

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2008-0068

WASTE DISCHARGE REQUIREMENTS

FOR

LAKE BERRYESSA RESORT IMPROVEMENT DISTRICT
WASTEWATER TREATMENT FACILITY
NAPA COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Water Board) finds that:

1. The Lake Berryessa Resort Improvement District (hereafter referred to as Discharger) submitted a Report of Waste Discharge (RWD) on 27 April 2007 for updating existing Waste Discharge Requirements (WDRs) Order No. 95-171 for its wastewater treatment facility. The update is necessary because the WDRs do not reflect the current and proposed wastewater treatment and disposal system. Supplemental information was received on 9 August 2007.
2. For the purposes of this Order, the term "Wastewater Treatment Facility" (WWTF) shall mean the wastewater collection system, the wastewater treatment and evaporation/percolation ponds and the land application areas.
3. The WWTF is located along the north side of Lake Berryessa near Putah Creek at the end of Stagecoach Canyon Road in Pope Valley, Napa County, Section 25, T10N, R5W, MDB&M. The Assessor's Parcel Numbers (APNs) for the wastewater treatment and disposal system is 016-224-001-000 and 015-080-009-000. The facility is accessed via Snell Valley Road to Stagecoach Canyon Road. The general location of the facility is shown on Attachment A, which is attached hereto and made part of this Order by reference.
4. WDRs Order No. 95-171, adopted by the Regional Water Board on 14 April 2004, prescribe requirements for the Lake Berryessa Resort Improvement District WWTF. This Order regulates the treatment and disposal of domestic wastewater to five wastewater ponds. WDRs Order No. 95-171 is not consistent with the current plans and policies of the Regional Water Board, and does not allow for the use of the two additional wastewater ponds that have been constructed, and the land application areas necessary to treat and dispose of the domestic wastewater generated from the subdivision.

Existing Facility, Facility Improvements, and Discharge

5. The existing WWTF currently treats and disposes of wastewater from 187 existing single-family dwellings at the Berryessa Estates Subdivision. There are a total of 339 available service connections at full buildout.

6. The following table presents a summary of existing and projected (at full buildout) wastewater flows in gallons per day (gpd) based on metered domestic water use:

	Existing flow (gpd)	Projected flow at full buildout (gpd)
Average Dry Weather Flow (ADWF)	37,000	67,000
Peak Wet Weather Flow (PWWF)	44,000	80,000

7. The RWD states that a magnetic flow meter was installed in February 2006 to meter the wastewater flows to the wastewater ponds. Since that time, the average dry weather flow (June through September) in 2006 ranged from 36,000 gpd to 56,000 gpd, and the average wet weather flow (October through May) ranged from 38,000 gpd to 135,000 gpd. In 2007, the average dry weather flow ranged from 37,000 gpd to 42,000 gpd and the average wet weather flow ranged from 30,000 gpd to 60,000 gpd.
8. Wastewater from the Berryessa Estates Subdivision flows via gravity to three lift stations where it is pumped to a 91,000-gallon aboveground holding tank and a 21,000-gallon overflow tank. From the tanks, the wastewater is pumped approximately 1.2 miles through a six-inch diameter force main into a manhole. The flow meter is located within the force main. From the manhole, wastewater gravity flows to a manually operated distribution box and to three treatment ponds (Pond Nos. 1 through 3) that are connected in series. From Pond No. 3, wastewater gravity flows to Pond No. 4 and then to Pond No. 5. A portable effluent pump is used to transfer wastewater from either Pond Nos. 4 or 5 to Pond No. 6. A portable effluent pump is also used to transfer wastewater from Pond No. 6 to Pond No. 7. The RWD states that Pond No. 4 serves as a polishing pond and Pond Nos. 5, 6, and 7 serve as storage ponds. A wastewater treatment schematic is presented on Attachment B, which is attached hereto and made part of this Order by reference.
9. The volumes of the seven wastewater ponds at the facility are as follows:

<u>Pond No.</u>	<u>Max Water Depth at 2-feet of freeboard (feet)</u>	<u>Volume at 2-feet freeboard (acre-feet)</u>	<u>Volume at 2-feet freeboard (million gallons)</u>
1	5	1.7	0.55
2	6	5.57	1.81
3	6	4.07	1.32
4	6	5.47	1.78
5	9	10.11	3.29
6	10	5.05	1.64
7	11	6.9	2.24

10. The range of the effluent quality from the wastewater ponds per the RWD is presented below:

<u>Constituent</u>	<u>Units</u>	<u>Ponds 1 to 5</u>	<u>Pond No. 6</u>	<u>Pond No. 7</u>
pH	pH Units	8.4 – 8.7	8.5 – 9.4	8.5 – 9.6
BOD	mg/L	44.5	10 – 37	12 - 20
TDS (fixed)	mg/L	180 – 600	490	490
TDS (volatile)	mg/L	92 – 140	110	130
TDS (total)	mg/L	272 – 740	600	620
TSS	mg/L	20 – 46	5.8	16
Nitrate as N	mg/L	0.2 – 1.4	0.5	0.5
Nitrite as N	mg/L	0.4	0.4	0.4
Ammonia as N	mg/L	0.2 – 14	0.2 – 0.32	0.2 – 0.32
TKN	mg/L	4.1 – 14.7	4.1	3.7
Total Organic Nitrogen	mg/L	3.6 – 10	4.1	3.5
Total Coliform	MPN/100 mL	13 - >1,600	2 - >24,000	2 – 17
Fecal Coliform	MPN/100 mL	2 - >1,600	<2 – 70	<2 – 2
Boron	mg/L	0.23 – 0.76	0.29 – 0.54	0.41 – 0.66
Calcium	mg/L	22 – 36	26 – 38	26 – 35
Chloride	mg/L	17 – 45	23	28
Iron	mg/L	0.09 – 0.33	0.13	0.1
Magnesium	mg/L	26 – 75	31 – 45	37 – 56
Manganese	mg/L	0.028 – 0.57	0.022 – 0.053	0.1 – 0.14
Potassium	mg/L	3 – 9.8	4.8 – 6.7	4.9 – 7.4
Sodium	mg/L	21 – 83	29 – 58	38 – 57
Specific Conductivity	umhos/cm	750 - 980	840	790

Notes: Values in bold represent constituents where only one test was conducted.

- The Discharger states that the wastewater in Pond No. 7 is disinfected using calcium hypochlorite tablets to maintain a chlorine residual of at least 0.3 mg/L and a total coliform organism concentration of less than 23 MPN/100 mL. Disinfection is conducted by placing chlorine tablets in Pond No. 7 at the point of discharge from Pond No. 6. The wastewater in Pond No. 7 is then tested for chlorine residual on a daily basis using a hand held meter. Fecal and total coliform organism samples are typically collected on a weekly basis and when the chlorine residual in the pond is at least 0.3 mg/L, prior to applying the wastewater to the land application areas. Disinfected wastewater is applied to the land application areas when the total coliform organism concentrations from the sample are below 23 MPN/100 mL. However, if total coliform organism concentrations are above 23 MPN/100 mL then the chlorine dose to the pond is increased and no wastewater is applied to the land application areas. This Order requires that if this proposed plan does not ensure continued compliance with the effluent limits the chlorination process must be updated.

Land Application

12. Wastewater from Pond No. 7 will be applied to three land application areas totaling approximately six acres using spray irrigation methods. Locations of the land application areas are shown on Attachment C, which is attached hereto and made part of this Order by reference.
13. The RWD contains a water balance that demonstrates adequate hydraulic capacity for a monthly average wastewater inflow rate of up to 97,000 gpd and a total annual inflow of approximately 36.7 million gallons. The water balance is based on 100-year annual precipitation, assumes an inflow/infiltration factor of 25 percent of the design flow, assumes that 20 percent of the effluent captured as tailwater is returned to the storage ponds, and assumes that wastewater will be applied year round. Because the wastewater will be applied year round, there are concerns about complying with Discharge Prohibition No. D.3 and therefore the monthly average dry weather inflow to the WWTP shall not exceed 42,000 gpd, which is the maximum monthly average dry weather flow during 2007.
14. The RWD states that a flow meter will be installed on the main discharge pipe from Pond No. 7 to the land application areas to measure the amount of wastewater applied.
15. The RWD states that all tailwater from the land application areas will be captured by two tailwater collection ditches. Tailwater in one of the ditches will flow via gravity through the ditch into Pond No. 4 for recirculation back into the sprayfield system. The amount of tailwater return is anticipated to be approximately 15 to 20 percent of the sprayed water. The second tailwater control ditch will be constructed at the base of the Spray Area Nos. 2 and 3 above Pond Nos. 6 and 7. Tailwater collected in this ditch will be diverted into Pond No. 7 via a diversion structure.
16. The RWD states that during wet periods when the land application areas are not being used, a culvert plug will be installed in all diversion structures in order to prevent storm water from entering the ponds. All storm water runoff will be allowed to follow the natural drainage into Stone Corral Creek when the inlet to Pond No. 4 is closed. In order to prevent the potential discharge of storm water mixed with wastewater, this Order prohibits irrigation with wastewater 24 hours before, during, or 24 hours after a rain event, or when soils are saturated.
17. The land application equipment will be operated manually using diesel-powered generators, since there are no utilities at the wastewater ponds and land application areas. The RWD states that the Discharger will inspect the irrigation equipment on a daily basis to ensure that it is operating within the permitted parameters.

Wastewater Collection System

18. The wastewater collection system is approximately 40 years old with the majority consisting of clay pipe. The RWD states that the Discharger is repairing or replacing sections of the sewer pipeline and replacing the steel tanks at each of the three lift stations with concrete collection tanks equipped with tank level sensors and high level alarms as part of the

Sewer Line and Sewer Lift Station Rehabilitation Project. The Rehabilitation Project is required by a Stipulated Judgment (see Finding No. 31).

19. On 31 January 2008, the Discharger submitted a technical report showing the three lift stations have been upgraded. The report describes the following upgrades: (a) the installation of urethane lined concrete collection tanks at each of the lift stations, (b) the installation of new pumps and motors at each of the lift stations, (c) the installation of components of a System Controls and Data Acquisition (SCADA) System to allow each lift station to be electronically monitored from a central location, and (d) the purchase of a mobile emergency generator to provide power to the three lift stations in the event of an electrical power failure. Because the high level alarms have not been completed, this Order requires that remotely operated alarms be installed.
20. On 29 February 2008, the Discharger submitted a technical report indicating that certain sewer line sections (B-2 to BB-1, BB-1 to BB-1.2, A-1.13 to A-1.133, A-1.1 to A-1.2, A-3 to A-5, A-8 to A-8.4, A-8.4 to A-8.6, A-8.6 to A-8.6.1, and LS C to C-4) had either been repaired or replaced as required by the Stipulated Judgment.
21. The sanitary sewer system collects wastewater and consists of sewer pipes, manholes, and/or other conveyance system elements that direct raw sewage to the treatment facility. A "sanitary sewer overflow" is defined as a discharge to ground or surface water from the sanitary sewer system at any point upstream of the treatment facility. Temporary storage and conveyance facilities (such as wet wells, regulated impoundments, tanks, highlines, etc.) may be part of a sanitary sewer system and discharges to these facilities are not considered sanitary sewer overflows, provided that the waste is fully contained within these temporary storage/conveyance facilities. Sanitary sewer overflow is also defined in State Water Resources Control Board (State Water Board) Order No. 2006-0003-DWQ, *Statewide General Waste Discharge Requirements for Sanitary Sewer Systems*, which can be found at: http://www.waterboards.ca.gov/resdec/wqorders/2006/wqo/wqo2006_0003.pdf. Per a 20 February 2008 amendment to the monitoring and reporting program, this Order now requires that all Category 1 spills be reported within two hours, to the State Office of Emergency Service, the Napa County Department of Environmental Management, and the Regional Water Board.
22. For this facility, any sanitary sewer overflow would consist of domestic wastewater. The chief causes of sanitary sewer overflows include grease blockages, root blockages, debris blockages, sewer line flood damage, manhole structure failures, vandalism, pump station mechanical failures, power outages, storm or groundwater inflow/infiltration, lack of capacity, and/or contractor caused blockages.
23. Sanitary sewer overflows often contain high levels of suspended solids, pathogenic organisms, toxic pollutants, nutrients, oxygen demanding organic compounds, oil and grease, and other pollutants. Sanitary sewer overflows can cause temporary exceedences of applicable water quality objectives, pose a threat to public health, adversely affect aquatic life, and impair the public recreational use and aesthetic enjoyment of surface waters in the area.

24. The Discharger is expected to take all necessary steps to adequately maintain, operate, and prevent discharges from its sanitary sewer collection system. This Order requires the Discharger to prepare and implement a *Sewer System Management Plan* (SSMP) consistent with State Water Board Order No. 2006-0003-DWQ.

Previous Enforcement

25. The Discharger has had a long history of sewage spills at this facility. On 28 December 1995, the Executive Officer issued Administrative Civil Liability (ACL) Complaint No. 95-516. The ACL Complaint was for a raw sewage spill to Putah Creek estimated at approximately 50,000 gallons and was in the amount of \$25,000. In addition to the monetary penalty, the Discharger was required, pursuant to CWC Section 13267, to submit a plan to complete improvements to the system to prevent future unauthorized discharges of wastewater. The ACL Complaint was withdrawn in January 1996 following submittal of a revised compliance schedule.
26. In April 1996, the Discharger submitted a report titled "*Capacity Study for the Wastewater Treatment and Disposal Facilities for Lake Berryessa Resort Improvement District.*" In summary, the report concluded that the infiltration/inflow (I/I) issues at the wastewater collection system are a serious problem and can overwhelm the system's storage and disposal capacity. The report included recommendations for studies to identify sources of I/I and to determine additional methods of wastewater disposal.
27. On 20 September 1996, Cease and Desist Order (CDO) No. 96-233 was subsequently adopted by the Regional Water Board. The CDO reflects the Discharger's revised compliance schedule (the document upon which the withdrawal of the ACLC was based) and required the Discharger to: begin an I/I study, establish a financial plan, select and design an upgrade to the wastewater facility, complete construction of the project, and submit quarterly progress reports. The final upgrade was to have been completed by 15 September 2001, and was to have resulted in compliance with the WDRs. The Discharger has not complied with the CDO. The only items submitted were an I/I study plan and a five-year financial plan, which were submitted in 1996.
28. On 14 February 2005, the Discharger was issued a Notice of Violation (NOV) for a spill of domestic wastewater and water treatment plant backwash water from Pond No. 5 to Stone Corral Creek. The spill began on 11 January 2005, and as of 28 February 2005 exceeded 2.3 million gallons. The spill was the result of inflow/infiltration problems in the collection system and the lack of capacity in the ponds. At the time the NOV was issued, the discharge was still ongoing.
29. On 4 March 2005, the Executive Officer then issued ACLC No. R5-2005-0507 to the Discharger in the amount of \$400,000. The ACLC resulted from the Discharger's violations of its WDRs and CDO, with the most significant violation being a months-long discharge of approximately 4.1 million gallons of wastewater into Stone Corral Creek, a tributary of Lake Berryessa. Following a hearing, the Regional Water Board adopted ACL Order No. R5-2005-0072 on 29 April 2005 in the amount of \$400,000. The matter was also referred to

the Attorney General for additional discharges to surface waters. The Discharger then petitioned the ACLO to the State Water Board, and following its dismissal, filed suit in Court. Following several months of negotiations between the Discharger, Regional Water Board staff and the Attorney General's office, the Regional Water Board agreed to the conditions of a settlement.

