other flow directions remained the same.

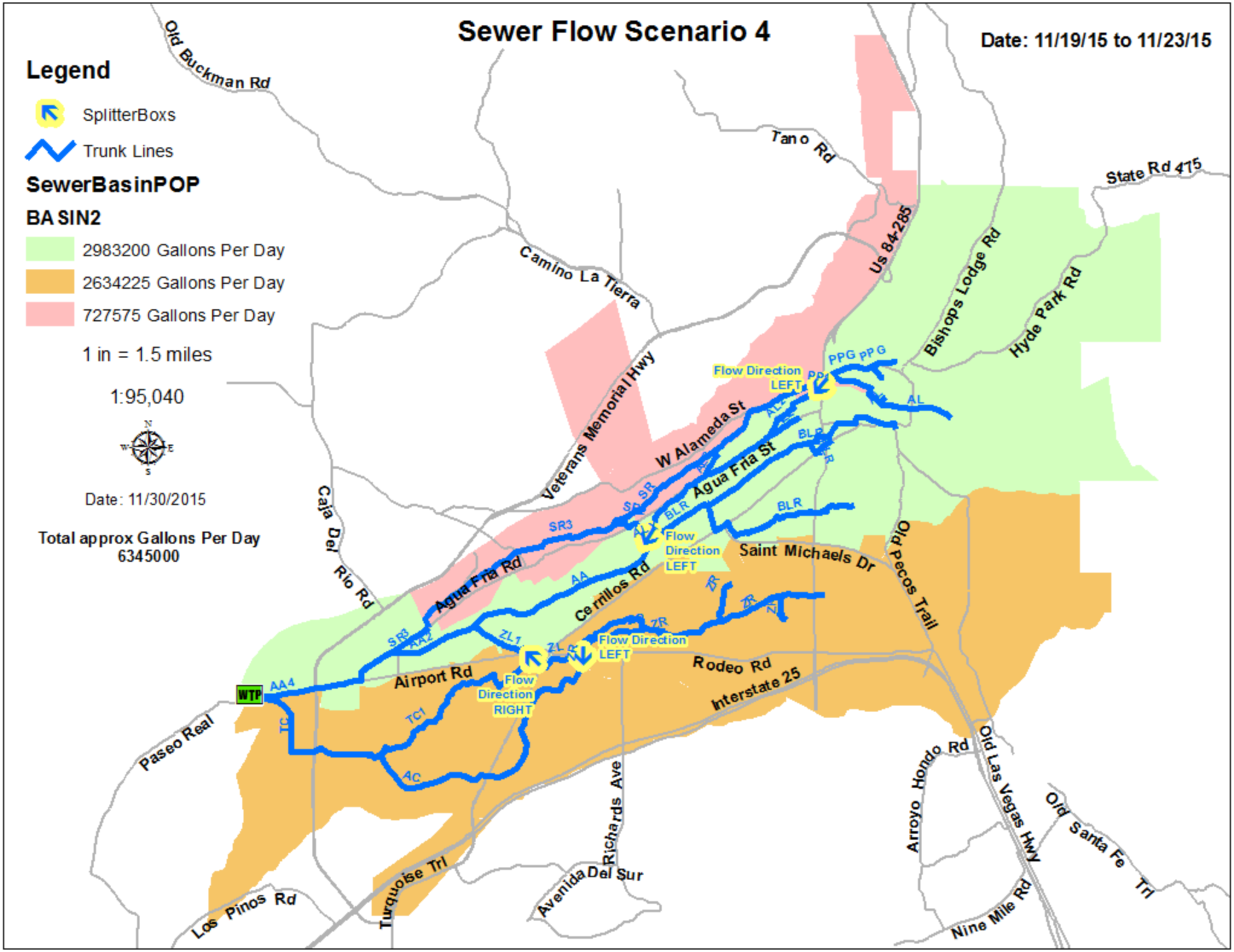
PROJECT MONITORING COMPLETE: On 11-23-15 US3 arrived at 8am to start removing monitors

SEPTEMBER 29TH, 2015 DISCOVERED SITE 8 MONITOR HAD BEEN DAMAGED WHEN CONTRACTOR AT THE SCHOOL FOR THE DEAF KNOCKED OFF SEWER MANHOLE LID AND ALLOWED 4 TO 5 FEET OF DEBRIS TO FALL INTO MANHOLE


Sewer Flow Scenario 1
Date: 8/9/15 to 9/9/15
Legend
SplitterBoxs
Trunk Lines
Splitter
1056000 Gallons Per Day
2654775 Gallons Per Day
2634225 Gallons Per Day
1 in = 1.5 miles
1:95,040
Date: 11/30/2015
Total approx Gallons Per Day
6345000
Old Buckman Rd
Tano Rd
State Rd 475
Us 84-285
Bishops Lodge Rd
Hyde Park Rd
Camino La Tierra
Veterans Memorial Hwy
W Alameda St
Agua Fria St
Caja Del Rio Rd
Agua Fria Rd
Cerrillos Rd
Saint Michaels Dr
Old Pecos Trail
Airport Rd
Rodeo Rd
Interstate 25
Paseo Real
Richards Ave
Avenida Del Sur
Arroyo Hondo Rd
Old Las Vegas Hwy
Old Santa Fe Trl
Turquoise Trl
Los Pinos Rd
Nine Mile Rd
WTP
Flow Direction RIGHT
Flow Direction LEFT
PPG
AL
BLR
SR3
AA
AA2
AA4
ZL1
ZR
TC
AC


Sewer Flow Scenario 2
Date: 9/9/15 to 10/9/15
Legend
SplitterBoxs
Trunk Lines
SewerBasinPOP 2
BASIN2
2587425 Gallons Per Day
1102800 Gallons Per Day
2654775 Gallons Per Day
1 in = 1.5 miles
1:95,040
Date: 11/30/2015
Total approx Gallons Per Day
6345000
Old Buckman Rd
Tano Rd
State Rd 475
Us 84-285
Bishops Lodge Rd
Hyde Park Rd
Camino La Tierra
Veterans Memorial Hwy
W Alameda St
Agua Fria St
Caja Del Rio Rd
Agua Fria Rd
Cerrillos Rd
Saint Michaels Dr
Old Pecos Trail
Airport Rd
Rodeo Rd
Interstate 25
Paseo Real
Los Pinos Rd
Turquoise Trl
Avenida Del Sur
Richards Ave
Arroyo Hondo Rd
Old Las Vegas Hwy
Old Santa Fe Trl
Nine Mile Rd
Flow Direction RIGHT
WTP
PPG
AL
BLR
SR3
AA
AA2
AA4
ZL1
ZR
TC
TC1
AC


Sewer Flow Scenario 3
Date: 10/9/15 to 11/19/15
Legend
SplitterBoxs
Trunk Lines
Splitter
1056000 Gallons Per Day
2654775 Gallons Per Day
2634225 Gallons Per Day
1 in = 1.5 miles
1:95,040
Date: 11/30/2015
Total approx Gallons Per Day
6345000
Old Buckman Rd
Tano Rd
State Rd 475
Us 84-285
Bishops Lodge Rd
Hyde Park Rd
Camino La Tierra
Veterans Memorial Hwy
W Alameda St
Agua Fria St
Caja Del Rio Rd
Agua Fria Rd
Cerrillos Rd
Saint Michaels Dr
Old Pecos Trail
Airport Rd
Rodeo Rd
Interstate 25
Paseo Real
Los Pinos Rd
Turquoise Trl
Avenida Del Sur
Richards Ave
Arroyo Hondo Rd
Old Las Vegas Hwy
Old Santa Fe Trl
Nine Mile Rd
WTP
Flow Direction LEFT
Flow Direction RIGHT
Flow Direction LEFT
Flow Direction RIGHT
PPG
AL
BLR
SR3
AA
AA4
ZL1
ZR
TC
TC1
AC


Sewer Flow Scenario 4
Date: 11/19/15 to 11/23/15
Legend
SplitterBoxs
Trunk Lines
SewerBasinPOP
BASIN2
2983200 Gallons Per Day
2634225 Gallons Per Day
727575 Gallons Per Day
1 in = 1.5 miles
1:95,040
Date: 11/30/2015
Total approx Gallons Per Day
6345000
Old Buckman Rd
Tano Rd
State Rd 475
Us 84-285
Bishops Lodge Rd
Hyde Park Rd
Camino La Tierra
Veterans Memorial Hwy
W Alameda St
Agua Fria St
Caja Del Rio Rd
Agua Fria Rd
Cerrillos Rd
Saint Michaels Dr
Old Pecos Trail
Airport Rd
Rodeo Rd
Interstate 25
Paseo Real
Los Pinos Rd
Turquoise Trl
Avenida Del Sur
Richards Ave
Arroyo Hondo Rd
Old Las Vegas Hwy
Old Santa Fe Trl
Nine Mile Rd
Flow Direction LEFT
Flow Direction RIGHT
WTP
PPG
AL
BLR
SR3
AA
AA4
ZL1
ZR
TC
TC1
AC

Appendix F. Mass Balance Results (Existing, 10-year, and 25-year)

Mass Balance Calibration Results

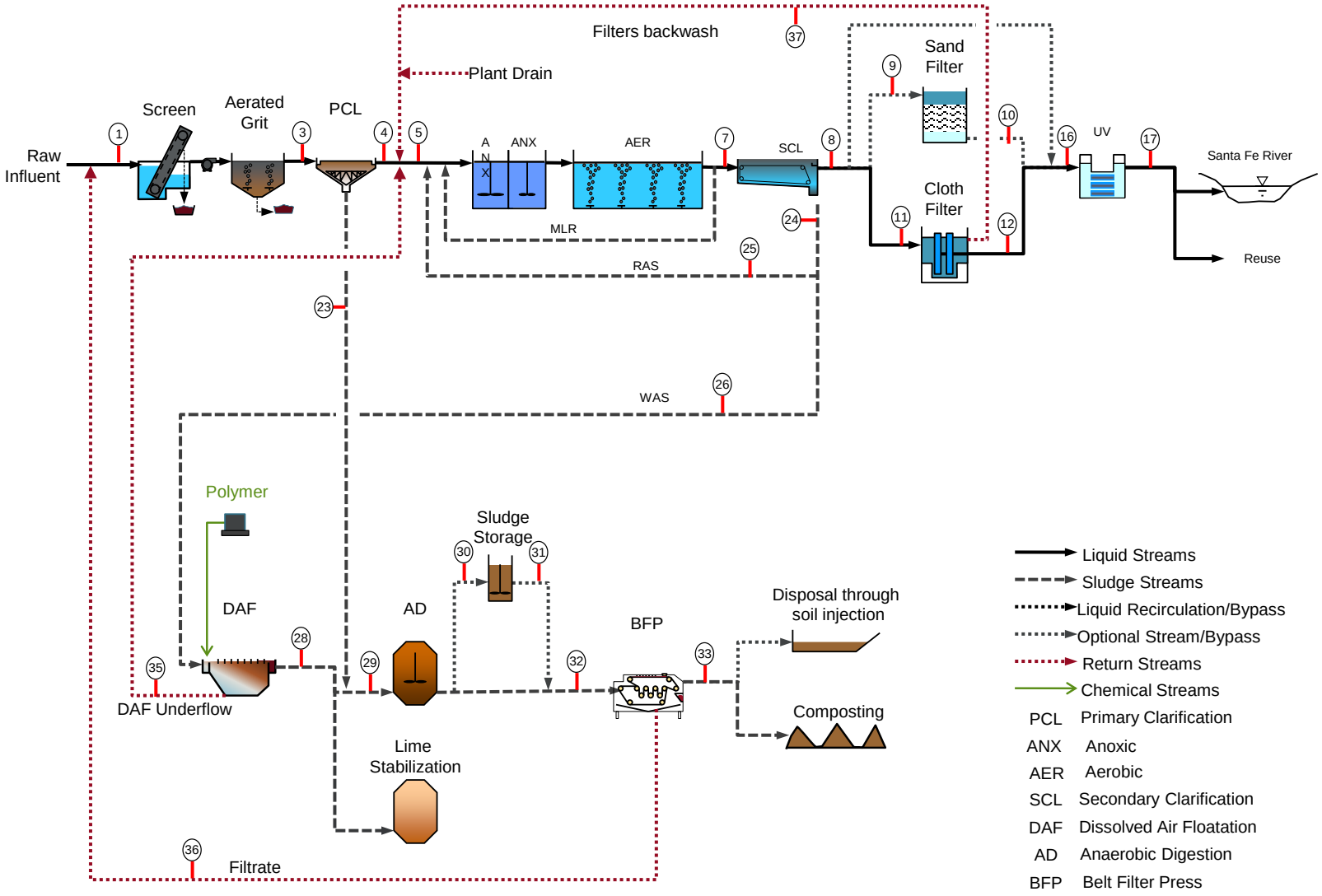


Figure F-1. Paseo Real WWTP Flow Schematic

Table F - 1. City of Santa Fe WWTP Mass Balance Calibration Results

Stream Summary for Calibration

ENV_Cal Stream Summary for Calibration

Line	Name	Flow		BOD		TSS		VSS		NH4		TN		TP		Alk	
		mgd	gpm	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d
1	Raw influent	5.52	3,832	403	18,550	431	19,830	366	16,860	39	1,795	64	2,945	10	451	285	13,120
3	Primary Influent	5.59	3,885	405	18,880	444	20,730	373	17,390	48	2,217	73	3,414	15	697	332	15,470
4	Primary Effluent	5.58	3,873	338	15,720	285	13,270	239	11,130	48	2,210	64	2,976	13	593	332	15,420
5	Activated Sludge Feed (w/out RAS)	6.06	4,210	317	16,010	286	14,440	237	11,980	44	2,215	61	3,068	13	640	320	16,190
7	Aeration Basins Effluent	11.52	8,002	573	55,060	2,617	251,500	1,905	183,100	1	115	192	18,450	96	9,227	189	18,150
8	Secondary Clarifiers Effluent	5.70	3,961	4	172	10	480	7	350	1	57	2	106	2	77	189	8,983
9	Filtration (Disk) Influent	5.70	3,961	4	172	10	480	7	350	1	57	2	106	2	77	189	8,983
10	Filtration (Disk) Effluent	5.54	3,849	2	83	2	83	1	60	1	55	2	75	1	61	189	8,730
11	Filtration (Media) Influent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Filtration (Media) Effluent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	UV Influent	5.54	3,849	2	83	2	83	1	60	1	55	2	75	1	61	189	8,730
17	Plant Discharge	5.54	3,849	2	83	2	83	1	60	1	55	2	75	1	61	189	8,730
23	Primary Sludge	0.02	12	22,440	3,160	53,000	7,464	44,460	6,262	48	7	3,109	438	741	104	332	47
24	Secondary Sludge (RAS plus WAS)	5.82	4,041	1,131	54,890	5,173	251,100	3,765	182,700	1	58	378	18,350	189	9,150	189	9,165
25	RAS	5.46	3,793	1,131	51,510	5,173	235,600	3,765	171,500	1	55	378	17,220	187	8,500	189	8,601
26	WAS	0.36	249	1,131	3,378	5,173	15,450	3,765	11,250	1	4	378	1,129	187	557	189	564
28	TWAS	0.03	24	11,360	3,208	52,000	14,680	37,850	10,680	1	0	3,786	1,069	1,865	526	189	53
29	Digesters Sludge Influent	0.05	35	15,050	6,368	52,330	22,140	40,050	16,950	17	7	3,561	1,507	1,490	631	236	100
30	Digested Sludge to Storage	0.05	35	9,712	4,109	30,710	12,990	18,420	7,795	1,255	531	2,885	1,221	1,490	631	7,069	2,991
31	Digested Sludge Effluent from Storage Tank	0.05	35	9,601	4,062	30,340	12,840	18,050	7,639	1,287	545	2,885	1,221	1,490	631	7,185	3,040
32	Belt Filter Press Influent	0.05	35	9,601	4,062	30,340	12,840	18,050	7,639	1,287	545	2,885	1,221	1,490	631	7,185	3,040
33	Dewatered Biosolids to Composting/Injection	0.01	8	37,700	3,600	125,000	11,940	74,390	7,104	1,287	123	7,870	752	4,023	384	7,185	686
35	DAF Underflow to Activated Sludge	0.32	225	72	196	286	773	208	562	1	3	22	60	11	31	189	511
36	Belt Filter Press Filtrate Return	0.08	53	530	335	1,421	899	846	535	667	422	742	469	390	246	3,723	2,354
37	Filter Backwash	0.16	112	66	89	297	398	216	290	1	2	23	31	12	16	189	253

Mass Balance Notes

The flow and loadings above are **daily average** values.

For solids streams, the actual flows may be different if the unit performance does not meet the concentration limits. Bracket flows based on **mass loading** with accomodation for lower/higher'concentrations. Instantaneous flow for solids streams is often intermittent and higher to match minimum pipe velocities and actual operating conditions. Adjust to match mass loading.

