Engineering Technical Report

Sunnyslope County Water District

Subject: **2016 Annual Engineering Technical Report**

Prepared For: Regional Water Quality Control Board

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Date: January 16, 2017

The purpose of this Technical Memorandum (TM) is to meet the Annual Engineering Report requirements of the Regional Water Quality Control Board (RWQCB) Waste Discharge Requirement (WDR) Order No. R3-2004-0065 (December 3, 2004).

Annual Engineering Reports must be submitted by January 30th every year commencing in 2006. The report will evaluate the performance and capacity of the wastewater treatment and disposal system. The report shall contain a hydraulic balance analysis of facility inputs and outputs including influent flow, precipitation, infiltration/percolation, and evaporation for both facilities and shall quantify disposal capacity of the facility based on actual operating data. The reports shall be prepared by, or under the supervision/review of, and be certified by a registered professional engineer registered in California and possessing applicable experience in wastewater engineering and planning.

1 Introduction

As identified in Section E, paragraph 7, of WDR R3-2004-0065 for the Sunnyslope County Water District (SSCWD), an annual engineering technical report shall be submitted to the Regional Water Quality Control Board (RWQCB) to evaluate the performance and capacity of the wastewater treatment and disposal system for the Ridgemark I (RM I) wastewater facility. The main aspect of these annual reports is a water balance analysis. The following sections of this document summarize the information required by the RWQCB for the annual reports.

2 Recent Maintenance Activities

Recent maintenance activities are summarized in Table 2-1. In 2011 Pond 3 at RM I was retired in order to prepare for the construction of the Ridgemark wastewater sequential batch reactors, which have been

installed in the area previously used for a portion of Pond 3. At the end of 2012, Pond 2 at RM I was retired from treatment service and the newly constructed Sequential Batch Reactor began treatment. At the end of 2012, Pond 1 at RM I was retired from wastewater treatment service and placed into service as a sludge storage/treatment pond until such time that the remainder of the new wastewater sludge treatment and drying facilities at RM I were completed. In 2013 the Sludge treatment tank and drying beds were completed and Pond 1 at RM I was retired from sludge treatment. Pond 1 at RM I will remain for backup emergency sludge disposal. In 2013, Ridgemark II treatment ponds 1 and 2 were decommissioned as part of the consolidation of RM I and RM II at RM I.

Table 2-1: Ridgemark I Maintenance Activities

Date	Item
2005	RM I, Ponds 3 & 4 drained, dried and solids removed
1/4/06 – 1/12/06	Pumping from Pond 4 at RM II to Pond 4 at RM I
July-Aug 2006	Bypass pumping from Pond 2 at RM I to Pond 4
10/30/06 – 12/3/06	Pumping from Pond 4 at RM II to Pond 4 at RM I
November 2006	Sludge removed from bottom of Pond 5 at RM I. Pond bottom ripped
November 2007	Ponds 3 & 4 at Ridgemark I. Pond bottoms ripped.
Jan-Dec 2007	Pumping effluent from Pond 4 at RM II to Pond 4 at RM I
August 2008	Ponds 3 & 4 at Ridgemark I. Pond bottoms ripped.
August 2009	Pond 4 Ridgemark I. Pond bottoms ripped.
August 2010	Ponds 4 & 5 at Ridgemark I. Pond bottoms ripped
September 2013	Ponds 4 and 6 were ripped to maintain percolation rates
June 2014	Pond 5 at Ridgemark I. Pond bottom ripped
July 2015	Ponds 3 & 4 at Ridgemark I. Pond bottoms ripped.
October 2015	Pond 5 at Ridgemark I. Pond bottom ripped.
October 2016	Ponds 3 & 4 at Ridgemark I. Pond bottoms ripped.

3 Hydraulic Balance Analysis

The hydraulic balance analysis is performed for the period spanning January 2016 through December 2016. The following sections describe the data used in the water balance and summarize the results.

3.1 Influent Flows

Influent flows are based on flow meter data for the analyzed period. RM I uses a magnetic flow meter. Total annual flow to RM I in 2016 was 174 AF.