30. On 24 January 2007 Regional Water Board staff issued a Notice of Violation (NOV) for a controlled discharge of partially treated wastewater to an unpermitted temporary sprayfield. The discharge totaled approximately 5.5 million gallons and occurred over a period of 52 days during March, April, May, and June 2006. Of this, an unknown volume flowed over vegetated land prior of the entering Stone Corral Creek. The volume of the discharge was based on monthly discharge summary reports provided by the Discharger. The Discharger indicated that the controlled discharge to the unpermitted sprayfield was necessary because of excessive rainfall and the lack of capacity in the wastewater ponds, and to avoid a possible overflow or breach in a pond berm.
31. On 13 July 2007, the Executive Officer signed a Stipulated Judgment regarding Case Nos. 6CS00256 and 06AS01602 on behalf of the Regional Water Board. All parties then signed the document. The terms of the Stipulated Judgment are as follows: (a) the Discharger must prevent any future discharges of wastes to surface waters; (b) by 10 August 2007, the Discharger must submit a complete RWD to operate a permanent sprayfield (see Finding No. 1); (c) by 31 January 2008, the Discharger must submit a report showing that three of the lift stations have been upgraded (see Finding No. 19); (d) by 1 March 2008 the Discharger must submit a report showing that several sewer line sections have been replaced or repaired; (e) the Discharger must pay the liability beginning 1 August 2009, in monthly installments of \$3,333.33 over a 10 year period; and (f) by 30 August 2009, the Discharger must replace the water treatment plant to be in compliance with applicable California Department of Public Health requirements.
32. In February 2008, Regional Water Board staff was notified of a controlled discharge of partially treated wastewater to an unpermitted temporary sprayfield. The discharge occurred over an 18 day period in February and March 2008 and totaled approximately 0.7 million gallons. An unknown volume flowed over vegetated land prior of the entering Stone Corral Creek. The discharge volume was based on monthly discharge summary reports provided by the Discharger. In a 27 February 2008 report, the Discharger stated that the controlled discharge was necessary because of pond capacity issues and the need to alleviate an immediate threat of breaching a pond berm.

Site-Specific Conditions

33. Average precipitation in the vicinity ranges from approximately 0.06 inches in July to 6.01 inches in January and averages approximately 27.99 inches per year. Based on information from the State Climate Department, the 100-year annual precipitation at Middletown is approximately 58 inches. These data are from the nearest weather/climate station, which is approximately 25 miles northwest of the facility.

34. Evapotranspiration rates for the area range from 1.5 to 13.2 inches per month, with the highest rate occurring in July.
35. All portions of the WWTF are outside the 100-year flood zone.
36. Based on information obtained from the Soil Survey of Napa County, the soils in the area consist of the Maxwell clay loam, Henneke-Montara Rock outcrop complex and Bressa-Millsholm loams. The Maxwell clay loam is a poorly drained alluvium. The Henneke-Montara Rock complex is an excessively drained soil formed in material weathered from serpentinitic rock, while the Bressa-Millsholm loam is a moderately deep and well-drained soil formed from weathered sandstone.
37. The facility lies within the Lake Berryessa Hydrologic Unit Area No. 512.21, as depicted on interagency hydrologic maps prepared by the Department of Water Resources in August 1986.
38. Stone Corral Creek, a tributary to Lake Berryessa lies at the base of Pond No. 5.

Domestic Water Supply

39. The RWD states that Berryessa Estates obtains potable water from Lake Berryessa surface water. Water quality data from the water treatment plant collected on 20 June 2007 is presented below:

<u>Analyte</u>	<u>Units</u>	<u>Concentration</u>
pH	pH Units	8.2
BOD	mg/L	18
TDS (total)	mg/L	240
Nitrate as N	mg/L	1.4
Nitrite as N	mg/L	<0.4
Ammonia as N	mg/L	<0.2
TKN	mg/L	0.74
Total Organic Nitrogen	mg/L	0.74
Total Coliform	MPN/100 mL	<2.0
Fecal Coliform	MPN/100 mL	<2.0
Boron	mg/L	0.32
Calcium	mg/L	20
Iron	mg/L	<0.10
Magnesium	mg/L	42
Manganese	mg/L	<0.020
Potassium	mg/L	1.8
Sodium	mg/L	12

Groundwater Considerations

40. There are five two-inch diameter groundwater monitoring wells at the site. The wells range in depth from approximately 30 to 50 feet below ground surface (bgs) and are constructed with a 15-foot of screened interval. Monitoring wells MW-1 and 2 were installed in June 2006 and MW-3 through 5 were installed in August 2006, and have been sampled on a quarterly basis since that time. Well locations around the wastewater treatment and disposal facility are shown on Attachment C, which is hereto and attached to this Order by reference.
41. The depth to groundwater ranges from approximately 4 to 18 feet bgs. The predominate groundwater flow direction is generally from northwest to southeast with a gradient of approximately 0.07 feet per foot.
42. Groundwater quality has been characterized by quarterly sampling of monitoring wells since June and August 2006. A summary of groundwater quality for all five monitoring wells through the third quarter 2007 sampling event is presented in the table below as well as the Water Quality Limit for each analyte.

<u>Well</u>	<u>Units</u>	<u>Downgradient</u>		<u>Upgradient</u>		<u>Downgradient</u>	
		<u>MW-1</u>	<u>MW-2</u>	<u>MW-3</u>	<u>MW-4</u>	<u>MW-5</u>	
pH	std.	7.8	7.4	7.6	7.7	7.5	
EC	umhos/cm	789	818	742	535	1,000	
TDS	mg/L	520	517	533	413	5,250	
NO ₃ -N	mg/L	<0.1	0.21	<0.1	3.57	<0.1	
TKN	mg/L	0.27	0.22	0.39	0.14	6.85	
TCO	MPN/100 mL	<2	<2	<2	18.7	<2	
Boron	mg/L	0.44	0.36	2.55	0.25	14	
Calcium	mg/L	58.5	77	6.7	38.5	100	
Iron	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
Magnesium	mg/L	57	34.5	2.3	58.5	215	
Manganese	mg/L	0.2	0.02	0.01	0.02	0.22	
Potassium	mg/L	3.9	4	2.4	4.85	50.5	
Sodium	mg/L	51.5	59.5	195	28	1,200	
Chloride	mg/L	38	12.5	25.5	22	1,450	

pH and EC are field measurements, NO₃-N denotes Nitrate as Nitrogen. TKN denotes Total Kjeldahl Nitrogen. TDS denotes Total Dissolved Solids. Na denotes sodium. Cl denotes chloride. TCO denotes Total Coliform Organisms. MPN/100mL denotes Most Probable Number per 100 mL. ND denotes Not Detected. NA denotes Not Applicable.

43. The following constituents were not detected in the monitoring wells: hydroxide, carbonate, and iron.

44. In general, groundwater exceeds Water Quality Objectives (WQOs) for TDS, boron, manganese, sodium, and chloride. A summary of the results are presented below:
- a. All of the monitoring wells except for MW-4 contained TDS concentrations that exceed the lowest possible water quality limit of 450 mg/L. Average concentrations in the downgradient wells ranged from 413 to 5,250 mg/L with the highest average concentration reported in downgradient well MW-5. The RWD states that the TDS concentration in MW-5 is most likely not associated with the waste discharge because TDS concentrations in the wastewater ponds are reported up to 620 mg/L. The average TDS concentration in the upgradient well MW-2 is 517 mg/L. To further evaluate the TDS concentrations in MW-5, this Order requires the Discharger to submit a technical report that discusses potential sources of these elevated TDS concentrations.
 - b. MW-3 and MW-5 were the only wells that contained average boron concentrations that exceeded the lowest possible water quality limit of 0.7 mg/L. The average concentrations in these downgradient wells were 2.55 mg/L and 14 mg/L. The average boron concentration in MW-2 is 0.36 mg/L.
 - c. MW-1 and MW-5 were the only wells that contained average manganese concentrations above the lowest possible water quality limit of 0.05 mg/L. Average concentrations in these wells were 0.2 and 0.22 mg/L. The average manganese concentration sodium concentration in MW-2 is 59.5 mg/L.
 - d. All of the monitoring wells contained sodium concentrations above the lowest possible water quality limit of 20 mg/L. Average concentrations in the downgradient wells ranged from 28 to 1,200 mg/L. The highest average sodium concentration was reported in MW-5. The average sodium concentration in MW-2 is 59.5 mg/L.
 - e. MW-5 was the only monitoring well that contained average chloride concentrations above the lowest possible water quality limit of 106 mg/L. The RWD states that this concentration of 1,450 mg/L is most likely not associated with the waste discharge because chloride concentrations in the wastewater ponds are reported up to 28 mg/L. The average chloride concentration in MW-2 is 12.5 mg/L, which is well below the water quality limit of 106 mg/L.
 - f. Total Coliform Organisms (TCO) is reported in MW-4 at an average concentration of 18.7 mpn/100 mL, which exceeds the Basin Plan water quality limit of 2.2 mpn/100 mL. TCO concentrations ranged from <2 to 49 mpn per 100 mL with the highest concentration reported during the first quarter groundwater sampling event. Because coliform organisms are normally filtered as they migrate through soil media, the presence of TCO in the well is most likely a result of contamination during well installation or sampling. The current non-detectable TCO concentration complies with the Basin Plan, and additional sampling results will be evaluated to determine compliance with the TCO limits in MW-4.

45. Based on the average total nitrogen concentration in effluent (5 mg/L), and a maximum flow rate (up to 0.097 Mgal/day) at full buildout, the total nitrogen applied to the six acres of land application area each year is expected to be approximately 58 lbs/acre•year. Native grasses are grown on the land application areas. According to the *Western Fertilizer Handbook*, Bermuda turf grasses are capable of taking up approximately 425 lbs/acre•year of nitrogen. In a 24 March 2008 letter, the Discharger states that the grasses will be harvested (mowed and hauled offsite).
46. Based on the average TDS concentration in final effluent from Pond No. 7 (620 mg/L), and a flow rate (up to 0.097 Mgal/day), the total TDS applied to the land application areas (six acres each year) is expected to be approximately 7,308 lbs/acre•year. Because TDS consists of biodegradable dissolved solids and Fixed Dissolved Solids (FDS), the loading rate of FDS based on an average concentration of 490 mg/L is expected to be approximately 5,776 lbs/acre•year. Groundwater beneath land application areas and wastewater ponds is expected to be degraded by TDS compounds as a result of the wastewater application and storage, and the Discharger must implement measures to reduce salinity.

Antidegradation Analysis

47. State Water Board Resolution No. 68-16 (“Policy with Respect to Maintaining High Quality Waters of the State”) (hereafter Resolution 68-16 or the “Antidegradation Policy”) requires a Regional Water Board in regulating the discharge of waste to maintain high quality waters of the state (i.e., background water quality) until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than as described in the plans and policies, including water quality objectives in the applicable Basin Plan. The discharge is required to meet waste discharge requirements that will result in the best practicable treatment or control of the discharge necessary to assure that pollution or nuisance will not occur, and highest water quality consistent with maximum benefit to the people of the State will be maintained. It is the responsibility of the Discharger to provide information for the Regional Water Board to evaluate whether any degradation caused by the discharge is consistent with this policy, as well as the amount of degradation that would be consistent.
48. The Discharger has not provided an antidegradation analysis. The information in the Findings shows that effluent disposal has the potential to degrade or pollute the underlying groundwater with respect to salinity constituents.
49. The concentration of TDS in the potable water at the site is approximately 240 mg/L. TDS concentration in the effluent discharged to the land application areas is approximately 620 mg/L. The incremental addition of dissolved salts through water usage at this facility (about 380 mg/L) is higher than the normal range for domestic use and may not be considered reasonable. This Order requires the Discharger to complete salinity BPTC analysis to determine additional best practicable treatment and control measures for salinity constituents.

50. The Regional Water Board finds that some degradation of the groundwater beneath the WWTP is consistent with the maximum benefit to the people of the state provided that:
- a. The degradation is confined within a specified boundary;
 - b. The Discharger minimizes the degradation by fully implementing, regularly maintaining, and optimally operating Best Practicable Treatment and Control (BPTC) measures;
 - c. The degradation is limited to waste constituents typically encountered in municipal wastewater as specified in the groundwater limitations in this Order; and
 - d. The degradation does not result in water quality less than that prescribed in the Basin Plan.
51. In general, some degradation of groundwater by some of the typical waste constituents released with discharge from a municipal wastewater utility after effective source control, treatment, and control is consistent with maximum benefit to the people of California. The technology, energy, and waste management advantages of municipal utility service far exceed any benefits derived from a community otherwise reliant on numerous concentrated individual wastewater systems, and the impact on water quality will be substantially less. Degradation of groundwater by constituents (e.g., toxic chemicals) other than those specified in the groundwater limitations in this Order, and by constituents that can be effectively removed by conventional treatment (e.g., total coliform bacteria) is inconsistent with maximum benefit and/or BPTC. When allowed, the degree of degradation permitted depends upon many factors (i.e., background water quality, the waste constituent, the beneficial uses and most stringent applicable water quality objective, source control measures, waste constituent treatability).
52. This Order acknowledges that some degradation may occur as a result of the application of treated wastewater to land, but the Regional Water Board finds that such degradation at this facility is consistent with the maximum benefit to the people of the state. Economic prosperity of local communities and associated industry is of benefit to the people of California, and therefore sufficient reason exists to accommodate growth and some groundwater degradation, provided that the terms of the Basin Plan and the factors in Finding No. 47 are met. This Order is consistent with State Water Board policy.