10-Year Projection Mass Balance Alternative Results

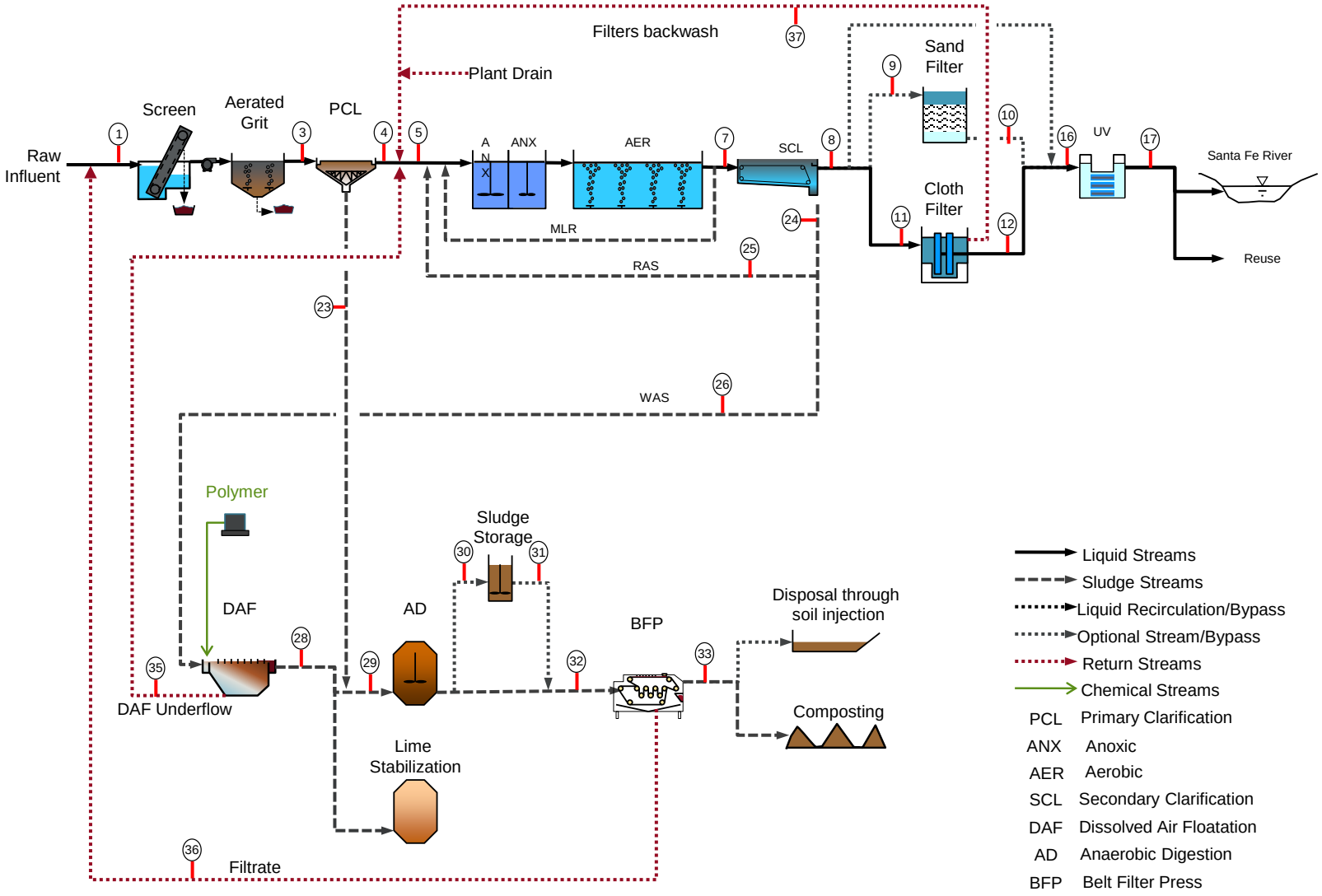


Figure F - 2. Paseo Real WWTP Flow Schematic

Table F- 2. 10-year Projection: Tier 1 – Average Annual Mass Balance Results

Line	Name	Flow		BOD		TSS		VSS		NH4		TN		TP		Alk	
		mgd	gpm	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d
1	Raw influent	7.40	5,139	400	24,690	430	26,540	391	24,100	37	2,283	66	4,073	9	555	270	16,660
3	Primary Influent	7.49	5,202	401	25,080	441	27,580	397	24,770	45	2,824	75	4,673	14	873	315	19,660
4	Primary Effluent	7.47	5,187	273	17,030	283	17,650	255	15,850	45	2,815	64	3,999	12	749	315	19,610
5	Activated Sludge Feed (w/out RAS)	7.95	5,517	262	17,370	288	19,060	255	16,900	43	2,820	62	4,112	12	810	305	20,230
7	Aeration Basins Effluent	15.22	10,570	666	84,560	2,985	378,900	2,216	281,200	1	165	224	28,390	124	15,750	159	20,130
8	Secondary Clarifiers Effluent	7.59	5,272	4	239	10	639	7	475	1	82	3	181	1	83	159	10,040
9	Filtration (Disk) Influent	7.59	5,272	4	239	10	639	7	475	1	82	3	181	1	83	159	10,040
10	Filtration (Disk) Effluent	7.43	5,160	2	120	2	111	1	82	1	81	2	139	1	60	159	9,830
11	Filtration (Media) Influent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Filtration (Media) Effluent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	UV Influent	7.43	5,160	2	120	2	111	1	82	1	81	2	139	1	60	159	9,830
17	Plant Discharge	7.43	5,160	2	120	2	111	1	82	1	81	2	139	1	60	159	9,830
23	Primary Sludge	0.02	16	42,980	8,053	53,000	9,929	47,610	8,918	45	8	3,600	674	660	124	315	59
24	Secondary Sludge (RAS plus WAS)	7.63	5,296	1,326	84,320	5,947	378,200	4,414	280,800	1	83	444	28,210	246	15,670	159	10,090
25	RAS	7.27	5,051	1,326	80,420	5,947	360,700	4,414	267,700	1	79	444	26,900	244	14,790	159	9,622
26	WAS	0.35	246	1,326	3,908	5,947	17,530	4,414	13,010	1	4	444	1,308	244	719	159	468
28	TWAS	0.04	27	11,590	3,712	52,000	16,660	38,600	12,360	1	0	3,862	1,237	2,124	680	159	51
29	Digesters Sludge Influent	0.06	42	23,180	11,760	52,370	26,580	41,920	21,280	18	9	3,765	1,911	1,584	804	216	110
30	Digested Sludge to Storage	0.06	42	9,419	4,782	29,730	15,090	19,280	9,789	1,327	673	3,050	1,548	1,584	804	7,440	3,777
31	Digested Sludge Effluent from Storage Tank	0.06	42	9,304	4,723	29,350	14,900	18,900	9,593	1,361	691	3,050	1,548	1,584	804	7,563	3,839
32	Belt Filter Press Influent	0.06	42	9,304	4,723	29,350	14,900	18,900	9,593	1,361	691	3,050	1,548	1,584	804	7,563	3,839
33	Dewatered Biosolids to Composting/Injection	0.01	9	37,700	4,178	125,000	13,850	80,500	8,922	1,361	151	8,556	948	4,393	487	7,563	838
35	DAF Underflow to Activated Sludge	0.32	219	84	222	334	877	248	651	1	3	27	71	15	38	159	417
36	Belt Filter Press Filtrate Return	0.09	63	515	392	1,368	1,043	881	672	709	540	787	600	416	317	3,937	3,001
37	Filter Backwash	0.16	112	89	120	394	529	293	392	1	2	31	42	17	23	159	213

Mass Balance Notes

The flow and loadings above are **daily average** values.

For solids streams, the actual flows may be different if the unit performance does not meet the concentration limits. Bracket flows based on **mass loading** with accomodation for lower/higher'concentrations. Instantaneous flow for solids streams is often intermittent and higher to match minimum pipe velocities and actual operating conditions. Adjust to match mass loading.

Table F - 3. 10-year Projection: Tier 1 – Maximum Month Mass Balance Results

Line	Name	Flow		BOD		TSS		NH4		TN		TP		Alk	
		mgd	gpm	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d
1	Raw influent	8.00	5,556	450	30,020	490	32,690	41	2,736	76	5,071	11	734	300	20,020
3	Primary Influent	8.11	5,634	451	30,510	502	33,980	50	3,414	86	5,824	17	1,165	352	23,790
4	Primary Effluent	8.09	5,614	307	20,730	323	21,750	50	3,402	73	4,945	15	1,003	352	23,710
5	Activated Sludge Feed (w/out RAS)	8.55	5,939	296	21,120	328	23,400	48	3,407	71	5,076	15	1,081	342	24,380
7	Aeration Basins Effluent	16.41	11,390	816	111,600	3,656	500,400	1	178	274	37,420	168	22,990	172	23,550
8	Secondary Clarifiers Effluent	8.20	5,693	4	281	10	691	1	89	3	204	1	93	172	11,760
9	Filtration (Disk) Influent	8.20	5,693	4	281	10	691	1	89	3	204	1	93	172	11,760
10	Filtration (Disk) Effluent	8.04	5,582	2	152	2	120	1	87	2	159	1	66	172	11,530
11	Filtration (Media) Influent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Filtration (Media) Effluent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0
16	UV Influent	8.04	5,582	2	152	2	120	1	87	2	159	1	66	172	11,530
17	Plant Discharge	8.04	5,582	2	152	2	120	1	87	2	159	1	66	172	11,530
23	Primary Sludge	0.03	19	42,380	9,782	53,000	12,230	50	12	3,810	879	699	161	352	81
24	Secondary Sludge (RAS plus WAS)	8.21	5,702	1,626	111,300	7,297	499,700	1	89	544	37,220	334	22,900	172	11,780
25	RAS	7.86	5,456	1,626	106,500	7,297	478,100	1	85	544	35,610	331	21,680	172	11,270
26	WAS	0.35	246	1,626	4,805	7,297	21,570	1	4	544	1,606	331	978	172	509
28	TWAS	0.05	33	11,580	4,563	52,000	20,490	1	1	3,860	1,521	2,352	927	172	68
29	Digesters Sludge Influent	0.07	52	22,960	14,350	52,370	32,720	19	12	3,842	2,400	1,741	1,088	239	149
30	Digested Sludge to Storage	0.07	52	9,437	5,896	29,790	18,610	1,354	846	3,112	1,944	1,741	1,088	7,606	4,752
31	Digested Sludge Effluent from Storage Tank	0.07	52	9,322	5,824	29,410	18,370	1,389	868	3,112	1,944	1,741	1,088	7,731	4,830
32	Belt Filter Press Influent	0.07	52	9,322	5,824	29,410	18,370	1,389	868	3,112	1,944	1,741	1,088	7,731	4,830
33	Dewatered Biosolids to Composting/Injection	0.02	11	37,700	5,153	125,000	17,090	1,389	190	8,712	1,191	4,806	657	7,731	1,057
35	DAF Underflow to Activated Sludge	0.31	213	104	266	421	1,078	1	3	33	86	20	51	172	441
36	Belt Filter Press Filtrate Return	0.11	78	515	483	1,371	1,286	723	678	803	753	459	431	4,023	3,774
37	Filter Backwash	0.16	112	97	130	426	571	1	2	34	45	20	27	172	231

Mass Balance Notes

The flow and loadings above are **daily average** values.

For solids streams, the actual flows may be different if the unit performance does not meet the concentration limits. Bracket flows based on **mass loading** with accomodat for lower/higher'concentrations. Instantaneous flow for solids streams is often intermittent and higher to match minimum pipe velocities and actual operating conditions. Adj to match mass loading.

Table F - 4. 10-year Projection: Tier 1 – Peak Flow Mass Balance Results

Line	Name	Flow		BOD		TSS		NH4		TN		TP		Alk	
		mgd	gpm	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d
1	Raw influent	27.00	18,750												
3	Primary Influent	27.44	19,060												
4	Primary Effluent	27.34	18,980												
5	Activated Sludge Feed (w/out RAS)	27.66	19,210												
7	Aeration Basins Effluent	53.86	37,400												
8	Secondary Clarifiers Effluent	27.31	18,960												
9	Filtration (Disk) Influent	27.31	18,960												
10	Filtration (Disk) Effluent	27.15	18,850												
11	Filtration (Media) Influent	0.00	0												
12	Filtration (Media) Effluent	0.00	0												
16	UV Influent	27.15	18,850												
17	Plant Discharge	27.15	18,850												
23	Primary Sludge	0.10	72												
24	Secondary Sludge (RAS plus WAS)	26.55	18,440												
25	RAS	26.20	18,200												
26	WAS	0.35	244												
28	TWAS	0.19	132												
29	Digesters Sludge Influent	0.29	204												
30	Digested Sludge to Storage	0.29	204												
31	Digested Sludge Effluent from Storage Tank	0.29	204												
32	Belt Filter Press Influent	0.29	204												
33	Dewatered Biosolids to Composting/Injection	0.06	44												
35	DAF Underflow to Activated Sludge	0.16	111												
36	Belt Filter Press Filtrate Return	0.44	307												
37	Filter Backwash	0.16	112												

Mass Balance Notes

The flow and loadings above are **daily average** values.

For solids streams, the actual flows may be different if the unit performance does not meet the concentration limits. Bracket flows based on **mass loading** with accomodat for lower/higher'concentrations. Instantaneous flow for solids streams is often intermittent and higher to match minimum pipe velocities and actual operating conditions. Adj to match mass loading.

Table F - 5. 10-year Projection: Tier 2 – Average Annual Mass Balance Results

Line	Name	Flow		BOD		TSS		NH4		TN		TP		Alk	
		mgd	gpm	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d
1	Raw influent	7.40	5,139	400	24,690	430	26,540	37	2,283	66	4,073	9	555	270	16,660
3	Primary Influent	7.49	5,202	401	25,080	441	27,580	45	2,824	75	4,673	14	889	315	19,660
4	Primary Effluent	7.47	5,187	273	17,030	283	17,650	45	2,815	64	3,999	12	765	315	19,610
5	Activated Sludge Feed (w/out RAS)	7.95	5,517	262	17,370	288	19,060	43	2,820	62	4,112	12	828	305	20,230
7	Aeration Basins Effluent	15.22	10,570	666	84,560	2,985	378,900	1	165	224	28,390	131	16,630	159	20,130
8	Secondary Clarifiers Effluent	7.59	5,272	4	239	10	639	1	82	3	181	1	60	159	10,040
9	Filtration (Disk) Influent	7.59	5,272	4	239	10	639	1	82	3	181	1	60	159	10,040
10	Filtration (Disk) Effluent	7.43	5,160	2	120	2	111	1	81	2	139	1	36	159	9,830
11	Filtration (Media) Influent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Filtration (Media) Effluent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0
16	UV Influent	7.43	5,160	2	120	2	111	1	81	2	139	1	36	159	9,830
17	Plant Discharge	7.43	5,160	2	120	2	111	1	81	2	139	1	36	159	9,830
23	Primary Sludge	0.02	16	42,980	8,053	53,000	9,929	45	8	3,600	674	664	124	315	59
24	Secondary Sludge (RAS plus WAS)	7.63	5,296	1,326	84,320	5,947	378,200	1	83	444	28,210	261	16,570	159	10,090
25	RAS	7.27	5,051	1,326	80,420	5,947	360,700	1	79	444	26,900	258	15,640	159	9,622
26	WAS	0.35	246	1,326	3,908	5,947	17,530	1	4	444	1,308	258	760	159	468
28	TWAS	0.04	27	11,590	3,712	52,000	16,660	1	0	3,862	1,237	2,250	721	159	51
29	Digesters Sludge Influent	0.06	42	23,180	11,760	52,370	26,580	18	9	3,765	1,911	1,664	845	216	110
30	Digested Sludge to Storage	0.06	42	9,419	4,782	29,730	15,090	1,327	673	3,050	1,548	1,664	845	7,440	3,777
31	Digested Sludge Effluent from Storage Tank	0.06	42	9,304	4,723	29,350	14,900	1,361	691	3,050	1,548	1,664	845	7,563	3,839
32	Belt Filter Press Influent	0.06	42	9,304	4,723	29,350	14,900	1,361	691	3,050	1,548	1,664	845	7,563	3,839
33	Dewatered Biosolids to Composting/Injection	0.01	9	37,700	4,178	125,000	13,850	1,361	151	8,556	948	4,609	511	7,563	838
35	DAF Underflow to Activated Sludge	0.32	219	84	222	334	877	1	3	27	71	15	39	159	417
36	Belt Filter Press Filtrate Return	0.09	63	515	392	1,368	1,043	709	540	787	600	438	334	3,937	3,001
37	Filter Backwash	0.16	112	89	120	394	529	1	2	31	42	18	24	159	213

Mass Balance Notes

The flow and loadings above are **daily average** values.

For solids streams, the actual flows may be different if the unit performance does not meet the concentration limits. Bracket flows based on **mass loading** with accomodation for lower/higher'concentrations. Instantaneous flow for solids streams is often intermittent and higher to match minimum pipe velocities and actual operating conditions. Adjust to match mass loading.

Table F - 6. 10-year Projection: Tier 2 – Maximum Month Mass Balance Results

Line	Name	Flow		BOD		TSS		NH4		TN		TP		Alk	
		mgd	gpm	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d
1	Raw influent	8.00	5,556	450	30,020	490	32,690	41	2,736	76	5,071	11	734	300	20,020
3	Primary Influent	8.11	5,634	451	30,510	502	33,980	50	3,414	86	5,824	17	1,184	352	23,790
4	Primary Effluent	8.09	5,614	307	20,720	323	21,740	50	3,402	73	4,945	15	1,022	352	23,710
5	Activated Sludge Feed (w/out RAS)	8.55	5,939	296	21,120	328	23,390	48	3,407	71	5,076	15	1,102	342	24,380
7	Aeration Basins Effluent	16.41	11,390	816	111,600	3,656	500,300	1	178	274	37,420	176	24,030	172	23,550
8	Secondary Clarifiers Effluent	8.20	5,693	4	281	10	691	1	89	3	204	1	67	172	11,760
9	Filtration (Disk) Influent	8.20	5,693	4	281	10	691	1	89	3	204	1	67	172	11,760
10	Filtration (Disk) Effluent	8.04	5,582	2	152	2	120	1	87	2	159	1	39	172	11,530
11	Filtration (Media) Influent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Filtration (Media) Effluent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0
16	UV Influent	8.04	5,582	2	152	2	120	1	87	2	159	1	39	172	11,530
17	Plant Discharge	8.04	5,582	2	152	2	120	1	87	2	159	1	39	172	11,530
23	Primary Sludge	0.03	19	42,390	9,782	53,000	12,230	50	12	3,811	879	702	162	352	81
24	Secondary Sludge (RAS plus WAS)	8.21	5,702	1,626	111,300	7,297	499,600	1	89	544	37,220	350	23,970	172	11,780
25	RAS	7.86	5,456	1,626	106,500	7,297	478,100	1	85	544	35,610	346	22,680	172	11,270
26	WAS	0.35	246	1,626	4,805	7,297	21,560	1	4	544	1,606	346	1,023	172	509
28	TWAS	0.05	33	11,580	4,563	52,000	20,490	1	1	3,860	1,521	2,464	971	172	68
29	Digesters Sludge Influent	0.07	52	22,960	14,340	52,370	32,720	19	12	3,842	2,400	1,813	1,133	239	149
30	Digested Sludge to Storage	0.07	52	9,421	5,886	29,740	18,580	1,354	846	3,112	1,944	1,813	1,133	7,606	4,752
31	Digested Sludge Effluent from Storage Tank	0.07	52	9,305	5,813	29,350	18,340	1,389	868	3,112	1,944	1,813	1,133	7,731	4,830
32	Belt Filter Press Influent	0.07	52	9,305	5,813	29,350	18,340	1,389	868	3,112	1,944	1,813	1,133	7,731	4,830
33	Dewatered Biosolids to Composting/Injection	0.02	11	37,700	5,143	125,000	17,050	1,389	190	8,726	1,190	5,005	683	7,731	1,055
35	DAF Underflow to Activated Sludge	0.31	213	104	266	421	1,078	1	3	33	86	20	52	172	441
36	Belt Filter Press Filtrate Return	0.11	78	515	483	1,368	1,284	723	678	803	754	479	450	4,024	3,775
37	Filter Backwash	0.16	112	97	130	426	571	1	2	34	45	21	28	172	231

Mass Balance Notes

The flow and loadings above are **daily average** values.

For solids streams, the actual flows may be different if the unit performance does not meet the concentration limits. Bracket flows based on **mass loading** with accomodation for lower/higher'concentrations. Instantaneous flow for solids streams is often intermittent and higher to match minimum pipe velocities and actual operating conditions. Adjust to match mass loading.

Table F - 7. 10-year Projection: Tier 2 – Peak Flow Mass Balance Results

Line	Name	Flow		BOD		TSS		NH4		TN		TP		Alk	
		mgd	gpm	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d
1	Raw influent	27.00	18,750												
3	Primary Influent	27.44	19,060												
4	Primary Effluent	27.34	18,980												
5	Activated Sludge Feed (w/out RAS)	27.66	19,210												
7	Aeration Basins Effluent	53.86	37,400												
8	Secondary Clarifiers Effluent	27.31	18,960												
9	Filtration (Disk) Influent	27.31	18,960												
10	Filtration (Disk) Effluent	27.15	18,850												
11	Filtration (Media) Influent	0.00	0												
12	Filtration (Media) Effluent	0.00	0												
16	UV Influent	27.15	18,850												
17	Plant Discharge	27.15	18,850												
23	Primary Sludge	0.10	72												
24	Secondary Sludge (RAS plus WAS)	26.55	18,440												
25	RAS	26.20	18,200												
26	WAS	0.35	244												
28	TWAS	0.19	132												
29	Digesters Sludge Influent	0.29	204												
30	Digested Sludge to Storage	0.29	204												
31	Digested Sludge Effluent from Storage Tank	0.29	204												
32	Belt Filter Press Influent	0.29	204												
33	Dewatered Biosolids to Composting/Injection	0.06	44												
35	DAF Underflow to Activated Sludge	0.16	111												
36	Belt Filter Press Filtrate Return	0.44	307												
37	Filter Backwash	0.16	112												

Mass Balance Notes

The flow and loadings above are **daily average** values.

For solids streams, the actual flows may be different if the unit performance does not meet the concentration limits. Bracket flows based on **mass loading** with accomodation for lower/higher'concentrations. Instantaneous flow for solids streams is often intermittent and higher to match minimum pipe velocities and actual operating conditions. Adjust to match mass loading.