Table 3-1: Facility Influent Flows (Monthly Average) to SBR

Month	RM I SBR Influent (gpd)	RM I SBR Influent (gallons)
Jan-16	159,419	4,942,000
Feb-16	155,345	4,505,000
Mar-16	154,516	4,790,000
Apr-16	153,633	4,609,000
May-16	153,839	4,769,000
Jun-16	154,900	4,647,000
Jul-16	153,774	4,767,000
Aug-16	154,839	4,800,000
Sep-16	150,233	4,507,000
Oct-16	151,806	4,706,000
Nov-16	157,787	4,733,000
Dec-16	161,839	5,017,000
Annual Total (Gallons)		**56,792,000**
Annual Total (Acre Feet)		**174**
Annual Average(gpd)	**155,161**	

Note: Influent flow rate is the average daily value over each month.

3.2 Precipitation

Precipitation data for the water balance is based on the California Irrigation Management Information System (CIMIS) station #126 located at the San Benito County Water District (SBCWD) offices (approximately 3-miles from the Ridgemark wastewater treatment facilities). The monthly precipitation for 2016 is shown in table 3-2.

Table 3-2: 2016 Precipitation Data

Month	Precipitation (in)
January 2016	3.98
February 2016	0.57
March 2016	3.72
April 2016	0.79
May 2016	0.05
June 2016	0.08
July 2016	0.08
August 2016	0.06
September 2016	0.10
October 2016	1.77
November 2016	2.48
December 2016	3.61
Total	**17.29**

3.3 Percolation

The primary means of wastewater disposal for the Ridgemark facilities is through percolation of the treated wastewater via disposal ponds. The RM I facility has 4 disposal ponds while the RM II facility has 2 disposal ponds. During 2016, at RM I disposal pond 3, 4, 5 and 6 were used for the disposal of 178 acre-feet of treated wastewater. In 2016, at the RM II Ponds 3 and 4 were not used for disposal. The size of these ponds is summarized in 3-3.

Table 3-3: Ridgemark Disposal Pond Surface Area

Pond	Area (acres)
RM I Pond 3	0.4
RM I Pond 4	0.8
RM I Pond 5	1.2
RM I Pond 6	2.1
RM II Pond 3 (not used)	1.1
RM II Pond 4 (not used)	1.1

Prior to the 2005 maintenance that was performed on RM I Ponds 3 and 4, it was estimated that Ponds 3, 4, and 5 at RM I had a percolation capacity of approximately 0.34 inches/day (SSCWD *Long-Term Wastewater Management Plan*, RMC 2006). After the 2005 maintenance was performed on Ponds 3 and 4 (RM I), Pond 4 was observed to have a percolation rate of 5.97 in/day in August 2006. Ponds 3 and 5 are estimated to have percolation rate of 3 in/day. The Pond 6 percolation rate was estimated to be the

maximum observed percolation rate of 3.82 in/day based on the Water Balance in the *Long-Term Wastewater Management Plan*. However, subsequent percolation monitoring in Pond 6 was performed that indicated a percolation rate range between 1.0 in/day and 3.0 in/day depending on level in the pond. An average Pond 6 percolation rate of 1.75 in/day (SSCWD *Long-term Wastewater Management Plan*) was assumed for the capacity analysis. RM II Ponds 3 and 4 have an estimated percolation capacity of 1.37 in/day (SSCWD *Long-Term Wastewater Management Plan*).

3.4 Evaporation

Table 3-4 presents average monthly pan evaporation data from DWR Bulletin 73-79 for the Hollister Costa Station from 1962 to 1966. These were the only pan evaporation data that were found for the region. Pond evaporation rates are assumed to be 75% of pan evaporation rates. Pond evaporation is 38.83 inches per year. Precipitation during 2016 was 17.29 inches. Net pond evaporation was 38.83 – 17.29 = 21.54 inches this year. Ridgemark I Ponds 3, 4, 5 and 6 have a combined area of 4.5 acres. However, in 2016, pond 6 was not utilized. Consequently, Ridgemark I ponds 3, 4 & 5 had an active evaporation area of 2.4 acres for 12 months. With a net evaporation rate of 21.54 inches this year, Ridgemark I active ponds have total evaporation of 4.31 acre feet in 2016 while Ridgemark II was not used.

