City of Jackson Wastewater Treatment Facility Improvements

Project Report

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City of Jackson

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Sign-off Sheet

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1.0 PURPOSE

The City of Jackson (City) owns and operates a wastewater treatment facility (WWTF) serving the needs of the people and businesses located in the City. Treated wastewater (termed "effluent") from this WWTF is discharged year-round to Jackson Creek, a water of the United States. This discharge is regulated by State and Federal laws administered by the California Regional Water Quality Control Board, Central Valley Region (hereinafter, "Regional Water Board") through the issuance and regular renewal (including amendments) of Waste Discharge Requirements, aka "Orders".

1.1 PROJECT NEED

The City's need for a wastewater treatment and disposal project was created by Waste Discharge Requirements adopted by the Regional Water Board in 2013 in Order No. R5-2013-0146 (hereinafter, Order). These requirements affect the quantity of City effluent that can be discharged to Jackson Creek (relative to the accumulated percentage of effluent in Lake Amador, a downstream reservoir serving as a source of water for a public water supply), and the quality of City effluent that can be discharged to Jackson Creek (based on what was known about Jackson Creek and the effluent discharge in 2013). Specifics of these requirements include:

- The City has received Time Schedule Order R5-2013-0147 which requires compliance with final effluent limitations for disinfection byproducts (chlorodibromomethane and total trihalomethanes) by March 2018.
- There are new final effluent limitations in the Order for copper, zinc, dichlorobromomethane (DCBM), chlorodibromomethane, cyanide, nitrate and nitrite, ammonia and total trihalomethanes, which the City cannot reliably meet without treatment process improvements.

Additionally, historic compliance problems with effluent limitations on turbidity and coliform need to be addressed as part of this compliance project along with an assessment of whether the effluent discharge is in compliance with narrative policy objectives of the Regional Water Board as stated in its Basin Plan. The Order contain revisions to the previous Order (2007 Order) based on the results of on-going studies of the feasibility of various wastewater treatment and disposal alternatives.

The project need is described in greater detail in Section 6.0.

1.2 PROJECT BENEFITS

The primary benefits of the project are:

1. Increase water quality in Jackson Creek.
2. Increase water quality in Lake Amador.
3. Compliance with Regional Water Board Basin Plan.

1.3 PROJECT OBJECTIVES

The over-riding objective is to provide an improved WWTF and effluent disposal system to meet the existing needs of the City of Jackson, within the limits of the permitted capacity of the existing WWTF, while keeping in mind the future needs of the City. To achieve this overall objective requires the planning, design, construction, operation and maintenance of various WWTF improvements that are cost-effective and minimize the impact to rate payers, while complying with the intent of the Order. Specific project objectives include:

1. Reducing the potential toxicity of the effluent discharge to aquatic life in Jackson Creek.
2. To improve the City's wastewater effluent quality and disposal method in a manner that protects the existing beneficial uses of Jackson Creek and Lake Amador to the maximum extent reasonable.
3. To provide the City with treatment facilities that will afford a higher probability of compliance with prohibitions and limitations contained in the Order.

In the City's efforts to achieve these objectives, public involvement is an important aspect of the overall plan so that City residents and businesses know what the City is doing with their wastewater, why, and how the City intends to 1) protect public health and enhance the environment, 2) comply with pertinent laws and regulations, 3) protect the value of properties served by the wastewater utility, and 4) fund the improvements.

2.0 PROJECT PLANNING

The project must be completed to comply with new prohibitions and limitations contained on the Order, which was adopted by the Regional Water Board in December 2013 and became effective January 2014. Planning for the improvements has been under way for several years due to conflicting regulatory input related to water rights in Jackson Creek, calling for the WWTF effluent to remain in the creek, and Department of Public Health (DPH) potable water requirements, calling for a reduction in the amount of effluent in the downstream Lake Amador water supply. These regulatory drivers have been resolved with the latest data and analysis allowing the effluent to remain in the creek with respect to DPH water concerns, which is reflected in the Order language relative to the prohibition of effluent percentages in Lake Amador greater than five percent. The Order changes the method for determining compliance with the prohibition to acknowledge that the harmonic mean of annual flows into Lake Amador is the appropriate statistical measure when calculating the percent effluent in Lake Amador (R5-2013-0146, VII, F).

2.1 LOCATION

The City of Jackson is located in the Sierra Nevada Foothills in Amador County on the Highway 49 corridor at an elevation ranging from 1,200 to 1,600 feet. Jackson is approximately 45 miles south and east of Sacramento, between 1 and 3 miles south and east of the City of Sutter Creek and 3 to 4 miles north of the Mokelumne River. A vicinity map showing the location of the City of Jackson is provided in Figure 2-1.

2.1.1 SETTING

Amador County is located on the western slope of the Sierra Nevada. Jackson Creek flows through downtown Jackson into a relatively narrow and steep canyon rising to ridges to the north and south. The ridges to the south separate the City from the upper Mokelumne River watershed, while the unincorporated community of Martell is located on the ridge to the north, which lies between Jackson and the City of Sutter Creek.

TOPOGRAPHY

Central Amador County where Jackson is located is characterized by a variety of topographical features including valleys, rolling foothills and steep high country terrain in the east. Topography is particularly important in the development of this Project Report given that the Alternatives considered include improvements that could be separated by significant topographic features (mountains and rivers) from the City's wastewater treatment plant. When conveying sewage, topography plays a critical part in determining the type of system used and the ultimate costs.

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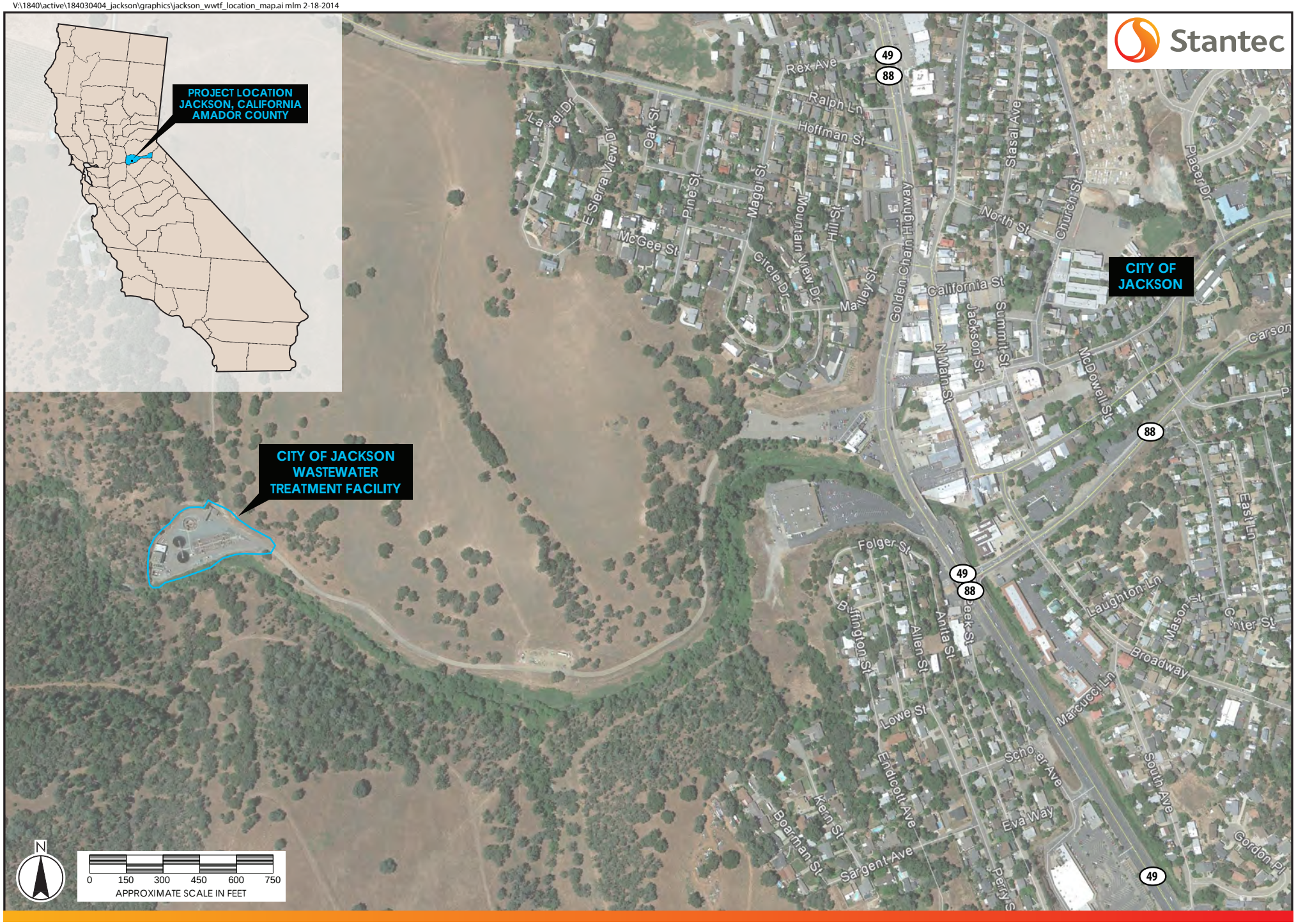

City of Jackson
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Figure 2-1
City of Jackson Location Map

HYDROLOGY

The City of Jackson service area is contained within the Jackson Creek watershed. The City's wastewater treatment facility (WWTF) discharges treated effluent to Jackson Creek in a location west of Highway 49 and old town Jackson. Jackson Creek flows continue about 6.5 miles to Lake Amador downstream.