25-Year Projection Mass Balance Alternative Results

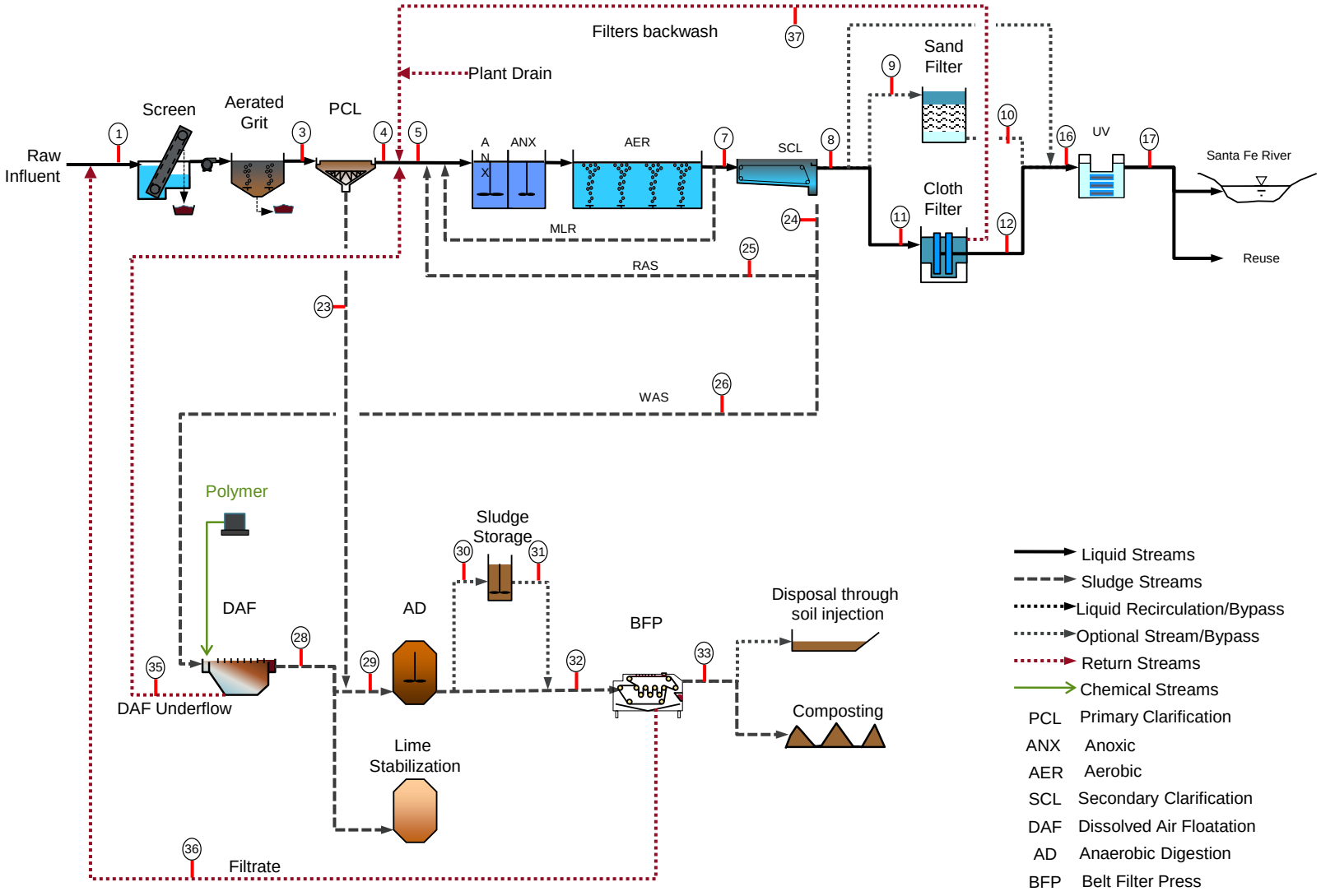


Figure F - 3. Paseo Real WWTP Flow Schematic

Table F - 8. 25-year Projection: Tier 1 – Average Annual Mass Balance Results

Line	Name	Flow		BOD		TSS		VSS		NH4		TN		TP		Alk	
		mgd	gpm	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d
1	Raw influent	8.50	5,903	400	28,360	430	30,480	391	27,680	37	2,623	66	4,679	9	638	270	19,140
3	Primary Influent	8.61	5,976	401	28,810	441	31,680	397	28,460	45	3,244	75	5,368	14	1,002	315	22,590
4	Primary Effluent	8.58	5,958	273	19,560	283	20,280	255	18,210	45	3,234	64	4,594	12	860	315	22,520
5	Activated Sludge Feed (w/out RAS)	9.23	6,410	259	19,960	284	21,890	252	19,410	42	3,241	61	4,725	12	931	304	23,380
7	Aeration Basins Effluent	17.56	12,190	511	74,740	2,287	334,900	1,698	248,600	1	190	172	25,160	95	13,950	159	23,240
8	Secondary Clarifiers Effluent	8.70	6,039	3	248	10	733	7	544	1	94	3	207	1	95	159	11,510
9	Filtration (Disk) Influent	8.70	6,039	3	248	10	733	7	544	1	94	3	207	1	95	159	11,510
10	Filtration (Disk) Effluent	8.54	5,927	2	112	2	127	1	95	1	93	2	159	1	69	159	11,300
11	Filtration (Media) Influent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Filtration (Media) Effluent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	UV Influent	8.54	5,927	2	112	2	127	1	95	1	93	2	159	1	69	159	11,300
17	Plant Discharge	8.54	5,927	2	112	2	127	1	95	1	93	2	159	1	69	159	11,300
23	Primary Sludge	0.03	18	42,980	9,250	53,000	11,410	47,610	10,240	45	10	3,600	775	660	142	315	68
24	Secondary Sludge (RAS plus WAS)	8.86	6,153	1,008	74,500	4,521	334,100	3,356	248,000	1	96	338	24,960	187	13,850	159	11,730
25	RAS	8.33	5,782	1,008	70,000	4,521	314,000	3,356	233,100	1	90	338	23,450	185	12,880	159	11,020
26	WAS	0.53	371	1,008	4,492	4,521	20,150	3,356	14,960	1	6	338	1,505	185	826	159	707
28	TWAS	0.04	31	11,590	4,266	52,000	19,140	38,600	14,210	1	0	3,862	1,422	2,123	782	159	58
29	Digesters Sludge Influent	0.07	49	23,170	13,520	52,370	30,550	41,920	24,450	17	10	3,765	2,196	1,583	923	216	126
30	Digested Sludge to Storage	0.07	49	9,419	5,494	29,730	17,340	19,280	11,250	1,327	774	3,051	1,779	1,583	923	7,441	4,340
31	Digested Sludge Effluent from Storage Tank	0.07	49	9,303	5,427	29,340	17,120	18,900	11,020	1,361	794	3,051	1,779	1,583	923	7,564	4,412
32	Belt Filter Press Influent	0.07	49	9,303	5,427	29,340	17,120	18,900	11,020	1,361	794	3,051	1,779	1,583	923	7,564	4,412
33	Dewatered Biosolids to Composting/Injection	0.02	11	37,700	4,801	125,000	15,920	80,500	10,250	1,361	173	8,557	1,090	4,392	559	7,564	963
35	DAF Underflow to Activated Sludge	0.49	340	65	265	246	1,007	183	748	1	5	20	83	11	45	159	649
36	Belt Filter Press Filtrate Return	0.11	73	515	451	1,368	1,198	881	772	709	621	787	690	416	364	3,937	3,449
37	Filter Backwash	0.16	112	102	136	452	605	335	449	1	2	36	48	19	26	159	213

Mass Balance Notes

The flow and loadings above are **daily average** values.

For solids streams, the actual flows may be different if the unit performance does not meet the concentration limits. Bracket flows based on **mass loading** with accomodation for lower/higher concentrations. Instantaneous flow for solids streams is often intermittent and higher to match minimum pipe velocities and actual operating conditions. Adjust to match mass loading.

Filter backwash is calculated as a 24-hour average flow. Instantaneous flows will be higher, pending the operating strategy. Adjust instantaneous flows as needed.

Table F - 9. 25-year Projection: Tier 1 – Maximum Month Mass Balance Results

Line	Name	Flow		BOD		TSS		VSS		NH4		TN		TP		Alk	
		mgd	gpm	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d
1	Raw influent	9.20	6,389	450	34,530	490	37,600	443	33,950	41	3,146	76	5,831	11	844	300	23,020
3	Primary Influent	9.33	6,479	451	35,080	502	39,080	449	34,900	50	3,926	86	6,698	17	1,340	352	27,360
4	Primary Effluent	9.30	6,457	307	23,830	323	25,010	288	22,330	50	3,913	73	5,687	15	1,154	352	27,270
5	Activated Sludge Feed (w/out RAS)	9.94	6,902	293	24,300	325	26,900	286	23,740	47	3,919	70	5,839	15	1,244	340	28,190
7	Aeration Basins Effluent	18.95	13,160	626	98,850	2,804	443,100	2,081	328,700	1	205	210	33,230	129	20,390	172	27,200
8	Secondary Clarifiers Effluent	9.40	6,530	4	289	10	792	7	588	1	102	3	233	1	107	172	13,500
9	Filtration (Disk) Influent	9.40	6,530	4	289	10	792	7	588	1	102	3	233	1	107	172	13,500
10	Filtration (Disk) Effluent	9.24	6,419	2	141	2	138	1	102	1	100	2	182	1	76	172	13,270
11	Filtration (Media) Influent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Filtration (Media) Effluent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	UV Influent	9.24	6,419	2	141	2	138	1	102	1	100	2	182	1	76	172	13,270
17	Plant Discharge	9.24	6,419	2	141	2	138	1	102	1	100	2	182	1	76	172	13,270
23	Primary Sludge	0.03	22	42,380	11,250	53,000	14,070	47,330	12,560	50	13	3,810	1,011	699	186	352	93
24	Secondary Sludge (RAS plus WAS)	9.54	6,626	1,239	98,560	5,558	442,300	4,124	328,200	1	103	415	32,990	255	20,280	172	13,700
25	RAS	9.01	6,254	1,239	93,030	5,558	417,500	4,124	309,700	1	98	415	31,140	252	18,940	172	12,930
26	WAS	0.54	372	1,239	5,529	5,558	24,810	4,124	18,410	1	6	415	1,851	252	1,125	172	769
28	TWAS	0.05	38	11,580	5,251	52,000	23,570	38,580	17,490	1	1	3,860	1,750	2,351	1,066	172	78
29	Digesters Sludge Influent	0.09	60	22,960	16,500	52,370	37,640	41,810	30,050	19	14	3,842	2,761	1,741	1,251	239	171
30	Digested Sludge to Storage	0.09	60	9,437	6,783	29,790	21,410	19,230	13,820	1,354	973	3,112	2,237	1,741	1,251	7,606	5,467
31	Digested Sludge Effluent from Storage Tank	0.09	60	9,322	6,700	29,410	21,130	18,850	13,550	1,389	999	3,112	2,237	1,741	1,251	7,732	5,557
32	Belt Filter Press Influent	0.09	60	9,322	6,700	29,410	21,130	18,850	13,550	1,389	999	3,112	2,237	1,741	1,251	7,732	5,557
33	Dewatered Biosolids to Composting/Injection	0.02	13	37,700	5,928	125,000	19,660	80,130	12,600	1,389	218	8,713	1,370	4,804	756	7,732	1,216
35	DAF Underflow to Activated Sludge	0.48	334	79	316	309	1,241	230	920	1	5	25	101	15	60	172	691
36	Belt Filter Press Filtrate Return	0.13	90	515	556	1,371	1,479	879	948	723	780	803	867	459	496	4,024	4,341
37	Filter Backwash	0.16	112	110	148	488	654	362	485	1	2	38	52	23	31	172	231

Mass Balance Notes

The flow and loadings above are **daily average** values.

For solids streams, the actual flows may be different if the unit performance does not meet the concentration limits. Bracket flows based on **mass loading** with accomodation for lower/higher concentrations. Instantaneous flow for solids streams is often intermittent and higher to match minimum pipe velocities and actual operating conditions. Adjust to match mass loading.

Filter backwash is calculated as a 24-hour average flow. Instantaneous flows will be higher, pending the operating strategy. Adjust instantaneous flows as needed.

Table F - 10. 25-year Projection: Tier 1 – Peak Flow Mass Balance Results

Line	Name	Flow		BOD		TSS		VSS		NH4		TKN		TN		TP		Alk	
		mgd	gpm	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d
1	Raw influent	27.00	18,750																
3	Primary Influent	27.44	19,060																
4	Primary Effluent	27.34	18,990																
5	Activated Sludge Feed (w/out RAS)	27.84	19,330																
7	Aeration Basins Effluent	54.03	37,520																
8	Secondary Clarifiers Effluent	27.31	18,960																
9	Filtration (Disk) Influent	27.31	18,960																
10	Filtration (Disk) Effluent	27.15	18,850																
11	Filtration (Media) Influent	0.00	0																
12	Filtration (Media) Effluent	0.00	0																
16	UV Influent	27.15	18,850																
17	Plant Discharge	27.15	18,850																
23	Primary Sludge	0.10	72																
24	Secondary Sludge (RAS plus WAS)	26.72	18,560																
25	RAS	26.20	18,190																
26	WAS	0.53	367																
28	TWAS	0.19	132																
29	Digesters Sludge Influent	0.29	205																
30	Digested Sludge to Storage	0.29	205																
31	Digested Sludge Effluent from Storage Tank	0.29	205																
32	Belt Filter Press Influent	0.29	205																
33	Dewatered Biosolids to Composting/Injection	0.06	45																
35	DAF Underflow to Activated Sludge	0.34	234																
36	Belt Filter Press Filtrate Return	0.44	308																
37	Filter Backwash	0.16	112																

Mass Balance Notes

The flow and loadings above are **daily average** values.

For solids streams, the actual flows may be different if the unit performance does not meet the concentration limits. Bracket flows based on **mass loading** with accomodation for lower/higher concentrations. Instantaneous flow for solids streams is often intermittent and higher to match minimum pipe velocities and actual operating conditions. Adjust to match mass loading.

Filter backwash is calculated as a 24-hour average flow. Instantaneous flows will be higher, pending the operating strategy. Adjust instantaneous flows as needed.

Table F - 11. 25-year Projection: Tier 2 – Average Annual Mass Balance Results

Line	Name	Flow		BOD		TSS		VSS		NH4		TN		TP		Alk	
		mgd	gpm	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d
1	Raw influent	8.50	5,903	400	28,360	430	30,480	391	27,680	37	2,623	66	4,679	9	638	270	19,140
3	Primary Influent	8.61	5,976	401	28,810	441	31,680	397	28,460	45	3,244	75	5,368	14	1,022	315	22,590
4	Primary Effluent	8.58	5,958	273	19,560	283	20,280	255	18,210	45	3,234	64	4,594	12	879	315	22,520
5	Activated Sludge Feed (w/out RAS)	9.23	6,410	259	19,960	284	21,890	252	19,410	42	3,241	61	4,725	12	951	304	23,380
7	Aeration Basins Effluent	17.56	12,190	511	74,740	2,287	334,900	1,698	248,600	1	190	172	25,160	101	14,710	159	23,240
8	Secondary Clarifiers Effluent	8.70	6,039	3	248	10	733	7	544	1	94	3	207	1	68	159	11,510
9	Filtration (Disk) Influent	8.70	6,039	3	248	10	733	7	544	1	94	3	207	1	68	159	11,510
10	Filtration (Disk) Effluent	8.54	5,927	2	112	2	127	1	95	1	93	2	159	1	41	159	11,300
11	Filtration (Media) Influent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Filtration (Media) Effluent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	UV Influent	8.54	5,927	2	112	2	127	1	95	1	93	2	159	1	41	159	11,300
17	Plant Discharge	8.54	5,927	2	112	2	127	1	95	1	93	2	159	1	41	159	11,300
23	Primary Sludge	0.03	18	42,980	9,250	53,000	11,410	47,610	10,240	45	10	3,600	775	664	143	315	68
24	Secondary Sludge (RAS plus WAS)	8.86	6,153	1,008	74,500	4,521	334,100	3,356	248,000	1	96	338	24,960	198	14,640	159	11,730
25	RAS	8.33	5,782	1,008	70,000	4,521	314,000	3,356	233,100	1	90	338	23,450	196	13,610	159	11,020
26	WAS	0.53	371	1,008	4,492	4,521	20,150	3,356	14,960	1	6	338	1,505	196	874	159	707
28	TWAS	0.04	31	11,590	4,266	52,000	19,140	38,600	14,210	1	0	3,862	1,422	2,249	828	159	58
29	Digesters Sludge Influent	0.07	49	23,170	13,520	52,370	30,550	41,920	24,450	17	10	3,765	2,196	1,664	970	216	126
30	Digested Sludge to Storage	0.07	49	9,419	5,494	29,730	17,340	19,280	11,250	1,327	774	3,051	1,779	1,664	970	7,441	4,340
31	Digested Sludge Effluent from Storage Tank	0.07	49	9,303	5,427	29,340	17,120	18,900	11,020	1,361	794	3,051	1,779	1,664	970	7,564	4,412
32	Belt Filter Press Influent	0.07	49	9,303	5,427	29,340	17,120	18,900	11,020	1,361	794	3,051	1,779	1,664	970	7,564	4,412
33	Dewatered Biosolids to Composting/Injection	0.02	11	37,700	4,801	125,000	15,920	80,500	10,250	1,361	173	8,557	1,090	4,608	587	7,564	963
35	DAF Underflow to Activated Sludge	0.49	340	65	265	246	1,007	183	748	1	5	20	83	11	46	159	649
36	Belt Filter Press Filtrate Return	0.11	73	515	451	1,368	1,198	881	772	709	621	787	690	438	384	3,937	3,449
37	Filter Backwash	0.16	112	102	136	452	605	335	449	1	2	36	48	20	27	159	213

Mass Balance Notes

The flow and loadings above are **daily average** values.

For solids streams, the actual flows may be different if the unit performance does not meet the concentration limits. Bracket flows based on **mass loading** with accomodation for lower/higher concentrations. Instantaneous flow for solids streams is often intermittent and higher to match minimum pipe velocities and actual operating conditions. Adjust to match mass loading.

Filter backwash is calculated as a 24-hour average flow. Instantaneous flows will be higher, pending the operating strategy. Adjust instantaneous flows as needed.

Table F - 12. 25-year Projection: Tier 2 – Maximum Month Mass Balance Results

Line	Name	Flow		BOD		TSS		VSS		NH4		TN		TP		Alk	
		mgd	gpm	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d
1	Raw influent	9.20	6,389	450	34,530	490	37,600	445	34,150	41	3,146	76	5,831	11	844	300	23,020
3	Primary Influent	9.33	6,479	451	35,080	502	39,070	451	35,100	50	3,926	86	6,698	17	1,361	352	27,360
4	Primary Effluent	9.30	6,457	307	23,830	323	25,010	290	22,460	50	3,913	73	5,687	15	1,175	352	27,270
5	Activated Sludge Feed (w/out RAS)	9.94	6,902	293	24,300	325	26,900	288	23,870	47	3,920	70	5,840	15	1,267	340	28,190
7	Aeration Basins Effluent	18.95	13,160	626	98,840	2,804	443,100	2,080	328,700	1	205	210	33,220	135	21,290	172	27,200
8	Secondary Clarifiers Effluent	9.40	6,530	4	289	10	792	7	588	1	102	3	233	1	77	172	13,500
9	Filtration (Disk) Influent	9.40	6,530	4	289	10	792	7	588	1	102	3	233	1	77	172	13,500
10	Filtration (Disk) Effluent	9.24	6,419	2	141	2	138	1	102	1	100	2	182	1	45	172	13,270
11	Filtration (Media) Influent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Filtration (Media) Effluent	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	UV Influent	9.24	6,419	2	141	2	138	1	102	1	100	2	182	1	45	172	13,270
17	Plant Discharge	9.24	6,419	2	141	2	138	1	102	1	100	2	182	1	45	172	13,270
23	Primary Sludge	0.03	22	42,390	11,250	53,000	14,070	47,600	12,630	50	13	3,811	1,011	702	186	352	93
24	Secondary Sludge (RAS plus WAS)	9.54	6,626	1,238	98,550	5,558	442,300	4,123	328,100	1	104	415	32,990	267	21,210	172	13,700
25	RAS	9.01	6,254	1,238	93,020	5,558	417,500	4,123	309,700	1	98	415	31,140	264	19,810	172	12,930
26	WAS	0.54	372	1,238	5,529	5,558	24,810	4,123	18,410	1	6	415	1,851	264	1,177	172	769
28	TWAS	0.05	38	11,580	5,251	52,000	23,570	38,580	17,490	1	1	3,860	1,750	2,463	1,116	172	78
29	Digesters Sludge Influent	0.09	60	22,960	16,500	52,370	37,640	41,910	30,120	19	14	3,842	2,761	1,812	1,302	239	171
30	Digested Sludge to Storage	0.09	60	9,421	6,771	29,740	21,370	19,280	13,860	1,354	973	3,112	2,237	1,812	1,302	7,606	5,467
31	Digested Sludge Effluent from Storage Tank	0.09	60	9,305	6,687	29,350	21,090	18,890	13,580	1,389	999	3,112	2,237	1,812	1,302	7,732	5,557
32	Belt Filter Press Influent	0.09	60	9,305	6,687	29,350	21,090	18,890	13,580	1,389	999	3,112	2,237	1,812	1,302	7,732	5,557
33	Dewatered Biosolids to Composting/Injection	0.02	13	37,700	5,916	125,000	19,620	80,470	12,630	1,389	218	8,727	1,370	5,004	785	7,732	1,213
35	DAF Underflow to Activated Sludge	0.48	334	79	316	309	1,241	230	920	1	5	25	101	15	61	172	691
36	Belt Filter Press Filtrate Return	0.13	90	515	555	1,368	1,477	881	951	723	780	804	867	479	517	4,025	4,343
37	Filter Backwash	0.16	112	110	148	488	654	362	485	1	2	38	52	24	32	172	231

Mass Balance Notes

The flow and loadings above are **daily average** values.