Table 3-4: Pan and Pond Evaporation Data

Month	Pan Evaporation (in) [a]	Pond Evaporation (in)
January 2005	2.05	1.54
February 2005	2.17	1.62
March 2005	3.19	2.39
April 2005	4.84	3.63
May 2005	5.91	4.43
June 2005	6.26	4.69
July 2005	7.32	5.49
August 2005	6.02	4.52
September 2005	5.00	3.75
October 2005	4.37	3.28
November 2005	2.76	2.07
December 2005	1.89	1.42
Total	**51.77**	**38.83**

Footnotes:
a) Source: DWR Bulletin 73-79 for the Hollister Costa Station

3.5 Water Balance Summary

The purpose of the water balance analysis was to 1) identify the 2016 disposal balance and 2) assess the disposal capacity of the facilities. It should be noted that the maintenance activities described previously have significantly enhanced disposal capacity of RM I and have altered the number of disposal ponds required to be in operation. Table 3-5 summarizes the actual influent and disposal quantities for RM I for the analyzed period.

Table 3-5: 2015 Water Balance Summary

WWTF	Total Influent Raw WW Flow (AF)	Net Evaporation (Evaporation – Precipitation) (AF)	Inter-Facility Transfers (AF)	Treated WW Effluent Pond Percolation (AF)
RM I	174	-4.31	0	169.69

Using the observed percolation rates since construction of the SBR Treatment Plant of 4.7 in/day for Ponds 3, 4, and 5 and the percolation rate for Pond 6 measured in 2005 of 1.75 in/day, the 2016 disposal capacity was 466 AF per year. The District will be measuring and observing percolation rates in 2017 to further refine the estimated percolation rates in 2017. The District has observed and experienced improved percolation rates since the completion of the SBR Treatment Plant and with annual maintenance on the ponds.

The RM II facility disposal capacity is calculated at 97.3 AFY based on a percolation rate of 1.37 in/day and 38.8 inches of evaporation. In the third quarter 2013, the RM II facility was decommissioned from a wastewater treatment and disposal facility in conjunction with Long-Term Wastewater Management Plan improvements. Treatment Pond 1 at the Ridgemark II facility was converted to a Ridgemark II Liftstation emergency overflow holding pond.

4 Treatment Process Performance

Table 4-1 summarizes the average influent and effluent water quality from the treatment ponds at the RM I facility and summarizes WDR water quality regulations that are in effect since 2010. RM I treatment processes are meeting some, but not all of the requirements. Since the beginning of the operations at RM I of the SBR unit, RM I effluent has complied with all discharge requirements with the exception of the salinity requirements for TDS, sodium, and chloride. The District achieved compliance with TDS regulations in 2015 and continued to remain under the limit 2016 as the effluent TDS concentrations have been drastically reduced. Additionally the concentration levels of sodium and chlorides have been steadily declining since December 2014 due to the improved drinking water quality being delivered to the District's sewer customers and due to an aggressive effort to encourage customers to eliminate the use of salt discharging water softeners. These efforts will continue in 2017 and future years and are expected to bring the District's effluent quality into full compliance in 2018.

Table 4-1: 2016 Average Influent and Effluent Water Quality

Existing Water Quality Parameter	RM I SBR Influent	RM I SBR Effluent	RM I % Removal	2010 Permit Requirement
TDS (mg/L)	982	914	6.92%	1,200
Sodium (mg/L)	258	257	0.39%	200
Chloride (mg/L)	383	374	2.35%	200
Nitrate as N (mg/L)	NA	0.98		5
Ammonia as Nitrogen (mg/L)	53	0.62		5
Total Nitrogen (mg/L)	57	2.3	95.96%	
BOD_5 (mg/L)	228	3.49	98.47%	30
TSS (mg/L)	254	7.75	96.95%	30
pH	7.97	7.3	8.41%	6.5-8.4

1. Data consists of 12 monthly sampling events from Jan/2016 through Dec/2016. All values shown are monthly averages.

The *Long-Term Wastewater Management Plan* identified several improvements and modifications that could be implemented to provide an enhanced level of treatment to meet the future requirements. SSCWD is working with the City of Hollister, San Benito County Water District, San Benito County, and other regional stakeholders to develop agreement on preferred projects to meet the water quality objectives and to develop a regional reclaimed water system that will provide recycled water for agricultural and urban users. SSCWD has joined the Governance Committee of the Hollister Area Urban Waster and Wastewater Management Plan in order to become an integral part of this regional effort to improve potable water and wastewater quality. These water quality improvements will allow for the development of recycled water for agricultural and urban users.

