INFORMATION SHEET

WASTE DISCHARGE REQUIREMENTS ORDER R5-2012-XXXX
SHASTA-TEHAMA-TRINITY JOINT COMMUNITY COLLEGE DISTRICT
SHASTA COLLEGE WASTEWATER TREATMENT FACILITY
SHASTA COUNTY

Background
The Shasta-Tehama-Trinity Joint Community College District owns and operates the Shasta College Wastewater Treatment Facility (WWTF), which is ½ mile northeast of the intersection of State Highway 299 East and Old Oregon Trail near the City of Redding, in Shasta County. The WWTF was originally constructed in 1965 and is located in Section 15, T32N, R4W, MDB&M and occupies Assessor's Parcel No. 076-030-08. The WWTF serves a faculty, staff, and student population of approximately 9,500 persons in 28 major buildings covering 337 acres.

In 1994, the Discharger began considering whether to participate in a proposed sewer assessment district for the northeastern Redding area. An engineering firm was retained by the Discharger to evaluate the existing system and compare the cost and benefits of maintaining the existing system versus participating in the assessment district. The consultants determined that "the ponds could easily overflow during a wet year" and recommended connection to the City sewer. If connection was not pursued, the report recommended significant improvements to the existing pond system.

Waste Discharge Requirements (WDR) Order 93-212 adopted by the Central Valley Water Board on 22 October 1993, prescribed requirements for the Discharger's WWTF and the discharge of treated effluent to a single lined aeration pond, two evaporation/percolation ponds (3.5 and 3.2 surface acres), one irrigation pond (1.5 surface acres), and an approximate 10 acre agricultural field. Crops grown on this field are pasture grasses used for non-milking livestock feed for the Shasta College Animal Science Program.

During January 1995, the Redding area received approximately 25 inches of rain. Inspection by staff in January 1995 indicated rapidly diminishing freeboard in the primary ponds. On 31 January 1995, the Discharger, after notifying the Central Valley Water Board and adding chlorine for disinfection began flood irrigating with partially treated wastewater. Within 4 hours the application area began to flood in the direction of Stillwater Creek and areas of public use.

On 28 April 1995, the Central Valley Water Board adopted Cease and Desist Order (CDO) 95-084. This Order was issued in response to unauthorized discharge or threatened unauthorized discharge of partially treated wastewater resulting from an undersized WWTF. This Order required the Discharger to cease and desist from discharging contrary to waste discharge requirements and to submit a report identifying how the Discharger intended to ensure compliance. The Order also required the Discharger to provide a time schedule for implementing interim and long-term measures to achieve compliance and confirm intent to connect to the City of Redding sewer system.

On 29 June 1995, the Discharger responded to CDO 95-084 with plans to conduct various feasibility studies, investigation of potential sources of inflow and infiltration (I/I), and identified

potential mitigation areas to reduce overall flow to the WWTF. The Discharger also expressed its intentions to connect to the City of Redding sewer system. This act however, would first require annexation and an election (Mello Roos District) as well as formation of a new assessment district. Approximately one year later, the Discharger notified the Central Valley Water Board that after extensive discussions with the City of Redding, it did not appear annexation would be a viable option in the near future. Additionally the Discharger had approved a sewer sealing project that would consist of cleaning, videoing, and air-testing of joints; sealing of joints; and retesting portions of approximately 8,000 feet of sewer lines at the facility.

On 31 January 1997, the Discharger provided a summary report of an extensive I/I investigation and repairs conducted during fall 1996 and a proposed schedule to complete additional repairs in subsequent years. In March 1997 the Discharger provided an additional report, prepared by the Discharger's consultant, which identified several alternatives to mitigate concerns identified in CDO 95-084.