For solids streams, the actual flows may be different if the unit performance does not meet the concentration limits. Bracket flows based on **mass loading** with accomodation for lower/higher concentrations. Instantaneous flow for solids streams is often intermittent and higher to match minimum pipe velocities and actual operating conditions. Adjust to match mass loading.

Filter backwash is calculated as a 24-hour average flow. Instantaneous flows will be higher, pending the operating strategy. Adjust instantaneous flows as needed.

Table F - 13. 25-year Projection: Tier 2 – Peak Flow Mass Balance Results

Line	Name	Flow		BOD		TSS		VSS		NH4		TN		TP		Alk	
		mgd	gpm	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d	mg/L	lb/d
1	Raw influent	27.00	18,750														
3	Primary Influent	27.44	19,060														
4	Primary Effluent	27.34	18,990														
5	Activated Sludge Feed (w/out RAS)	27.84	19,330														
7	Aeration Basins Effluent	54.03	37,520														
8	Secondary Clarifiers Effluent	27.31	18,960														
9	Filtration (Disk) Influent	27.31	18,960														
10	Filtration (Disk) Effluent	27.15	18,850														
11	Filtration (Media) Influent	0.00	0														
12	Filtration (Media) Effluent	0.00	0														
16	UV Influent	27.15	18,850														
17	Plant Discharge	27.15	18,850														
23	Primary Sludge	0.10	72														
24	Secondary Sludge (RAS plus WAS)	26.72	18,560														
25	RAS	26.20	18,190														
26	WAS	0.53	367														
28	TWAS	0.19	132														
29	Digesters Sludge Influent	0.29	205														
30	Digested Sludge to Storage	0.29	205														
31	Digested Sludge Effluent from Storage Tank	0.29	205														
32	Belt Filter Press Influent	0.29	205														
33	Dewatered Biosolids to Composting/Injection	0.06	45														
35	DAF Underflow to Activated Sludge	0.34	234														
36	Belt Filter Press Filtrate Return	0.44	308														
37	Filter Backwash	0.16	112														

Mass Balance Notes

The flow and loadings above are **daily average** values.

For solids streams, the actual flows may be different if the unit performance does not meet the concentration limits. Bracket flows based on **mass loading** with accomodation for lower/higher concentrations. Instantaneous flow for solids streams is often intermittent and higher to match minimum pipe velocities and actual operating conditions. Adjust to match mass loading.

Filter backwash is calculated as a 24-hour average flow. Instantaneous flows will be higher, pending the operating strategy. Adjust instantaneous flows as needed.

Appendix G. Asset Inventory Raw Data Output

OBJECTID	Building Name	Name	Asset ID	Equipment ID	Process	System	Pump Type	Pump Purpose	INSTALLATIONYEAR	Notes	Elec Manufacturer Name	Elec Model Number	Elec Serial Number	Elec Power	Elec Speed	Elec Voltage	Elec Phase	Elec Frequency	Elec Amps	Mech Manufacturer Name	Mech Model Number	Mech Serial Number	Mech Power	Mech Drive Type	Mech Total Head Pressure	Mech Flow Rate	Mech Flow Rate Units	Mech Speed	Mech Total Head Pressure Units
12	Headworks	Grit Pump 1		GRP-1	Preliminary Treatment	Grit Removal	Vortex	Grit Pump	2000	Impeller Size: 11- inches,	Reliance Electrical	XE	P21G7402 MA	7.5	1750	460	60	3	9.1	Wemco Pump Company	4 x11 CE	99W22628	7.5	Belt	25	305	GPM	860	
10	Headworks	Grit Pump 2		GRP-2	Preliminary Treatment	Grit Removal	Vortex	Grit Pump	2000	Impeller Size: 11 - inches	Reliance Electrical	XE	P21G7402 MA	7.5	1750	460	3	60	9.1	Wemco Pump Company	Vortex Pump	99W22627	7.5	Belt	17	400	gpm	740	
91	Headworks	Influent Wetwell Scum Pump		SCMP-1	Preliminary Treatment		Submersible	Scum Pump	2000	This pump is not used very often because the v-notch weir gate used to remove grease balls from the inf. wet well does not work well in that application.	Flygt Corporation	3102.180-6104	3102.180-0010739	4	1750	460	3	60	5	Flygt Corporation	3102.180-6104	3102.180-0010739	3.7	Direct				1750	
49	Headworks	Headworks Influent Pump 1		IP-1	Preliminary Treatment	Conveyance	Submersible		2000		Flygt Corporation	M35-35-8AA/1	3356/665-0021064	85	880	460	3	60	111	Flygt	3356/665-5051	3356/665-0021064	85	None	0		gpm	880	
60	Headworks	Headworks Influent Pump 2		IP-2	Preliminary Treatment	Conveyance	Submersible		2000		Flygt Corporation	M35-35-8AA/1	3356665-0021D62	85	880	460	3	60	111	Flygt Corporation	M35-35-8AA/1	3356/665-0021D62	85	Fixed			gpm	880	
63	Headworks	Headworks Influent Pump 3		IP-3	Preliminary Treatment	Conveyance	Submersible		2000		Flygt Corporation	M35-35-8AA/1	3356/665-0021065	85	880	460	3	60	111	Flygt Corporation	M35-35-8AA/1	3356/665-0021065	85	Fixed			gpm	880	
64	Headworks	Headworks Influent Pump 4		IP-4	Preliminary Treatment	Conveyance	Submersible		2000		Flygt Corporation	M35-35-8AA/1	3356/665-0021063	85	880	460	3	60	111	Flygt Corporation	M35-35-8AA/1	3356/665-0021D63	85	Fixed			gpm	880	
56	Primary Clarifier 1	Primary Scum Pump 1		SCMP-2A	Primary Treatment	Primary Clarification	Submersible	Scum Pump	2000	Wetwell located between PC-01 & PC-02	Flygt Corporation	NP 3085 MT	3085.160 1280060	3	1700	460	3	60	4.3	Flygt	NP 3085 NT	3085.160 1280060	3	Fixed			gpm	1700	
57	Primary Clarifier 1	Primary Scum Pump 2		SCMP-2B	Primary Treatment	Primary Clarification	Submersible	Scum Pump	2000	Wetwell located between PC-01 & PC-02	Flygt Corporation	NP 3085 NT	3085.160 1280060	3	1700	460	3	60	4.3	Flygt Corporation	NT3085-462	3085.160 1280060	3	Fixed			gpm	1700	
21	Headworks	Primary Sludge Pump 1		PSP-1	Primary Treatment	Primary Clarification	Progressive Cavity	Primary Sludge Pump	2000	Inlet/Outlet Pipe Diameter: 6-inch, Operating speed: 120-240 rpm, Flow: 75-150 gpm	Reliance Electrical	TFSC-XENT	5533805A-001-CC	40	1775	460	3	60	47.7	Netzch Incorporated	2NE90A/0301663499		40		75	150	gpm	1750	
22	Headworks	Primary Sludge Pump 2		PSP-2	Primary Treatment	Primary Clarification	Progressive Cavity	Primary Sludge Pump	2000	Inlet/Outlet Pipe Diameter: 6-inch	Reliance Electrical	TEFC-XEXT	5533805A-001-CC	40	1730	460	3	60	2	Netzch Incoporated	2NE90A/0301663499		40		100		gpm	1750	
23	Headworks	Primary Sludge Pump 3		PSP-3	Primary Treatment	Primary Clarification	Progressive Cavity	Primary Sludge Pump	2000	Inlet/Outlet Pipe Diameter: 6-inch	Reliance Electrical	P3201036	5533805A-001-CC	40	1750	460	3	60	47.7	Netzch Incoporated	2NE90A/0301663499	4950232	40	Reducer: 19991214100800, RPM: 358	100		gpm	1750	
127	Admin Bldg	Mixed Liquor Recycle Pump 1			Secondary Treatment	Aeration Basins	Submersible	Solids Transfer Pump	1982		Flygt	3300.181-0160113		45	875	460	3	60	60	Flygt	3300.181-2994		45	Direct		5333	gpm	875	
32	DAF Bldg 1	RAS Pump 3			Secondary Treatment	Aeration Basins	Centrifugal	Solids Transfer Pump	1982	Impeller Diameter: 19.12-inches	Marathon Electric	ML444TTDS7131AN W		50	705	460	3	60	60	Allis Chalmers	150	821-37560-01-1	50	VFD	43	2267	gpm	695	
152	Secondary Clarifiers 6	Secondary Clarifier 5 & 6 Sludge Pump 1		SCSTP-01	Secondary Treatment	Secondary Clarifier Basins	Submersible	Solids Transfer Pump	2009	821 Impeller	Flygt Corporation	CP3201-821		30	860	460	3	60	41	Flygt Corporation	CP3201.180	3201.180 0880035	30	Direct	26	3125	GPM	860	
153	Secondary Clarifiers 6	Secondary Clarifier 5 & 6 Sludge Pump 2		SCSTP-02	Secondary Treatment	Secondary Clarifier Basins	Submersible	Solids Transfer Pump	2009	821 Impeller	Flygt Corporation	CP3201-821		30	860	460	3	60		Flygt Corporation	CP3201.180	3201.180 0880036	30	Direct	26	3125	gpm	860	
155	Secondary Clarifiers 6	Secondary Clarifier 5 & 6 Scum Pump 1		SCSP-01	Secondary Treatment	Secondary Clarifier Basins	Submersible	Scum Pump	2009	462 Impeller	Flygt Corporation	NP3085-462		3	1705	460	3	60	4.5	Flygt Corporation	NP3085.183	3085.183 0880901	3	Direct	20	100	gpm	1705	
156	Secondary Clarifiers 6	Secondary Clarifier 5 & 6 Scum Pump 2		SCSP-02	Secondary Treatment	Secondary Clarifier Basins	Submersible	Scum Pump	2009	462 Impeller	Flygt Corporation	NP3085-462		3	1705	460	4	60	4.5	Flygt Corporation	NP 3085.183	3085.183 0880902	3	Direct	20	100	gpm	1705	
30	DAF Bldg 1	RAS Pump 1			Secondary Treatment	Aeration Basins	Centrifugal	Solids Transfer Pump	1982	VFD available but not functioning	Marathon Electric	ML444TTDS7131AN W		50	705	460	3	60	72	Allis Chalmers	150		50	VFD	43	2267	gpm	695	
169	Admin Bldg	ML Recycle Room Sump Pump 1			Secondary Treatment	Drainage	Submersible		1982		Marathon	MD145tTDR8948AB		2	1735	460	3	60	3	Peerless	VCS NSC 4-A		2	Direct	20	100	gpm	1750	
168	Admin Bldg	ML Recycle Room Sump Pump 2			Secondary Treatment	Drainage	Submersible		1982		Baldor Industrial Motor	VM3154T		1.5	1725	460	3	60	2.4	Peerless Pumps	VCS NSC 4A	196704A	1.5	Direct	20	100	gpm	1725	
129	Admin Bldg	Mixed Liquor Recycle Pump 3			Secondary Treatment	Aeration Basins	Submersible	Solids Transfer Pump	1982		Flygt Corporation	3300.181-0160112		40	875	460	3	60		Flygt Corporation	3300.181-2994		40	Direct		5333	gpm	875	
130	Admin Bldg	Mixed Liquor Recycle Pump 4			Secondary Treatment	Aeration Basins	Submersible	Solids Transfer Pump	1982		Flygt Corporation	3300.181-0360064		40	875	460	3	60		Flygt Corporation	3300.181-2994		40	Direct		5333	gpm	875	
131	Admin Bldg	Mixed Liquor Recycle Pump 5			Secondary Treatment	Aeration Basins	Submersible	Solids Transfer Pump	1982		Flygt Corporation	3300.181-01610114		40	875	460	3	60		Flygt Corporation	3300.181-2994		40	Direct		5333	gpm	875	
128	Admin Bldg	Mixed Liquor Recycle Pump 2			Secondary Treatment	Aeration Basins	Submersible	Solids Transfer Pump	1982		Flygt Corporation	3300.181-0360065		40	875	460	3	60		Flygt Corporation	3300.181-2994		40	Direct		5333	gpm	875	
31	DAF Bldg 1	RAS Pump 2			Secondary Treatment	Aeration Basins	Centrifugal	Solids Transfer Pump	1982		Marathon Electric	ML444TTDS7131AN W		50	705	460	3	60	72	Allis Chalmers	150		50	VFD	43	2267	gpm	696	
51	DAF Bldg 2	DAF Recirculation Pump 2		RP-02	Solids Handling	DAF Thickening	Centrifugal	Recirculating Pressure Pump	2009		Flowserve	B478381	B478381-020 L002 CM	20	3600	460	3	60	23.79999924	Flowserve	1K3 x 1.5-82RV M3 ST FPD-DCI	0209-2487 B	20	Fixed	166	180	gpm	3600	
50	DAF Bldg 2	Recirculating Pump 1		RP-01	Solids Handling	DAF Thickening	Centrifugal	Recirculating Pressure Pump	2009		Flowserve	B478381	B478381-020 L001 CM	20	3600	460	3	60	23.8	Flowserve	1K3 X 1.5-82RV M3 ST FPD-DCI	0209-2487 A	20	Fixed	166	180	gpm	3600	
69	DAF Bldg 2	Recirculation Pump 2		RP-02	Solids Handling	DAF Thickening	Centrifugal	Recirculating Pressure Pump	2009		Flowserve	B478381	B478381-020 L002 CM	20	3600	460	3	60	23.8	Flowserve		0209-2487 B	20	Fixed	166	180	gpm	3600	
94	DAF Bldg 1	DAF Sludge Pump 1		WAS 1	Solids Handling	DAF Thickening	Progressive Cavity	Solids Transfer Pump	2009	Nord Reducer: 4.92:1	Nord	180 LX/4 TWI TWI	8109331861 00	30	1750	460	3	60	35.5	Netzsch	NM090BY02D09K.	USB76149	30	Reducer	75	350	gpm	345	
97	DAF Bldg 1	DAF Sludge Pump 3		DAF Float Pump 3	Solids Handling	DAF Thickening	Progressive Cavity	Recirculating Pressure Pump	2009	Nord Reducer: 4.92:1	Nord	SK 872		30	1750	460	3	60		Netzch Incoporated	NM090BY02D09K	USB76147	30	Reducer	75	350	gpm	345	
98	DAF Bldg 1	DAF Sludge Pump 4		DAF Float Pump 4	Solids Handling	DAF Thickening	Progressive Cavity	Solids Transfer Pump	2009	Nord Reducer: 4.92:1	Nord	SK 872		30	1750	460	3	60		Netzch Incoporated	NM090BY02D09K	USB76145	30	Reducer	75	350	gpm	345	
16		DAF Polymer Feed Pump 1			Solids Handling	DAF Thickening	Metering-Diaphragm		2008	LMI Pump, Part of the Polyblend System, Polymer Feed Rate: 0.05 -1 gph						115	1	60											
53	DAF Bldg 2	DAF 3 Thickened Sludge Transfer Pump 2		TSTP-02	Solids Handling	DAF Thickening	Progressive Cavity	Solids Transfer Pump	2009		Nord	SK872		30	1800	460	3	60	35.5	Netzsch	NM090BY02D09K		30	Variable	75	300	gpm	295	

