Engineering Technical Report

Sunnyslope County Water District

Subject: **2014 Annual Engineering Technical Report**

Prepared For: Regional Water Quality Control Board

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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 1. 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 1. Pond bottoms ripped.
August 2009	Pond 4 Ridgemark 1. Pond bottoms ripped.
August 2010	Ponds 4 & 5 at Ridgemark 1. Pond bottoms ripped
September 2013	Ponds 4 and 6 were ripped to maintain percolation rates
June 2014	Pond 5 at Ridgemark 1. Pond bottom ripped

3 Hydraulic Balance Analysis

The hydraulic balance analysis is performed for the period spanning January 2014 through December 2014. 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 2014 was 196 AF.

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

Month	RM I SBR Influent (gpd)	RM I SBR Influent (gallons)
Jan-14	181,452	5,625,000
Feb-14	177,000	4,956,000
Mar-14	176,581	5,474,000
Apr-14	176,700	5,301,000
May-14	174,419	5,407,000
Jun-14	178,000	5,340,000
Jul-14	174,226	5,401,000
Aug-14	170,903	5,298,000
Sep-14	167,300	5,019,000
Oct-14	167,323	5,187,000
Nov-14	177,100	5,313,000
Dec-14	180,290	5,589,000
Annual Total (Gallons)		**63,910,000**
Annual Total (Acre Feet)		**196**
Annual Average(gpd)	**175,108**	

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 2014 is shown in table 3-2.

Table 3-2: 2013 Precipitation Data

Month	Precipitation (in)
January 2014	0.22
February 2014	1.91
March 2014	1.59
April 2014	0.86
May 2014	0.02
June 2014	0.00
July 2014	0.00
August 2014	0.00
September 2014	0.14
October 2014	1.57
November 2014	0.48
December 2014	5.78
Total	**12.57**

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 2014, at RM I, disposal pond 6 was not used at all. During 2014, at RM I disposal pond 3, 4, and 5 were used for the disposal of 196 acre-feet of treated wastewater. In 2014, at RM II, Ponds 3 and 4 were not used for disposal. The size of these ponds is summarized in 3-3.

Table 3-4: 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 (dry)	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 through 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 2014 was 12.57 inches per year. Net pond evaporation was 38.83 – 12.57 = 26.26 inches per year. Ridgemark I Ponds 3, 4, 5 and 6 have a combined area of 4.5 acres. However, in 2014, 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 26.26 inches per year, Ridgemark I active ponds have total evaporation of 5.25 acre feet per year 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 2014 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: 2014 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	196	- 5.25	0	190.75

Using the maximum observed percolation rates during 2006 for Ponds 3 and the estimated percolation rate for Pond 4 at RM I, the theoretical disposal capacity of the facility was estimated. In August 2006, Pond 4 was observed to have a percolation rate of 5.97 in/day. Ponds 3 and 5 have a lower percolation rate than Pond 4 even though they have all been maintained in the same manner, and are estimated at 3 in/day. The observed percolation rate for the disposal ponds after maintenance from 2005 (6.81 in/day) was greater than the observed rate from 2006 (5.97 in/day). This is a function of solids build up that was observed in Pond 4. Ongoing maintenance activities including solids removal are planned to maintain percolation capacity.

In the summer of 2014, as a result of Sequencing Batch Reactor (SBR) construction activities dirt was removed from Pond 6 to fill in former Pond 2 for new sludge treatment facilities. The percolation rate for Pond 6 is assumed to be the same as measured in June 2005 as 1.75 in/day. Assuming that RM I Ponds 3 and 5 percolate water at 3 in/day, Pond 4 percolates water at 5.97 in/day, and Pond 6 percolates water at 1.75 in/day, with annual evaporation is 38.8 inches of overall ponds, the RM I facility had a 2005 disposal capacity of 469 AFY. The 2005 capacity analysis above does not reflect any degradation of percolation capacity due to solids accumulation.

Assuming no maintenance activities on the percolation ponds the currently observed percolation rates are eventually expected to degrade. The speed that the percolation rate degrades is not clear at this point but monitoring by SSCWD staff in the upcoming years will assist in planning required maintenance activities in the future. Assuming a reduced percolation rate of 3 in/day in RM I Ponds 3, 4 and 5 and the stated percolation rate for RM I Pond 6, the 2010 disposal capacity of RM I would be 378 AFY, which exceeds the 2014 influent flow of 196 AFY. After January 2012, RM I Pond 3 was temporarily eliminated during construction, for a net loss of approximately 114 acre-feet per year from RM I. Subtracting this 114 acre-foot per year from the 2010 disposal capacity of 378 acre-feet per year, After the elimination of Pond 3, Ridgemark 1 will have a 2012 reduced disposal capacity of 264 acre-feet per year. For the 2013 and 2014 calendar years, RM I Pond 3 was returned to service at half disposal capacity 57 acre-feet per year. Total disposal capacity at RM I will be approximately 321 acre-feet per year which still exceeds the current 2014 wastewater flow of 196 AFY at the RM I facility by a wide margin. In the third quarter 2013 wastewater flow into the RM II facility began flowing to the RM I SBR for treatment. In 2014 all wastewater treatment occurred at the RM I facility utilizing SBR Treatment.