On 17 July 1997, the Discharger submitted a written report indicating which improvements and modification of the existing treatment facility they intended to pursue (Alternative B1: increase the capacity of the existing ponds and add an aeration basin). In September 1997, Discharger submitted a detailed work plan and time schedule for implementing Alternative B1. Due to funding constraints, the Discharger proposed that the project be divided into three phases. The first phase included enlargement of both stabilization ponds, construction of a headworks bar screen, and extension of an 8 inch force main to the headworks. The second phase included reconstruction of the irrigation pond, construction of irrigation recapture and recycle system (tail water return system), outlet system modifications, installation of pond pump station, and construction of a control building. The third phase included construction of an aeration basin with three aerators, resurfacing dikes, installation of security fencing and berms, and electrical work. This work was to be completed over three years ending in the summer 2000.

On 24 October 1997, CDO 95-084 was amended with CDO 97-216 to incorporate activities included in the work plan along with the proposed time schedule. The Discharger has completed activities required under CDO 97-216. The Discharger's engineer provided a water balance as the basis for the facility upgrades which was included in the 2001 Report of Waste Discharge. Based on this water balance the WWTF can accommodate a design average daily flow (during school year) of 0.076 million gallons per day (mgd) and an average dry weather flow of 0.033 mgd.

The WWTF treats primarily domestic sewage. In addition, the College owns and operates a large swimming pool for collegiate sports. Swimming pool filters are backwashed three to four times per month based on pool use. Each flushing event produces approximately 5,000 gallons of filter backwash that is now discharged to the WWTF. Currently, sewage and filter backwash from the Community College flows by gravity sewer to a single lift station at the lowest point of the campus. The lift station has been upgraded and now notifies the on call operator directly should a problem occur.

The lift station pumps raw sewage to the head works bar screens and into a single concrete lined aeration basin, containing two cells separated by a baffle curtain. Each cell is approximately 0.86 million gallons. BOD_5 loading estimates are 191 lbs/day in Cell 1, which contains two 5-horsepower aerators. BOD_5 loading estimates are 80 lbs/day in Cell 2, which contains one 5-horsepower aerator. From the aeration basin, wastewater is gravity fed to one of two clay lined facultative lagoons. One sample from each of the clay liners reflect permeabilities of 1.8×10^{-6} and 2.9×10^{-7}.

Periodically wastewater from the facultative lagoons is pumped to a single clay lined irrigation pond. Wastewater stored in the irrigation pond is used to flood irrigate one of two 10-acre fields used to grow crops for the College's Animal Science Program. Fields are bermed to prevent runoff and contain tailwater ponds with automatic pump systems, which return flows to the headworks. Land application occurs between May and September to supplement fresh water supply provided by the Bella Vista Water District.

Reportedly, there were four groundwater wells at the facility. Of these wells, two wells cannot be located, one is buried and one is available for inspection. It appears, based on visual observations, that the wells were constructed as groundwater monitoring wells, however the purpose of construction, date of construction, and construction details are unknown. On 3 November 2011, the well located between the two effluent-irrigated fields was measured to be seven feet deep. No water was present in the well. Thus, groundwater at that time was more than seven feet below the ground surface.

The North Facultive Lagoon is located approximately 200 feet from Stillwater Creek, a perennial stream. Based on construction drawings provided by the Discharger, the North Facultive Lagoon, South Facultive Lagoon, and Irrigation Basins are constructed to base level elevation (bottom of lagoons) of approximately 590 feet above mean sea level (msl). This is approximately the same elevation as Stillwater Creek based on the USGS 7.5 minute Project City quadrangle. Based on this information it is likely is the bottoms of the facultative ponds are in direct contact with groundwater at least seasonally. This inferred condition has yet to be verified.

Basin Plan, Beneficial Uses, and Regulatory Considerations

Surface water drainage is to Stillwater Creek tributary to the Sacramento River the confluence of which is located near the City of Anderson, also in Shasta County. 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 municipal and domestic 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.