Lake Amador (also known as Jackson Valley Reservoir) is an impoundment on Jackson Creek located southwest of the city of Jackson and east of the community of Buena Vista. The spillway elevation of Lake Amador is approximately 500 feet. Lake Amador serves as an irrigation water supply for the Jackson Valley area and is managed by the Jackson Valley Irrigation District. Jackson Creek flows out of Lake Amador and eventually into Dry Creek which joins the Mokelumne River to the west.

The Mokelumne River flows into Pardee Reservoir and subsequently, Camanche Reservoir. Both reservoirs are located along the southwestern boundary of Amador County. With a spillway crest elevation of 567.7 feet Pardee Reservoir serves as the primary water supply for the East Bay Municipal Utility District (EBMUD). The 28.65-megawatt Pardee Powerhouse is located at the base of the dam.

Camanche Reservoir is located downstream of Pardee Reservoir, on the Mokelumne River. This reservoir is operated jointly with Pardee Reservoir storing water for irrigation and stream-flow regulation, providing flood protection, and storing water to meet the demands of downstream water rights holders. The confluence of Dry Creek with the Mokelumne River is located downstream of Camanche Reservoir.

Beneficial Uses

The beneficial uses of the various waterways of concern to this Project Report are listed in Table 2-1.

Table 2-1
Beneficial Uses of Water Bodies of Interest (a)

Water Body	Municipal and Domestic Supply	Agriculture	Industrial Supply / Power	Recreation	Freshwater Habitat	Migration	Spawning	Wildlife Habitat
Jackson Creek	X	X		X	X	X	X	X
Mokelumne River	X	X (b)	X	X	X	X	X	X
Pardee Reservoir	X		X	X	X		X	X
Lake Amador	X	X	X	X				X
Camanche Reservoir	X	X		X	X	X	X	X

(a) Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, 4th Edition.
(b) The Mokelumne River is designated as a water source for agriculture from Camanche Reservoir to the Delta.

GEOLOGY

The Planning Area is divided between two geomorphic provinces, the Sierra Nevada section to the east and the Great Valley of California to the west. These features were created by a series of geologic events over millions of years. Mineral resources, the products of the region's geologic history, have played an important role in development.

Gold found in and along stream channels in the mid-1800s and copper mined from the hills east of Ione through the 1900s were the principal metallic ores of significance in the area.

The foothills of the western Sierra Nevada are characterized by fractured rock formations and thin soils. The valleys below are underlain by formations of clay, sand and conglomerates created by erosion of materials from the Sierra Nevada Mountains and subsequent sedimentation and consolidation in the marine environment that existed millions of years ago in the Eocene geologic period. The clay formations in the valleys have been commercially mined since the mid-1800s for clay and lignite, and more recently for glass sand.

Surface soils overlying the clay formations in the hilly areas consist generally of shallow gravelly clay loam layers of moderate to low permeabilities. In the valley bottomlands, somewhat deeper sections of sandy, silt and clay loam soils predominate and demonstrate moderate permeabilities.

Surface permeabilities and depth to relatively impervious layers such as consolidated clays or slightly fractured rock formations are key factors influencing the potential for wastewater disposal to land, as discussed in more detail in later sections.

CLIMATE

Warm, dry summers and mild to cold, wet winters characterize the region. Annual precipitation varies with elevation throughout the area from 20 inches per year at lower elevations to over 40 inches per year at the higher elevations.

WASTEWATER SERVICE AREA

Figure 2-2 identifies the current City Limits as well as the area into which the City of Jackson may expand. The City Limits identified in Figure 2-2 correspond to the existing wastewater service area. Service to growth within the Sphere of Influence is anticipated to be extended as those areas are annexed to the City in accordance with the policies contained in the General Plan and the City's municipal code.

The City currently provides wastewater service to approximately 1,704 residential accounts and approximately 352 non-residential accounts.

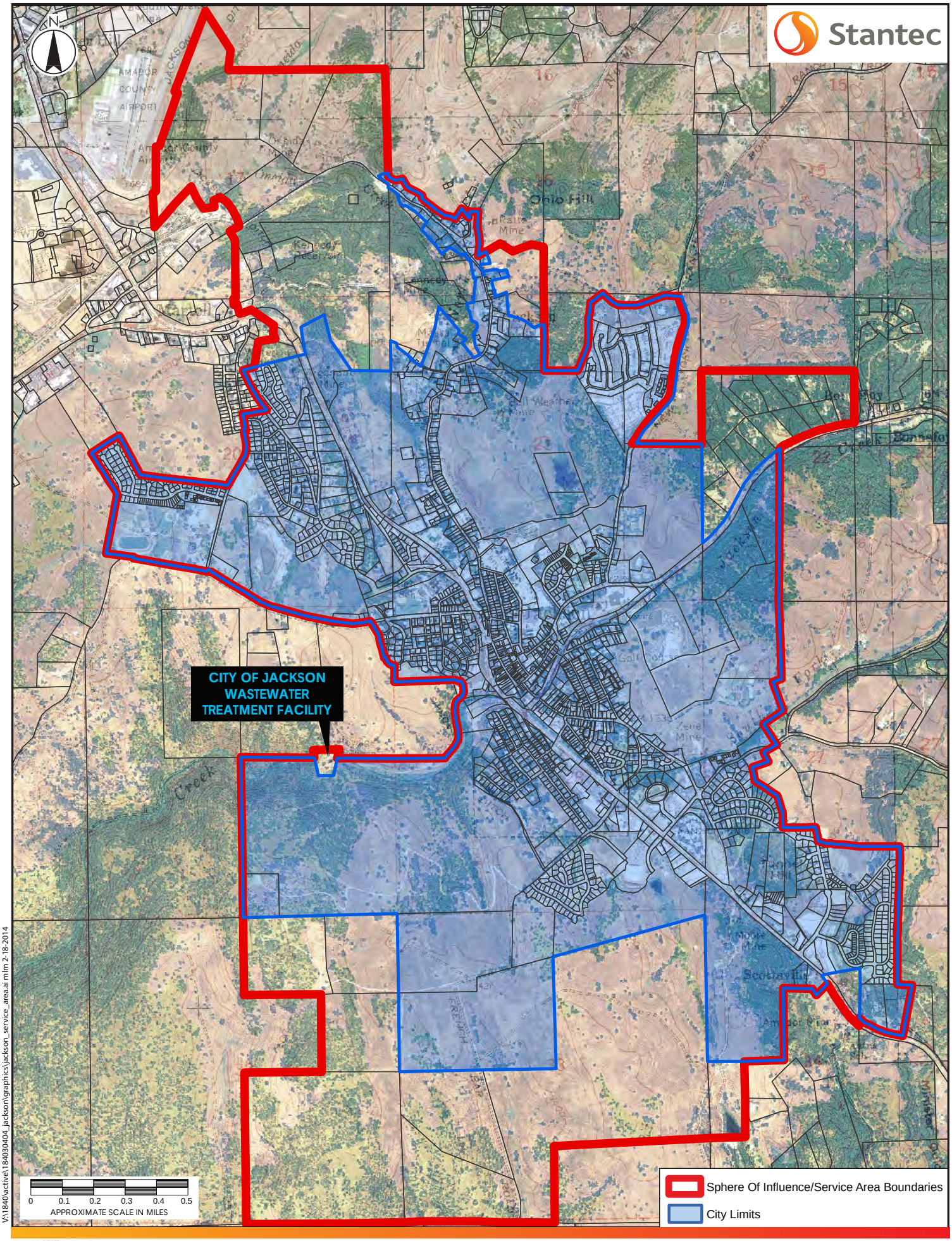

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Figure 2-2
City of Jackson WWTF Service Area

2.2 ENVIRONMENTAL RESOURCES PRESENT

The environmental resources present in the planning area for the Project are identified and potential impacts due to the Project are assessed in the *City of Jackson Wastewater Treatment Plant Improvement Plan Draft Environmental Impact Report*, (PMC, 2012). Additional information is also contained in the *Jackson Creek Beneficial Use Attainment Study* (BUAS, ECO:LOGIC, 2009).