Treatment and Control Practices

53. Resolution No. 68-16 requires the discharge to be regulated to assure use of best practicable treatment or control (BPTC). The Regional Water Board may not, in general, specify the manner of compliance; therefore, to implement Resolution No. 68-16, the Regional Water Board sets forth effluent and receiving water limitations. To be consistent with Resolution No. 68-16, the Discharger must assure that it is complying with the requirements of this Order and complying with the receiving water limits. The Discharger will provide treatment and control of the discharge that incorporates:

- a. Disinfection to secondary standards in Pond No. 7;
 - b. A plan for biosolids storage and disposal practices; and
 - c. The use of certified operators to assure proper operation and maintenance.
54. In order to determine compliance with Resolution No. 68-16 it is appropriate to formally determine background groundwater concentrations for selected constituents, and implement BPTC measures to reduce salinity in the effluent. Groundwater monitoring is insufficient to determine true background conditions. If groundwater is degraded or there is evidence that the discharge may cause degradation, then the Discharger will be required to evaluate and implement BPTC measures for each conveyance, treatment, storage, and disposal component of the system. Completion of these tasks will ensure that BPTC and the highest water quality consistent with the maximum benefit to the people of the state will be achieved.
55. This Order establishes effluent limitations for salinity and groundwater limitations that will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan. This Order also contains tasks for assuring that BPTC and the highest water quality consistent with the maximum benefit to the people of the state will be achieved. Accordingly, the discharge is consistent with Resolution 68-16 and the Basin Plan. Based on the results of the scheduled tasks, the Regional Water Board may reopen this Order to reconsider effluent and groundwater limitations and other requirements to comply with Resolution 68-16.

Basin Plan, Beneficial Uses, and Regulatory Considerations

56. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Board. These requirements implement the Basin Plan.
57. Surface water drainage from the site is to Stone Corral Creek, which flows in to Putah Creek and is a tributary to Lake Berryessa.
58. The Basin Plan designates the beneficial uses of Lake Berryessa as municipal and domestic supply (MUN); agricultural supply (AGR); power generation (POW); water contact recreation (REC-1); noncontact water recreation (REC-2); warm freshwater habitat (WARM); cold freshwater habitat (COLD); spawning, reproduction and/or early development of warm freshwater aquatic organisms (SPWN); and wildlife habitat (WILD).
59. The Basin Plan designates the beneficial uses of underlying groundwater as municipal and domestic supply (MUN), agricultural supply (AGR), industrial service supply (IND), and industrial process supply (PRO).

60. The Basin Plan establishes numerical and narrative water quality objectives for surface water and groundwater within the basin. Numerical and narrative water quality objectives are maximum limits directly applicable to the protection of designated beneficial uses of the water. The Basin Plan requires that the Regional Water Board, on a case-by-case basis, follow specified procedures to determine maximum numerical limitations that apply the narrative objectives when it adopts waste discharge requirements.
61. The Basin Plan includes a water quality objective for Bacteria that requires that the most probable number (MPN) of coliform organisms over any seven day period shall be less than 2.2 per 100 mL in MUN groundwater. The applicability of this objective to groundwater designated as MUN has been affirmed by State Water Board Order No. WQO-2003-0014 and by subsequent decisions of the Sacramento County Superior Court and California Court of Appeal, 3rd Appellate District. The numerical value of this objective is equal to the limit of analytical detection for coliform organisms in water. Properly sited and operated facilities that discharge treated domestic wastewater to land should not cause detectable levels of coliform organisms in groundwater. Therefore a coliform limit of less than 2.2 MPN/100 mL is consistent with both the water quality objective for Bacteria and antidegradation directives of State Water Board Resolution No. 68-16.
62. The Basin Plan establishes numerical and narrative water quality objectives for surface water and groundwater within the basin. Numerical and narrative water quality objectives are maximum (i.e., least stringent) limits directly applicable to the protection of designated beneficial uses of the water. Controllable water quality factors are not allowed to cause further degradation of water quality in instances where other factors have already resulted in water quality objectives being exceeded. Controllable factors are those actions, conditions, or circumstances resulting from human activities that may influence the quality of the waters of the State are subject to the authority of the State or Regional Board, and that may be reasonably controlled. In addition, the water quality objectives do not require improvement over naturally occurring background concentrations. As described in the attached Information Sheet, the Basin Plan requires that the Regional Water Board, on a case-by-case basis, follow specified procedures to determine maximum numerical limitations that apply the narrative objectives when it adopts waste discharge requirements.
63. The Basin Plan includes a water quality objective for Chemical Constituents that, at a minimum, requires waters designated as domestic or municipal supply to meet the maximum contaminant levels (MCLs) specified in the following provisions of Title 22, California Code of Regulations (CCR): Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, Table 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) of Section 64449, and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of Section 64449. The Basin Plan's incorporation of these provisions by reference is prospective, and includes future changes to the incorporated provisions as the changes take effect. The Basin Plan recognizes that that the Regional Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

64. State Board Order No. WQO-2003-0014 upheld the Regional Board's use of numeric groundwater limits, and states that numeric groundwater limits must be restricted to those constituents present in the waste, breakdown products of constituents present in the waste, and those that might be leached from the soil beneath the land application area. The Groundwater Limitations of this Order complies with State Board Order No. WQO-2003-0014, as described below. Additional information regarding each of these chemicals is found in the Information Sheet.

- a. Boron, which was found in the wastewater at concentrations ranging from 0.23 to 0.76 mg/L, has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to the land application areas. Boron occurs naturally in waters, and is known to be present in the cleaning products used in domestic households¹. The groundwater underlying the facility has the designated beneficial use of agricultural supply. According to Ayers and Westcot², boron can damage sensitive crops if present in excess of 0.7 mg/L in irrigation water, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of boron is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 0.7 mg/L for boron, based on Ayers and Westcot, is appropriate to apply the narrative Chemical Constituents objective to protect the agricultural use of groundwater. This limit assumes no impact on sensitive agricultural uses, consistent with the high quality of expected natural background water quality in the area of the discharge.
- b. The wastewater contains chloride concentrations ranging from 17 to 45 mg/L. Chloride is one of the major components of total dissolved solids. Chloride is also a major anion in natural water and wastewater, and is added to the waste stream because chloride is present in the human diet and is excreted unchanged from the human body^{1,3}. Chloride has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to land application areas. According to Ayers and Westcot², chloride can damage sensitive crops if present in excess of 106 mg/L in irrigation water applied by sprinklers, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of chloride is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 106 mg/L for chloride, based on Ayers and Westcot, is appropriate to apply the narrative

¹ American Public Health Association et al., 1985. Standard Method for the Examination of Water and Wastewater, 16th Edition.

² Ayers, R.S. and D.W. Westcot, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations- Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985). This paper contains the results of studies of the impacts of various chemicals on agricultural uses including crop irrigation and stock watering. Therefore, it is appropriate to use the data contained therein to apply the narrative Chemical Constituent water quality objective.

³ Metcalf and Eddy, 2003. Wastewater Engineering Treatment and Reuse, 4th Edition.

Chemical Constituents objective to protect the agricultural use of groundwater. This limit assumes no impact on sensitive agricultural uses, consistent with the high quality of expected natural background water quality in the area of the discharge.

- c. The wastewater contains iron concentrations ranging from 0.09 to 0.33 mg/L. Iron is naturally occurring in all waters due to its presence in soils and rocks¹, and is liberated from the soil under oxidizing conditions associated with the biodegradation of organic matter. Iron has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to the land application areas. In addition, naturally occurring iron can be solubilized from soil under reducing conditions caused by the land disposal of domestic wastewater¹. The Chemical Constituents objective prohibits concentrations of chemical constituents in excess of California MCLs in groundwater that is designated as municipal or domestic supply. The California secondary MCL for iron is 0.3 mg/L, and groundwater beneath the facility is designated as municipal or domestic supply. It is therefore appropriate to adopt a numerical groundwater limitation of 0.3 mg/L for iron to implement the Chemical Constituents objective to protect the municipal and domestic use of groundwater.
- d. Manganese is present in the wastewater at concentrations ranging from 0.028 to 0.57 mg/L. Manganese occurs naturally in waters and is added to the waste stream through both domestic and industrial use¹. Manganese has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to the land application areas. In addition, naturally occurring manganese can be solubilized from soil under reducing conditions caused by the land disposal of domestic wastewater, and is more prevalent in dissolved forms in groundwater¹. The Chemical Constituents objective prohibits concentrations of chemical constituents in excess of California MCLs in groundwater that is designated as municipal or domestic supply. The California secondary MCL for manganese is 50 ug/L, and groundwater beneath the facility is designated as municipal or domestic supply. It is therefore appropriate to adopt a numerical groundwater limitation of 50 ug/L for manganese to implement the Chemical Constituents objective to protect the municipal and domestic use of groundwater.
- e. Sodium concentrations in the wastewater range from 21 to 83 mg/L. Sodium is a major cation in natural water, due to its prevalence in the earth's crust, and in wastewater because sodium chloride is present in the human diet and is excreted unchanged by the body¹. Sodium has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to land application areas. According to Ayers and Westcot², sodium can damage sensitive crops if present in excess of 69 mg/L in irrigation water, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of sodium is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 69 mg/L for sodium, based on Ayers and Westcot, is appropriate to apply the narrative Chemical

Constituents objective to protect the agricultural use of groundwater. This limit assumes no impact on sensitive agricultural uses, consistent with the high quality of expected natural background water quality in the area of the discharge.

- f. TDS is present in the wastewater at concentrations ranging from 272 to 740 mg/L. TDS has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to the land application areas. According to Ayers and Westcot², dissolved solids can damage sensitive crops if present in excess of 450 mg/L in irrigation water, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of total dissolved solids is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 450 mg/L for total dissolved solids, based on Ayers and Westcot, is appropriate to apply the narrative Chemical Constituents objective to protect the agricultural use of groundwater. This limit assumes no impact on sensitive agricultural uses, consistent with the high quality of expected natural background water quality in the area of the discharge.
- g. Nitrate as nitrogen in the wastewater at concentrations ranging from 0.2 to 1.4 mg/L. The Chemical Constituents objective prohibits concentrations of chemical constituents in excess of California MCLs in groundwater that is designated as municipal or domestic supply. The California primary MCL for nitrate is equivalent to 10 mg/L as nitrogen, and groundwater beneath the facility is designated as municipal or domestic supply. It is therefore appropriate to adopt a numerical groundwater limitation of 10 mg/L for nitrate as nitrogen to implement the Chemical Constituents objective to protect the municipal and domestic use of groundwater.
- h. Ammonia as Nitrogen, which was found in the wastewater at concentrations ranging from 0.2 to 14 mg/L, has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to the land application areas. According to Amoores and Hautala⁴, the odor of ammonia can be detected in water at a concentration of 1.5 mg/L (as ammonia), and concentrations that exceed this value can impair the municipal or domestic use of the resource due to the adverse odor. The applicable water quality objective to protect the municipal and domestic use from discharges of ammonia is the narrative Tastes and Odors objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 1.5 mg/L for ammonia (as ammonia), based on Amoores and Hautala, is appropriate to apply the narrative Tastes and Odors objective to protect the municipal and domestic use of groundwater.

⁴ Amoores, J.E. and E. Hautala, *Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatilities for 214 Industrial Chemicals in Air and Water Dilution*, Journal of Applied Toxicology, Vol. 3, No. 6, (1983). These authors studied the concentration of chemicals in air that caused adverse odors and then calculated the concentration in water that would be equivalent to that amount in air. Therefore, it is appropriate to use the data contained therein to apply the narrative Tastes and Odors water quality objective.

- i. Field pH levels ranging from 8.4 to 9.6 standard units in the wastewater, has the ability to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to the land application areas. According to Ayers and Westcot², pH less than 6.5 or greater than 8.4 can damage sensitive crops if present in irrigation water, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of substances that affect pH is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation range of 6.5 to 8.4 for pH, based on Ayers and Westcot, is appropriate to apply the narrative Chemical Constituents objective to protect the agricultural use of groundwater. This limit assumes no impact on sensitive agricultural uses, consistent with the high quality of expected natural background water quality in the area of the discharge.

- j. The Discharger has not yet sampled its effluent for trihalomethane compounds. The trihalomethane chemicals bromoform, bromodichloromethane, chloroform, and dibromochloromethane are found in wastewater that has been chlorinated and have the ability to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to land application areas. These byproducts are formed from reactions with organic matter during the disinfection process. These volatile organic chemicals do not naturally occur in groundwater, and are toxic priority pollutants. According to the USEPA and the Cal/EPA Office of Environmental Health Hazard Assessment, these four chemicals pose a cancer risk at low concentrations in drinking water, and could thereby impair the municipal and domestic beneficial use by imposing toxicity. The applicable water quality objective to protect the municipal and domestic beneficial use from discharges of these trihalomethanes is the narrative Toxicity objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. For bromoform, a numerical groundwater limitation of 4 ug/L, based on the USEPA IRIS⁵ cancer risk level, is appropriate to apply the narrative Toxicity objective to protect the municipal and domestic beneficial use of groundwater. For bromodichloromethane, a numerical groundwater limitation of 0.27 ug/L, based on the Cal/EPA Cancer Potency Factor⁶, is appropriate to apply the narrative Toxicity objective to protect the municipal and domestic beneficial use of groundwater. For chloroform, a numerical groundwater limitation of 1.1 ug/L, based on the Cal/EPA Cancer Potency Factor, is appropriate to apply the narrative Toxicity objective to protect the municipal and domestic beneficial use of groundwater. For dibromochloromethane, a numerical groundwater limitation of 0.37 ug/L, based on the Cal/EPA Cancer Potency Factor, is appropriate to apply the narrative Toxicity objective to protect the municipal and domestic beneficial use of groundwater.

65. The Basin Plan contains narrative water quality objectives for Chemical Constituents, Tastes and Odors, and Toxicity. The Toxicity objective, in summary, requires that

⁵ U.S. Environmental Protection Agency, Integrated Risk Information System, <http://www.epa.gov/iris>.