The RM II facility disposal capacity is calculated at 109 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 1 of the SBR unit, RM 1 effluent has complied with all discharge requirements with the exception of the salinity requirements for TDS, sodium, and chloride.

Table 4-1: 2014 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)	1647	1616	1.88%	1,200
Sodium (mg/L)	407	406	0.25%	200
Chloride (mg/L)	607	581	4.28%	200
Nitrate as N (mg/L)	0	1.51		5
Ammonia as Nitrogen (mg/L)	50	0.37	99.26%	5
Total Nitrogen (mg/L)	49	2.2	95.51%	
BOD_5 (mg/L)	236	2.53	98.93%	30
TSS (mg/L)	319	3.76	98.82%	30
pH	8.07	7.51	6.94%	6.5-8.4

1. Data consists of 12 monthly sampling events from Jan/2014 through Dec/2014 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.

Prior to beginning construction on the new Ridgemark Wastewater Treatment Plant located at the RM I facility, The RM I and RM II treatment facilities consisted of partial-mix facultative (aerobic-anaerobic) treatment (stabilization) ponds and disposal ponds in series. Each facility had two treatment ponds and RM I has 4 disposal ponds while RM II has 2 disposal ponds. The removal efficiencies for RM I and RM II for BOD, TSS, and Total Nitrogen are summarized in Table 4-2. The higher removal efficiencies at

RM II were primarily a function of the long hydraulic detention times (more than 100 days based on average 2012 daily flows) due to large treatment pond volumes and actual hydraulic loadings.

Table 4-2: RM I & II Average Removal Efficiencies

Constituent	RM I Removal	RM II Removal
BOD_5	98.61%	94.90%
TSS	97.58%	95.34%
Total Nitrogen	96.51%	82.81%

The treatment process was not designed to remove nitrogen from the wastewater, however a significant degree of incidental nitrogen removal is observed at the RM II facility. This removal is likely a result of long detention times and the combination of aerobic and anaerobic conditions found in different layers of the treatment ponds. RM I, which has a detention time of approximately 50 days based on average 2012 daily flows, has minimal nitrogen removal. There is currently no salinity removal in the treatment process and evaporation appears to have only a small impact on the concentrations of salts in the effluent. Water softeners are thought to be the major contributor to TDS concentrations in the treated effluent. The *2011 Annual Salt Management Report* provides detailed analysis of salt sources to the wastewater and proposed methods for mitigation of these concentrations.

5 Next Steps

The construction contract to build the wastewater treatment project at Ridgemark 1 was awarded in May 2011. Construction commenced in the summer of 2011. Construction of the SBR WWTP is complete. At Ridgemark 1, the Sequential Batch Reactors were operational by the end of 2012. Since the beginning of the operation of the SBR unit at Ridgemark 1, SSCWD has met all the requirements for nitrate as nitrogen, Ammonia, BOD (5 day), TSS, and pH. Ridgemark 2 influent flow was routed to Ridgemark 1 for treatment in the third quarter of 2013, and is now meeting the requirements for nitrate as nitrogen, Ammonia, BOD (5 day), TSS, and pH.

SSCWD plans to meet the requirements for TDS, sodium, and chloride by improving the Lessalt surface water treatment facility discussed in the Hollister Urban Area Coordinated Water Supply and Treatment Plan, January 2010. The surface water treatment improvements will be built in conjunction with San Benito County Water District, the City of Hollister, and the County of San Benito.

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, as discussed by the managers of the three agencies 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: the need to complete a Mitigated Negative Declaration for Lessalt, 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 substantially complete and only minor punch list items remain. 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. Efforts to educate customers and discontinue the use of salt based water softeners which contribute to higher sodium, chloride, and TDS levels in wastewater effluent has begun. A plan to reduce and/or eliminate customer's use of brine discharging water softeners will be implemented in 2015.

Sunnyslope County Water District has begun a coordinated education campaign and will be adopting a water softener ordinance in the spring of 2015. The reduction and/or elimination of the water softeners will reduce salinity in the wastewater discharge to levels below regulatory limits and allow Sunnyslope County Water District to begin meeting sodium, chloride, and TDS regulations. Sunnyslope County Water District will make significant reductions is sodium, chloride and TDS in 2015 and expect to be in compliance with regulatory limits in 2016.

COORDINATED WATER SUPPLY AND TREATMENT PLAN SCHEDULE

Lessalt Water Treatment Plant Upgrade

- Substantially 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 Underway and expected completion April, 2015.
- Project to be bid in April, 2015.
- Construction to begin in June, 2015.
- Project completion in July, 2017.

References

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