Limited degradation is expected to occur as a result of the operation of the WWTF. This degradation is consisted with Resolution 68-16 because:

- The degradation is consistent with maximum benefit to the people of the state. The Discharger provides needed educational opportunities to the region and the WWTF is a vital part of the school's operations.
- The groundwater limitations, coupled with the additional studies that are being required herein to determine reasonable protection of the AGR beneficial use, will ensure protection of all beneficial uses in groundwater and surface waters.
- The limited degradation that will occur as a result of the operation of the WWTF will not result in water quality less than that prescribed in state and regional policies.
- The Discharger has made the significant upgrades to the WWTF required in the CDO, has conducted an investigation into I/I issues affecting the sewer collection system and has repaired or replaced portions of the sewer collection system that were deficient, and has improved irrigation tail water control through the use of improved berms and irrigation procedures since the adoption of the existing WDRs. The Discharger will also be required to prepare and implement *Salinity Evaluation and Minimization Plan*. Therefore, current WWTF operations can reasonably be considered BPTC, after considering waste management technologies employed by similarly-situated dischargers.

Groundwater Monitoring
Groundwater monitoring is a new requirement in the proposed WDRs to confirm compliance with water quality objectives specified in the proposed WDRs.

Water quality objectives are used to 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 values below reflect water quality limitations that must be met to maintain specific beneficial uses of groundwater. Unless natural background for a constituent proves higher, the groundwater quality limit established in proposed Order is the most stringent of the values for the listed constituents.

Constituent	Limit	Beneficial Use	Water Quality Objective	Criteria or Justification
Ammonia (mg/l)	1.5	MUN [1]	Tastes and Odors	Odor Threshold [2]
Boron (mg/l)	1.0	MUN[1]	Toxicity	Calif. Drinking Water Notification Level based on toxicity[1]
Chloride (mg/l)	250	MUN [1]	Chemical Constituents	Recommended Secondary MCL [3]
	500	MUN [1]	Chemical Constituents	Upper Secondary MCL [3]
Electrical Conductivity at 25°C (umhos/cm)	900	MUN [1]	Chemical Constituents	Secondary MCL [4]
Iron (mg/l)	0.3	MUN [1]	Chemical Constituents	Secondary MCL [4]
Manganese (mg/l)	0.05	MUN [1]	Chemical Constituents	Secondary MCL [4]
Nitrate plus Nitrite as N (mg/l)	10	MUN [1]	Chemical Constituents	Primary MCL [5]
Nitrite as N (mg/l)	1	MUN [1]	Chemical Constituents	Primary MCL [5]
Total Dissolved Solids (mg/l)	500	MUN [1]	Chemical Constituents	Recommended Secondary MCL [3]
	1,000	MUN [1]	Chemical Constituents	Upper Secondary MCL [3]
Total Coliform Organisms (MPN/100 ml)	<2.2	MUN [1]	Bacteria	Basin Plan numerical objective and non-detect
pH (units)	6.5 to 8.5	MUN [1]	Chemical Constituents	Secondary MCL [7]

[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] Title 22, California Code of Regulations (CCR), Section 64449, Table 64449-B which is incorporated by reference into the Basin Plan.

[4] Title 22, CCR, Section 64449, Table 64449-A which is incorporated by reference into the Basin Plan.

[5] Title 22, CCR, Section 64431, Table 64431-A which is incorporated by reference into the Basin Plan.

[6] Title 22, CCR, Section 64439, which applies the narrative objective to fully protect the cited beneficial use.

[7] Title 40, Code of Federal Regulations, Section 143.3, which applies the narrative objective to fully protect the cited beneficial use.

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 effect of the constituents that are individually listed can be effectively controlled using TDS as a generic indicator parameter.

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. However, groundwater chloride concentrations in the region are highly variable, which might limit the use of chloride as an indicator parameter of groundwater degradation. Boron is another TDS

constituent that may occur in wastewater in concentrations greater than in groundwater because it is a common ingredient of detergents. Other indicator constituents for monitoring for groundwater degradation due to land application of wastewater include total coliform bacteria, ammonia, and total nitrogen. Dissolved iron and manganese are useful indicators to determine whether components of the WWTP with high-strength wastewater constituents, such as sludge handling facilities, are ineffective in containing waste. Exceptionally high TDS and nitrogen also typifies this type of release.