2.3 POPULATION TRENDS

The current population within the City of Jackson's wastewater service area is limited to those residents and businesses within the existing City Limits. The City uses California Department of Finance (DOF) estimates as the basis for the population projections within the community. Table 2-2 summarizes recent estimates of population within the City's service area.

Table 2-2
City of Jackson Population Projections

Year	City of Jackson Estimated Population
2010	4,651
2011	4,618
2012	4,600
2013	4,592
2014	4,545

The recent near term population reduction, as presented here, is not anticipated to continue and some positive growth is expected to resume in the City in the future.

The design criteria for the Recommended Project presented in this report are based on the original design criteria for the City's WWTF, constructed in 1985, which can serve the populations presented here. No new capacity is proposed with the Recommended Project, with permit compliance being the primary reason for the proposed improvements.

2.4 COMMUNITY ENGAGEMENT

The need for a WWTF improvements project has been known by the City and public since before the 2007 Order was adopted and has been discussed over the years at many City Council meetings with public discussion and discourse. Most recently, presentations have been made by City Staff and Stantec to the City Council related to the project. These occurred on July 22, 2013, August 12, 2013 and January 13, 2014. All three presentations involved public comment. The City has also issued periodic press releases describing the City's planning process and the recommended proposed project to achieve wastewater compliance. Prior to these City Council meetings, the City also completed a formal and public CEQA process that included public notification and opportunity for comment on a full EIR. The EIR process was concluded in February 2013.

3.0 FLOWS AND LOADS

The flows and loads in this section were developed based on analytical work completed in 2013, with WWTF influent data from 2007 through 2013. A slight decrease in both flows and loads was observed in 2012 and 2013 data, possibly due to drought and economic conditions during this period. This most recent data (2014) will be incorporated into final design work, but its inclusion is not anticipated to materially change the results presented herein.

The purpose of this section is to evaluate historical and project future flows and loads into the City of Jackson WWTF. This section is organized into the following sections:

- Historical Wastewater Flows and Loads
- Projected Future Wastewater Flows and Loads

3.1 HISTORICAL WASTEWATER FLOWS AND LOADS

In order to properly size biological treatment components of the WWTF, the expected average and peak flow rates and key constituent loads entering the plant must be determined. Key loading criteria include those for Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), and Total Kjeldahl Nitrogen (TKN).

3.1.1 Influent Flows

Wastewater influent flow data for the period from January 1st 2007 through December 31st 2013 were obtained and analyzed. It must be noted that influent flows are a function of several factors including water conservation by the service area residents and businesses, precipitation, and sewer maintenance practices as they influence the amount of infiltration and inflow (I/I) entering the wastewater collection system. Average and peak flows into the WWTF are described below:

- **Average Dry Weather Flow (ADWF)** – The daily average flow during the dry season. ADWF is calculated as the average daily flow from the three lowest flow months of the year.
- **Average Annual Flow (AAF)** – The daily average flow during the course of a year. AAF is calculated via a rolling 365-day average, centered on the date in question.
- **Peak Monthly Flow (PMF)** – The maximum rolling 30-day average flow.
- **Peak Daily Flow (PDF)** – The maximum daily flow recorded.
- **Peak Hourly Flow (PHF)** – The maximum flow that occurs during a one-hour period.

The ADWF decreased from 0.45 Mgal/d in 2007 to 0.41 Mgal/d in 2013 as shown in Figure 3-1. It is suspected that the loss in ADWF is due in part to vacant properties resulting from the housing crisis that occurred during this period. In addition, water conservation measures may be playing a part in the reduced ADWF as this period also coincides with drought conditions in California. Data from 2013 indicates an ADWF of 0.41 Mgal/d, with a possible increasing trend.

It is considered appropriate based on engineering judgment, to assume that demographics and general water usage will increase as the economy recovers (and if/when the drought ends). For this reason, it is advisable to apply slightly higher estimates of existing system obligations in terms of flow and load for planning purposes (it is not recommended to plan or build any improvements limited to current low flow conditions as those improvements may be too small to accommodate natural variations over time). In the case of the City of Jackson, the use of 0.47 Mgal/d as a measure of the existing ADWF service obligation is recommended to avoid underserving the existing community due to natural variations in water use consumption over time. An ADWF of 0.47 Mgal/d was observed over the years preceding the data analysis presented herein and has been identified in previous City planning to represent the current City of Jackson ADWF.[1]

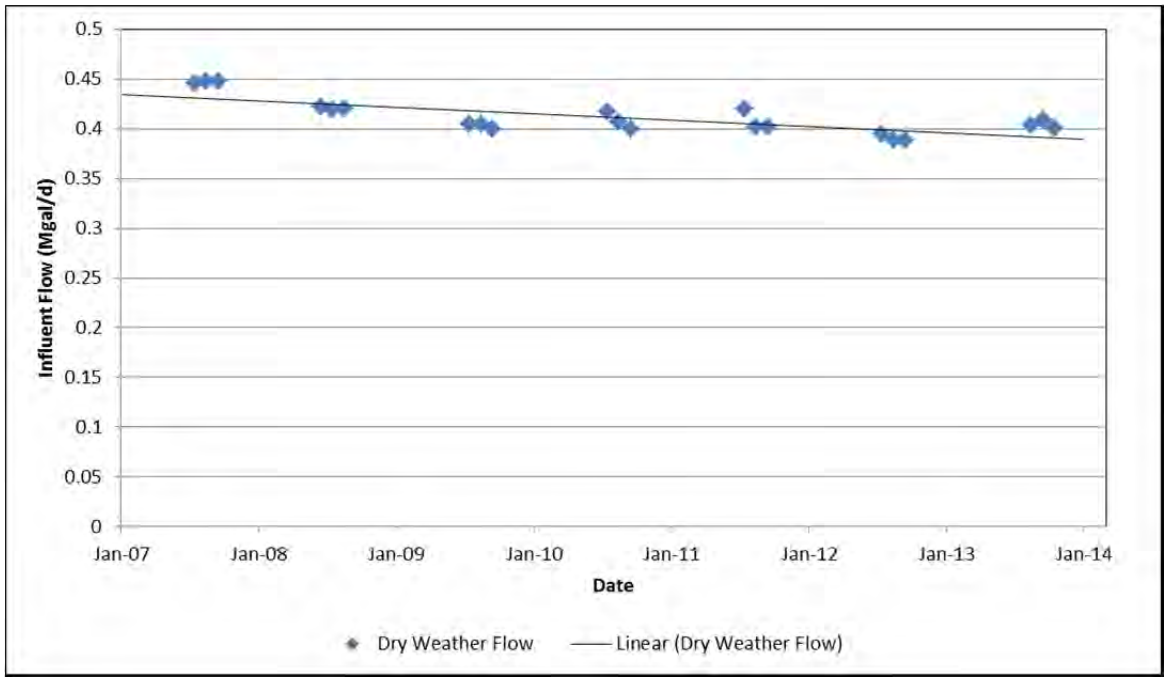

Figure 3-1
Influent Average Dry Weather Flows (ADWF)

Daily, rolling 30-day average, and rolling 365-day average flows are shown in Figure 3-2. The monthly average flows are "centered" averages, meaning that the average includes 14 days preceding and 15 days after the date in question. The annual average flows are also "centered" averages, representing the period beginning 182 days before the date in question and ending 182 days after the date in question. The centered average was used because it allows daily and monthly flows to be compared to the then-current average annual flows. The peak daily flow observed in the data set was about 1.87 Mgal/d, which occurred on March 20th 2011 (See Figure 3-2). The year 2011 was the second wettest year in the last 22 years as recorded by the Camp Pardee weather station near Jackson. Therefore a peak daily flow of 1.87 Mgal/d is considered reasonable.

[1] An ADWF rate 0.47 Mgal/d was identified as a current baseline flow rate in the *Wastewater Treatment Facility and Effluent Disposal Improvements Facilities Description Report, The City of Jackson Wastewater Treatment Plant Improvement Project Final Environmental Impact Report* (EIR) and the *City of Jackson Wastewater Rate Study*. The EIR identified ADWF ranges from 0.59 Mgal/d in 2000 to 0.40 Mgal/d ADWF in 2009, further illustrating that ADWF has been higher in the past.