OBJECTID	Building Name	Name	Asset ID	Equipment ID	Process	System	Pump Type	Pump Purpose	INSTALLATIONYEAR	Notes	Elec Manufacturer Name	Elec Model Number	Elec Serial Number	Elec Power	Elec Speed	Elec Voltage	Elec Phase	Elec Frequency	Elec Amps	Mech Manufacturer Name	Mech Model Number	Mech Serial Number	Mech Power	Mech Drive Type	Mech Total Head Pressure	Mech Flow Rate	Mech Flow Rate Units	Mech Speed	Mech Total Head Pressure Units
52	DAF Bldg 2	DAF 3 Thickened Sludge Transfer Pump 1		TSTP-01	Solids Handling	DAF Thickening	Progressive Cavity	Solids Transfer Pump	2009		Nord	SK872	8109331564 00	30	1800	460	3	60	35.5	Netzsch	NM090BY02D 09K		30	Variable	75	300	gpm	295	
159	Digester Building	Rotary Pump 1			Solids Handling	Anaerobic Digesters	Rotary Lobe	Solids Transfer Pump	2012		Westinghouse	Optim HE	HH678095000 3	7.5	1170	460	3	60	9.5	Borgor	FL-518	12006881 1.1		Belt					
209	Digester Building	Sludge Transfer Pump 2		P-2-6-2	Solids Handling	Anaerobic Digesters	Progressive Cavity	Solids Transfer Pump	2014		Reliance	Duty Master	7383181-001 l002 FK	20	1760	460	3	60	24	Netzsch	NM076SY01L0 7K								
140	Digester Building	Secondary Hot Water Pump 2		P-4-5-2	Solids Handling	Anaerobic Digesters	Centrifugal		1992		Baldor Reliance		F1302142016	5		460	3	60		Paco Pumps	2050-1	1971084372-10	5		62	150	gpm		
157	Digester Building	Rotary Pump 2			Solids Handling	Anaerobic Digesters	Rotary Lobe	Solids Transfer Pump	2011				LFH15A40900 2	7.5	1170	460	3	60	9.95	Borger				Belt					
141	Digester Building	Secondary Hot Water Pump 3		P-4-5-3	Solids Handling	Anaerobic Digesters	Centrifugal		1992		Baldor Reliance		F1204120876	5		460	3	60		Paco Pumps	2050-1		5	Direct	62	150	gpm		
139	Digester Building	Secondary Hot Water Pump 1		P-4-5-1	Solids Handling	Anaerobic Digesters	Centrifugal		1992		Baldor Reliance	JMM3212T		5	3450	460	3	60	6.1	Paco Pumps	2050-1	1971078856-10	5	Direct	67	199	gpm	3450	Feet
137	Digester Building	Primary Hot Water Pump North		P-4-3-1	Solids Handling	Anaerobic Digesters	Centrifugal		1992	Newer motor	Baldor Reliance	Super E motor	F1110211963	3	1765	460	3	60	4.2	Paco Pumps	2570-7	916/8421	3	Direct	127	395	gpm	1765	Feet
138	Digester Building	Primary Hot Water Pump South		P-4-3-2	Solids Handling	Anaerobic Digesters	Centrifugal		1992	Motor nameplate painted over. Last lube 1/14				3		460	3	60		Paco Pumps	2570-7		3		34	180	gpm		
158	Digester Building	Rotary Pump 3			Solids Handling	Anaerobic Digesters	Rotary Lobe	Solids Transfer Pump	2008		Westinghouse		KFH15743201 2	7.5	1170	460	3	60	9.95	Borger									
231	Dewatering Bldg	Washwater Booster Pump 2		WP-2	Solids Handling	Sludge Dewatering	Centrifugal		2008					5	3538	460	3	60		Peerless	C810A AMBF		5.61	Close coupled	65	90	gpm	3538	
230	Dewatering Bldg	Washwater Booster Pump 1		WP-1	Solids Handling	Sludge Dewatering	Centrifugal		2008					5	3538	460	3	60		Peerless	C810A AMBF		5.61	Close coupled	65	90	gpm	3538	
95	DAF Bldg 1	DAF Sludge Pump 2		WAS 2	Solids Handling	DAF Thickening	Progressive Cavity	Solids Transfer Pump	2009	Nord Reducer: 4.92:1	Nord	SK 872		30	1750	460	3	60		Netzch Incoporated	NM090BY02D 09K	USB76148	30	Reducer	75	350	gpm	345	
36	Filters	Sand Filter 1 Skimming Pump			Tertiary Treatment		Submersible		1997	TDH: 17 Feet,	Flygt Corporation	CT3085-438		2	1180	460	3	60		Flygt Corporation	CT3085-438		2		17	75	gpm	1180	
40	Filters	Sand Filter 2 Backwash/Wash Water Pump			Tertiary Treatment		Submersible		1997	Flange: 3-inch	Flygt Corporation	NT3085-462		4.7	1780	460	3	60		Flygt Corporation	NT3085-462		4.7		17	400	gpm	1780	
39	Filters	Sand Filter 1 Backwash/Wash Water Pump			Tertiary Treatment		Submersible		1997	Flange: 3-inch	Flygt Corporation	NT3085-462		4.7	1780	460	3	60		Flygt Corporation	NT3085-462		4.7		17	400	gpm	1780	
37	Filters	Sand Filter 2 Skimming Pump			Tertiary Treatment		Submersible		1997		Flygt Corporation	CT3085-438		2	1180	460	3	60		Flygt Corporation	CT3085-438		45		17	75	gpm	1180	
237	Filters	Wetwell Sump Pump 3		TTDP-3	Tertiary Treatment	DIsc Filters	Submersible		1998		Flygt Corporation			25		460	3	60		Flygt Corporation			25						
236	Filters	Wetwell Sump Pump 2		TTDP-2	Tertiary Treatment	DIsc Filters	Submersible		1998		Flygt Corporation			25		460	3	60		Flygt Corporation			25						
233	Filters	Wetwell Sump Pump 1		TTDB-1	Tertiary Treatment	DIsc Filters	Submersible		1998		Flygt Corporation			25		460	3	60		Flygt Corporation			25						
45	WWTP Pump	Non-Potable Water Pump 2		NPWP-02		Utilities	Vertical Turbine		1999		US Electrical Motors	Premium Efficiency	C12 99002890-001 R-2	75	1800	460	3	60	87	Sterling Peerless Pump Inc.	12MB 6 stage	516992VY-1	75	VFD	280	750	gpm	1780	
48	WWTP Pump	Non-Potable Water Pump 3		NPWP-03		Utilities	Vertical Turbine		1999		US Electrical Motors	Premium Efficiency	C12 99002890-001R-01	75	1800	460	3	60	87	Sterling Peerless Pump Inc.	12MB 6 stage	516992VY-3	75	Fixed	280	750	gpm	1780	
46	WWTP Pump	Non-Potable Water Pump 1		NPWP-01		Utilities	Vertical Turbine		1999		US Electrical Motors	Premium Efficiency	C11 99002905-001R-01	75	1800	460	3	60	87	Sterling Peerless Pump Inc.	12MB 6 stage	516992VY-2	75	VFD	280	750	gpm	1780	
136		test																											
9	Headworks	Headworks Sump Pump 2				Drainage	Centrifugal		2000	3 hp, Size: 2-inch, Impeller Size: 3.81-inch				3		460	3	60		FE Myers Pumps	3 MW Series Double Seal Pump		3						
162	FeCl2 Injection	FeCl2 Metering Pump 1		FP-01		Ferric Chloride	Metering-Diaphragm		2009							120	1	60		LMI Milton Roy	C931-318SI	10032933066-1			60	8	gph		PSI
161	FeCl2 Injection	FeCl2 Metering Pump 2		FP-02		Ferric Chloride	Metering-Diaphragm		2009							120	1	60		LMI Milton Roy	C931-318SI	00012901503-1			60	8	gph		PSI
234		Test pic														460	3	60											
210	Digester Building	Sludge Transfer Pump 1		P-2-6-1		Anaerobic Digesters	Progressive Cavity	Solids Transfer Pump	2007		Reliance	Duty Master	7383181-001 L001 FK	20	1760	460	3	60	24	Netzch Incoporated	NM076BY01L0 7K								
235	WWTP Pump	Sump Pump 1		SP-2A		Drainage	Submersible		1999		Myers			0.5		460	3	60											
266	WWTP Pump	Sump Pump 2		SP-2B		Drainage	Submersible		1999		Myer			0.5		460	3	60											
11	Headworks	Headworks Sump Pump 1				Drainage	Submersible		2000	Size: 2-inch, Impeller Size: 3.81-inches. Review ops. May be able to increase wet well depth to minimize run tip.				3		460	3	60		FE Myers Pumps	3 NW Series Double Seal Pump		3						
196	Post Aeration Basin	Post Aeration Sump Pump		PASP-01		Drainage	Submersible		2009	463 Impeller	Flygt Corporation	NP3102	18-11-4AL	5	1745	460	3	60	6.7	Flygt Corporation	NP3102	3102.181 0880921	5	Direct	30	200	gpm	1745	

OBJECTID	Building Name	Name	Asset Id	Equipment ID	Process	System	INSTALLATIONYEAR	Blower Type	Notes	Manufacturer Name	Model Number	Serial Number	Speed	Voltage	Phase	Frequency	AMB	Air Flow	DESIGNFLOW	Mean Operating Pressure	Motor Power	Motor Manufacturer
7	Grit Blower Bldg	Grit Basin Blower 1		GB-1	Preliminary Treatment	Grit Removal	2000	Positive Displacement	Motor Model C42311,	Gardner Denver Blower System	GAEMDRA	S292921	1725	460	3	60		430	1394227.221	7.5	30	Elektrim
30	Grit Blower Bldg	Grit Basin Blower 2		GB-2	Preliminary Treatment	Grit Removal	2000	Positive Displacement	Serial C 02110	Excelsior Blower Systems	Suttorbilt 5LB		2489	460	3	60		430	0	7.5	30	Elektrim
38	Turblex Blower Bldg	Aeration Basin Blower 1		B-3710	Secondary Treatment	Aeration Basins	1991	Energy Efficient	Motor Model:Duty Master Large AC Motor, ID#;VAQ10143-A3-XT	Turblex	KA5SV-GA200	3164	3571	460	3	60	40	3328	1.73685E+11	20.83	300	Reliance
20	Hoffman Blower Bldg	Hoffman Blower 1		B-1	Secondary Treatment	Bioselector Basins	1992	Centrifugal	Main duty- supply air to Bioselectors	JCH Incorporated/Siemens/Hoffman	5KS256BD205C		3570	460	3	60			3950		200	Siemens
22	Hoffman Blower Bldg	Hoffman Blower 2		B-2	Secondary Treatment	Bioselector Basins	1992	Centrifugal	Main duty - supply air to Bioselectors	JCH Incorporated/Siemens/Hoffman	5KS256BD205C	M028010	3570	460	3	60	40		0		200	Siemens
23	Hoffman Blower Bldg	Hoffman Blower 3		B-3	Secondary Treatment	Bioselector Basins	1992	Centrifugal	Main duty - supply air to Bioselectors	JCH Incorporated/Siemens/Hoffman	5KS256BD205C	M028020	3570	460	3	60	40		7.82289E+20		200	Siemens
27	Hoffman Blower Bldg	Sutorbilt Blower 1		B-5	Secondary Treatment	Bioselector Basins	2015	Positive Displacement	New blower, original motor	Gardner Denver - Sutorbilt	GACMDRA	S469647	1770	460	3	60					20	GE
66	Hoffman Blower Bldg	Sutorbilt Blower 2		B-5	Secondary Treatment	Bioselector Basins	1992	Positive Displacement	Motor Model #: 5KS256BD205C, belt drive	Colorado Compressor Inc.	GACMDPA	S125183	1770	460	3	60	40				20	GE Motors
41	Turblex Blower Bldg	Aeration Basin Blower 2		B-3720	Secondary Treatment	Aeration Basins	1991	Energy Efficient	Model: Duty Master Large AC Motor, ID#: VAQ10143-A1-XT	Turblex	KA5SV-GA200	3165	3571	460	3	60	40	3328	3500	20.83	300	Reliance Electric
42	Turblex Blower Bldg	Aeration Basin Blower 3		B-3730	Secondary Treatment	Aeration Basins	1991	Energy Efficient	Model: Duty Master Large AC Motor, ID#: VAQ10143-A2-XT	Turblex	KA5SV-GA200	3166	3571	460	3	60	40	3328	3500	20.83	300	Reliance
34	Post Aeration Basin	Post Aeration Blower 1		PAB-01	Tertiary Treatment	Post Aeration Basins	2009	Positive Displacement	Motor HP: 15, Speed: 3600, Model #: 01536EP3E254TF3, Serial #: M08L-70042	Aerzen	GM 10S	917743	2980	460	3	60	40	217	217	8	15	
33	Post Aeration Basin	Post Aertion Blower 2		PAB-02	Tertiary Treatment	Post Aeration Basins	2009	Positive Displacement	Motor HP: 15, Speed: 3600, Model #: 01536EP3E254TF3, Serial #: M08L-70043	Aerzen	GM 10S	917747	2980	460	3	60	40	217	1.25041E+16	8	15	
85	UV Disinfection	UV Regenerative/Chemical Clean Blower		UVRB-1	Tertiary Treatment	Disinfection	1996	Centrifugal	Used for UV bulb cleaning.	Gast	T17100A-3		3450	220	3	60		430			10	Baldor Industrial Motor

OBJECTID	Building Name	Name	Basin Type	Equipment Id	Asset Id	Process	System	INSTALLATION YEAR	Diameter	Length	Width	Water Depth	Tank Area	Operating Volume	Material	Solids Float Skimmer Collector Type	Settled Sludge Collector Type	Basin Location	Notes	Elec1 Manufacturer Name	Elec1 Model Number	Elec1 Serial Number	Elec1 Power	Elec1 Drive Type	Elec1 Speed	Elec1 Output Speed	Elec1 Voltage	Elec1 Phase
68	Aerated Grit Basin	Grit Basin 1	Grit			Preliminary Treatment	Grit Removal	1999						30600	Concrete			East of Headworks										
41	Aerated Grit Basin	Grit Basin 2	Grit			Preliminary Treatment	Grit Removal	1999						30600	Concrete			East of Headworks										
21	Headworks	Influent Channel 1	Channel			Preliminary Treatment	Conveyance	2000						27000000	Concrete			Headworks										
38	Headworks	Influent Flow Meter Flume	Flume			Preliminary Treatment	Conveyance	2000			36			32.57														
23	Headworks	Influent Channel 2	Channel	Influent Channel 2		Preliminary Treatment	Conveyance	2000						27000000	Concrete			Headworks										
117	Headworks	Influent Wetwell 1	Wetwell			Preliminary Treatment	Conveyance	2000							Concrete													0
24	Primary Clarifier 1	Primary Clarifier 1	Primary Clarifier			Preliminary Treatment	Primary Clarification	2000				12	6940	580600	Concrete			North of Headworks										
119	Headworks	Influent Wetwell 2	Wetwell			Preliminary Treatment	Conveyance	2000							Concrete													
43	Primary Clarifier 2	Primary Clarifier 2	Primary Clarifier	PC-2		Primary Treatment	Primary Clarification	2000	94			12	6940	580600	Concrete	Westech Engineering inc. Model #: COPC 2,	Westech Engineering Inc. Model # COPC 2	North of Grit Blower Building		Baldor Reliance Industrial Motor	VM3539	W0809100937	0.5	SM-CYCLO Speed Reducer	1140	2	230	3
59	Bioselector Basins	Bioselector Collection Box	Bioselector			Secondary Treatment	Bioselector Basins					4	28	838	Concrete			North of Aeration Basins	Lines Entering this asset: 42-inch MLSS, 8-inch Plant Drain, 18-inch RAS, 8-inch DAF Underdrain									
60	Bioselector Basins	Rapid Mix Tank	Bioselector			Secondary Treatment	Bioselector Basins					12.5	144	13464	Concrete			Norht of DAF Building 1										
145	Secondary Clarifiers 6	Secondary Clarifier 6	Secondary Clarifier			Secondary Treatment	Secondary Clarifier Basins	2009		176	32	12			Concrete	Eurodrive	Eurodrive	West of Bioselector Basins		Eurodrive	R87R57DT71-D4		0.5	Eurodrive	1800	0.63	460	3
124	Secondary Clarifiers 1	Secondary Clarifier 1	Secondary Clarifier			Secondary Treatment	Secondary Clarifier Basins	1982		180	30	12	5440	488294	Concrete	Leopold	Leopold	West of Bioselector Basins		Baldor Reliance		W1406041064	0.33	Chain	1750		90	3
125	Secondary Clarifiers 2	Secondary Clarifier 2	Secondary Clarifier			Secondary Treatment	Secondary Clarifier Basins	1982		180	30	12	5440	488294	Concrete	Leopold	Leopold	West of Bioselector Basins		Baldor Reliance		W1503121239	0.33		1750		90	3
128	Secondary Clarifiers 3	Secondary Clarifier 3	Secondary Clarifier			Secondary Treatment	Secondary Clarifier Basins	1982		180	30	12	5440	488294	Concrete			West of Bioselector Basins	Ratio 150:1	Baldor Reliance		W1505121179	0.33	Magnetic	1750		90	3
129	Secondary Clarifiers 4	Secondary Clarifier 4	Secondary Clarifier			Secondary Treatment	Secondary Clarifier Basins	1982		180	30	12	5440	488294	Concrete			West of Bioselector Basins		Bald or Reliance	CDP3320	W1504171319	0.33	Magnetic	1750		90	3
144	Secondary Clarifiers 5	Secondary Clarifier 5	Secondary Clarifier			Secondary Treatment	Secondary Clarifier Basins	2009		176	32	12			Concrete	Eurodrive	Eurodrive	West of Bioselector Basins	Input 1700, Output 61 rpm	Eurodrive	R87R57DT71-D4		0.5	Eurodrive	1700	0.63	460	3
86	Aeration Basin 1	Aeration Basin 1	Aeration Basin			Secondary Treatment	Aeration Basins	1982		261.5		16	53559	2940000	Concrete			North of Bioselector Basins	Fine Bubble Diffusers									
87	Aeration Basin 2	Aeration Basin 2	Aeration Basin			Secondary Treatment	Aeration Basins	1982		261.5		16	53559	2940000	Concrete			North of Bioselector Basins	Fine Bubble Diffusers									
47	Bioselector Basins	Anoxic Basin 2	Bioselector			Secondary Treatment	Bioselector Basins	1982				16.7	2601	325000	Concrete			North of Aeration Basins										
51	Bioselector Basins	Anoxic Basin 4	Bioselector			Secondary Treatment	Bioselector Basins	1982				16.7	2601	325000	Concrete			North of Aeration Basins										
48	Bioselector Basins	Anoxic Basin 3	Bioselector			Secondary Treatment	Bioselector Basins	1982				16.7	2601	325000	Concrete			North of Aeration Basins										
46	Bioselector Basins	Anoxic Basin 1	Bioselector			Secondary Treatment	Bioselector Basins	1982				16.7	2601	325000	Concrete			North of Aeration Basins										
81	DAF Bldg 1	DAF Basin 2	Dissolved Air Flotation			Solids Handling	DAF Thickening			48	12	8	576	13820	Concrete	Chain and Flight	Chain and Flight	DAF Building 1		General Electric	Statotrol	HU8-1121-HU	1.5	Chain drive 6CTDM 500:1,	1750		180	3
80	DAF Bldg 1	DAF Basin 1	Dissolved Air Flotation			Solids Handling	DAF Thickening	2000		48	12	8	576	13820	Concrete	Chain and Flight	Chain and Flight	South of Bioselectors	Rex Drive, Drive 1-Float, Drive 2-Sludge	GE Motors	Statotrol	ON-8-190-ON	1.5	Chain drive: Winsmith-Reducer 500:1	1750		180	3
30	DAF Bldg 2	DAF Basin 3	Dissolved Air Flotation			Solids Handling	DAF Thickening	2010		40	12	8.67	480	31000	Concrete	Chain and flight	Chain and flight	DAF Building 2		Eurodrive	K77R37D16BD T71D4-KS		0.5	Variable with gear reducer	1800 Adjustable		460	3
94	Sludge Storage Tank 1	Sludge Storage Tank 1				Solids Handling	Sludge Holding	1961	85			15	5672	635000	Concrete			South of DAF 2 Building										
95	Sludge Storage Tank 2	Sludge Storage Tank 2				Solids Handling	Sludge Holding	1961	90					1617923	Concrete			East of Sludge Drying Beds										
167	Digester 1	Anaerobic Digester 1				Solids Handling	Anaerobic Digesters	1961	55			24		453147	Concrete			North of Compost Basin										
168	Digester 2	Anaerobic Digester 2				Solids Handling	Anaerobic Digesters	1961	55			22.5		462032	Concrete			North of Compost Basin										
111	Filters	Sand Filter 4	Filter			Tertiary Treatment	Sand Filters (Not Active)	1997		102	16		1568	95780	Concrete			South of UV Disinfection Building	Plate type: Pourous									
110	Filters	Sand Filter 5	Filter			Tertiary Treatment	Sand Filters (Not Active)	1997		102	16		1568	95780	Concrete			South of UV Disinfection Building	Plate type: Pourous									
239	Filters	Tertiary Drain Pump Wetwell	Wetwell			Tertiary Treatment	DIsc Filters	1998		12	8																	
175	UV Disinfection	UV Channel 3	Channel			Tertiary Treatment	Disinfection	1996		27.75	6	2			Concrete			Inside UV Disinfection Building	Houses UV Bank 3A and 3B									
174	UV Disinfection	UV Channel 2	Channel			Tertiary Treatment	Disinfection	1996		27.75	6	2			Concrete			Inside UV Disinfection Building	Houses UV Bank 2A and 2B									
173	UV Disinfection	UV Channel 1	Channel			Tertiary Treatment	Disinfection	1996		27.75	6	2			Concrete			Inside UV Disinfection Building	Houses UV Bank 1A and 1B									
176	UV Disinfection	UV Channel 4	Channel			Tertiary Treatment	Disinfection	1996		27.75	6	2			Concrete			Inside UV Disinfection Building	Houses UV Bank 4A and 4B									

Elec1 Frequency	Elec1 Amps	Elec2 Manufacturer Name	Elec2 Model Number	Elec2 Serial Number	Elec2 Power	Elec2 Drive Type	Elec2 Voltage	Elec2 Phase	Elec2 Frequency	Elec2 Speed	Elec2 Output Speed	Elec2 Amps
0								0	0			
60	2											
60												
60	3.5											
60	3.5											
60												
60	3.5											
60	1		DFT71D4-K3									
60	7.3											
60	7.3											
60		Eurodrive	K67R37D16BD T71D4-KS		0.5	Variable with Gear Reducer	460	3	60	1800 Adjustable	0.67-3.3	