5 Next Steps

The construction contract to build the wastewater treatment project at Ridgemark I was awarded in May 2011and construction of the SBR WWTP is complete. At Ridgemark I, the Sequential Batch Reactors were operational by the end of 2012. Since the beginning of the operation of the SBR unit at Ridgemark I, SSCWD has met all the requirements for nitrate as nitrogen, Ammonia, BOD (5 day), TSS, and pH. Ridgemark II influent flow was routed to Ridgemark I for treatment in the third quarter of 2013, and is now meeting the requirements for nitrate as nitrogen, Ammonia, BOD (5 day), TSS, TDS, and pH.

SSCWD plans to meet the requirements for sodium and chloride by delivering higher quality drinking water to the District's potable water customers and eliminating the use of salt discharging water softeners by the District's wastewater customers.

In June 2013, Sunnyslope County Water District, the City of Hollister, and San Benito County Water District entered into a Water Supply and Treatment Agreement to implement the entire Hollister Urban Area Water and Wastewater Master Plan and Coordinated Water Supply and Treatment Plan. The three

major water supply and treatment components for the Coordinated Water Supply and Treatment Plan are: 1) upgrade the Lessalt Surface Water Treatment Plant to an average of 2 mgd, with a peaking capacity of 2.5 mgd, 2) construct a new 4.5 mgd West Hills Surface Water Treatment Plant, and 3) build a North (San Benito) County Groundwater Bank to supply these two surface water treatment plants in time of drought. An updated schedule to complete all elements of the Coordinated Water Supply and Treatment Plan is shown below. This revised schedule is different from the previous schedule published in the Programmatic EIR for the Coordinated Water Supply and Treatment Plan. Changes in timing of the construction are related to a variety of factors including: developing financing options, environmental mitigation permitting for the West Hills Water Treatment Plant, and the delays in completing all the final agreements between the three agencies to build the two surface water plants and the North County Groundwater Basin.

The Upgrade to the Lessalt Water Treatment Plant and a potable water pipeline and pump station connecting the Lessalt surface water treatment plant to the Ridgemark Pressure Zone is complete. The upgraded Lessalt Water Treatment Plant began producing water in December, 2014. These facilities now allow the Ridgemark Pressure Zone, which includes the Ridgemark wastewater customers, to receive high quality drinking water. The District in cooperation with the Water Resources Association of San Benito County (WRA) has been conducting a significant educational campaign through door hanger distribution, website posts, direct outreach at community events, and in the annual Drinking Water Quality Report. These efforts to educate and urge customers to discontinue the use of salt based water softeners, which contribute to higher sodium, chloride, and TDS levels in wastewater effluent, are showing much success. Rebates of $250-$300 for customers who remove their brine discharging water softeners have been applied to 46 sewer customers in 2016 and at least 135 water softeners have been removed from the SSCWD sewer service area through the program since the Lessalt WTP Upgrade in December 2014. Additionally, in February 2015 the District adopted new codes prohibiting the replacement and/or installation of brine discharging water softeners. The water softener education and rebate plan will continue in 2017 and is expected to bring the District into compliance with the wastewater effluent requirements in 2018.

The reduction and/or elimination of the water softeners has resulted in significantly reduced salinity in the wastewater discharge levels. The District is now in compliance with TDS and has reduced sodium and chloride levels by 17.9% and 17.2% respectively compared to 2015. Moreover, the District has achieved a 43.4% reduction in TDS, a 36.7% reduction in Sodium, and a 35.6% reduction Chlorides over the two years since the Lessalt WTP Upgrade. Sunnyslope County Water District will continue to make significant reductions in sodium, chloride and TDS concentrations in 2017 and expects to be in compliance with regulatory limits in 2018.

COORDINATED WATER SUPPLY AND TREATMENT PLAN SCHEDULE

Lessalt Water Treatment Plant Upgrade

- Complete and operational in December, 2014.
- High quality drinking water is being delivered to the District's wastewater customers beginning December, 2014.

West Hills Water Treatment Plant

- EIR complete.
- Design and Specifications complete in December, 2014.
- Environmental Permitting complete.
- Project bid in April, 2015.
- Construction began in September, 2015.
- Project completion in summer, 2017.

References

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