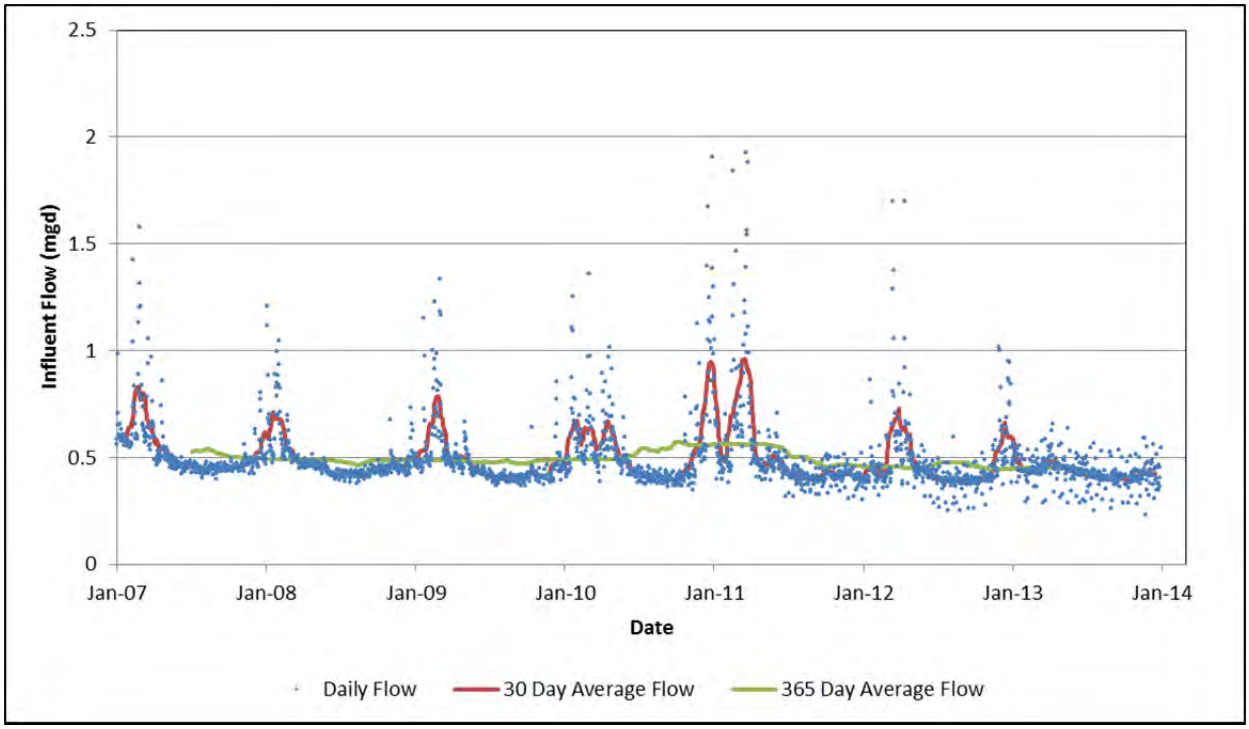

Figure 3-2
Influent Flows for Jackson WWTF

On selected days when the daily flow was high, the peak hourly flows were obtained from the archived daily charts. It was found that the peak hour flows can exceed 3.0 Mgal/d, which occurred on March 20th 2011 (see below). It is not known how high the peak hour flow on that day was, therefore, the design peak hour flow was subjectively estimated to be 3.2 Mgal/d.

Table 3-1
Peak Hour Flows

Day	Peak Hour Flow
3/20/2011	More than 3 Mgal/d (chart maxes out at 3.0 Mgal/d)
3/26/2011	2.4 Mgal/d
2/18/2011	2.1 Mgal/d
2/19/2011	2.0

Based on the data presented in Figures 3-1 and 3-2 and the above discussion, the following existing flow parameters are considered reasonable for design of the City's proposed WWTF upgrade project:

Table 3-2
Existing Flow Parameters

ADWF	0.47 Mgal/d
AAF	0.55 Mgal/d
PMF	0.94 Mgal/d
PDF	1.87 Mgal/d
PHF	3.2 Mgal/d

3.1.2 Historical Influent BOD and TSS

BOD and TSS loads (Figures 3-3 and 3-4) were calculated from weekly recorded influent BOD and TSS composite samples and daily recorded influent flows. Monthly and annual averages were calculated on the same basis as discussed for flows. With BOD and TSS concentrations generally in the range of about 200 to 500 mg/L, the wastewater would be considered moderately high in strength, which is expected because Jackson is a population center serving the surrounding area. It is also noticed that the variability of the measured TSS and BOD concentration was reduced since the beginning of 2011 (Figures 3-5 and 3-6). It is suspected that, with the exception of the TSS values during the winter of 2012, the general reduction in data variability is due to more reliable sampling techniques implemented by the operational staff.

The annual average BOD load has been stable from 2007 to 2010 but started to decline in the beginning of 2011 as shown in Figure 3-3. Based on the 2007-20013 data, a reasonable selection for the average, peak month, and peak day load for both BOD and TSS are 1,200, 1,800, and 2,520 lb/d, respectively.