OBJECTID	Building Name	Name	Process	System	Asset ID	Equipment ID	Equipment Type	INSTALLATION YEAR	Notes	Manufacturer Name	Manufacture Date	Model Number	Serial Number	Motor Manufacturer	Motor Model Number	Motor Serial Number	Motor Horsepower	Motor Speed	Motor Voltage	Motor Phase	Motor Frequency
207	Headworks	Influent Pump 1 VFD	Preliminary Treatment	Conveyance		AFD-IP-1	Drive VFD	2000		Robicon									460	3	60
209	Headworks	Exhaust Fan 1	Preliminary Treatment	Utilities		EAF-1	HVAC - Fan	2000		Greenheck		LBP-24-10,	00E13016	Greenheck	LBP-10		0.25	1750	460	3	60
8	Headworks	Grit Conveyor 1	Preliminary Treatment	Grit Removal		C-1	Conveyors	1999	Wash/Compactor Frame/ Case Number: ANSI Roller chain #60, single strand, 87 pitch, Belt Pan Size: 20-inches, Motor Frame: C1-143T-449T, Enclosure: Cast Iron 182-TEFC, HP: 2	Serpentix Conveyor Corporation		Pathfinder Conveyor (Belt Pan)		Reliance Electric	V-belt drive w/ Helical speed reducer		2	1750	460	3	60
10	Headworks	Hydrodegritter/ Grit Classifier 1	Preliminary Treatment	Grit Removal		GS&W-01	Classifiers	2000	305 gpm @ 10 psi	Wemco Pumps		12-inch Flared Hydrodegritter, 1000C Cyclone		Reliance Electric			0.5	1725	460	3	60
57	Headworks	Grit Conveyor 2	Preliminary Treatment	Grit Removal		C-2	Conveyors	1999	Washer/Compactor one unit. Hydraulic Ram on W/C valve: -BM847LG E A610 ClO235946, Belt Pan:: 20"	Serpentix Conveyor Corporation		Pathwinder Conveyor		Reliance Electric	V-belt drive wi Helical speed reducer		2	1750	460	3	60
58	Headworks	Hydrodegritter/ Grit Classifier 2	Preliminary Treatment	Grit Removal		GS&W-02	Classifiers	2000		Wemco Pumps		12-inch Flared Hdrodegritter, 1000C Cyclone	99W22776	Reliance Electric			0.5	1725	460	3	60
221	Headworks	Influent Pump 3 VFD	Preliminary Treatment	Conveyance		AFD-IP-3	Drive VFD	2000		Robicon											
222	Headworks	Influent Pump 4 VFD	Preliminary Treatment	Conveyance		AFD-IP-4	Drive VFD	2000		Robicon											
212	Headworks	Exhaust fan 2	Preliminary Treatment	Utilities		EAF-2	HVAC - Fan	2000		Greenheck		LBP-36-15	00EI3019	Greenheck	LBP-36		1.5	1750	460	3	60
203	Headworks	Automatic Transfer Switch	Preliminary Treatment	Utilities			Electrical - Panel	2000	2 source bypass/isolation switch	Russelectric		RTBD 16003 CEF	26099=1A						460	3	60
204	Headworks	Generator	Preliminary Treatment	Utilities		SEG-1	Electrical - Generator	2000	Spectrum/Detroit Diesel. 600KW			600DS-4	067524						460	3	60
194	Headworks	Exhaust Fan 3	Preliminary Treatment	Utilities		EAF-3	HVAC - Fan	2000		Greenheck		LBP-24-10	00E13018	Greenheck	LBP-24		1.0	1750	460	3	60
213	Headworks	Exhaust Fan 4	Preliminary Treatment	Utilities		EAF-4	HVAC - Fan	2000		Greenheck		LBP-36-15	00E13020	Greenheck	LBP-15		0.5	1750	460	3	60
202	Headworks	Exhaust Fan 5	Preliminary Treatment	Utilities		EAF-5	HVAC - Fan	2000		Greenheck		LBP-24-10	00E13017	Greenhect	LBP-10		0.25	1750	460	3	60
211	Headworks	Exhaust Fan 6	Preliminary Treatment	Utilities		EAF-6	HVAC - Fan	2000	Need ladder to reach	Greenheck		LBP-	00E13013	Greenheck	LBP		0.5	1750	460	3	60
216	Headworks	Exhaust Fan 7	Preliminary Treatment	Utilities		EAF-7	HVAC - Fan	2000	Noisy fan	Greenheck		LBP-36-15	00E13021	Greenheck	LBP-36		1.5	1750	460	3	60
245	Headworks	Supply Fan	Preliminary Treatment	Utilities		SAF-1	HVAC - Fan	2000	Need ladder to reach fan	Greenheck		RSFP-100	00E13023	Greenheck							
197	Headworks	Gas Fired Unit Heater 2	Preliminary Treatment	Utilities		HVU-2	HVAC - Gas Make Up Air	2000		Reznor		RPBL-400							460	3	60
247	Headworks	Gas Fired Unit Heater 1	Preliminary Treatment	Utilities		HVU-1	HVAC - Gas Make Up Air	2000		Reznor		RPBL-400									
208	Headworks	Gas Fired Unit Heater 3	Preliminary Treatment	Utilities		HVU-3	HVAC - Gas Make Up Air	2000		Reznor		RPBL-800							460	3	60
249	Headworks	Packaged Air Conditioning Unit	Preliminary Treatment	Utilities		ACU-1	HVAC - Air Conditioning Unit	2000		Carrier Corporation		50TJ009-6	2100G30243	Carrier	50TJ009-8.5 Tons	2100G30243			460	3	60
2	Headworks	Influent Flow Meter	Preliminary Treatment	Conveyance			Controls	2000	Open channel flow meter, Flow Transmitter: 305-301-4	Drexelbrook		305-300-100							120	1	60
381	Grit Blower Bldg	Motor Control Center	Preliminary Treatment	Utilities		MCC-GB	Electrical - Motor Control Center	2000		Siemens		System 89							460	3	60
383	Grit Blower Bldg	Lighting Control Panel	Preliminary Treatment	Utilities		LCPGB	Controls	2000											460	3	60
385	Grit Blower Bldg	Step down Transformer	Preliminary Treatment	Utilities		LT-GB	Electrical - Transformer	2000	480-208-120	Siemens			3F3Y030K13B						480	3	60
389	Grit Blower Bldg	Lighting Panel	Preliminary Treatment	Utilities		LPGB	Electrical - Panel	2000											460	3	60
217	Headworks	Hdwks Pump Rm Hot Water Heater	Preliminary Treatment	Utilities		EWH -1	Other	2000	Hot water heater, 30 gallon capacity	AO Smith Corporation		DSE-30							240	3	60
210	Headworks	Exhaust Fan 8	Preliminary Treatment	Utilities		EAF-8	HVAC - Fan	2000	Noisy fan	Greenheck		LBP-36-15	00E13022	Greenheck	LBP-36		1.5	1750	460	3	60

OBJECTID	Building Name	Name	Process	System	Asset ID	Equipment ID	Equipment Type	INSTALLATION YEAR	Notes	Manufacturer Name	Manufacture Date	Model Number	Serial Number	Motor Manufacturer	Motor Model Number	Motor Serial Number	Motor Horsepower	Motor Speed	Motor Voltage	Motor Phase	Motor Frequency
7	Headworks	Screenings Washer/Compactor 2	Preliminary Treatment	Screenings		PR-2	Compactors	2000	One of two.	Parkson Corporation		Siralklean		Reliance Electric	Duty Master AC/Explosion Proof		2		460	3	60
1	Headworks	Screenings Washer/Compactor 1	Preliminary Treatment	Screenings		PR-1	Compactors	1999	Washer/Compactor one unit. Hydraulic Ram on W/C valve: -BM847LG E A610 ClO235946	Parkson Corporation	############	Siralklean/Rotopress RP800 LH		Reliance Electrical					480	3	60
1000	Grit Blower Bldg	Exhaust Fan	Preliminary Treatment	Utilities		EAF-9	HVAC - Fan	2000		Greenbeck		70C 56C17E53 - MOTOR		Marathon			0.25	1725	115/208/230	1	60
206	Headworks	Atmospheric Monitor	Preliminary Treatment	Utilities			Controls	2000		MSA		5300	1244						110	1	60
5	Headworks	Barscreen 2	Preliminary Treatment	Screenings		SC-2	Other	2000	Mechanical Barscreen. Width: 3-feet, 10.5-inches, Discharge height: 11-feet, Screen element: 6 mm, Clear bar spacing: 0.25 mm	Parkson Corporation	############	Aqua guard AG-MN-A	25003017	Reliance Electric	Duty Master AC Motor/Explosion Proof	CC049A	2	1725	460/230	3	60
3	Headworks	Bar Screen 1	Preliminary Treatment	Screenings		SC-1	Other	2000	Mechanical Barscreen. Width: 3-feet, 10.5- inches, Discharge height: 11-feet, Screen element: 6 mm, Clear bar spacing: 0.25-inches	Parkson Corporation	############	Aqua Guard AG-MN-A	250030006	Reliance Corporation	Duty Master AC Motor/Explosion Proof		.75	1725	460	3	60
191	Headworks	MCC	Preliminary Treatment	Utilities		MCC-HW	Electrical - Motor Control Center	2000		Siemens/Furnas		System 89	M268690 - 268696						460	3	60
193	Headworks	Influent Pump Control Panel	Preliminary Treatment	Conveyance			Controls	2000	Remotely stops IPs on bad atmosphere?	Yukon & Associates									460	3	60
198	Headworks	HVAC Control Panel 1	Preliminary Treatment	Utilities		TCP-1	Controls	2000	HVAC Control Panel	Siemens											
215	Headworks	Step Down Transformer	Preliminary Treatment	Utilities		LTHW	Electrical - Transformer	2000	480-200-120	Siemens		3F3Y045K13B	L122508						460	3	60
9	Headworks	Influent Parshall Flume	Preliminary Treatment	Conveyance			Controls	2000	Throat Size: 36-inches, Maximum Flow: 32.57 MGD												
446	Headworks	PLC Control Panel	Preliminary Treatment			DTC-2 PLC Panel	Controls	2000		Yukon									460	3	60
214	Headworks	Main Switch Breaker - Headworks	Preliminary Treatment	Utilities		MSB-NW	Electrical - Panel	2000		Siemens									460	3	60
445	Headworks	Grit System Controller	Preliminary Treatment	Grit Removal		GRCP	Controls	2000											460	3	60
199	Headworks	Level Monitor	Preliminary Treatment	Conveyance		FIT-0001	Controls	2000	2 level, 1 Flow. Flow-Hydo 200, 0-18 mgd	Milltronics		Hydroranger							120	1	60
195	Headworks	Lighting Control Panel	Preliminary Treatment	Utilities		LCPHW	Electrical - Lighting	2000	Source from LPHW	US Electric Corp									460	3	60
200	Headworks	Electrical Panel	Preliminary Treatment	Utilities		LPHW	Electrical - Panel	2000		Siemens	############	S1C420J150CBS							120	1	60
63	Primary Clarifier 1	Primary Clarifier 1 Drive	Primary Treatment	Primary Clarification			Drive Mechanical	2000	Drive type: SM-Cyclo Speed Reducer, Brush cleaning system installed	Western Engineering Inc	############	COPC 2	18361A-1	Baldor Reliance Industrial Motors	VN3539	w0811031202	0.5	1140	460	3	60
64	Primary Clarifier 2	Primary Clarifier Drive 2	Primary Treatment	Primary Clarification			Drive Mechanical	2000	Brush cleaning system installed, Add reducer info.	Westech Engineering Inc	############	COPO 2	18361A-2	Baldor Reliance Industrial Motors	VM3539	W0809100937	0.5	1140	460	3	60
220	Headworks	Influent Pump 2 VFD	Primary Treatment	Conveyance		AFP-IP-2	Drive VFD	2000		Robicon											
175	Primary Clarifier 1	Primary Scum Pit Mixer	Primary Treatment	Primary Clarification			Mixer - High Speed		Older model mixer	Flygt Coporation		SR 4620	4620.410-1430006	Flygt Corporation	Same as above	Same as above	2.3	1685	460	3	60
192	Headworks	Primary Sludge Pump 2 VFD	Primary Treatment	Primary Clarification		AFD-PSP-2	Drive VFD	2000		Robicon		454GT								3	60
196	Headworks	Primary Sludge Pump 3 VFD	Primary Treatment	Primary Clarification		AFD-PSP-3	Drive VFD	2000		Robicon		454GT							460	3	60
45	Headworks	Primary Sludge Flow Meter	Primary Treatment	Primary Clarification			Controls	1999		Bailey-Fisher & Porter		10DX3111 G (1/2" x 12")									

OBJECTID	Building Name	Name	Process	System	Asset ID	Equipment ID	Equipment Type	INSTALLATION YEAR	Notes	Manufacturer Name	Manufacture Date	Model Number	Serial Number	Motor Manufacturer	Motor Model Number	Motor Serial Number	Motor Horsepower	Motor Speed	Motor Voltage	Motor Phase	Motor Frequency
75	Headworks	Primary Sludge Grinder	Primary Treatment	Primary Clarification		GR-01	Grinders	2009	Reducer 29:1	JWC Environmental		3000 4T-1206	105283-1-1	Baldor	Super E	F0809245040	3	1760	460	3	60
205	Headworks	Primary Sludge Pump VFD 1	Primary Treatment	Primary Clarification		AFD-PSP-1	Drive VFD	2000		Robicon		454GT	02169						460	3	60
99	Aeration Basin 1	Aeration Basin Sludge Mixer 1	Secondary Treatment	Aeration Basins		MX-3510	Mixer - Banana Blade	2012	Need to match up serial number with equipment in the field. See nameplates for serial number 0630014-0019 & 0530027-0029	Flygt Coporation		4430.010-0564		Same as above		Same as above	6.2	1730	460	3	60
100	Aeration Basin 1	Aeration Basin Sludge Mixer 2	Secondary Treatment	Aeration Basins		MX-3520	Mixer - Banana Blade	2012	Need to match up serial number with equipment in the field. See nameplates for serial number 0630014-0019 & 0530027-0029	Flygt Coporation		4430.010-0564		Same as above		Same as above	6.2	1730	460	3	60
101	Aeration Basin 1	Aeration Basin Sludge Mixer 3	Secondary Treatment	Aeration Basins		MX-3530	Mixer - Banana Blade	2012	Need to match up serial number with equipment in the field. See nameplates for serial number 0630014-0019 & 0530027-0029	Flygt Coporation		4430.010-0564		Same as above		Same as above	6.2	1730	460	3	60
103	Aeration Basin 1	Aeration Basin Sludge Mixer 4	Secondary Treatment	Aeration Basins		MX-3540	Mixer - Banana Blade	2012	Need to match up serial number with equipment in the field. See nameplates for serial number 0630014-0019 & 0530027-0029	Flygt Coporation		4430.010-0564		Same as above		Same as above	6.2	1730	460	3	60
104	Aeration Basin 2	Aeration Basin Sludge Mixer 5	Secondary Treatment	Aeration Basins		MX-3610	Mixer - Banana Blade	2012	Need to match up serial number with equipment in the field. See nameplates for serial number 0630014-0019 & 0530027-0029	Flygt Coporation		4430.010-0564		Same as above		Same as above	6.2	1730	460	3	60
105	Aeration Basin 2	Aeration Basin Sludge Mixer 6	Secondary Treatment	Aeration Basins		MX-3620	Mixer - Banana Blade	2012	Need to match up serial number with equipment in the field. See nameplates for serial number 0630014-0019 & 0530027-0029	Flygt Coporation		4430.010-0564		Same as above		Same as above	6.2	1730	460	3	60
107	Aeration Basin 2	Aeration Basin Sludge Mixer 7	Secondary Treatment	Aeration Basins		MX-3630	Mixer - Banana Blade	2012	Need to match up serial number with equipment in the field. See nameplates for serial number 0630014-0019 & 0530027-0029	Flygt Coporation		4430.010-0564		Same as above		Same as above	6.2	1730	460	3	60
108	Aeration Basin 2	Aeration Basin Sludge Mixer 8	Secondary Treatment	Aeration Basins		MX-3640	Mixer - Banana Blade	2012	Need to match up serial number with equipment in the field. See nameplates for serial number 0630014-0019 & 0530027-0029	Flygt Coporation		4430.010-0564		Same as above		Same as above	6.2	1730	460	3	60

OBJECTID	Building Name	Name	Process	System	Asset ID	Equipment ID	Equipment Type	INSTALLATION YEAR	Notes	Manufacturer Name	Manufacture Date	Model Number	Serial Number	Motor Manufacturer	Motor Model Number	Motor Serial Number	Motor Horsepower	Motor Speed	Motor Voltage	Motor Phase	Motor Frequency
157	Secondary Clarifiers 6	Secondary Sludge Scum Pit Mixer 1	Secondary Treatment	Secondary Clarifier Basins			Mixer - High Speed	2009	Flow: 1898 gpm. There are three more but i am not sure where they are located.	Flygt Coporation		4620		Flygt Corporation			2.3	1675	460	3	60
93	Bioselector Basins	High Speed Mixer 1	Secondary Treatment	Bioselector Basins		M-1	Mixer - High Speed		Verify serial numbers when units are removed for service. Install date unknown.	Flygt Coporation		4660.410-1349	4660.410-0950018	Flygt Corporation	Same as above	Same as above	15	575	460	3	60
94	Bioselector Basins	High Speed Mixer 2	Secondary Treatment	Bioselector Basins		M-2	Mixer - High Speed		Verify serial numbers when units are removed for service. Install date unknown.	Flygt Coporation		4660.410-1349	4660.410-0950019	Flygt Corporation	Same as above	Same as above	15	575	460	3	60
95	Bioselector Basins	High Speed Mixer 3	Secondary Treatment	Bioselector Basins		M-3	Mixer - High Speed		Verify serial numbers when units are removed for service. Install date unknown.	Flygt Coporation		4660.410-1349	4660.410-0950020	Flygt Corporation	Same as above	Same as above	15	575	460	3	60
96	Bioselector Basins	High Speed Mixer 4	Secondary Treatment	Bioselector Basins		M-4	Mixer - High Speed		Verify serial numbers when units are removed for service. Install date unknown.	Flygt Coporation		4660.410-1349	4660.410-0950021	Flygt Corporation	Same as above	Same as above	15	575	460	3	60
97	Bioselector Basins	High Speed Mixer 5	Secondary Treatment	Bioselector Basins		M-5	Mixer - High Speed		Verify serial numbers when units are removed for service. Install date unknown.	Flygt Coporation		4660.410-1349	4660.410-0950022	Flygt Corporation	Same as above	Same as above	15	575	460	3	60
98	Bioselector Basins	High Speed Mixer 6	Secondary Treatment	Bioselector Basins		M-6	Mixer - High Speed		Verify serial numbers when units are removed for service. Install date unknown.	Flygt Coporation		4660.410-1349	4660.410-0950023	Flygt Corporation	Same as above	Same as above	15	575	460	3	60
269	Turblex Blower Bldg	Evaporative Cooler 1	Secondary Treatment	Utilities		EC-3715	Other	1992	Cooler								1.5		460	3	60
277	Turblex Blower Bldg	Roof Exhaust Fan 1	Secondary Treatment	Utilities		REF-3716	HVAC - Fan	1992											120	1	60
278	Turblex Blower Bldg	Roof Exhaust Fan 2	Secondary Treatment	Utilities		REF-3726	HVAC - Fan	1992											120	1	60
279	Turblex Blower Bldg	Roof Exhaust Fan 3	Secondary Treatment	Utilities		REF-3736	HVAC - Fan	1992											120	1	60
340	Turblex Blower Bldg		Secondary Treatment	Aeration Basins		RTU 1	HVAC - Fan	2008		Aaon		Ram-013-3-0-BB02-000	200705-AMCK04611						460	3	60
271	Turblex Blower Bldg	Evaporative Cooler 2	Secondary Treatment	Utilities		EC-3725	Other	1992	Cooler. Information unavailable.								1.5		480	3	60
272	Turblex Blower Bldg	Evaporative Cooler 3	Secondary Treatment	Utilities		EC-3735	Other	1992	Cooler. The units are hard to work on.	Sun Manufacturing Inc.	############	15FC-36-00	2478-EC-3725				1.5		460	3	60
398	DAF Bldg 1	RAS Control Panel	Secondary Treatment	Secondary Clarifier Basins		RS-113	Controls		Include VFD. Not used.	Louis Allis									480	3	60
372	DAF Bldg 1	WAS Pump 2 Control Panel	Secondary Treatment	Secondary Clarifier Basins			Controls			Schneider Electric									460	3	60
201	Headworks	Blower Building Hot Water Heater	Secondary Treatment	Utilities		EWH-2	Other	2000	Hot water heater, 6 gallon capacity	AO Smith Corp		DEL-6							240	3	60
374	Admin Bldg	Motor Control Center	Secondary Treatment	Utilities		MCC-2	Electrical - Motor Control Center	1982		Square D		Model 4	A-589092-100 & A-589021-023						480	3	60
378	Admin Bldg	Electrical Panel L	Secondary Treatment	Utilities		Panel-L	Electrical - Panel	1982		Square D									120-208	1	60
382	Admin Bldg	Switchboard 1	Secondary Treatment	Utilities		SDS-1	Electrical - Panel	1982		Siemens	############								460	3	60
375	Admin Bldg	Motor Control Center	Secondary Treatment	Utilities		MCC-1	Electrical - Motor Control Center	1982		Square D			A-589036-A-58942, A-589023, A-58925, A-589026						480	3	60
386	Admin Bldg	Electrical Panel P	Secondary Treatment	Utilities		Panel P	Electrical - Panel	1982		Square D									460	3	60
391	Admin Bldg	Electrical Panel M	Secondary Treatment	Utilities		Panel-M	Electrical - Panel	1982		Square D									120-208	1	60
397	Admin Bldg	Step down Transformer	Secondary Treatment	Utilities		H-80	Electrical - Transformer	1982	480-208-120V	Square D									460	3	60
388	DAF Bldg 1	WAS Pump 1 Control Panel	Secondary Treatment	Sludge Holding			Controls	2010		Schneider Electric									460	3	60