⁶ California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, California Environmental Protection Agency Toxicity Criteria Database, <http://www.oehha.org/risk/ChemicalDB/index.asp>.

groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial uses. The Chemical Constituents objective requires that groundwater “shall not contain chemical constituents in concentrations that adversely affect beneficial uses.” The Tastes and Odors objective requires that groundwater “shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses.” Chapter IV, Implementation, of the Basin Plan contains the “Policy for Application of Water Quality Objectives.” This Policy specifies, in part, that numerical receiving water limitations will be established in Board orders which will, at a minimum, meet all applicable water quality objectives, that where compliance with narrative objectives is required (i.e., where the objectives are applicable to protect specified beneficial uses), the Regional Water Board will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives, and that compliance with narrative water quality objectives may be evaluated considering numerical criteria and guidelines developed and/or published by other agencies and organizations.

66. The “Antidegradation” section of the attached Information Sheet lists the various waste constituents identified thus far as fitting the restriction of the Findings, along with limits of each constituent necessary to protect beneficial uses known to be adversely affected by waste constituents in groundwater. The listing identifies each constituent, the beneficial uses, water quality objective, and its associated limit, as well as the technical reference for the limit. Some limits may become less restrictive when the water supply is limited to certain applications of a beneficial use. However, in the absence of specific factual information supplied by the discharger to justify restricting certain beneficial uses, groundwater limits have been selected so as to provide protection of unrestricted beneficial uses. Interim groundwater limitations for each constituent reflect the most restrictive listed limit for the waste constituent, except if natural background quality is greater, in which case background becomes the interim limitation.

Other Regulatory Considerations

67. On 2 May 2006, the State Water Board adopted Statewide General Waste Discharge Requirements For Sanitary Sewer Systems General Order No. 2006-0003-DWQ (General Order). The General Order requires all public agencies that own or operate sanitary sewer systems greater than one mile in length to comply with the Order. The Discharger’s collection system exceeds one mile in length, therefore the General Order is applicable. The Discharger has filed a Notice of Intent (NOI) for coverage under the General Order with the State Water Resources Control Board.
68. The United States Environmental Protection Agency (EPA) has promulgated biosolids reuse regulations in 40 CFR 503, *Standard for the Use or Disposal of Sewage Sludge*, which establishes management criteria for protection of ground and surface waters, sets application rates for heavy metals, and establishes stabilization and disinfection criteria.
69. The Regional Water Board is using the Standards in 40 CFR 503 as guidelines in establishing this Order, but the Regional Water Board is not the implementing agency for

40 CFR 503 regulations. The Discharger may have separate and/or additional compliance, reporting, and permitting responsibilities to the EPA. All biosolids will be hauled to a separate permitted facility.

70. The State Board adopted Order No. 97-03-DWQ (General Permit No. CAS000001) specifying waste discharge requirements for discharges of storm water associated with industrial activities, and requiring submittal of a Notice of Intent by all affected industrial dischargers. The design flow at this wastewater treatment plant is less than 1.0 mgd and therefore the Discharger is not required to apply for storm water NPDES permit.
71. The action to update WDRs for this existing facility is exempt from the provisions of the California Environmental Quality Act (CEQA), in accordance Title 14, California Code of Regulations (CCR), Section 15301.
72. Section 13267(b) of the CWC provides that: *“In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of discharging, or who proposes to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of discharging, or who proposes to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.”*

The attached Monitoring and Reporting Program No. R5-2008-0068 is necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

73. The California Department of Water Resources sets standards for the construction and destruction of groundwater wells (hereafter DWR Well Standards), as described in *California Well Standards Bulletin 74-90* (June 1991) and *Water Well Standards: State of California Bulletin 94-81* (December 1981). These standards, and any more stringent standards adopted by the state or county pursuant to CWC Section 13801, apply to all monitoring wells used to monitor the impacts of wastewater storage or disposal governed by this Order.
74. State regulations that prescribe procedures for detecting and characterizing the impact of waste constituents from waste management units on groundwater are found in Title 27 CCR Section 20380. While the WWTF is exempt from Title 27, the data analysis methods of Title 27 may be appropriate for determining whether the discharge complies with the terms for protection of groundwater specified in this Order.

75. The discharge authorized herein and the treatment and storage facilities associated with the discharge, except for discharges of residual sludge and solid waste, are exempt from the requirements of Title 27, CCR, Section 20380 et seq. The exemption, pursuant to Title 27 CCR Section 20090(a), is based on the following:
- a. The waste consists primarily of domestic sewage and treated effluent;
 - b. The waste discharge requirements are consistent with water quality objectives; and
 - c. The treatment and storage facilities described herein are associated with a municipal wastewater treatment facility.
76. Pursuant to CWC Section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

Public Notice

77. All the above and the supplemental information and details in the attached Information Sheet, which is incorporated by reference herein, as well as the Regional Water Board's administrative record, were considered in establishing the following conditions of discharge.
78. The Discharger and interested agencies and persons have been notified of the Regional Water Board's intent to prescribe waste discharge requirements for this discharge, and they have been provided an opportunity to submit written comments and an opportunity for a public hearing.
79. All comments pertaining to the discharge were heard and considered in a public hearing.

IT IS HEREBY ORDERED that Orders No. 95-171 is rescinded, and that pursuant to Sections 13263 and 13267 of the California Water Code, Lake Berryessa Resort Improvement District, their agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted hereunder, shall comply with the following:

[Note: Other prohibitions, conditions, definitions, and some methods of determining compliance are contained in the attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements" dated 1 March 1991.]

A. Discharge Prohibitions

1. Discharge of wastes to surface waters or surface water drainage courses is prohibited.
2. Bypass or overflow of untreated or partially treated waste is prohibited.
3. Discharge of sewage from a sanitary sewer system at any point upstream of a wastewater treatment plant is prohibited. Discharge of wastewater downstream of the wastewater treatment plant, other than at the designated storage ponds or land application areas, is prohibited.
4. Discharge of waste classified as "hazardous" under Title 23 CCR Chapter 15, Section 2521, or "designated," as defined in Section 13173 of CWC is prohibited.

5. The discharge of wastewater to the land application areas as described in Finding No. 12 is prohibited until the Discharger has submitted an *As-Built Report* certifying the completed installation of the land application areas as required by Provision No. G.1.f of this Order, and the report is approved by the Executive Officer. The Discharger may submit one *As-Built Report* for all six acres of sprayfields, or may submit multiple *As-Built Reports* as it completes construction of each portion of the sprayfield.

B. Discharge Specifications

1. The monthly average dry weather inflow to the WWTP shall not exceed 42,000 gpd. If the Discharger wishes to increase the monthly average dry weather inflow to 67,000 gpd, then the Discharger shall submit the technical report required by Provision G.1.b of this Order at least 60 days before the planned flow increase. Upon approval by the Executive Officer, the monthly dry weather inflow to the WWTP may increase up to 67,000 gpd.
2. Wastewater treatment shall not cause pollution or a nuisance as defined by Section 13050 of the CWC.
3. Public contact with wastewater shall be precluded or controlled through such means as fences, signs, or acceptable alternatives.
4. No waste constituent shall be released or discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of the Groundwater Limitations.
5. Objectionable odors originating at the facility shall not be perceivable beyond the limits of the property owned by the Discharger.
6. As a means of discerning compliance with Discharge Specification B.5, the dissolved oxygen content in the upper one foot of any wastewater pond shall not be less than 1.0 mg/L. Since there are no aeration devices in any of the wastewater ponds, this Order requires submittal of a technical report showing how this discharge specification will be met at all times.
7. The Discharger shall operate all systems and equipment to maximize treatment of wastewater and optimize the quality of the discharge.
8. All treatment and storage facilities shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.
9. All wastewater ponds shall be managed to prevent breeding of mosquitoes. In particular,

- a. An erosion control program shall be implemented to ensure that small coves and irregularities are not created around the perimeter of the water surface.
 - b. Weeds shall be minimized through control of water depth, harvesting, or herbicides.
 - c. Dead algae, vegetation, and debris shall not accumulate on the water surface.
10. The facility shall have sufficient treatment, storage, and disposal capacity to accommodate allowable wastewater flow, design seasonal precipitation, and ancillary inflow and infiltration. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns.
11. Freeboard in any pond containing wastewater shall never be less than two feet as measured from the water surface to the lowest point of overflow.
12. On or about **15 October** of each year, available pond storage capacity shall at least equal the volume necessary to comply with Discharge Specifications B.10 and B.11.

C. Effluent Limitations

1. Effective immediately, the effluent shall not exceed the following limits:

<u>Constituent</u>	<u>Units</u>	<u>Monthly Average</u>
BOD ₅ (leaving Pond No. 4)	mg/L	<30
Total Nitrogen (leaving Pond No. 4)	mg/L	<10
TDS (end of treatment process)	mg/L	600

BOD₅ denotes 5-day Biochemical Oxygen Demand. Total N denotes Total Nitrogen.
TDS denotes Total Dissolved Solids.

2. The effluent in Pond No. 7 shall not exceed the following limits for total coliform organisms:
- a. The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed a most probable number (MPN) of 23 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed.
 - b. The number of total coliform bacteria shall not exceed an MPN of 240 per 100 milliliters in more than one sample in any 30-day period.
3. No stored wastewater shall have a pH less than 6.5 or greater than 10.0.

D. Land Discharge Specifications

1. Application of effluent shall comply with the following setback requirements:

<u>Setback Definition</u> ¹	<u>Minimum Irrigation Setback (feet)</u>
Edge of land application area to property boundary	50
Edge of land application area to a public road	50
Edge of land application area to an irrigation well	100
Edge of land application area to a domestic well	100
Edge of land application area to a manmade or natural surface water drainage course ² or spring	50

¹ As defined by the wetted area produced during irrigation.

² Excluding ditches used exclusively for tailwater return.

2. Irrigation runoff (i.e., tailwater) shall be completely contained within the designated land application areas and shall not enter any surface water drainage course.
3. Irrigation of effluent shall not be performed within 24 hours of a forecasted storm, during a storm, within 24 hours after any measurable precipitation event, or when the ground is saturated.
4. Spray irrigation of effluent is prohibited when wind velocities exceed 30 mph.
5. The land application areas shall be managed to prevent breeding of mosquitoes. In particular:
- a. There shall be no standing water 48 hours after irrigation ceases;
 - b. Tailwater ditches must be maintained essentially free of emergent, marginal, and floating vegetation, and;
 - c. Low-pressure and unpressurized pipelines and ditches accessible to mosquitoes shall not be used to store effluent.
6. Tailwater ditches shall be adequately sloped such that the wastewater flows to a collection point, or back into Pond No. 7.

E. General Solids Disposal Specifications

1. Sludge means the solid, semisolid, and liquid residues removed during primary, secondary, or advanced wastewater treatment processes. Solid waste refers to grit and screenings generated during preliminary treatment. Residual sludge means sludge that will not be subject to further treatment at the facility. Biosolids refers to sludge that has undergone sufficient treatment and testing to qualify for reuse pursuant to federal and

state regulations as a soil amendment for agriculture, silviculture, horticulture, and land recycling.

2. Sludge and solid waste shall be removed from screens, sumps, and ponds as needed to ensure optimal plant operation.
3. Treatment and storage of sludge shall be confined to the treatment facility property, and shall be conducted in a manner that precludes infiltration of waste constituents into soils in a mass or at concentrations that will violate the Groundwater Limitations of this Order.
4. Any storage of residual sludge, solid waste, and biosolids at the facility shall be temporary, and the waste shall be controlled and contained in a manner that minimizes leachate formation and precludes infiltration of waste constituents into soils in a mass or at concentrations that will violate the Groundwater Limitations of this Order.
5. Residual sludge, biosolids, and solid waste shall be disposed of in a manner approved by the Executive Officer and consistent with Title 27 CCR Division 2. Removal for further treatment, disposal, or reuse at disposal sites operated in accordance with valid waste discharge requirements issued by a regional water quality control board will satisfy this specification.
6. Use and disposal of biosolids shall comply with the self-implementing Federal regulations of 40 CFR 503, which are subject to enforcement by the U.S. EPA, not the Regional Water Board. If during the life of this Order, the state accepts primacy for implementation of 40 CFR 503, the Regional Water Board may also initiate enforcement where appropriate.

F. Interim Groundwater Limitations

1. Release of waste constituents from any portion of the WWTF and land application areas shall not cause groundwater to:
 - a. Contain any of the following constituents in concentrations greater than listed or greater than natural background quality, whichever is greater. Note that natural background conditions have not yet been established for the land application areas.

<u>Constituent</u>	<u>Units</u>	<u>Limitation</u>
Boron	mg/L	0.7
Chloride	mg/L	106
Iron	mg/L	0.3
Manganese	mg/L	0.05
Sodium	mg/L	69
Total Coliform Organisms	MPN/100 mL	<2.2
Total Dissolved Solids	mg/L	450 ¹
Total Nitrogen	mg/L	10
Nitrate (as N)	mg/L	10

<u>Constituent</u>	<u>Units</u>	<u>Limitation</u>
Ammonia (as NH ₄)	mg/L	1.5
Bromoform	ug/L	4
Bromodichloromethane	ug/L	0.27
Chloroform	ug/L	1.1
Dibromochloromethane	ug/L	0.37

¹ A cumulative impact limit that accounts for several dissolved constituents in addition to those listed here separately [e.g., alkalinity (carbonate and bicarbonate), calcium, hardness, phosphate, and potassium].

2. Exhibit a pH of less than 6.5 or greater than 8.4 pH units.
3. Impart taste, odor, toxicity, or color that creates nuisance or impairs any beneficial use.