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.

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.

Dissolved solids can pass through the treatment process and soil profile; effective control of such constituents relies primarily upon source control and pretreatment measures. Even in the best of circumstances, long-term land discharge of treated wastewater will degrade groundwater with dissolved solids (as measured by TDS or EC). The proposed Order sets groundwater limitations equivalent to water quality objectives.

A discharge of treated wastewater 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 of the California Code of Regulations (“Title 27”) contains regulations that establish minimum standards governing the water quality aspects of waste discharges to land for treatment, storage, or disposal. These regulations classify wastes and contain siting, design, construction, monitoring, and closure requirements for waste management units.

Section 20090 of Title 27 exempts certain activities from its provisions. Certain exempted activities contain preconditions for which the specified activity must meet and continue to meet in order to maintain the specified exemption.

The treatment and storage facilities associated with the sewage treatment facility, except for discharges of residual sludge and solid waste, are exempt from the requirements of Title 27 pursuant to Section 20090(a) 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 plant.

The reuse of the treated effluent for irrigation purposes is exempt from Title 27 pursuant to Section 20090(b) of Title 27 based on the following:

(a) By this Order, Central Valley Water Board has issued WDRs for the discharge;

(b) By complying with the WDRs and by taking necessary steps to conduct a further evaluation of possible impacts to groundwater, the discharge is in compliance with the applicable water quality control plan; and

(c) The discharge does not need to be managed according to Chapter 11, Division 4.5 of Title 22 as a hazardous waste.

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. While the wastewater treatment facility is exempt from Title 27, the data analysis methods of Title 27 are appropriate for determining whether the discharge complies with the terms for protection of groundwater specified in this Order.

Proposed Order Terms and Conditions

Discharge Prohibitions, Effluent Limitations, Discharge Specifications, and Provisions
The proposed Order prohibits discharge to surface waters and water drainage courses.

The proposed Order allows a monthly average inflow rate to the WWTF of 33,000 gpd as an average daily dry weather flow based a water balance provided by the Discharger's engineer and associated facility improvements.

The proposed Order's effluent limitation for electrical conductivity was selected to protect groundwater beneficial uses.

The discharge specifications regarding dissolved oxygen and freeboard are consistent with Regional Board policy for the prevention of nuisance conditions and overtopping, and are applied to all such facilities.

In order to protect public health and safety, the proposed Order requires the Discharger to comply with the provision of Title 22 and to implement best management practices with respect to recycled water application (application at reasonable rates considering the crop, soil, and climate).

The proposed WDRs prescribe groundwater limitations that implement water quality objectives for groundwater from the Basin Plan. The limitations require that the discharge not

cause or contribute to exceedance of these objectives or natural background water quality, whichever is greatest.

The Order requires the Discharger to submit the following technical reports:

a. A Monitoring Well Evaluation and/or Installation Workplan;
b. A Monitoring Well Installation Report (if required);
c. A Salinity Evaluation and Minimization Plan;
d. An Updated Operation and Maintenance Plan if needed; and
e. Engineering Evaluation per Title 22 update, if needed.

Monitoring Requirements
Water Code section 13267 authorizes the Central Valley 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. Water Code section 13268 authorizes assessment civil administrative liability where appropriate.

The proposed Order includes effluent monitoring, pond monitoring, groundwater monitoring, biosolids monitoring, and facility monitoring. This monitoring is necessary to evaluate the extent of the potential degradation from the discharge.

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. In the event existing groundwater wells are unsuitable for the purposes of evaluating compliance with Basin Plan objectives, the Discharger is required to install additional groundwater monitoring wells around the facility. 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 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 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 Water Code requires that waste discharge requirements implement all applicable requirements.