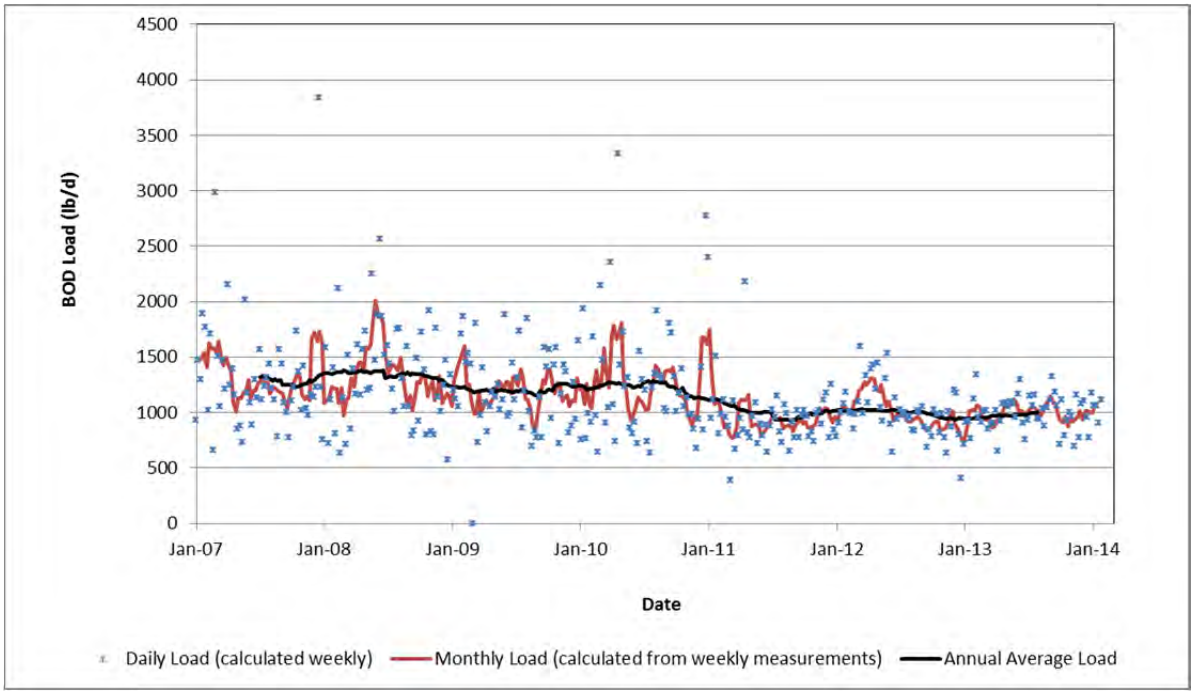

Figure 3-3
Influent BOD Loads

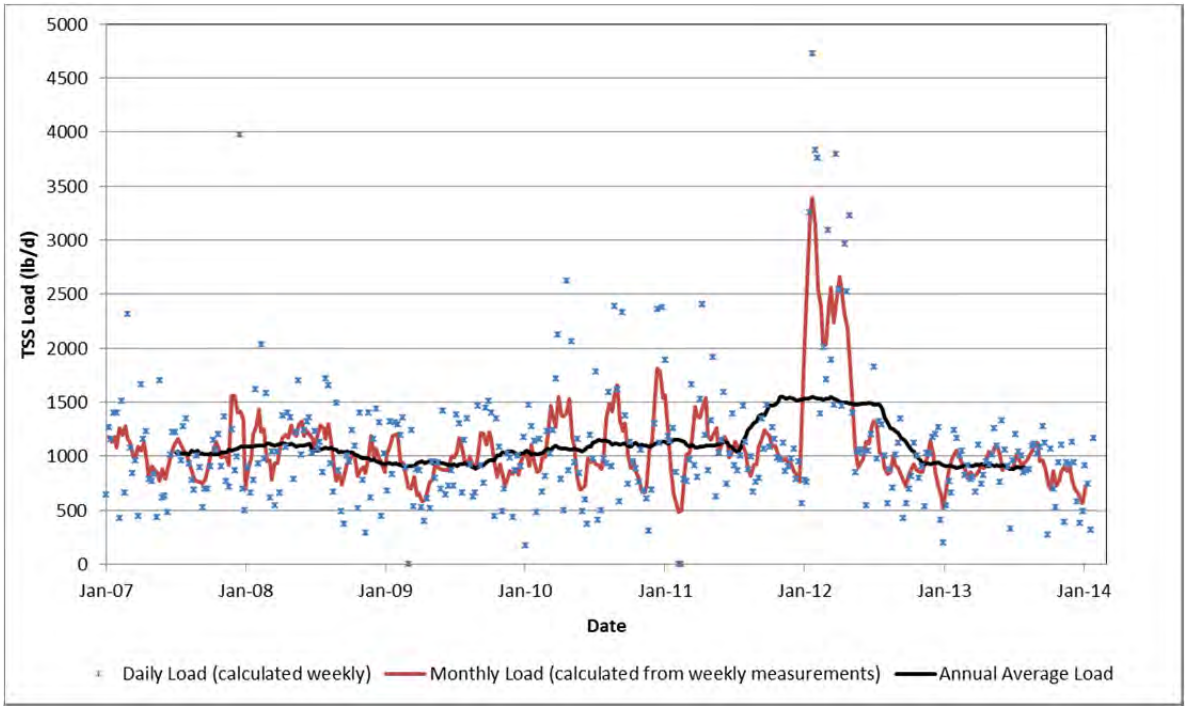

Figure 3-4
Influent TSS Loads

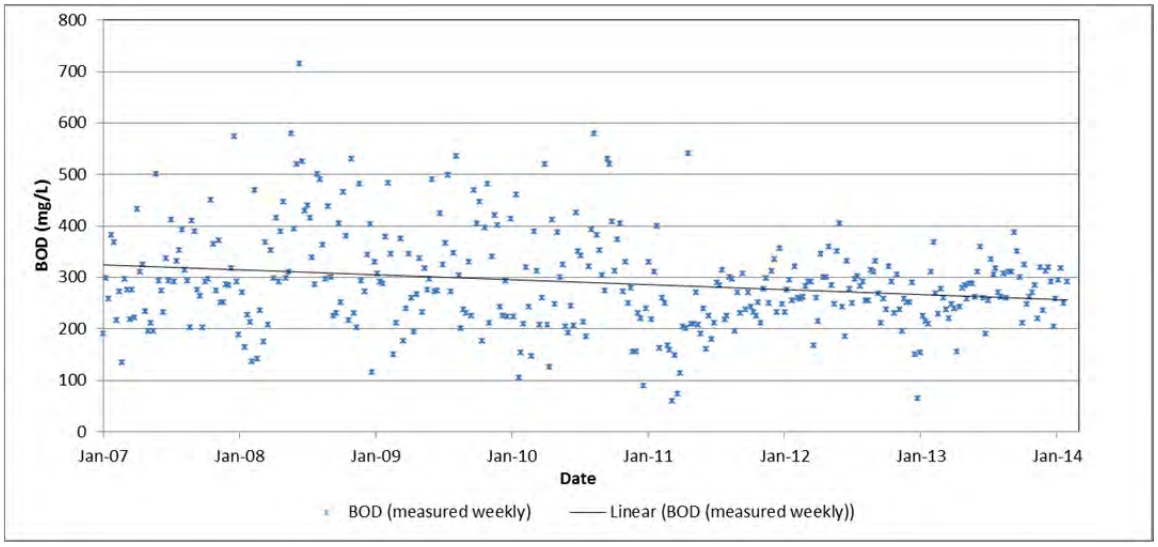

Figure 3-5
Influent BOD Concentrations

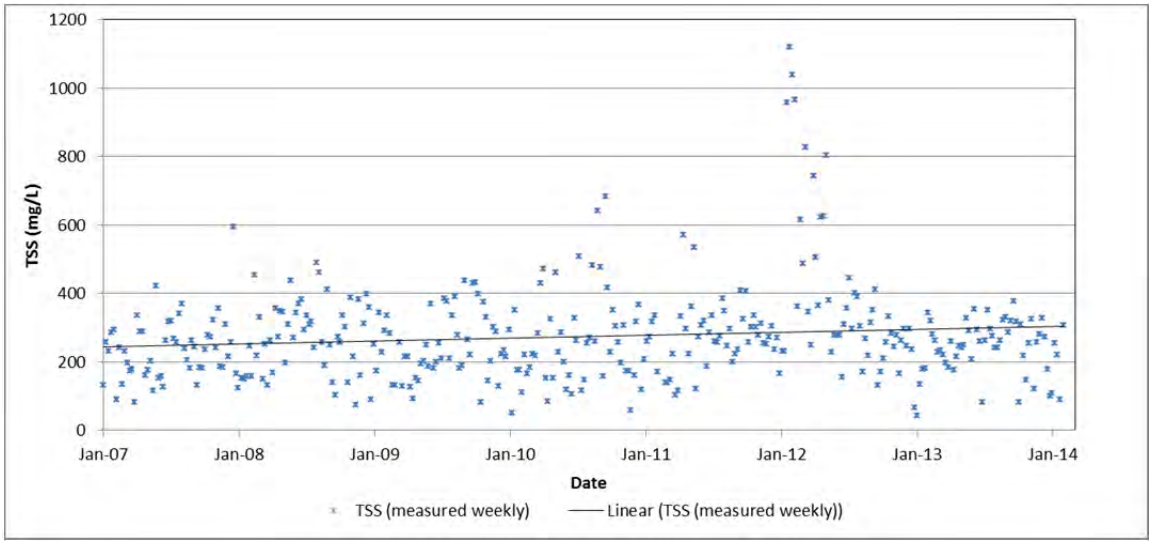

Figure 3-6
Influent TSS Concentrations

3.1.3 Nitrogen Loads

Because the City does not monitor influent ammonia nitrogen or TKN, influent TKN loads have to be estimated. Typical municipal wastewater TKN concentrations are approximately between 15 and 20 percent of BOD concentrations. Therefore, it is assumed that the influent TKN loads will be 17.5 percent of the influent BOD loads.

3.1.4 Wastewater Temperature

Effluent wastewater temperatures oscillate between 50 F (10 C) in the winter and 79 F (26 C) in the summer as shown in Figure 3-7. The minimum wastewater temperature is an important parameter in properly sizing secondary treatment processes. The recommended design minimum wastewater temperature is 10°C.

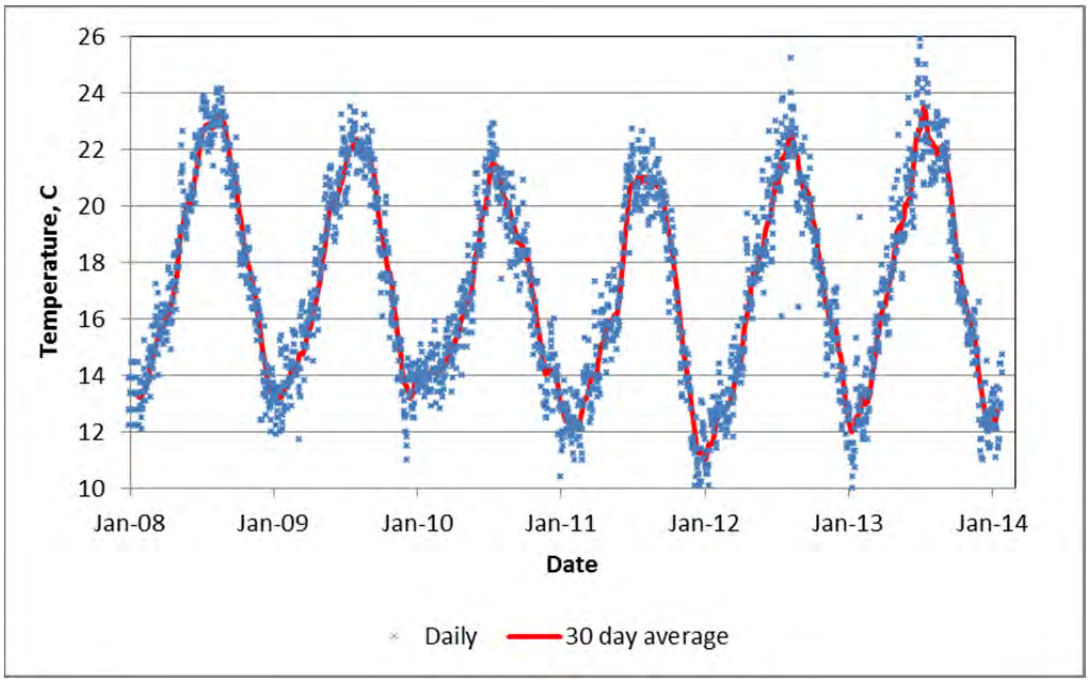

Figure 3-7
Effluent Temperature

3.2 ESTIMATE OF FUTURE FLOWS AND LOADS

The permitted capacity of the system is 0.71 Mgal/d on an average dry weather flow (ADWF) basis. However, this is based on the original design criteria, which assumed a lower BOD concentration than currently seen. The total BOD load the plant is designed to treat remains the same, 1,421 lbs/day, on an Annual Average Daily Load basis. With the current BOD load, assuming current water use practices continuing, the capacity of the existing plant is predicted to be about 0.55 Mgal/d. This is not a reduction in service capacity; it simply reflects that the organic loading of about 1,421 pounds per day on average would arrive at the plant with less water, but that all the same waste can be treated. The 0.55 Mgal/d flow rate is about 17% higher than the dry weather flow of approximately 0.47 Mgal/d currently being used for planning and design purposes. When the ultimate BOD load is conveyed to the plant for treatment, influent ADWF rates may vary depending on demographics and water conservation practices at the time.