G. Provisions

1. All of the following reports shall be submitted pursuant to Section 13267 of the California Water Code and shall be prepared as described in Provision G.3.
 - a. Forthwith, the Discharger shall install a SCADA system as required by the Stipulated Judgment, and shall submit a report showing that this work has been completed. The installation shall include high level alarms at the lift stations.
 - b. **At least 60 days** before requesting an increase in the average dry weather wastewater inflow into the WWTP up to 67,000 gpd, the Discharger shall submit a technical report that justifies the proposed increase. At a minimum, the technical report shall include: (a) a map showing additional land application areas necessary to apply the wastewater at agronomic rates, (b) loading rates for total nitrogen, and TDS in lbs/acre/day and lbs/acre/year that justify the increased application of wastewater to the land application areas, (c) a description of the tailwater return system, berms or other physical methods used to prevent tailwater from leaving the additional land application areas, and (d), a revised water balance based on 100 year annual rainfall returns. The water balance shall include consideration of at least the following:
 - i. Wastewater flows from all sources such as subsurface inflows, storm water run-on, and documented inflow and infiltration from the collection system.
 - ii. Local precipitation data (indicate what weather station was used to obtain the data, and indicate what the total annual precipitation is for average and 100 year annual storm events, and show how that value was distributed throughout the year, by months, based on historical rainfall patterns), and

- iii. Local evaporation data and projected percolation rates for the effluent storage ponds, and irrigation disposal rates that comply with the requirements of the WDRs.

Upon approval by the Executive Officer of technical report, the monthly dry weather inflow to the WWTP may increase up to 67,000 gpd.

- c. By **1 August 2008**, the Discharger shall submit a technical report describing how a dissolved oxygen content of greater than 1.0 mg/L will be met at all times in the upper one-foot of any wastewater pond. Measures taken to ensure that the dissolved oxygen content in the ponds is greater than 1.0 mg/L may include the installation of aeration devices.
- d. By **1 August 2008**, the Discharger shall submit an *Operation and Maintenance Plan (O&M Plan)* for the WWTF. A copy of the O&M Plan shall be kept at the facility for reference by operating personnel. Key personnel shall be familiar with its contents. The O&M Plan shall provide the following:
 - i. Operation and Control of Wastewater Treatment - A description of the wastewater treatment equipment; operational controls; treatment requirements/effluent limitations; flow diagrams including valve/gate locations; operation of the treatment systems during start-up, normal operation, by-pass, shut-down, and draining procedures; potential operational problems including a troubleshooting guide.
 - ii. Sludge Handling - A description of the biosolids handling equipment, operational controls, control tests and observations related to process control, potential operational problems including a troubleshooting guide, and disposal procedures.
 - iii. Personnel - Recommended staffing requirements, staff qualifications, training requirements and schedule, and operator certification requirements.
 - iv. Maintenance – Maintenance procedures, equipment record system, scheduling and use of the maintenance record system, inventory system, special tools, warranty provisions and expiration dates, maintenance cost and budgeting system, maintenance schedule of all equipment including lubricants, filters, etc.
 - v. Emergency Response – A description of the vulnerability analysis including emergencies such as power outage, severe weather, or flooding. An equipment and telephone list for emergency personnel and equipment vendors. Coordination procedures with fire, police, and health department personnel, and an emergency operating plan.

- vi. Safety – A general discussion of the hazards of collection systems, mechanical equipment, explosion, pathogens, oxygen deficiencies, chemical and electrical hazards, etc.
 - vii. Appendices – Shall include flow diagrams, valve/gate locations, copy of WDRs, miscellaneous form samples, manufacturers manuals, and a list of reference materials.
- e. By **1 October 2008**, the Discharger shall submit a technical report documenting that the remotely operated high level alarms at each of lift stations be installed to notify staff in the event of a power loss or malfunction.
- f. By **1 October 2008**, the Discharger shall submit an *As-Built Report* certifying the completed installation of the land application areas totaling six acres including the flow meter on the outlet of Pond No. 7, as described in the Findings of this Order and in compliance with the land discharge specifications. If the Discharger previously submitted *As-Built Reports* for individual sections of the sprayfield, then these may be referenced instead of resubmitted.
- g. By **1 October 2008**, the Discharger shall submit a technical report describing measures that will be taken to ensure continuous compliance with the Total Coliform Organisms Effluent limitations in the Order. Those measures may include the installation of a chlorine mixing vessel and contact chamber.
- h. By **1 October 2008**, the Discharger shall submit a technical report that discusses potential sources of the elevated TDS concentrations in MW-5. The report shall include a plan for additional investigation if required.
- i. By **1 May 2009**, the Discharger shall prepare and implement and implement a *Salinity Evaluation and Minimization Plan* to address sources of salinity to the wastewater treatment system. At a minimum, the plan shall meet the following requirements outlined in CWC Section 13263.3(d)(3) Pollution Prevention Plans:
- i. An estimate of all of the sources of a pollutant contributing, or potentially contributing, to the loadings of salinity in the treatment plant influent including water supply, water softeners, and other residential salinity sources.
 - ii. An analysis of the methods that could be used to prevent the discharge of salinity into the facility, including pollution prevention techniques, public education and outreach, or other innovative and alternative approaches to reduce discharges of the pollutant to the facility. The analysis shall also identify sources, or potential sources, not within the ability or authority of the Discharger to control.
 - iii. An estimate of load reductions that may be identified through the methods identified in subparagraph ii.

- iv. A plan for monitoring the results of the salinity pollution prevention program.
 - v. A description of the tasks, costs, and time required to investigate and implement various elements in the salinity pollution prevention plan.
 - vi. A statement of the Discharger's salinity pollution prevention goals and strategies, including priorities for short-term and long-term action, and a description of the Dischargers intended pollution prevention activities for the immediate future.
 - vii. A description of the Discharger's existing salinity pollution prevention programs.
 - viii. An analysis, to the extent feasible, of any adverse environmental impacts, including cross-media impacts or substitute chemicals that may result from the implementation of the pollution prevention program.
 - ix. An analysis, to the extent feasible, of the costs and benefits that may be incurred to implement the pollution prevention program.
 - x. Progress in reducing salinity shall be reported each year in the annual report required as part of Monitoring and Reporting Program No. R5-2008-0068.
- j. By **1 May 2009**, the Discharger shall submit a *Background Groundwater Quality Study Report*. For each groundwater monitoring parameter/constituent identified in the MRP, the report shall present a summary of monitoring data and calculation of the concentration in background monitoring wells. Determination of background quality shall be made using the methods described in Title 27 CCR, Section 20415(e)(10), and shall be based on data from at least eight consecutive quarterly (or more frequent) groundwater monitoring events. For each monitoring parameter/constituent, the report shall compare the calculated background concentration with the interim numeric limitations set forth in Groundwater Limitation F.1.a. Where background concentrations are statistically greater than the interim limitations specified in Groundwater Limitation F.1.a, the report shall recommend final groundwater limitations which comply with Resolution 68-16 for the waste constituents listed therein. Subsequent use of a concentration as a final groundwater limitation will be subject to the discretion of the Executive Officer.
- k. By **30 August 2009**, the Discharger must provide documentation indicating that the water treatment plant is in compliance with applicable California Department of Public Health requirements as required by the Stipulated Judgment.
- l. **At least 60 days prior** to any sludge removal and disposal, the Discharger shall submit a *revised Sludge Management Plan*. The plan shall estimate the quantity of sludge to be removed from the wastewater ponds; method of removal; method of drying; leachate and runoff controls for any temporary on-site biosolids drying and

storage areas to prevent water quality impacts; a sampling and analysis plan; and the name, location, and permitting information for the selected biosolids disposal site.

2. If groundwater monitoring results show that the discharge of waste is causing groundwater to contain waste constituents in concentrations statistically greater than background water quality then, within **120 days** of the request of the Executive Officer, the Discharger shall submit a *BPTC Evaluation Workplan* that sets forth the scope and schedule for a systematic and comprehensive technical evaluation of each component of the facility's waste treatment and disposal system to determine best practicable treatment and control for each waste constituent listed in the Interim Groundwater Limitations F.1.a of this Order. The workplan shall contain a preliminary evaluation of each component of the WWTF and effluent disposal system and propose a time schedule for completing the comprehensive technical evaluation. The schedule to complete the evaluation shall be as short as practicable, and shall not exceed one year.
3. In accordance with California Business and Professions Code Sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain workplans for investigations and studies, that describe the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall bear the professional's signature and stamp.
4. The Discharger shall comply with Monitoring and Reporting Program No. R5-2008-0068, which is part of this Order, and any revisions thereto as ordered by the Executive Officer.
5. The Discharger shall comply with the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements," dated 1 March 1991, which are attached hereto and made part of this Order by reference. This attachment and its individual paragraphs are commonly referenced as "Standard Provision(s)."
6. The Discharger shall use the best practicable cost-effective control technique(s) including proper operation and maintenance, to comply with discharge limits specified in this order.
7. The Discharger shall provide certified wastewater treatment facility operators in accordance with Title 23 CCR, Division 3, Chapter 26.
8. As described in the Standard Provisions, the Discharger shall report promptly to the Regional Water Board any material change or proposed change in the character, location, or volume of the discharge.

9. Upon the reduction, loss, or failure of the sanitary sewer system resulting in a sanitary sewer overflow, the Discharger shall take any necessary remedial action to (a) control or limit the volume of sewage discharged, (b) terminate the sewage discharge as rapidly as possible, and (c) recover as much as possible of the sewage discharged (including wash down water) for proper disposal. The Discharger shall implement all applicable remedial actions including, but not limited to, the following:
 - a. Interception and rerouting of sewage flows around the sewage line failure.
 - b. Vacuum truck recovery of sanitary sewer overflows and wash down water.
 - c. Use of portable aerators where complete recovery of the sanitary sewer overflows are not practicable and where severe oxygen depletion is expected in surface waters.
 - d. Cleanup of sewage-related debris at the overflow site.
10. The Discharger shall report to the Regional Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "Emergency Planning and Community Right to Know Act of 1986."
11. The Discharger shall not allow pollutant-free wastewater to be discharged into the wastewater collection, treatment, and disposal system in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means rainfall, groundwater, cooling waters, and condensates that are essentially free of pollutants.
12. The Discharger shall submit to the Regional Water Board on or before each compliance report due date, the specified document or, if appropriate, a written report detailing compliance or noncompliance with the specific schedule date and task. If noncompliance is being reported, then the Discharger shall state the reasons for such noncompliance and provide an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Regional Water Board in writing when it returns to compliance with the time schedule.
13. In the event of any change in control or ownership of the facility or wastewater disposal areas, the Discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office. To assume operation as Discharger under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Regional Water Board, and a statement. The statement shall comply with the signatory paragraph of Standard Provision B.3 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of

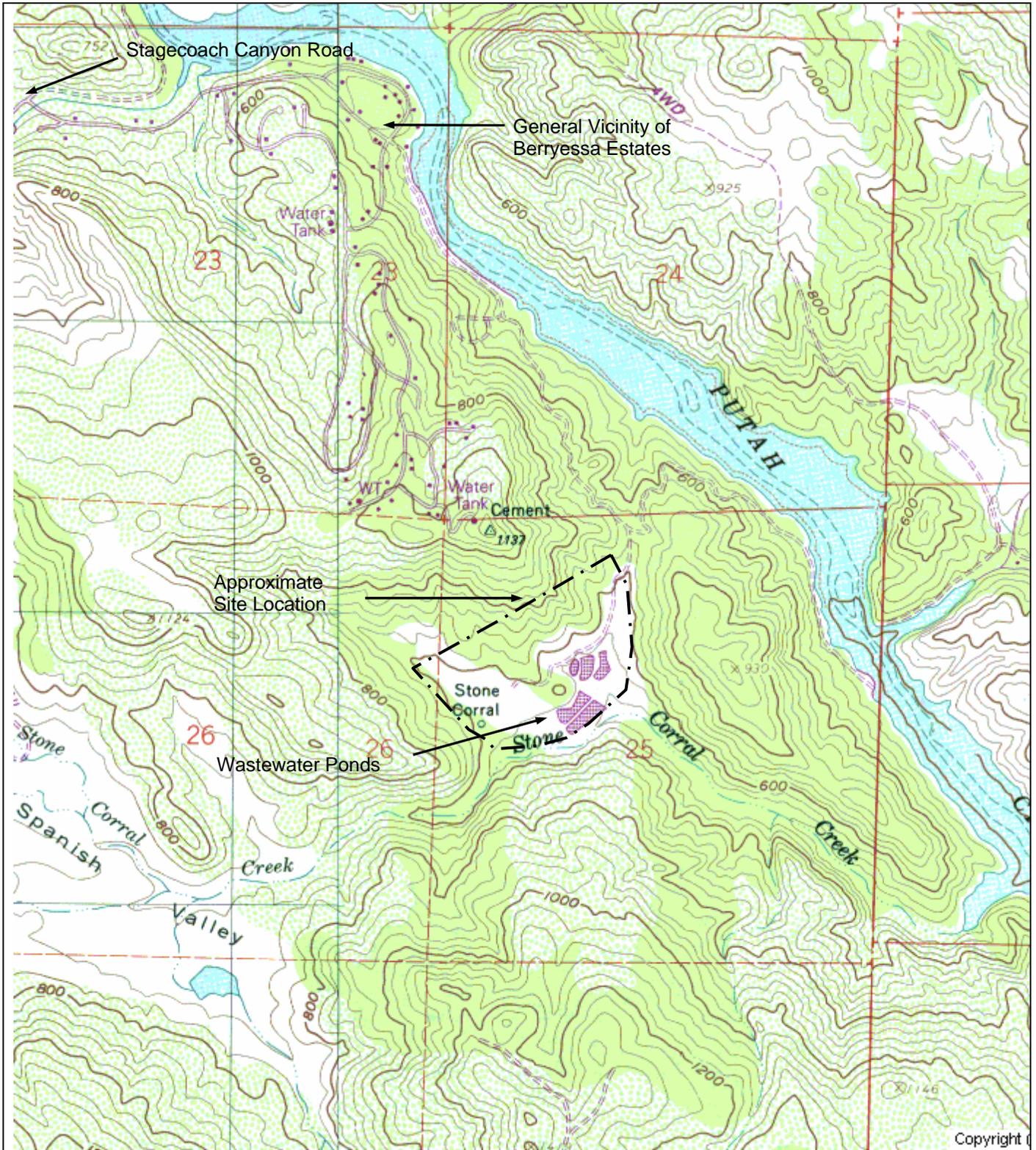
the California Water Code. Transfer shall be approved or disapproved by the Executive Officer.

14. At least **90 days** prior to termination or expiration of any lease, contract, or agreement involving disposal or recycling areas or off-site reuse of effluent, used to justify the capacity authorized herein and assure compliance with this Order, the Discharger shall notify the Regional Water Board in writing of the situation and of what measures have been taken or are being taken to assure full compliance with this Order.
15. The Discharger must comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Violations may result in enforcement action, including Regional Water Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or recession of this Order.
16. A copy of this Order shall be kept at the discharge facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.
17. The Regional Water Board will review this Order periodically and will revise requirements when necessary.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 25 April 2008.