OBJECTID	Building Name	Name	Process	System	Asset ID	Equipment ID	Equipment Type	INSTALLATION YEAR	Notes	Manufacturer Name	Manufacture Date	Model Number	Serial Number	Motor Manufacturer	Motor Model Number	Motor Serial Number	Motor Horsepower	Motor Speed	Motor Voltage	Motor Phase	Motor Frequency
426	Secondary Clarifiers 6	Secondary Clarifier 5 & 6 Sludge Pump Control Pnl	Secondary Treatment	Secondary Clarifier Basins		Secondary Clarifier PLC Cabinet	Controls	2010		Yukon									460	3	60
1140	Hoffman Blower Bldg	Unit Heater	Secondary Treatment	Utilities		UH-1	HVAC - Electrical Unit Heater	1992		Berko									460	3	60
362	Hoffman Blower Bldg	Motor Control Center	Secondary Treatment	Bioselector Basins		MCC-BB	Electrical - Motor Control Center	1992		Siemens									460	3	60
359	Hoffman Blower Bldg	Control Panel LA	Secondary Treatment	Utilities		LA	Electrical - Panel	1992		Siemens									120-208	1	60
351	Hoffman Blower Bldg	120/240 Transformer	Secondary Treatment	Utilities		T-1	Electrical - Transformer	1992		Siemens									460	3	60
355	Hoffman Blower Bldg	Centrifugal Blower Control Panel 1 2 3	Secondary Treatment	Bioselector Basins			Controls	1992		Yukon									460	3	60
367	Hoffman Blower Bldg	PD Compressor Control Panel	Secondary Treatment	Bioselector Basins			Controls	1992											460	3	60
46	Sludge Storage Tank 2	Sludge Storage Tank 2 Submersible Mixer	Solids Handling	Sludge Holding			Mixer - High Speed			Flygt Coporation		4670					20		460	3	60
128	Digester Building	Digester Gas Booster North	Solids Handling	Anaerobic Digesters			Other	1991	Gas booster	Eclipse	############	HB-4623	91-1453	Baldor	Z920733	P791	3		460	3	60
76	Digester Building	Recirculation Sludge Grinder 1	Solids Handling	Sludge Holding		SL-GR-01	Grinders	2009	Reducer serial#: CL 0105147, Reducer Ratio: 29:1	JWC Environmental		30004T-1206	105 28 3-1-2	Baldor Reliance	Super E Motor	F0809111293	3	1760	460	3	60
125	Dewatering Bldg	Biosolids Dewatering Belt Conveyor	Solids Handling	Sludge Dewatering			Conveyors	2008													
81	Digester Building	Digester Heat Exchanger 1	Solids Handling	Sludge Holding		M-2-4-1	Heat Exchangers	1992	National Board #: 14797	Alfa-Laval Thermal	############	Spiral	20052								
82	Digester Building	Digester Heat Exchanger 2	Solids Handling	Sludge Holding		M-2-4-2	Heat Exchangers	1992	National Board #: 14798	Alfa-Laval Thermal	############	Spiral	20053								
127	Digester Building	Digester Heat Exchanger 3	Solids Handling	Anaerobic Digesters		M-2-4-3	Heat Exchangers	1992	National Board #: 14799	Alfa-Laval	############	Spiral	20054								
131	Digester Building	Hot Water Boiler North	Solids Handling	Anaerobic Digesters		M-4-1-1	Boilers	1984		Kewanee	############	7L280X		Marathon	EVF 56T34F5306J P		3	3450	460	3	60
285	Composting Faciity	Exhaust Fan 1	Solids Handling	Compost Building		EF-1	HVAC - Fan	2008									7.5		460	3	6
289	Composting Faciity	Exhaust Fan 3	Solids Handling	Compost Building		EF-3	HVAC - Fan	2008									7.5		460	3	60
288	Composting Faciity	Exhaust Fan 2	Solids Handling	Compost Building		EF-2	HVAC - Fan	2008									7.5		460	3	60
123	Dewatering Bldg	Belt Filter Press 1	Solids Handling	Sludge Dewatering		BFP-01	Filter Press	2008		Andritz		2.0 Meter SMX-S8 V							460	3	60
124	Dewatering Bldg	Belt Filter Press 2	Solids Handling	Sludge Dewatering		BFP-02	Filter Press	2008		Andritz		2.0 Meter SMX-S8 V							460	3	60
320	FeCl2 Injection	Unit Heater 1	Solids Handling	Ferric Chloride		UH-1	HVAC - Fan	2009											460	3	60
330	DAF Bldg 2	Exhaust Fan 4	Solids Handling	DAF Thickening		EF-104	HVAC - Fan	2008		Greenheck							0.25	803	115	1	60
379	DAF Bldg 2	Anvic International	Solids Handling	Utilities			Other		Unknown										460	3	60
291	Composting Faciity	Exhaust Fan 4	Solids Handling	Compost Building		EF-4	HVAC - Fan	2008									7.5		460	3	60
292	Composting Faciity	Exhaust Fan 5	Solids Handling	Compost Building		EF-5	HVAC - Fan	2008									7.5		460	3	60
293	Composting Faciity	Exhaust Fan 6	Solids Handling	Compost Building		EF-6	HVAC - Fan	2008									7.5		460	3	60
294	Composting Faciity	Exhaust Fan 7	Solids Handling	Compost Building		EF-7	HVAC - Fan	2008									7.5		460	3	60
295	Composting Faciity	Exhaust Fan 8	Solids Handling	Compost Building		EF-8	HVAC - Fan	2008									7.5		460	3	60
296	Composting Faciity	Supply Fan 1	Solids Handling	Compost Building		SF-1	HVAC - Fan	2008									7.5		460	3	60
297	Composting Faciity	Supply Fan 2	Solids Handling	Compost Building		SF-2	HVAC - Fan	2008									7.5		460	3	60
298	Composting Faciity	Supply Fan 3	Solids Handling	Compost Building		SF-3	HVAC - Fan	2008									7.7		460	3	60
299	Composting Faciity	Supply Fan 4	Solids Handling	Compost Building		SF-4	HVAC - Fan	2008									7.5		460	3	60
300	Composting Faciity	Supply Fan 5	Solids Handling	Compost Building		SF-5	HVAC - Fan	2008									7.5		460	3	60
301	Composting Faciity	Supply Fan 6	Solids Handling	Compost Building		SF-6	HVAC - Fan	2008									7.7		460	3	60
302	Composting Faciity	Supply Fan 7	Solids Handling	Compost Building		SF-7	HVAC - Fan	2008									7.5		460	3	60
303	Composting Faciity	Supply Fan 8	Solids Handling	Compost Building		SF-8	HVAC - Fan	2008									7.5		460	3	60

OBJECTID	Building Name	Name	Process	System	Asset ID	Equipment ID	Equipment Type	INSTALLATION YEAR	Notes	Manufacturer Name	Manufacture Date	Model Number	Serial Number	Motor Manufacturer	Motor Model Number	Motor Serial Number	Motor Horsepower	Motor Speed	Motor Voltage	Motor Phase	Motor Frequency
255	DAF Bldg 2	Exhaust Fan 1	Solids Handling	DAF Thickening		EF-101	HVAC - Fan	2008		Greenheck		GB-200-4	11743627 0904				0.25		115	1	60
328	DAF Bldg 2	Exhaust Fan 2	Solids Handling	DAF Thickening		EF-102	HVAC - Fan	2008	2,450 CFM	Greenheck		GB-200-4	11743626 0904				0.25	543	115	1	60
329	DAF Bldg 2	Exhaust Fan 3	Solids Handling	DAF Thickening		EF-103	HVAC - Fan	2008	1,850 CFM	Greenheck		GB-161-4	11743628 0904/11743629 0904				0.25	803	115	1	60
331	DAF Bldg 2	Unit Heater 1	Solids Handling	DAF Thickening		UH-101	Other	2008	Gas Unit Heater. No info tags available.	Garage Guy.									115	1	60
332	DAF Bldg 2	Unit Heater 2	Solids Handling	Utilities		UH-102	Other	2008	Gas Unit Heater	Garage Guy									115	1	60
333	DAF Bldg 2	Unit Heater 3	Solids Handling	Utilities		UH-103	Other	2008	Gas Unit Heater, No info tags available.	Garage Guy									115	1	60
334	DAF Bldg 2	Unit Heater 4	Solids Handling	Utilities		UH-104	Other	2008	Gas heater. No info available.	Garage Guy.									115	1	60
427	Digester Building	??? Control Panel	Solids Handling	Anaerobic Digesters		DTC-3 PLC Panel	Controls			Yukon									460	3	60
126	Dewatering Bldg	Dewatering Sludge Grinder	Solids Handling	Sludge Dewatering		GR-01	Grinders	2008		JWC Environmental		30004T-1206	103596-1-1	Baldor Industrial Motors		F0608100256	3	1725	460	3	60
396	DAF Bldg 1	Grinder Control Panel	Solids Handling	Aeration Basins			Controls			Disposable Waste Systems Inc									460	3	60
67	DAF Bldg 1	Sludge Grinder	Solids Handling	Sludge Holding			Grinders			JWC Environmental		VM3611		Baldor Industrial	30001-12-6	6825	3	1725	460	3	60
384	DAF Bldg 1	DAF Pump 3 Control Panel	Solids Handling	DAF Thickening			Controls			Schneider Electric									460	3	60
399	DAF Bldg 1	DAF Pump 4 Control Panel	Solids Handling	DAF Thickening			Controls			Schneider Electric									460	3	60
129	Digester Building	Hot Water Boiler South	Solids Handling	Anaerobic Digesters		M-4-1-2	Boilers	1984		Kewanee	############	7L280X		Marathon	WVL56T34D5316A L		3	3450	460	3	60
321	FeCl2 Injection	Unit Heater 2	Solids Handling	Ferric Chloride		UH-2	HVAC - Electrical Unit Heater	2009		Indeeco	############	233-FA-0106U-C2DT		Indeeco			0.25	1725	480	3	60
428	Dewatering Bldg	Motor Control Center	Solids Handling	Utilities		MCC-1	Electrical - Motor Control Center	2009		Eaton / Cutler Hammer	############	Freedom Series 2100	SAQ43842 IT.002-FVC						460	3	60
441	Digester Building	Motor Control Center	Solids Handling	Utilities		MCC-6	Electrical - Motor Control Center	1991		Westinghouse	############	2100	DA22709 IT.1-FVC						480	3	60
318	FeCl2 Injection	Exhaust Fan 1	Solids Handling	Anaerobic Digesters		EF-1	HVAC - Fan	2009	600 CFM	Greenheck		CW-090D	12008029 1002					1425	115	1	60
319	FeCl2 Injection	Exhaust Fan 2	Solids Handling	Ferric Chloride		EF-2	HVAC - Fan	2009	600 CFM	Greenheck		CW-090D	12008028 1002					1425	115	1	60
308	Dewatering Bldg	Utility Set 3	Solids Handling	Utilities		US-3	HVAC - Fan	2008	Utility Set, 3050 CFM	Loren Cook	############	130 MHAS 130-MHA-SD	102S935397-01/0004503				3	1725	460	3	60
307	Dewatering Bldg	Utility Set 2	Solids Handling	Utilities		US-2	HVAC - Fan	2008	Utility Set, 3050 CFM	Loren Cook	############	130 MHAS 130-MHA-SD	1028935397-01/0004502				3	1725	460	3	60
306	Dewatering Bldg	Utility Set 1	Solids Handling	Utilities		US-1	HVAC - Fan	2008	Utility Set, 3050 CFM	Loren Cook	############	130 MHAS 130-MHA-SD	102S935397-01/0004501				3	1725	460	3	60
283	Dewatering Bldg	Electric Unit Heater	Solids Handling	Utilities		UH-1	HVAC - Electrical Unit Heater	2008									10		460	3	60
994	DAF Bldg 1	Exhaust Fan	Solids Handling	Utilities			HVAC - Fan	1982		Greenbeck		GB 21 014 1A	690741	AO Smith		14312CH	0.33	1725	115	1	60
995	DAF Bldg 1	Exhaust Fan	Solids Handling	Utilities			HVAC - Fan	1982		Greenbeck		GB-21-5X OD	71747	Marathon	NB56T17D712B		0.5	1725	115	1	60
996	DAF Bldg 1	Exhaust Fan	Solids Handling	Utilities			HVAC - Fan	1982		Greenbeck		GB 21 3XOD	65849	AO Smith		14212CH	0.33	1725	115	1	60
997	DAF Bldg 1	Exhaust Fan	Solids Handling	Utilities			HVAC - Fan	1982	Out of service	Greenbeck		GB 21 5X10	64698	Century		07915J2	0.5	1725	115	1	60
998	DAF Bldg 1	Exhaust Fan	Solids Handling	Utilities			HVAC - Fan	1982		Greenbeck		GB-21-014-1A	690740	Dayton	3K304A		0.5	1725	115	1	60
999	DAF Bldg 1	Exhaust Fan	Solids Handling	Utilities			HVAC - Fan	1982		Greenbeck		GB-21-3QD	65847	AO Smith		14212CH	0.33	1725	115	1	60
376	DAF Bldg 1	Air Handling Unit Electrical Room	Solids Handling	Utilities		MAU-1	Other		Electric Air Handling Unit	Reznor		No tag							460	3	60
77	Digester Building	Recirculation Sludge Grinder 2	Solids Handling	Sludge Holding		SL-GR-02	Grinders	2009	Reducer Model #: CNVJS-6125Y-29-182-T, Reducer Ratio: 29:1,	JWC Environmental		30004T-1206	105 28 3-1-3	Baldor Reliance	Super E motor	F0808262469	3	1760	460	3	60
400	DAF Bldg 2	Motor Control Center	Solids Handling	Utilities		MCC-DC	Electrical - Motor Control Center	2008		Square D		Model 6	T-115182-T115184						460	3	60
395	DAF Bldg 2	Motor Control Center	Solids Handling	Utilities		MCC-3	Electrical - Motor Control Center	2008		Square D		Model 4 Control Center	A-589072 - A589077						460	3	60
394	DAF Bldg 2	Transformer	Solids Handling	Utilities			Electrical - Transformer	2008	480-208-120V	Square D									460	3	60
312	Dewatering Bldg	Radiant Heating Panel	Solids Handling	Utilities		RHP-1	Other	2008		Berko		CP7502							120	1	60
431	Dewatering Bldg	Air Conditioner	Solids Handling	Utilities		MS-1	HVAC - Air Conditioning Unit	2008		Evcon		THGD18S31S3A	W1L0368839						208-230	3	60
434	Dewatering Bldg	Belt Filter Press 2 Control Panel	Solids Handling	Sludge Dewatering		BFP-202	Controls	2009											460	3	60

OBJECTID	Building Name	Name	Process	System	Asset ID	Equipment ID	Equipment Type	INSTALLATION YEAR	Notes	Manufacturer Name	Manufacture Date	Model Number	Serial Number	Motor Manufacturer	Motor Model Number	Motor Serial Number	Motor Horsepower	Motor Speed	Motor Voltage	Motor Phase	Motor Frequency
438	Dewatering Bldg	Belt Filter Press 1 Control Panel	Solids Handling	Sludge Dewatering		BFP-201	Controls	2009		Andritz									460	3	60
310	Dewatering Bldg	Carbon Filter	Solids Handling	Utilities		CF-1	HVAC - Carbon Unit	2008		Purifil		PPU-250V	HO7 9141				1.0		460	3	60
430	Dewatering Bldg	Air Handling Unit	Solids Handling	Utilities		MA-1	Other	2008	Air Handler	Reznor	##########	RPBL600-8S-MV-H	3BGI792JF09				5		460	3	60
373	DAF Bldg 1	Main Breaker Panel -120V	Solids Handling	Utilities		LP-1	Electrical - Panel	1982		Square D									460	3	60
380	DAF Bldg 1	Step down Transformer	Solids Handling	Utilities			Electrical - Transformer	1982	480-208-120V	Square D									460	3	60
387	DAF Bldg 1	Motor Control Center	Solids Handling	Utilities		MCC-4	Electrical - Motor Control Center	1982		Square D		4	A-589196, 504, 505, 410, 411, 412 & 413						460	3	60
392	DAF Bldg 1	DAF Poly Room Heater	Solids Handling	Utilities			HVAC - Electrical Unit Heater	1982		QMark									460	3	60
402	DAF Bldg 1	DAF Control Panel	Solids Handling	DAF Thickening			Controls	1982											460	3	60
27	DAF Bldg 2	Settled Sludge Collector	Solids Handling	DAF Thickening			Drive Mechanical	2008	Chain and flight, Gear reducer output speed 0.67 - 3.3 rpm	Eurodrive				Eurodrive	K67R37D16BD T71D4-KS		0.5	1800 Adjustable	460	3	60
442	Dewatering Bldg	Gas Heater	Solids Handling	Utilities		UH-1	HVAC - Gas Make Up Air	2008		Rheem Manufacturing Company	##########	RH1P1817STA NJA							208-240	1	60
130	Digester Building	Digester Gas Booster South	Solids Handling	Anaerobic Digesters			Other	1991	Gas booster	Eclipse	##########	HB-4623	91/1452	Baldor	Z920733	P791	3		460	3	60
421	FeCl2 Injection	Electrical Panel 208-120	Solids Handling	Utilities		LP-FC	Electrical - Panel	2010		Siemens	##########	P1C30BL30BS	000300						460	3	60
424	FeCl2 Injection	480 Electrical Panel	Solids Handling	Utilities			Electrical - Panel	2010		Siemens		P2							460	3	60
429	Digester Building	Step down Transformer	Solids Handling	Utilities		T-1	Electrical - Transformer	1984		Westinghouse			391 60435						480-208-120	3	60
432	Digester Building	Electric Panel	Solids Handling	Utilities		Panel HP1	Electrical - Panel	1984		Westinghouse			944679						480V	3	60
436	Digester Building	Digester Control Panel	Solids Handling	Anaerobic Digesters		Local Panel LCP	Controls	1984											460	3	60
439	Digester Building	Electrical Panel	Solids Handling	Utilities		Panel LP-1	Electrical - Panel	1984		Westinghouse									208-120	3	60
422	FeCl2 Injection	Electric Unit Heater	Solids Handling	Utilities		UH-2	HVAC - Electrical Unit Heater	2009		Indeeco	##########	233-FA-0036U-CT2T		Indeeco			0.25	1725	460	3	60
141	FeCl2 Injection	FeCl2 Storage Tank	Solids Handling	Ferric Chloride			Tanks	2009	4000 gallon capacity	Belco	##########		30735								
423	FeCl2 Injection	Step down Transformer	Solids Handling	Utilities			Electrical - Transformer	2010		Eaton	##########	DT-3	J09H06802						480-208-120	3	60
425	Digester Building	Air Handling Unit	Solids Handling	Utilities		MAU-3	HVAC - Gas Make Up Air	1991				Rapid 2000	9200						460	3	60
83	Digester Building	Waste Gas Burner	Solids Handling	Anaerobic Digesters		M-3-6	Other	1991	Digester Gas Burner -7000 SCFM @ 1.5" pressure drop	Groth		8392B-06-AS-050200	0907116-01-1								
259	UV Disinfection	Exhaust Fan 2	Tertiary Treatment	Utilities		EAF-2	HVAC - Fan	1997										1750	115	1	60
262	UV Disinfection	Exhaust Fan 4	Tertiary Treatment	Utilities		EAF-4	HVAC - Fan	1997		Cook		ACE-B					0.75	1750	460	3	60
70	Filters	Disc Filter 1	Tertiary Treatment	DIsc Filters		TF-01	Other	2008	Disc Filter, 10 micron polyester filter element, Backwash Pump: Grundfos model MTR32-11/4, 15hp, 132 GPM @ 110 PSI	Hydrotech		2220-2F	6063	SEW-Eurodrive	S77DTE90S4	850121007.08	1.5		460	3	60
71	Filters	Disc Filter 2	Tertiary Treatment	DIsc Filters		TF-02	Other	2009	Disc Filter, 10 micron polyester filter element, Backwash Pump: Grundfos model MTR32-11/4, 15hp, 132 GPM @ 110 PSI	Hydrotech		2220-2F	6064	SEW-Eurodrive	S77DTE90S4	850121007.08	1.5		460	3	60