Increases in peak flows due to I/I resulting from the new connections also must be projected. In this regard, it is presumed that any new sewer extensions and service laterals will be built to modern standards, with less I/I than older existing facilities. For these reasons, the amount of I/I added per unit of ADWF increase should be somewhat lower than the amount of I/I per unit of ADWF for existing users. Accordingly, it is subjectively assumed that the rate of increase in the I/I component of peak flows (the increment of flow above the ADWF) will be 75% of the rate of increase in ADWF. For example, if the ADWF was to increase by 50 percent, excess flows due to I/I would be projected to increase by 37.5 percent.

It is important to consider the ultimate loading conditions which the City's WWTF may experience when formulating plans and designing process improvements. Certain process components may be easily expanded to accommodate future planned growth. Others may not be so easily expandable. For example, concrete structures required to treat existing flows and loads will be very similar in size to those required to treat future flows and loads (1,421 lbs/day AAL). Therefore, this document will use as the basis for planning and design the capacity required to match the future conditions (matching capacity of the existing facilities), an efficient approach that avoids incurring undue costs and complexity to provide this incremental capacity in the future.

3.3 SUMMARY OF EXISTING AND FUTURE FLOWS AND LOADS

Based on the analysis presented above, existing and projected future flows and loads to be used in planning and design are summarized in Table 3-1.

Table 3-3
Existing and Future Flows and Loads

Parameter	Existing Conditions	Future (Capacity of Existing Facilities)
Influent Flow, Mgal/d		
Average Dry Weather Flow (ADWF)	0.47 (c)	0.55
Annual Average Flow (AAF)	0.55	0.64
Average Day Maximum Month Flow (ADMMF)	0.94	1.08
Peak Day Flow (PDF)	2.14	2.43
Peak Hour Wet Weather Flow (PHWWF)	3.20	3.63
Influent BOD Load and TSS Load, lb/d		
Annual Average Load (AAL)	1200 (d)	1421
Average Day Maximum Month Load (ADMML)	1800	2106
Peak Day Load (PDL)	2520	2949
Influent TKN Load, lb/d		
Annual Average Load (AAL)	210	246
Average Day Maximum Month Load (ADMML)	315	369
Peak Day Load (PDL)	441	516
Flow Peaking Factor		
AAF/ADWF	1.17	1.16
ADMMF / ADWF	2.00	1.96
PDF / ADWF	4.55	4.42
PHWWF / ADWF	6.81	6.60
BOD, TSS, and TKN Load Peaking Factor		
ADMML / AAL	1.50	1.50
PDL / AAL	2.10	2.10

(a) Excess flow = total flow - average dry weather flow.
(b) Increase in excess flow / Increase in ADWF = 0.75.
(c) 0.41+/- Mgal/d is the current ADWF, but because it is a historic low flow rate, for improvement planning it should be assumed that the current ADWF is 0.47 Mgal/d to avoid underserving the existing community due to natural variations in water use consumption over time.
(d) Similar to Note (c), current loads are lower (near 1,000 lb/d), but due to historic values being higher, it is recommended to assume loads could increase due to natural variations over time.

4.0 EXISTING FACILITIES

4.1 LOCATION

The City of Jackson is located in the Sierra Nevada Foothills in Amador County on the Highway 49 corridor at an elevation ranging from 1,200 to 1,600 feet. A vicinity map showing the location of the City of Jackson is provided in Figure 2-1.

4.2 HISTORY

The City of Jackson operates an advanced secondary treatment plant consisting of an oxidation ditch, secondary clarification, gravity sand filtration, gaseous chlorine disinfection, and gaseous sulfur dioxide dechlorintaion. The City discharges effluent to Jackson Creek which generally flows west into Lake Amador. The effluent is disinfected with chlorine and de-chlorinated prior to discharge to the creek. Figure 4-1 is an illustration of the existing Jackson WWTF site.

The existing plant is approximately 29 years old and in good condition generally. Prior to 1985, the City operated a pond plant in the same location. In this section, the existing plant components will be described in the context of:

- Design capacity (including approximate construction or renovation dates)
- Present condition
- Adequacy and suitability for continued use

4.2.1 Design Capacity

The existing WWTF was originally designed in 1984 with construction substantially completed in 1985. The design average annual BOD loading for ADWF for the existing WWTF was 1,421 lb/day. Based on the BOD concentration assumed in 1984, the design ADWF for the plant was 0.71 Mgal/d. Currently the ADWF into the plant is approximately 0.41 Mgal/d[2]. The existing plant is designed to hydraulically accommodate 3.5 Mgal/d of peak influent flow based on the original design criteria.

Note that the design capacity of the WWTF in 1985 was in accordance with the waste discharge requirements (WDRs) in place at the time. Current WDRs include the requirement to filter all secondary effluent flow without bypassing during peak flow events, which was not required when the WWTF was originally designed. Influent water quality and actual equipment performance have affected the capacity of the facility. As a result, the current capacity of the WWTF to filter (and by extension properly disinfect) is limited during high flow events. Actual existing and needed capacity will be assessed in greater detail in the Predesign Report for the Recommended Project.

[2] See flows and loads section (Section 3) and discussion of current average dry weather flow rates. 0.47 Mgal/d is recommended for planning and design as the current ADWF.

A site plan identifying the major components of the existing WWTF is presented in Figure 4-1 and a flow diagram is presented in Figure 4-2. Table 4-1 is a summary of the existing plant design criteria and the sections which follow provide a brief description of the facilities.

It should be noted that the capacities cited above, presented in table 4-1 and reflected in the current permit and are no longer exactly correct. Increased water efficiency and possible changes in demographics over time have changed the water quality and therefore the associated flow rate capacities of the wastewater treatment. The domestic wastewater, consisting of organic loading and water flow has shifted towards a more concentrated wastewater. This means that all the biological wastes for the facility, up to 1,200 pounds per day on an annual average basis are arriving at the plant as originally designed for, but with less liquid flow, and both parameters affect the rating of the plant. Therefore, while the facility can treat all the same community organic waste for which it was originally designed - same service capacity - it is currently, and may continue to do so at a reduced flow rate. The average dry weather flow capacity of the current plant is approximately 0.55 Mgal/d based on the current wastewater BOD concentrations, as opposed to the original 0.71 Mgal/d capacity, but both flow rates reflect the same capacity to serve the community's estimated 1,421 pounds per day of annual average of organic waste load per the original design criteria. This is discussed in the flows and loads section (Section 3) of this report. It should also be noted that the original design criteria cite average dry weather BOD loads, which are slightly less than average annual BOD loads cited above. Because BOD loads are reflective of human biological activity, they typically do not vary to the same degree as wastewater flows. Wastewater flows are subject to climatological variables and collection system conditions, including the influence of I/I, which do not typically affect BOD loads.