Original Signed By

PAMELA C. CREEDON, Executive Officer

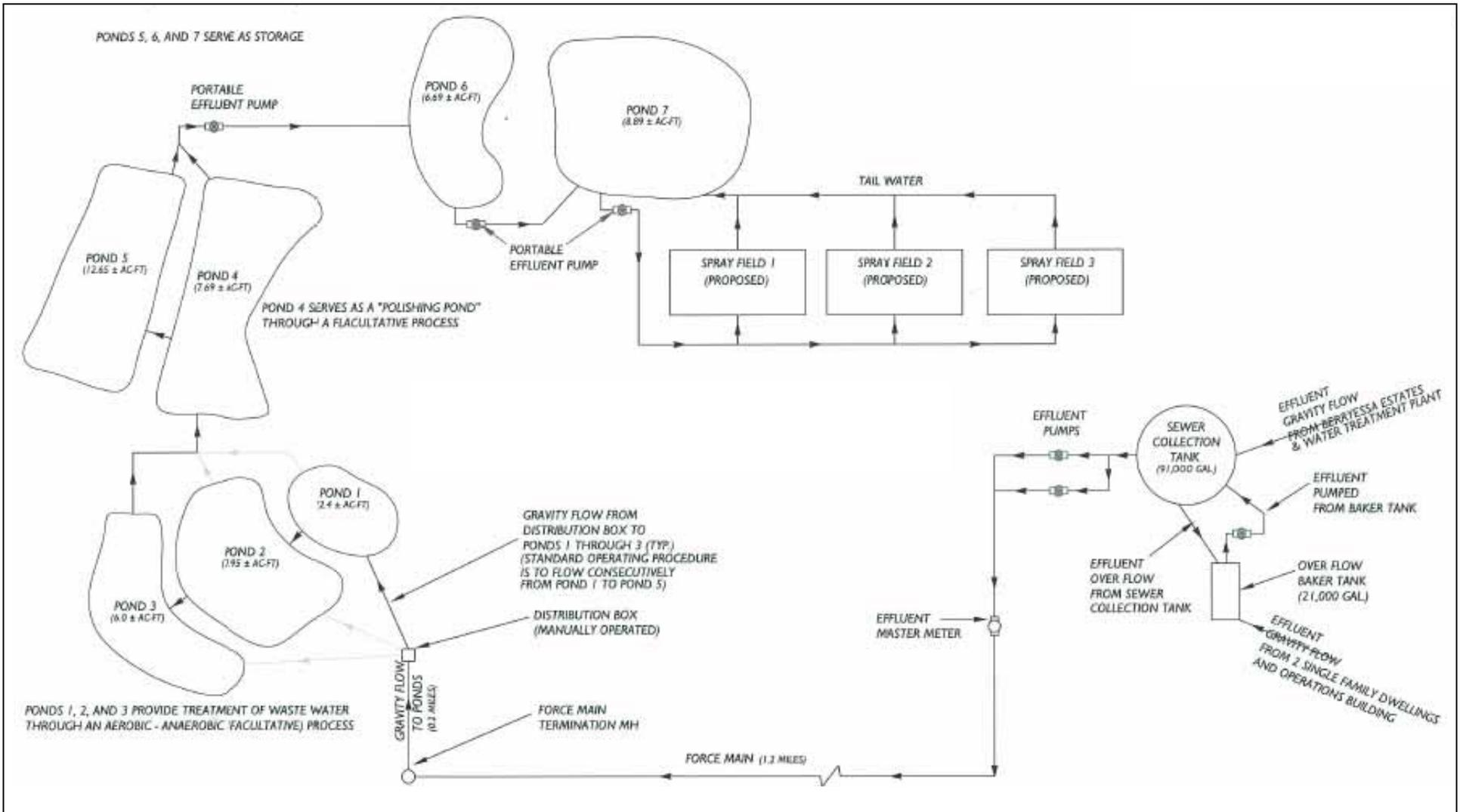


Drawing Reference:
U.S.G.S
TOPOGRAPHIC MAP
LAKE BERRYESSA
7.5 MINUTE QUAD

SITE LOCATION MAP

Lake Berryessa Resort Improvement District
Wastewater Treatment Facility
Napa County


approx. scale
1 in. = 2,000 ft.

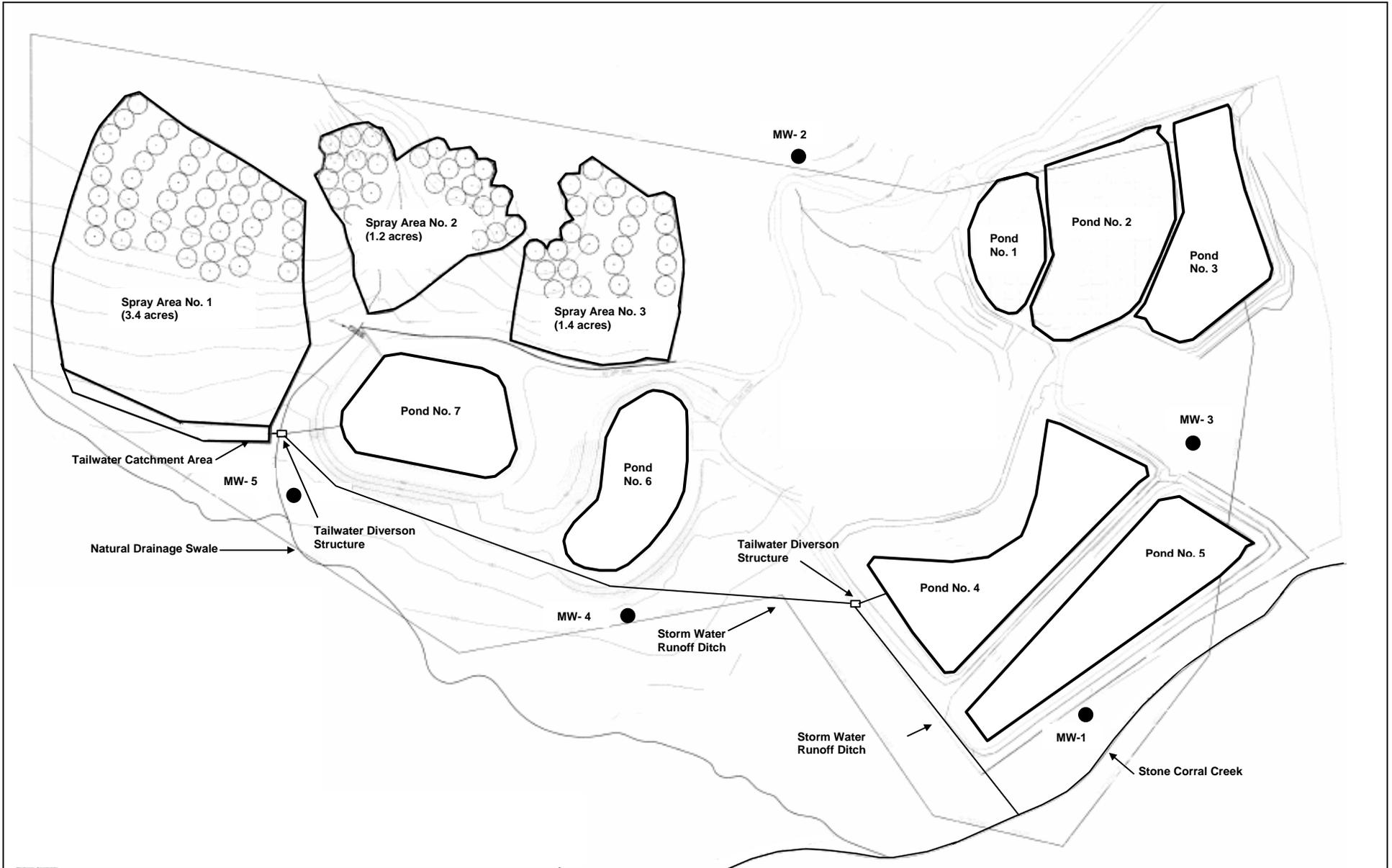


Drawing Reference:
Lake Berryessa Resort Improvement District

**WASTEWATER TREATMENT SYSTEM
SCHEMATIC**

**LAKE BERRYESSA RESORT IMPROVEMENT DISTRICT
WASTEWATER TREATMENT FACILITY**

NAPA COUNTY



Drawing Reference:
Lake Berryessa Resort Improvement District

**WASTEWATER PONDS AND LAND APPLICATION AREAS
LAKE BERRYESSA RESORT IMPROVEMENT DISTRICT
WASTEWATER TREATMENT FACILITY**

NAPA COUNTY

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2008-0068

FOR

LAKE BERRYESSA RESORT IMPROVEMENT DISTRICT
NAPA COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring influent wastewater, treated effluent, wastewater treatment and storage ponds, land application areas, groundwater, and water supply. This MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. Regional Water Board staff shall approve specific sample station locations prior to implementation of sampling activities.

This MRP is effective upon date of signature; however, portions of the MRP will not be relevant until the land application areas have been constructed and are in use. In the meantime, the Discharger shall submit the monitoring data that is possible to collect, monthly construction status reports, and quarterly groundwater monitoring reports as described in the "Reporting" section of this MRP.

All samples shall be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form. Field test instruments (such as those used to measure pH and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are calibrated prior to each monitoring event;
3. The instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the "Reporting" section of the MRP.

INFLUENT MONITORING

Influent flow monitoring shall be performed prior to discharge to the first wastewater treatment pond. Samples shall be collected at approximately the same time as effluent samples. Influent monitoring shall include the following:

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Flow ¹	gpd	Continuous Meter	Daily	Monthly
Average Daily Flow ²	gpd	Calculated	Monthly	Monthly
BOD ₅ ³	mg/L	Grab	Monthly	Monthly

¹ Flow represents the daily flow rate.

² Average Daily Flow represents the daily flow rate averaged over the month.

³ BOD denotes 5-day Biochemical Oxygen Demand.

EFFLUENT MONITORING

Effluent samples shall be collected prior to the discharge to the land application areas and shall be representative of the volume and nature of the discharge. Effluent monitoring shall include at least the following:

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
BOD ₅	mg/L	Grab/Composite ¹	Monthly	Monthly
Chlorine Residual	mg/L	Grab/Composite ¹	Daily ⁶	Monthly
Total Coliform Organisms ²	MPN/100 ml ³	Grab	Weekly ⁷	Monthly
Total Dissolved Solids	mg/L	Grab/Composite ¹	Monthly	Monthly
Sodium	mg/L	Grab/Composite ¹	Monthly	Monthly
Chloride	mg/L	Grab/Composite ¹	Monthly	Monthly
Nitrate as Nitrogen	mg/L	Grab/Composite ¹	Monthly	Monthly
Total Kjeldahl Nitrogen	mg/L	Grab/Composite ¹	Monthly	Monthly
Total Nitrogen (as N)	mg/L	Grab/Composite ¹	Monthly	Monthly
Standard Minerals ⁴	mg/L	Grab/Composite ¹	Annually	Annually
Trihalomethanes ⁵	ug/L	Grab/Composite ¹	Annually	Annually

¹ Grab/Composite indicates samples may be collected by composite sampler or grab method.

² Using a minimum of 15 tubes or 3 dilutions.

³ Most probable number per 100 ml.

⁴ Standard Minerals shall include, at a minimum, the following elements/compounds: boron, calcium, magnesium, potassium, sulfate, iron, manganese, total alkalinity (including alkalinity series), and hardness.

⁵ Individual trihalomethane constituent concentrations shall be identified, using EPA Method 8260B or equivalent.

⁶ Samples collected 5 days per week.

⁷ Samples collected at a minimum every 5 days.

POND MONITORING

Each of the wastewater treatment and evaporation/percolation ponds shall be monitored as specified below:

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Dissolved Oxygen ¹	mg/L	Grab	Weekly	Monthly
Freeboard	0.1 feet	Measurement	Weekly	Monthly
pH ¹	Standard	Grab	Weekly	Monthly
Odors	--	Observation	Weekly	Monthly
Total Dissolved Solids	mg/L	Grab	Monthly	Monthly
Berm condition	--	Observation	Monthly	Monthly

¹ Samples shall be collected at a depth of one foot from each pond in use, opposite the inlet. Samples shall be collected between 0700 and 0900 hours.

LAND APPLICATION AREA MONITORING

Monitoring of each land application area shall be conducted **daily** during the irrigation season, and the results shall be included in the monthly monitoring report. All land application areas shall be inspected following an irrigation event to identify any equipment malfunction or other circumstance that might allow the wastewater to runoff the land application areas and/or create ponding conditions that violate the Waste Discharge Requirements. Evidence of erosion, saturation, irrigation runoff, or the presence of nuisance conditions shall be noted in the report. A log of these inspections as well as any public complaints of runoff shall be kept at the facility and made available for review upon request.

Effluent monitoring results shall be used in calculations to ascertain loading rates at the land application area. Monitoring of the land application areas shall include the following:

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Flow	Gallons	Continuous	Daily	Monthly
Rainfall	Inches	Observation	Daily	Monthly
Acreage Applied ¹	Acres	Calculated	Daily	Monthly
Water Application Rate ²	gal/acre-day	Calculated	Daily	Monthly
Total Nitrogen Loading Rate ²	lbs/ac•month	Calculated	Monthly	Monthly
TDS Loading Rate ²	lbs/ac•month	Calculated	Monthly	Monthly

¹ Land application areas shall be identified and a map identifying all land application areas included.

² For each of the land application areas.

GROUNDWATER MONITORING

Prior to construction and/or sampling of any groundwater monitoring wells, the Discharger shall submit plans and specifications to the Regional Water Board for review and approval. All wells identified in the groundwater monitoring well network in the Findings of this Order, as well as any wells installed after adoption of this Order, shall be sampled and analyzed according to the schedule below.