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72	Filters	Disc Filter 3	Tertiary Treatment	DIsc Filters		TF-03	Other	2009	Disc Filter, 10 micron polyester filter element, Backwash Pump: Grundfos model MTR32-11/4, 15hp, 132 GPM @ 110 PSI	Hydrotech		2220-2F	6065	SEW-Eurodrive	S77DTE90S4	850121007.08	1.5		460	3	60
264	UV Disinfection	Electric Unit Heater	Tertiary Treatment	Utilities		EUH-01	HVAC - Electrical Unit Heater	1997		Berko		HUHAA-520						1600	208	1	60
265	UV Disinfection	Gas Fired Unit Heater 1	Tertiary Treatment	Utilities		GUH-1	HVAC - Gas Make Up Air	1997													
337	Filters	Standby Generator	Tertiary Treatment	Utilities			Electrical - Generator	1994		Onan		45EM	K920492056						480	3	60
257	UV Disinfection	Exhaust Fan 1	Tertiary Treatment	Utilities		EAF-1	HVAC - Fan	1997		Loren		ACE-B135C4B					0.33	1725	115	1	60
261	UV Disinfection	Exhaust Fan 3	Tertiary Treatment	Utilities		EAF-3	HVAC - Fan	1997		Loren		19506B					0.75	1725	460	3	60
263	UV Disinfection	Exhaust Fan 5	Tertiary Treatment	Utilities		EAF-5	HVAC - Fan	1997	Vibrations	Cook		ACE-B					0.75	1750	460	3	60
266	UV Disinfection	Gas Fired Unit Heater 2	Tertiary Treatment	Utilities		GUH-2	HVAC - Gas Make Up Air	1997		Reznor											
267	UV Disinfection	Gas Fired Unit Heater 3	Tertiary Treatment	Utilities		GUH-3	HVAC - Gas Make Up Air	1997		Reznor									115	1	60
268	UV Disinfection	Gas Fired Unit Heater 4	Tertiary Treatment	Utilities		GUH-4	HVAC - Gas Make Up Air	1997	Electric? Berkeley huhaa520. 208	Reznor									115	1	60
158	UV Disinfection	UV Disinfection Bank 1A	Tertiary Treatment	Disinfection			Other	1996	UV Disinfection Bank	Trojan		UV 3000									
159	UV Disinfection	UV Disinfection Bank 1B	Tertiary Treatment	Disinfection			Other	1996	UV Disinfection Bank	Trojan		UV 3000									
160	UV Disinfection	UV Disinfection Bank 2A	Tertiary Treatment	Disinfection			Other	1996	UV Disinfection Bank	Trojan		UV 3000									
161	UV Disinfection	UV Disinfection Bank 2B	Tertiary Treatment	Disinfection			Other	1997	UV Disinfection Bank	Trojan		UV 3000									
350	UV Disinfection	Control Panel	Tertiary Treatment	Disinfection		DTC-4 PLC Panel	Controls	1997		Yukon									460	3	60
347	UV Disinfection	UV Control Panel	Tertiary Treatment	Disinfection			Controls	1997		Trojan		SCC	SCC00616						460	3	60
343	UV Disinfection	Temperature Control Panel	Tertiary Treatment	Utilities			Controls	1997		Ener-Tech									460	3	60
342	UV Disinfection	Power Source Monitoring Panel	Tertiary Treatment	Utilities			Electrical - Panel	1997		Cutler-Hammer									460	3	60
338	UV Disinfection	UV Distribution Panel	Tertiary Treatment	Utilities		UVDP	Electrical - Panel	1997		Cutler-Hammer									460	3	60
345	UV Disinfection	Unknown Transformer	Tertiary Treatment	Utilities			Electrical - Transformer	1997		Cutler-Hammer									460	3	60
349	UV Disinfection	Lighting Panel 1	Tertiary Treatment	Utilities		LP-1	Electrical - Lighting	1997											460	3	60
352	UV Disinfection	Main Distribution Source Panel 1	Tertiary Treatment	Utilities		MDS-1	Electrical - Power Source	1997		Cutler-Hammer									460	3	60
353	UV Disinfection	Lighting Transformer	Tertiary Treatment	Utilities		LT-1	Electrical - Transformer	1997		Cutler-Hammer									460	3	60
357	UV Disinfection	Main Power Source 2 Main	Tertiary Treatment	Utilities		MDS 2 - Main	Electrical - Power Source	1997		Cutler-Hammer									460	3	60
358	UV Disinfection	Main Distribution Source - Tie Breaker	Tertiary Treatment	Utilities		MDS - Tie Breaker	Electrical - Power Source	1997		Cutler-Hammer									460	3	60
361	UV Disinfection	Main Distribution Source 2	Tertiary Treatment	Utilities		MSD - 2	Electrical - Power Source	1997		Cutler- Hammer									460	3	60
363	UV Disinfection	Main Distribution Source 1 - Main	Tertiary Treatment	Utilities		MSD-1 Main	Electrical - Power Source	1997		Cutler-Hammer									460	3	60
365	UV Disinfection	UV Transformer 1 & 2	Tertiary Treatment	Utilities		UVT - 1 & 2	Electrical - Transformer	1997		Hammond Power Solutions									460	3	60
364	UV Disinfection	UV Main Transfer Switch	Tertiary Treatment	Utilities		UV MTS	Electrical - Panel	1997		Cutler- Hammer									460	3	60
368	UV Disinfection	Lighting Control Panel	Tertiary Treatment	Utilities		LCP	Controls	1997		Yukon									460	3	60
393	UV Disinfection	Motor Control Center	Tertiary Treatment	Utilities		MCC-8	Electrical - Motor Control Center	1997		Cutler-Hammer	############	Freedom 2100	HPX16156 IT.015-FVC						480	3	60
401	UV Disinfection	Moto Control Center	Tertiary Treatment	Utilities		MCC-7	Electrical - Motor Control Center	1997		Cutler-Hammer	############	Freedom 2100	HPX16156 IT014-FVC						480	3	60

OBJECTID	Building Name	Name	Process	System	Asset ID	Equipment ID	Equipment Type	INSTALLATION YEAR	Notes	Manufacturer Name	Manufacture Date	Model Number	Serial Number	Motor Manufacturer	Motor Model Number	Motor Serial Number	Motor Horsepower	Motor Speed	Motor Voltage	Motor Phase	Motor Frequency
162	UV Disinfection	UV Disinfection Bank 3B		Disinfection			Other	1996	UV Disinfection Bank	Trojan		UV 3000									
163	UV Disinfection	UV Disinfection Bank 3A		Disinfection			Other	1996	UV Disinfection Bank	Trojan		UV 3000									
164	UV Disinfection	UV Disinfection Bank 4B		Disinfection			Other	2008	UV Disinfection Bank	Trojan		UV 3000									
165	UV Disinfection	UV Disinfection Bank 4A		Disinfection			Other	2008	UV Disinfection Bank	Trojan		UV 3000									
344	WWTP Pump	Non-Potable Water pump 2 VFD		Utilities			Drive VFD			ABB									460	3	60
990	Engineering Building	Air makeup					HVAC - Gas Make Up Air			Rheem		RKKA-9A060JK13E	2A5642ADAAF460012721						208/230	1	60
992	Supply's Office	Makeup Air Unit					HVAC - Gas Make Up Air			Trane		4YCC3-----K1064AA	9334r---				0.5		208/230	1	60
993	WWM Conference Room	Air Conditioning Unit					HVAC - Air Conditioning Unit			Trane	##########	4TTM3036A1000Aa	102036Y4AA						208/230	1	60
1001	Diesel Auxilary Power Generator	Standby Generator		Utilities			Electrical - Generator		277/480V	Marathon		Magna One 682FDR8074GG-P000 W	VA 3562709-1					1800	460	3	60
1002	Diesel Auxilary Power Generator	Service Disconnect				GDSB-1	Electrical - Panel			Cutler Hammer									480/277V	3	60
448																					
982	Admin Bldg	Lab Exhaust Fan 1		Utilities			HVAC - Fan	1982		Kewaunee		2C-3302-06	b-37124	Dayton			0.5	1725	460	3	60
390	Admin Bldg	HVAC Control Panel		Utilities		ECP-1	Controls	1982											460	3	60
983	Admin Bldg	Lab Exhaust Fan 2		Utilities			HVAC - Fan	1982		Kewaunee scientific		2C-3301-B6	B-37123dayton				0.33	1725	208-230	3	60
377	Admin Bldg	Rapid Gas Heaters		Utilities			HVAC - Gas Make Up Air	1982		Rapid Engineering									460	3	60
977	Admin Bldg	Exhaust Fan		Utilities			HVAC - Fan	1982		GB 14 017 3A			690738	GE			0.25	1725	115	3	60
311																					
304																					
433																					
66																					
11																					
65																					
25																					
26																					
68																					
284																					
435																					
440																					
437																					
991																					
1003	Diesel Auxilary Power Generator	Manual transfer Switch					Electrical - Panel		PNW Power	Cutler Hammer		SPB 100							480	3	60
1004	Diesel Auxilary Power Generator	Main Disconnect Breaker Switchboard 1				MDB-1	Electrical - Panel			Cutler Hammer									480	3	60
1005	Diesel Auxilary Power Generator	Utility AC Disconnect					Electrical - Panel												460	3	60
1006	Diesel Auxilary Power Generator	Service Disconnect					Electrical - Panel			Siemens		SBS 2000							460	3	60
975	Admin Bldg	Exhaust Fan 1		Utilities		HVAC EF-1	HVAC - Fan	1982	3 other fans	Loren Cook				GE Motors	K-161		0.75	1725	208-230-460V	3	60
976	Admin Bldg	Air Conditioning Unit		Utilities			HVAC - Air Conditioning Unit	1982		Fujitsu		AOU18CL	DCN 012957						208-230-460	1	60
978	Admin Bldg	Exhaust Fan		Utilities			HVAC - Fan	1982		Greenheck			690737						460	3	60
979	Admin Bldg	Exhaust Fan		Utilities			HVAC - Fan	1982	No motor				690735						460	3	60
981	Admin Bldg	Exhaust Fan		Utilities			HVAC - Fan	1982						Marithon	Mvd48S17D2054B		0.25	1725	115	3	60
980	Admin Bldg	Air Conditioner		Utilities		ACU-3801	HVAC - Gas Make Up Air	1992		Carrier									460	3	60
6																					
4																					
444	Laboratory	Air Conditioner		Utilities			HVAC - Air Conditioning Unit	1997		ARI		24APA560A300	5007E05409	GE			0.25		208/230V	1	60
447	Laboratory	Step down Transformer		Utilities			Electrical - Transformer	1997	Tag unreadable	Siemens									460	3	60
984	Laboratory	Exhaust Fan		Utilities			HVAC - Fan	1997	95G01047										460	3	60
985	Laboratory	Lab Exhaust 1		Utilities			HVAC - Fan	1997		Kew		2C3321B5K	B-56216	Dayton	5K115S		0.33	1725	115-230	1	60
443	Laboratory	Air Conditioner Unit		Utilities			HVAC - Air Conditioning Unit	1997		ARI		24APA524A300	3008E16432	GE			0.5		208/230V	3	60

OBJECTID	Building Name	Name	Process	System	Asset ID	Equipment ID	Equipment Type	INSTALLATION YEAR	Notes	Manufacturer Name	Manufacture Date	Model Number	Serial Number	Motor Manufacturer	Motor Model Number	Motor Serial Number	Motor Horsepower	Motor Speed	Motor Voltage	Motor Phase	Motor Frequency
989	Laboratory	Lab Supply Fan		Utilities			HVAC - Fan	1997		Greenbeck		Sub-10-4-CW-TH	95G00847				0.25	1725	115	1	60
988	Laboratory	Supply Fan		Utilities			HVAC - Fan	1997				Sub-10-4-CW-TH	95G00846	Marathon	2VB48S17D2054F		0.25	1725	125	1	60
987	Laboratory	Lab Fan 3		Utilities			HVAC - Fan	1997				2C3321C5K	B-56218				0.5	1725	115/230V	1	60
986	Laboratory	Lab Fan 2		Utilities			HVAC - Fan	1997		Kew			B-56215						460	3	60
449	Maintenance Office	Swamp Cooler		Utilities			HVAC - Fan	1993											460	3	60
366	WWTP Pump	Non-potable Water Pump Motor Controls		Utilities		MCC-NW	Electrical - Motor Control Center	2000		Siemens									460	3	60
339	WWTP Pump	Unit Heater		Utilities		GIH-2	Other	2000	Gas Unit Heater	Reznor									460	3	60
341	WWTP Pump	Non-potable Water Pump 1 VFD		Utilities			Drive VFD			ABB									460	3	60
346	WWTP Pump	Lighting Control Panel		Utilities		LCPNW	Electrical - Lighting	2000											460	3	60
348	WWTP Pump	Non-potable Water Pump Control Panel		Conveyance		DTC-5 PLC Panel	Controls	2000		Yukon									460	3	60
354	WWTP Pump	Lighting Transformer		Utilities		LT-NW	Electrical - Transformer	2000		Siemens									460	3	60
356	WWTP Pump	Lighting Panel		Utilities		LPNW	Electrical - Lighting	2000		Siemens	############								460	3	60
360	WWTP Pump	Main Switch Breaker		Utilities		MSB-NW	Electrical - Power Source	2000		Siemens									460	3	60

OBJECTID	Building Name	Name	Asset ID	Equipment ID	Process	System	Notes	Compressor Type	Manufacturer Name	Model Number	Serial Number	Max Discharge Pressure	Power	CFM	Voltage	Phase	Frequency	INSTALLATIONYEAR
21	DAF Bldg 1	Compressor 2			Solids Handling	DAF Thickening	Motor Model: 47225479, 1750 rpm	Reciprocating	Ingersol-Rand	2475	1219264		3		460	3	60	2012
18	DAF Bldg 1	Compressor 1			Solids Handling	DAF Thickening	Tank: T 30, Motor Manufacturer: Baldor Industrial, Motor Model #: M3218T, Motor Serial #: F0511051309, Motor Speed: 1750	Reciprocating	Ingersol-Rand	242ON5	791916		5		460	3	60	
23	Dewatering Bldg	Compressor 1			Solids Handling	Sludge Dewatering	Baldor Motor, 1725 rpm, 10 gallon tank	Reciprocating	Industrial Air of Texas	BM23-HL60		100	2	6.0	460	3	60	2008
10	DAF Bldg 2	DAF Compress 1		CAU-01	Solids Handling	DAF Thickening	Belt drive, Baldor Reliance Industrial Motor, MT3611T, SN: F0901273376, , Speed: 1750	Reciprocating	Quincy	F325-60	QB0903060031	175	5	15	460	3	60	2009
12	DAF Bldg 2	DAF Compress 2		CAU-02	Solids Handling	DAF Thickening		Reciprocating	Quincy	F325-60	QB0908060033	175	5	15	460	3	60	2009
29	Dewatering Bldg	Dewatering Building Compressor			Solids Handling	Utilities	3520 rpm	Upright	Ingersol-Rand	2340	NAR1006.1312		5		460	3	60	
24	Dewatering Bldg	Compressor 2			Solids Handling	Sludge Dewatering		Reciprocating	Industrial Air of Texas	BM23-HL60		100	2	6.0	460	3	1	2008

OBJECTID	Building Name	Name	Asset ID	Equipment ID	Process	System	INSTALLATIONYEAR	Pump Type	Manufacturer Name	Model Number	Serial Number	Manufacture Date	Polymer Flow Rate	Voltage	Phase	Frequency	Notes		
29	Dewatering Bldg	Dewatering Polymer System 2		PB-02	Solids Handling	Sludge Dewatering	2008	Metering-Diaphragm	Veloblend	VH-8D-1800-C	0307-136		8	115	1	60	LMI Pump, Serial # 12033344367-1		
22	DAF Bldg 1	East Polymer Unit			Solids Handling	DAF Thickening	1992	Metering-Diaphragm	LMI	AA951	06082227432-2		1 gph @ 11 psi	120	1	60	Polymaster Neptune PA 200, Seriel #: 18850		
18	DAF Bldg 1	West Polymer Unit			Solids Handling	DAF Thickening	1992	Metering-Diaphragm	LMI	AA951	05092048983-1		1 gph @ 110 psi	120	1	60	Komax, Model-ET, serial # 32756		
11	DAF Bldg 2	Polyblend Unit 1		PB-01	Solids Handling	DAF Thickening	2009	Metering-Diaphragm	LMI/Siemens	M240-D1AA	BS50250		1 gph @ 110 psi	120	1	60	LMI Pump, model #: AA751 85PBX, serial#: 08112700439-4,		
12	DAF Bldg 2	Polyblend Unit 2		PB-02	Solids Handling	DAF Thickening	2009	Metering-Diaphragm	LMI/Siemens	M240-D1AA	BS50249		1 gph @ 110 psi	120	1	60	LMI Pump, model #: AA761 85PBX, serial #: XX102575032-3		
28	Dewatering Bldg	Dewatering Polymer System 1		PB-01	Solids Handling	Sludge Dewatering	2008	Metering-Diaphragm	Veloblend	VH-8D-1800-C	0307-135		8	115	1	60	LMI pump, c931-25P, s#07012307020 .1		

OBJECTID	Building Name	Name	System	Process	Asset ID	Equipment ID	INSTALLATIONYEAR	Compressor Type	Notes	Manufacturer Name	Model Number	Serial Number	Diameter	Height	Pressure	Material	Flow Range
15	DAF Bldg 1	DAF Pressure Tank 2	DAF Thickening	Solids Handling			1982	Reciprocating		Chicago Boiler Company		829691-2	2	8	100	Steel	
14	DAF Bldg 1	DAF Pressure Tank 1	DAF Thickening	Solids Handling			1982	Reciprocating		Chicago Boiler Company		829691-1	2	8	100	Steel	
11	DAF Bldg 2	Pressure Tank 2	DAF Thickening	Solids Handling		PT-02	2009	Reciprocating		Siemens			2	9	130	Welded Steel	155-205
12	DAF Bldg 2	Pressure Tank 1	DAF Thickening	Solids Handling		PT-01	2009	Reciprocating		Siemens			2	9	130	Welded Steel	150-205