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City of Jackson
Wastewater Treatment Facility Improvements
Project Report

Figure 4-1
Existing Wastewater Treatment Facility

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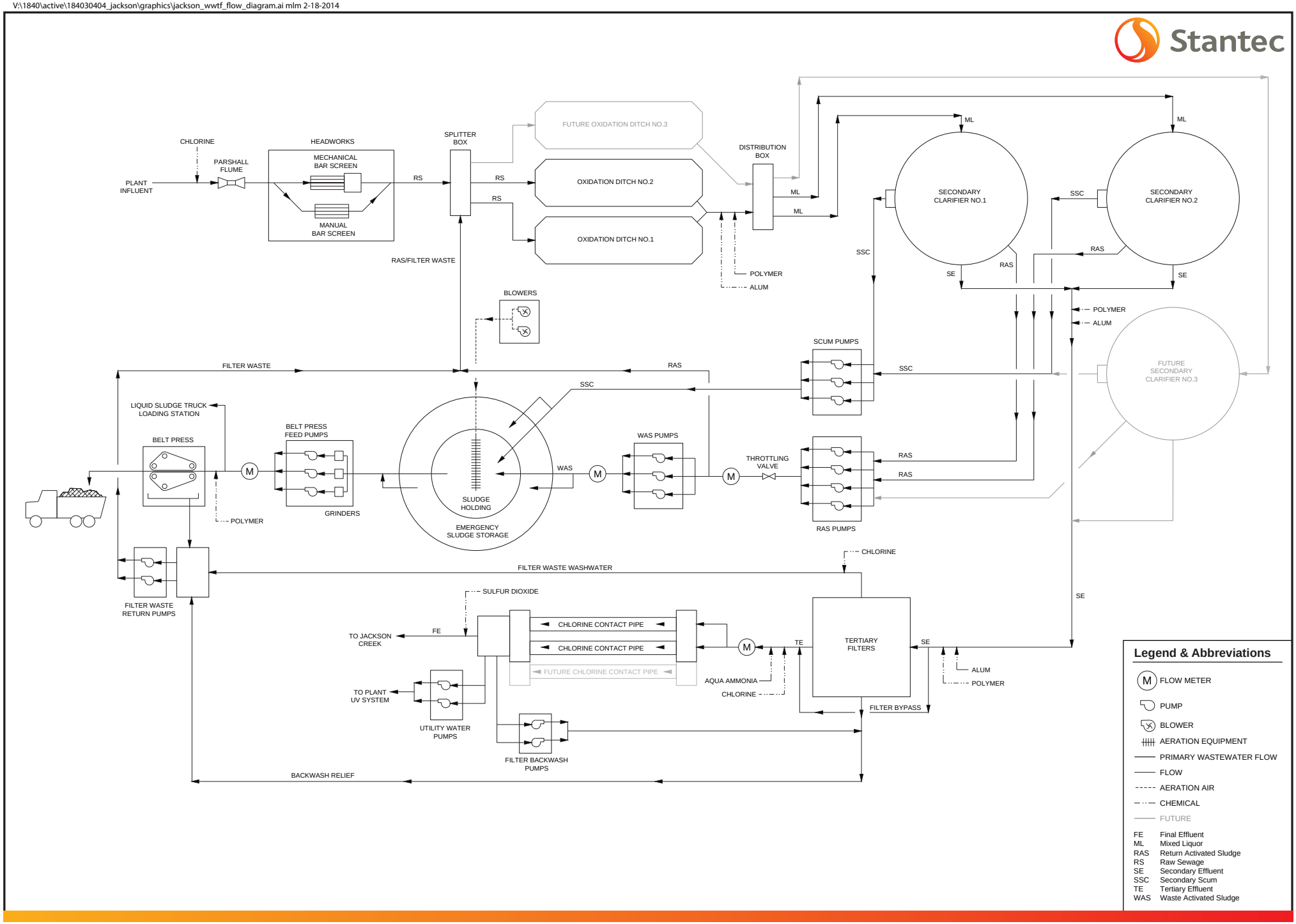


City of Jackson
Wastewater Treatment Facility Improvements
Project Report

Figure 4-2
Existing WWTF Flow Diagram

Table 4-1
Existing Treatment Plant Design Criteria

Item	
Influent Flow Measurement	
Number	1
Type	Parshall Flume
Capacity	
Minimum Flow	0.064 Mgal/d
Maximum Flow	5.75 Mgal/d
Date Installed	1984
Headworks	
Mechanical Screen	
Number	1
Mfr./Type	WesTech Cleanflo/FS15/Spiral
Capacity [(a)]	3.2
Screening Washer	Clean Wash Model CW250/400
Date Installed	2007
Bypass Bar Screen	
Number	1
Bar Spacing	1.0 in
Width	2.0 feet
Oxidation Ditch	
Number	2
Volume (Each)	394,000 gal
Sidewall Depth (Ave.)	10 feet
Length (Each)	182 feet
Width (Each)	30 feet
MCRT	25 days
MLSS (Ave.) [(b)]	4000 mg/L
MLSS (Max.) [(b)]	6000 mg/L
BOD Loading (ADWF)	710 lb/day
Date Installed	1984
Aeration	
Number (per basin)	2
Size	30 hp
Type	Brush
Oxygen Transfer (per basin)	2500 lb/day
Date Installed	1984

Table 4-1 (continued)
Existing Treatment Plant Design Criteria

Item	
Secondary Clarification	
Number	2
Diameter	50 feet
Sidewater Depth	12 feet
Overflow Rate (ADWF)	181 gpd/sq-ft
Overflow Rate (PWWF)	1000 gpd/sq-ft
Solids Loading Rate (PWWF)	46 lb/sq-ft/day
Date Installed	1984
RAS Pumps	
Number	2
Capacity	486
Type	Double disc
TDH	18
Motor size	10 hp
Date Installed	1999
WAS Pumps	
Number	2
Capacity [c]	~ 140 gpm
Head [c]	23 feet
Motor size	--
Date Installed	1984
Tertiary Filters	
Number of Cells	4
Area (each cell)	110 sq ft
Peak flow	
PWWF	2430 gpm
Backwash Return	370 gpm
Total	2800 gpm
Filtration Rate (one cell out of service)	8.48 gpm/sq ft
Backwash Rate	12 gpm/sq ft
Date Installed	1984
Backwash Pumps	
Number	2
Capacity	1460 gpm
TDH	15 feet
Motor Size	10 hp
Date Installed	1984

Table 4-1 (continued)
Existing Treatment Plant Design Criteria

Item	
Chlorination/Dechlorination	
Chlorinators	
Number	2
Capacity	500 lb/day
Ammonia Dosage	
Concentration, PWWF	5 mg/L
Quantity, PWWF	146 lb/day
Sulfonators	
Number	2
Capacity	250 lb/day
Chlorine Contact Pipes	
Number	2
Total Contact Time, PWWF	17 min
Pipe Diameter	54 in
Length (each pipe)	180 feet
L:W Ratio	40:1
Blowers	
Number	2
Capacity (each)	192 scfm
Pressure	5 psig
Motor Size	10 hp
Date Installed	1984
Sludge Dewatering	
Sludge Production	1150 lb/day
Concentration	1 %
Belt Press	
Number	1
Size	1.5 m
Hydraulic Loading (minimum)	85 gpm
Solids Loading (minimum)	430 lb/hr
Belt Press Feed Pumps	
Number	2
Type	Double disc
Capacity [c]	~ 140
TDH [c]	37
Motor Size	--
Date Installed	1999

Table 4-1 (continued)
Existing Treatment Plant Design Criteria

Item		
Utility Water System		
Utility Water Pumps		
	Number	2
	Capacity	280 gpm
	TDH	164 feet
	Motor Size	20 hp
Utility Water Booster Pumps		
	Number	2
	Capacity	70 gpm
	TDH	69 feet
	Motor Size	5 hp
Date Installed		1984

(a) Design capacity per August 2005 proposal prepared by WesTech.

(b) Operations are currently relying on both ditches in operation with an emphasis on nitrification/de-nitrification. MLSS (ave.) 2,500 mg/L, (max.) 3,000 mg/L.

(c) Capacity per plant operator and Penn Valley Pump Company, Inc. cut sheet. Engineer should confirm speed and motor size prior to any system design modification.

4.2.2 Influent Flow Measurement

Influent flow from the collection system is measured with a 9-inch Parshall flume with water level determined using an ultrasonic level sensor. The flume is designed to measure a flow range from 0.06 Mgal/d to 5.75 Mgal/d.

4.2.3 Headworks

The headworks consist of the Parshall flume, described above, followed by a mechanical screen and a manual by-pass bar screen. The mechanical screen is a relatively new (2006) spiral screen type unit with ¼-inch openings and a washer compactor. The manual screen has vertical openings 1-inch wide and must be cleared of debris manually with a rake. Both screens are located in 2-foot wide channels isolated by manual hydraulic gates.

4.2.4 Oxidation Ditches

The oxidation ditches consist of two race-track type, aerated ditches. They are each 30-feet wide, 10-feet deep and 182-feet long with an approximate volume of 394,000 gallons. They are aerated and mixed with two 30 horsepower brush aerators. Screened raw sewage enters at one end and exits over an adjustable weir on the opposite end. Recycled activated sludge from the secondary clarifiers is returned to the headworks and enters the oxidation ditches with the raw sewage. The design MCRT (mean cell residence time) is 25 days and the system capacity per the original design is to meet 2500 pounds per day of oxygen demand.