Prior to sampling, the groundwater elevations shall be measured and the wells shall be purged at least three well volumes until temperature, pH, and electrical conductivity have stabilized. Depth to groundwater shall be measured to the nearest 0.01 feet. Samples shall be collected using standard EPA methods. Groundwater monitoring shall include, at a minimum, the following:

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Depth to Groundwater	0.01 feet	Measurement	Quarterly	Quarterly
Groundwater Elevation ¹	0.01 feet	Calculated	Quarterly	Quarterly
Gradient	feet/feet	Calculated	Quarterly	Quarterly

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Gradient Direction	Degrees	Calculated	Quarterly	Quarterly
Total Dissolved Solids	mg/L	Grab	Quarterly	Quarterly
Nitrate as Nitrogen	mg/L	Grab	Quarterly	Quarterly
Total Kjeldahl Nitrogen	mg/L	Grab	Quarterly	Quarterly
pH	pH units	Grab	Quarterly	Quarterly
Trihalomethanes ²	µg/L	Grab	Quarterly	Quarterly
Boron	mg/L	Grab	Quarterly	Quarterly
Chloride	mg/L	Grab	Quarterly	Quarterly
Iron	mg/L	Grab	Quarterly	Quarterly
Manganese	mg/L	Grab	Quarterly	Quarterly
Sodium	mg/L	Grab	Quarterly	Quarterly
Total Coliform Organisms	MPN/100 mL	Grab	Quarterly	Quarterly
Standard Minerals ³	mg/L	Grab	Annually	Annually
Metals ⁴	ug/L	Grab	Annually	Annually

¹ Groundwater elevation shall be determined based on depth-to-water measurements using a surveyed measuring point elevation on the well and a surveyed reference elevation.

² Individual trihalomethane constituent concentrations shall be identified, using EPA Method 8260B or equivalent.

³ Standard Minerals shall include, at a minimum, the following elements/compounds: calcium, magnesium, potassium, sulfate, total alkalinity (including alkalinity series), and hardness.

⁴ At a minimum, the following metals shall be included: arsenic, copper, lead, iron, manganese, molybdenum, nickel, and zinc. Analytical methods shall be selected to provide reporting limits below the Water Quality Limit for each constituent.

SLUDGE MONITORING

A composite sample of digested sludge shall be collected at least once per year when sludge is removed from the wastewater treatment system for disposal in accordance with EPA's POTW Sludge Sampling and Analysis Guidance Document, August 1989, and analyzed for cadmium, copper, nickel, chromium, lead, and zinc.

Sampling records shall be retained for a minimum of five years. A log shall be kept of sludge quantities generated and of handling and disposal activities. The frequency of entries is discretionary; however, the log should be complete enough to serve as a basis for part of the annual report.

WATER SUPPLY MONITORING

A sampling station shall be established where a representative sample of the municipal water supply can be obtained. Water supply monitoring shall include at least the following for each water source used during the previous year:

<u>Constituents</u>	<u>Units</u>	<u>Sampling Frequency</u>
Total Dissolved Solids	mg/L	Annually
pH	Std. Unit	Annually
Standard Minerals ¹	mg/L	Annually

¹ Standard Minerals shall include, at a minimum, the following elements/compounds: boron, calcium, magnesium, sodium, potassium, chloride, nitrogen, sulfate, iron, manganese, total alkalinity (including alkalinity series), and hardness.

REPORTING

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g., effluent, pond, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall be reported to the Regional Water Board.

As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all Groundwater Monitoring Reports shall be prepared under the direct supervision of a Registered Engineer or Professional Geologist and signed by the registered professional.

A. Monthly Monitoring Reports

Daily, weekly, and monthly monitoring data shall be reported in monthly monitoring reports. Monthly reports shall be submitted to the Regional Water Board on the **1st day of the second month following sampling** (i.e. the January Report is due by 1 March). At a minimum, the reports shall include:

1. The report shall include the following:
 - a. Results of influent; effluent; wastewater ponds; and land application area monitoring.
 - b. A comparison of monitoring data to the discharge specifications and an explanation of any violation of those requirements. Data shall be presented in tabular format;
 - c. If requested by staff, copies of laboratory analytical report(s); and
 - d. A calibration log verifying calibration of all hand-held monitoring instruments and devices used to comply with the prescribed monitoring program.

B. Quarterly Monitoring Reports

The Discharger shall establish a quarterly sampling schedule for groundwater monitoring such that samples are obtained approximately every three months. Quarterly monitoring reports shall be submitted to the Board by the **1st day of the second month after the quarter** (i.e. the January-March quarterly report is due by May 1st) and may be combined with the monthly report. The Quarterly Report shall include the following:

1. Results of groundwater monitoring;
2. A narrative description of all preparatory, monitoring, sampling, and analytical testing activities for the groundwater monitoring. The narrative shall be sufficiently detailed to verify compliance with the WDR, this MRP, and the Standard Provisions and Reporting Requirements. The narrative shall be supported by field logs for each well documenting depth to groundwater; parameters measured before, during, and after purging; method of purging; calculation of casing volume; and total volume of water purged;
3. Calculation of groundwater elevations, an assessment of groundwater flow direction and gradient on the date of measurement, comparison of previous flow direction and gradient data, and discussion of seasonal trends if any;
4. A narrative discussion of the analytical results for all groundwater locations monitored including spatial and temporal trends, with reference to summary data tables, graphs, and appended analytical reports (as applicable);
5. A comparison of monitoring data to the groundwater limitations and an explanation of any violation of those requirements;
6. Summary data tables of historical and current water table elevations and analytical results;
7. A scaled map showing relevant structures and features of the facility, the locations of monitoring wells and any other sampling stations, and groundwater elevation contours referenced to mean sea level datum; and
8. Copies of laboratory analytical report(s) for groundwater monitoring.

C. Annual Report

An Annual Report shall be prepared as the fourth quarter monitoring report. The Annual Report will include all monitoring data required in the monthly/quarterly schedule. The Annual Report shall be submitted to the Regional Water Board by **1 February** each year. In addition to the data normally presented, the Annual Report shall include the following:

1. The contents of the regular groundwater monitoring report for the last sampling event of the year;
2. If requested by staff, tabular and graphical summaries of all data collected during the year;
3. An evaluation of the groundwater quality beneath the wastewater treatment facility, and land application areas;
4. A discussion of compliance and the corrective actions taken, as well as any planned or proposed actions needed to bring the discharge into full compliance with the waste discharge requirements;
5. A discussion of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program;

6. A copy of the certification for each certified wastewater treatment plant operator working at the facility and a statement about whether the Discharger is in compliance with Title 23, CCR, Division 3, Chapter 26.
7. Summary of information on the disposal of sludge and/or solid waste;
8. The results from annual monitoring of the groundwater wells and water supply;
9. The results from any sludge monitoring required by the disposal facility;
10. Equipment maintenance and calibration records, as described in Standard Provision No. C.4;
11. A forecast of influent flows, as described in Standard Provision No. E.4;
12. A discussion of the following:
 - a. Compliance with any interim effluent performance limits as specified in the Effluent Limitations of the WDRs;
 - b. Salinity reduction efforts implemented in accordance with any required workplan;
 - c. Other best practical treatment and control measures implemented pursuant to any approved BPTC Workplan (if required by the Executive Officer); and
 - d. Based on monitoring data, an evaluation of the BPTC measures that were implemented.

A letter transmitting the self-monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

The Discharger shall implement the above monitoring program on the first day of the month following adoption of this Order.

Original Signed By

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

25 April 2008
(Date)

INFORMATION SHEET

ORDER NO. R5-2008-0068
LAKE BERRYESSA RESORT IMPROVEMENT DISTRICT
WASTEWATER TREATMENT FACILITY
NAPA COUNTY

Background

The Lake Berryessa Resort Improvement District's wastewater treatment facility is located along the northwestern shoreline of Lake Berryessa near Putah Creek in Napa County. The WWTF currently treats and disposes of wastewater from 187 existing single family dwellings at the Berryessa Estates Subdivision. A total of 339 service connections are available at full buildout. Lake Berryessa Resort Improvement District's previous Waste Discharge Requirements (WDRs) Order No. 95-171 prescribes requirements for the treatment discharge of up to 35,000 gallons per day of wastewater to five evaporation/percolation ponds. However, because these WDRs do not reflect the two additional wastewater ponds and three land application areas necessary to treat and dispose of the wastewater, updated WDRs are necessary.

Wastewater from the Berryessa Estates Subdivision flows via gravity to three lift stations where it is pumped to a 91,000-gallon aboveground holding tank and a 21,000-gallon overflow tank. From the tanks, the wastewater is pumped approximately 1.2 miles through a six-inch diameter force main into a manhole. The flow meter is located within the force main. From the manhole, wastewater gravity flows to a manually operated distribution box and to three treatment ponds (Pond Nos. 1 through 3) that are connected in series. From Pond No. 3, wastewater gravity flows to Pond No. 4 and then to Pond No. 5. A portable effluent pump is used to transfer wastewater from either Pond Nos. 4 or 5 to Pond No. 6. A portable effluent pump is also used to transfer wastewater from Pond No. 6 to Pond No. 7.

The wastewater in Pond No. 7 will be disinfected using calcium hypochlorite tablets to maintain a chlorine residual of no less than 0.3 mg/L and total coliform organism concentrations of less than 23 MPN/100 mL prior to being discharged to one of three land application areas totaling six acres via a spray irrigation system. The wastewater in Pond No. 7 is tested on a daily basis for chlorine residual using a handheld meter and samples for fecal and total coliform organisms are collected on a weekly basis or when the chlorine residual of the wastewater in Pond No. 7 is at least 0.3 mg/L. Disinfected wastewater is applied to the land application areas when the total coliform concentrations are less than 23 MPN/100 mL. If the total coliform organism concentrations are above 23 MPN/100 mL then the chlorine dose to the pond is increased and no wastewater is applied to the land application areas. This Order requires that if this proposed plan does not ensure continued compliance with the effluent limits the chlorination process must be updated.

Initially, the monthly average inflow to the WWTP shall not exceed an average monthly dry weather flow (ADWF) of 42,000 gpd. However, the monthly average dry weather inflow to the WWTP may be increased to 67,000 gpd if the Discharger submits a technical report as required by Provision G.1.a of the Order that justifies the increase and is approved by the Executive Officer.

Sludge will be allowed to accumulate in the treatment and storage ponds and will be removed on an as needed basis to maintain pond capacity and treatment effectiveness.

Basin Plan, Beneficial Uses, and Regulatory Considerations

Surface water drainage from the site is to Stone Corral Creek, which flows in to Putah Creek and is a tributary to Lake Berryessa. The *Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region, Fourth Edition* (Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin. Beneficial uses often determine the water quality objectives that apply to a water body. For example, waters designated as municipal and domestic supply must meet the maximum contaminant levels (MCLs) for drinking waters. The Basin Plan sets forth the applicable beneficial uses (industrial, agricultural, and domestic and municipal supply in this instance) of groundwater, procedure for application of water quality objectives, and the process for and factors to consider in allocating waste assimilation capacity.

Antidegradation

The antidegradation directives of State Water Board Resolution No. 68-16, "Statement of Policy With Respect to Maintaining High Quality Waters in California," or "Antidegradation Policy" require that waters of the State that are better in quality than established water quality objectives be maintained "consistent with the maximum benefit to the people of the State." Waters can be of high quality for some constituents or beneficial uses and not others. Policies and procedures for complying with this directive are set forth in the Basin Plan.

Resolution 68-16 is applied on a case-by-case, constituent-by-constituent basis in determining whether a certain degree of degradation can be justified. It is incumbent upon the Discharger to provide technical information for the Regional Water Board to evaluate that fully characterizes:

- All waste constituents to be discharged;
- The background water quality of the uppermost layer of the uppermost aquifer;
- The background quality of other waters that may be affected;
- The underlying hydrogeologic conditions;
- Waste treatment and control measures;
- How treatment and control measures are justified as best practicable treatment and control;
- The extent to which the discharge will impact the quality of each aquifer; and

- The expected degree of degradation below water quality objectives.

In allowing a discharge, the Regional Water Board must comply with CWC Section 13263 in setting appropriate conditions. The Regional Water Board is required, relative to the groundwater that may be affected by the discharge, to implement the Basin Plan and consider the beneficial uses to be protected along with the water quality objectives essential for that purpose. The Regional Water Board need not authorize the full utilization of the waste assimilation capacity of the groundwater (CWC 13263(b)) and must consider other waste discharges and factors that affect that capacity.

Certain domestic wastewater constituents are not fully amenable to waste treatment and control and it is reasonable to expect some impact on groundwater. Some degradation for certain constituents is consistent with maximum benefit to the people of California because the technology, energy, water recycling, and waste management advantages of municipal utility service to the State far outweigh the environmental impact of a community that would otherwise be reliant on numerous concentrated individual wastewater systems. Economic prosperity of local communities is of maximum benefit to the people of California, and therefore sufficient reason to accommodate wastewater discharge provided terms of reasonable degradation are defined and met. The proposed Order authorizes some degradation consistent with the maximum benefit to the People of the State but does not authorize pollution (i.e., violation of any water quality objective).

Groundwater monitoring has been conducted around the facility; however, additional background groundwater quality data are needed, and therefore staff is unable to establish the most appropriate groundwater limits. In addition, certain aspects of wastewater treatment and control practices may not be justified as representative of Best Practicable Treatment and Control (BPTC). Reasonable time is necessary to gather specific information about the WWTP to make informed, appropriate, long-term decisions. This Order, therefore, establishes interim groundwater limitations to assure protection of beneficial uses of groundwater of the State pending the completion of certain tasks and provides time schedules to complete those tasks. During this period, degradation may occur from certain constituents, but cannot exceed water quality objectives (or natural background water quality should it exceed objectives) or cause nuisance.

According to the Basin Plan, water quality objectives define the least stringent limits that could apply as water quality limitations for groundwater at this location, except where natural background quality unaffected by the discharge of waste already exceeds the objective. The interim groundwater limits below apply numeric and narrative water quality objectives that must be met to maintain specific beneficial uses of groundwater. The constituents listed are those that are expected to be found in treated domestic wastewater or to be released from the soil upon the application of such waste. The *Policy for Application of Water Quality Objectives* in Chapter IV of the Basin Plan provides a mechanism to apply narrative objectives using relevant and appropriate numeric limits published by other agencies and organizations. Due to the expected high quality of natural background groundwater in the location of the discharge, numeric limits were selected so as to require that conditions of

nuisance, adverse tastes and odors, toxicity, or impact to sensitive agricultural uses would not be expected to occur. For the same reason, where incorporated drinking water MCLs are expressed as ranges, limits were selected that represent no impact on the municipal or domestic supply beneficial use. Unless natural background for a constituent proves to be higher, the groundwater quality limit established in proposed Order is the most stringent of the values for the listed constituents. Once the discharger provides information on background water quality and best practicable treatment or control, the groundwater limits may need to be adjusted (see *Reopener* below).

<u>Constituent</u>	<u>Units</u>	<u>Limit</u>	<u>Beneficial Use</u>	<u>Water Quality</u>	<u>Criteria or Justification</u>
Ammonia	mg/L	1.5	MUN ¹	Tastes and Odors	Odor Threshold ²
Boron	mg/L	0.7	AGR ³	Chemical Constituents Toxicity	Protect sensitive crops ⁴
	mg/L	1.0	MUN ¹		Calif. Drinking Water Notification Level based on toxicity ¹¹
Chloride	mg/L	106	AGR ³	Chemical Constituents	Protect sensitive crops irrigated via sprinklers ⁴
		142	AGR ³		Protect sensitive crops ⁴
		250	MUN ¹		Recommended Secondary MCL ⁵
		500	MUN ¹		Upper Secondary MCL ⁵
Iron	mg/L	0.3	MUN ¹	Chemical Constituents	Secondary MCL ⁶
Manganese	mg/L	0.05	MUN ¹	Chemical Constituents	Secondary MCL ⁶
Nitrate plus Nitrite as N	mg/L	10	MUN ¹	Chemical Constituents	Primary MCL ⁷
Nitrite as N	mg/L	1	MUN ¹	Chemical Constituents	Primary MCL ⁷
Sodium	mg/L	69	AGR ³	Chemical Constituents	Protect sensitive crops ⁴
Total Dissolved Solids	mg/L	450 ⁸	AGR ³	Chemical Constituents	Protect sensitive crops ⁴
		500	MUN ¹		Recommended Secondary MCL ⁵
		1,000	MUN ¹		Upper Secondary MCL ⁵
Total Coliform Organisms	MPN/100 ml	<2.2	MUN ¹	Bacteria	Basin Plan and non-detect
Trihalomethanes	ug/L	80	MUN ¹	Chemical Constituents	MCL ⁸
Bromoform	ug/L	4	MUN ¹	Toxicity	USEPA IRIS Cancer Risk Level ⁹
Bromodichloromethane	ug/L	0.27	MUN ¹	Toxicity	Cal/EPA Cancer Potency Factor ¹²
Chloroform	ug/L	1.1	MUN ¹	Toxicity	Cal/EPA Cancer Potency Factor ¹²
Dibromochloromethane	ug/L	0.37	MUN ¹	Toxicity	Cal/EPA Cancer Potency Factor ¹²

<u>Constituent</u>	<u>Units</u>	<u>Limit</u>	<u>Beneficial Use</u>	<u>Water Quality</u>	<u>Criteria or Justification</u>
PH	PH Units	6.5 to 8.5	MUN ¹	Chemical Constituents	Secondary MCL ¹⁰
		6.5 to 8.4	AGR ³	Chemical Constituents	Protect sensitive crops ⁴

- 1 Municipal and domestic supply
- 2 J.E. Amoore and E. Hautala, *Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatilities for 214 Industrial Chemicals in Air and Water Dilution*, Journal of Applied Toxicology, Vol. 3, No. 6 (1983).
- 3 Agricultural supply
- 4 Ayers, R. S. and D. W. Westcot, *Water Quality for Agriculture*, Food and Agriculture Organization of the United Nations – Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985)
- 5 Title 22, California Code of Regulations (CCR), Section 64449, Table 64449-B which is incorporated by reference into the Basin Plan.
- 6 Title 22, CCR, Section 64449, Table 64449-A which is incorporated by reference into the Basin Plan.
- 7 Title 22, CCR, Section 64431, Table 64431-A which is incorporated by reference into the Basin Plan.
- 8 Title 22, CCR, Section 64439, which applies the narrative objective to fully protect the cited beneficial use.
- 9 USEPA Integrated Risk Information System, <http://www.epa.gov/iris>.
- 10 Title 40, Code of Federal Regulations, Section 143.3, which applies the narrative objective to fully protect the cited beneficial use.
- 11 California Department of Public Health, Division of Drinking Water and Environmental Management, *Drinking Water Notification Levels*, <http://www.cdph.ca.gov/programs/pages/ddwem.aspx>.
- 12 CAL/EPA Toxicity Criteria Database (OEHHA), <http://www.oehha.org/risk/ChemicalDB>.

Domestic wastewater contains numerous dissolved organic and inorganic constituents that together comprise Total Dissolved Solids (TDS). Each component constituent is not individually critical to any beneficial use. Critical constituents are individually listed. The cumulative impact from the other constituents, along with the cumulative affect of the constituents that are individually listed can be effectively controlled using TDS as a generic indicator parameter. The relevant numerical water quality limit for salinity is 450 mg/L, and is used through Basin Plan procedures to apply the narrative Chemical Constituents water quality objective for the protection of agricultural supply, the beneficial use most sensitive to TDS. This limit assumes no impact on sensitive agricultural uses, consistent with the high quality of expected natural background water quality in the area of the discharge. Most individual salt components can safely be assumed to be proportionately low such that TDS can be an effective indicator parameter in their regulation.

Not all TDS constituents pass through the treatment process and soil profile in the same manner or rate. Chloride tends to pass through both rapidly to groundwater. As chloride concentrations in most groundwaters in the region are much lower than in treated municipal wastewater, chloride is a useful indicator parameter for evaluating the extent to which effluent reaches groundwater. Boron is another TDS constituent that may occur in wastewater in concentrations greater than groundwater depending on the source water and the extent residents use cleaning products containing boron. Other indicator constituents for monitoring for groundwater degradation due to recharged effluent include total coliform bacteria, ammonia and total nitrogen, and Total Trihalomethanes (TTHMs), a by-product of chlorination.

Treatment Technology and Control

Given the character of domestic wastewater, secondary treatment technology is generally sufficient to control degradation of groundwater from decomposable organic constituents. Adding disinfection significantly reduces populations of pathogenic organisms, and reasonable soil infiltration rates and unsaturated soils can reduce them further. Neither organics nor total coliform organisms, the indicator parameter for pathogenic organisms, should be found in groundwater beneath a facility that is well-sited, well-designed, and well-operated. The bacteria objective in the Basin Plan, cited as a groundwater limitation in the order, is equivalent to requiring that coliform organisms not be detected in groundwater.

Domestic wastewater typically contains nitrogen in concentrations greater than water quality objectives, which vary according to the form of nitrogen. Groundwater degradation by nitrogen can be controlled by an appropriate secondary treatment system (e.g., oxidation ditch), tertiary treatment with nitrogen reduction, and agronomic reuse crops that are harvested and removed from the land application area. The effectiveness varies, but generally best practicable treatment and control is able to control nitrogen degradation of groundwater at a concentration well below the water quality objectives. The proposed interim limitation reflects water quality objectives.

Dissolved solids can pass through the treatment process and soil profile; effective control of such constituents relies primarily upon source control and pretreatment measures. In the best of circumstances, long-term land discharge of treated wastewater will degrade groundwater with dissolved solids (as measured by TDS and EC). The quality of source water for the Berryessa Estates Subdivision is fairly good, with a TDS of approximately 240 mg/L. Salt addition through use higher than the expected range, as effluent reveals a TDS of approximately 620 mg/L. For comparison, the national average increment for TDS ranges from 100 to 300 mg/L, according to *Wastewater Engineering* by Metcalf & Eddy; the incremental maximum in the Basin Plan for the Tulare Lake Basin is 500 umhos/cm (about 300 mg/L); and the incremental average standard allowed in the Santa Ana Basin is 230 mg/L. The proposed Order sets for interim effluent limits at the current discharge concentration, while requiring the development of salinity reduction BPTC measures. The proposed Order also sets interim groundwater limitations equivalent to water quality objectives, while site-specific, constituent-specific limits are developed in conjunction with a BPTC evaluation of source control and pretreatment.

Other constituents in domestic wastewater that may pass through the treatment process and the soil profile include recalcitrant organic compounds, radionuclides, and pharmaceuticals. Hazardous compounds are not usually associated with domestic wastewater and when present are reduced in the discharge to inconsequential concentrations through dilution and treatment. It is inappropriate to allow degradation of groundwater with such constituents, so proposed limits are nondetectable concentrations.

A discharge of treated wastewater water that overloads soils with nutrients and organics can result in anaerobic conditions in the soil profile, which in turn creates organic acids and decreases soil pH. Under conditions of low soil pH (below 5), iron and manganese

compounds in the soil can solubilize and leach into groundwater. Overloading the land application areas is preventable. Though iron and manganese limits are set at their respective water quality objectives, groundwater pH is expected to remain the same as background.

Title 27

Title 27, CCR, Section 20005 et seq. ("Title 27"), contains regulations to address certain discharges to land. Title 27 establishes a waste classification system, specifies siting and construction standards for containment of classified waste, requires extensive monitoring of groundwater and the unsaturated zone for any indication of failure of containment, and specifies closure and post-closure maintenance requirements. Generally, no degradation of groundwater quality by any waste constituent is acceptable under Title 27 regulations.

Discharges of domestic sewage and treated wastewater can be treated and controlled to a degree that will not result in unreasonable degradation of groundwater. For this reason, they have been conditionally exempted from Title 27. Discharges of domestic sewage and treated effluent which are regulated by WDRs and treatment and storage facilities associated with the WWTP are considered exempt from Title 27 under Section 20090(a), provided that the discharges and facilities will not result in a violation of any water quality objective. As the exemption specifically excludes the discharge to land of: 1) solid waste such as grit and screenings that result from treatment of domestic sewage, and 2) residual sludge that will not be further treated at the WWTP, such discharges must comply with provisions of Title 27.

The discharge of treated wastewater and the operation of treatment and/or storage facilities associated with a wastewater treatment plant can be allowed without requiring compliance with Title 27 only if groundwater degradation complies with the Basin Plan, Resolution No. 68-16 (Antidegradation Policy), and does not violate any water quality objectives.

Proposed Order Terms and Conditions

Discharge Prohibitions and Specifications

The Order requires the Discharger to submit technical reports that discusses the following: (a) completed installation of a SCADA system and high-level remotely operated alarms at the lift stations, (b) measures that will be taken to ensure continuous compliance with the Total Coliform Organisms Effluent limitations in the Order, (c) measures taken to ensure that the dissolved oxygen content of greater than 1.0 mg/L will be met at all times in the upper one-foot of any wastewater pond, (d) measures taken to ensure that the dissolved oxygen content in the ponds is greater than 1.0 mg/L, and (e) potential sources of the elevated TDS concentrations in Monitoring Well No. 5.

This Order also requires the Discharger to submit (a) a Salinity Evaluation and Minimization Plan to address sources of salinity to the wastewater treatment system, (b) a Background Groundwater Quality Study Report, (c) documentation showing that the water treatment plant

is in compliance with applicable California Department of Public Health requirements, (d) a revised Sludge Management Plan, and (e) a BPTC Evaluation Workplan.

In addition, this Order requires the Discharger to submit a single or multiple *As-Built Report(s)* certifying the completed installation of the land application areas totaling six acres, including a flow meter on the outlet of Pond No. 7, as described in the Findings of this Order and in compliance with the land discharge specifications.

Finally, this Order requires that at least 60 days before requesting an increase in the average dry weather wastewater inflow into the WWTP up to 67,000 gpd, the Discharger shall submit a technical report and water balance that justifies the proposed increase. Upon approval by the Executive Officer of technical report, the monthly dry weather inflow to the WWTP may increase up to 67,000 gpd.

This Order allows the monthly average dry weather inflow rate to the WWTP to increase based on submittal, and approval by the Executive Officer, of a technical report and water balance that justifies the proposed increase.

This Order's Effluent Limitations for BOD₅, total nitrogen, and TDS are based on information provided in the RWD. The discharge specifications regarding dissolved oxygen and freeboard are consistent with Regional Water Board policy for the prevention of nuisance conditions and overtopping, and are applied to all such facilities.

Monitoring Requirements

Section 13267 of the CWC authorizes the Regional Water Board to require monitoring and technical reports as necessary to investigate the impact of a waste discharge on waters of the state. In recent years there has been increased emphasis on obtaining all necessary information, assuring the information is timely as well as representative and accurate, and thereby improving accountability of any discharger for meeting the conditions of discharge. Section 13268 of the CWC authorizes assessment civil administrative liability where appropriate.

The proposed Order includes monitoring influent wastewater, treated effluent, wastewater treatment and storage ponds, land application areas, groundwater, and water supply. The Title 27 zero leakage protection strategy relies heavily on extensive groundwater monitoring to increase a discharger's awareness of, and accountability for, compliance with the prescriptive and performance standards. Title 27 regulations pertaining to groundwater monitoring and the detection and characterization of waste constituents in groundwater have been in effect and successfully implemented for many years. No regulation currently specifies similar criteria more suitable for a situation where extensive land application of treated wastewater occurs. It is appropriate that the Title 27 groundwater monitoring procedures be extended and applied on a case-by-case basis under Water Code Section 13267.

The Discharger must monitor groundwater for wastewater constituents expected to be present in the discharge, and capable of reaching groundwater, and violating groundwater limitations if its treatment, control, and environmental attenuation, proves inadequate.

For each constituent listed in the Groundwater Limitations section, the Discharger must, as part of each monitoring event, compare concentrations of constituents found in each monitoring well (or similar type of groundwater monitoring device) to the background concentration or to prescribed numerical limitations to determine compliance.

Reopener

The conditions of discharge in the proposed Order were developed based on currently available technical information and applicable water quality laws, regulations, policies, and plans, and are intended to assure conformance with them. However, information is presently insufficient to develop final groundwater limitations, so the proposed Order contains interim groundwater limitations. Additional information must be developed and documented by the Discharger as required by schedules set forth in the proposed Order. As this additional information is obtained, decisions will be made concerning the best means of assuring the highest water quality at reasonable cost. It may be appropriate to reopen the Order if applicable laws and regulations change, but the mere possibility that such laws and regulations may change is not sufficient basis for reopening the Order. The CWC requires that waste discharge requirements implement all applicable requirements.

REVISED

gjc: 25-Apr-08