4.2.5 Secondary Clarifiers

The WWTF has two (2) 50-foot diameter circular secondary clarifiers. Oxidation ditch effluent flows to the clarifiers from a distribution box

4.2.6 Return Activated Sludge (RAS)/Waste Activated Sludge (WAS) Pump Station

The RAS/WAS pump station is located in the basement of the plant Operations Building. The three (3) RAS pumps are 10-hp, positive displacement pumps. The two (2) WAS pumps are 3-hp rotary lobe, positive displacement pumps. RAS is returned to the headworks and combined with screened influent sewage upstream of the oxidation ditch splitter box. WAS is lifted to the solids holding tank prior to being pumped up to the belt filter press located on the second floor of the Operations Building.

4.2.7 Tertiary Filters

The City's WWTF utilizes rapid sand filters constructed in 1985 which produce high quality filtered effluent very effectively under most flow conditions. During extreme high flows, (flows higher than 2.0 Mgal/d) the filters were originally designed to be bypassed resulting in a mixture of filtered and unfiltered secondary effluent being discharged to Jackson Creek contrary to effluent limitations contained in the most recent Order for the WWTF. This has been stopped. City operations staff removed the possibility of bypassing the filters to comply with the current Order. This presents a real risk that the filters will be overwhelmed at higher flows, not effectively removing solids, resulting in possible compromise of the disinfection system, or outright overflowing of the unfiltered, un-disinfected secondary effluent that could be discharged into Jackson Creek.

The filters are Hydroclear Rapid Sand Filters, consisting of four individual filter cells, each with 110 square feet of filtration area. The chlorine contact basin functions as the clear well for back-wash supply and a separate filter waste sump receives backwash waste. Table 3-2 is a summary of the operating conditions at different filter loading rates.

Table 4-2
Filter Capacity at Different Loading Rates

Parameter	From Filter Operations Manual (a)	Manufacturer Recommended Maximum	Manufacturer Recommended	Comments
Filter Loading Rate:	8.48 gpm/sf	5 gpm/sf	4 gpm/sf	
Filter Flow Rate:	2,798 gpm 4.0 Mgal/d	1,650 gpm 2.4 Mgal/d	1,320 gpm 1.9 Mgal/d	With 1 filter out of service or in backwash
Backwash Waste Return Rate:	370 gpm 0.5 Mgal/d	370 gpm 0.5 Mgal/d	370 gpm 0.5 Mgal/d	
Maximum Plant Influent Flow to Meet Filter Loading Rate with Return Flow:	3.5 Mgal/d	1.9 Mgal/d	1.4 Mgal/d	

(a) The value 8.48 gpm/sf is from the City's Operations Manual, which describes it as a "maximum rate that will rapidly consume the operating head resulting in short filter run times". This has been observed empirically. The 8.48 gpm/sf value with one filter out of service or in backwash is equivalent to 6.36 gpm/sf with all filters in service.

The 8.48 gpm/sf loading rate for the peak plant influent and backwash return flows is higher than the manufacturer's recommended loading rate of approximately 4 gpm/sf. This corresponds to the operators manual filter bypass of plant flow greater than about 2 Mgal/d, which brings the filter loading rate to approximately 4.2 gpm/sf.

In addition to the overall loading concerns, the filters have experienced operational difficulties from time to time. Technical Memorandum No. 1 (TM No. 1), prepared by ECO:LOGIC Engineering (now Stantec) and dated April 28, 2010 provides a detailed evaluation of the filters in addition to describing loading concerns. This memo is included in Appendix A of this report. Some of the operational problems associated with the rapid sand filters have reportedly been resolved by City staff with an overhaul completed in December 2011, which incorporated suggestions contained in TM No. 1. Those filter problems not yet implemented are described in the alternatives considered section of this report along with recommendations to address filter capacity limitations.

4.2.8 Disinfection

The City's effluent disinfection system is currently configured to deliver chlorine downstream of the rapid sand filters. One ton gaseous chlorine cylinders are stored in the Chlorine Storage Building. Effluent from the filters is discharged to two large diameter (54-inch) buried concrete pipes which provide contact time prior to de-chlorination with sulfur dioxide (also in gaseous form) prior to discharge to Jackson Creek. No static or mechanical mixing of the chlorine is currently provided.

As described in subsequent sections of this report, the recommended project alternative will replace the existing chlorine disinfection process with UV disinfection. This has to do with effluent limitations contained in the new order for disinfection by-products. At times Jackson Creek will not provide sufficient dilution for these common disinfection by-products. Therefore alternative disinfection processes must be evaluated.

With the change to UV disinfection with the Recommended Project alternative, a new influent or effluent storage facility is recommended. This is because while chlorine can still be effective for disinfection if there is a treatment process or filtration upset, UV disinfection is very sensitive to the effectiveness of the up-stream treatment. In particular UV is sensitive to the turbitity of the water being disinfected. Optimum effluent turbidity is 2NTU or less. If process upsets occur which prevent effluent turbidity from being equal to or better than 2NTU, the UV disinfection process may not effectively de-activate virus and bacteria found in the wastewater. As such, it may be important to have an emergency storage option to provide system robustness and flexibility to prevent the discharge of inadequately disinfected wastewater.

4.2.9 Solids Dewatering and Sludge Management Practices

The City's solids handling facilities are located on the second floor of the Operations Building. WAS is pumped from the basement of the building to the aerated sludge holding tank. Sludge from the holding tank is then pumped to the second floor of the Operations Building where a 1.5 meter belt press is located. Pumping from the sludge holding tank is accomplished by the belt press feed pumps located in the same room as the RAS/WAS pump station. The two (2) belt press feed pumps are 3-hp rotary lobe, positive displacement pumps. The belt press dewaters the sludge and the dewatered material is dropped into trailers located on the ground floor below. The dewatered solids are currently taken off-site to the Potrero Hills Landfill, Inc. facility in Suisun, CA.

The current belt filter press is not adequate to meet current landfill requirements for solids disposal. Replacing this facility with more efficient dewatering equipment is described as part of the Recommended Project Alternative.

4.2.10 Chemical Feed Facilities

Chemical feed facilities at the WWTF are currently limited to sodium hydroxide for effluent pH control, chlorine used for effluent disinfection, and sulfur dioxide used for de-chlorination. However, two projects in-progress now include 1) the addition magnesium hydroxide for alkalinity and pH adjustment in the treatment process and 2) polymer addition for filter augmentation.

4.2.11 Effluent Disposal

Disposal of treated effluent is via year-round surface water discharge to Jackson Creek. Figure 4-1shows the approximate discharge point from the city of Jackson WWTF into Jackson Creek. The current outfall is located on the north bank of Jackson Creek. Effluent discharges from a 16-inch diameter pipe onto a small concrete slab. There is currently no effluent diffuser on the City's outfall pipe.

Effluent flow is measured using a V-notch weir and an ultrasonic level sensor just prior to discharge.

4.2.12 Electrical, Instrumentation and SCADA

The WWTF electrical system has not been upgraded since the WWTF was constructed in 1985 and the City is operating using the controls system installed at that time. Control is provided locally for certain equipment, such as the recently upgraded headworks screen.

Instrumentation at the WWTF is limited to portable dissolved oxygen and pH probes, influent and effluent flow meters, a continuous chlorine residual analyzer and a continuous turbidimeter.

While controls and instrumentation are currently limited, the City has a SCADA and instrumentation improvement project under way at this time. This project will install permanent dissolved oxygen and pH sensors in the oxidation ditches and provide for remote monitoring and data logging of that equipment and other existing equipment at the plant. The SCADA system provided with this project will be expandable to be compatible with the Recommended Project described elsewhere in this report.

4.2.13 Operations and Laboratory Building

The main electrical service of the WWTF, the laboratory and the solids handing facilities (RAS/WAS pumping and sludge dewatering facilities) are located in the existing Operations and Laboratory Building. Office space for the operations staff is also included in this building.

4.3 PRESENT CONDITION

The existing WWTF equipment and facilities are in generally good condition. Certain process modifications were recently proposed by the City in response to exceedances of effluent limitations and administrative civil liabilities issued by the Regional Water Board. These modifications can be described as falling within the following three primary categories:

- Improvements to the aeration process in the oxidation ditches – add instrumentation and SCADA monitoring.
- Improvements to the pH control system – new magnesium hydroxide feed system.
- Improvements to the tertiary filters – add pre-filter coagulation facilities.

If possible, chemical storage and process tanks should be taken down for maintenance prior to designing any improvements to the WWTF. Condition of these facilities including structural integrity and coating systems should be analyzed by qualified personnel. If any serious deficiencies are identified, it is recommended these be incorporated into the project construction documents and addressed.

4.4 ADEQUACY AND SUITABILITY FOR CONTINUED USE

There is no indication that the existing facilities are inadequate or unsuitable for continued use. Unless a more rigorous evaluation of facility structures (as suggested in Section 4.3) identifies significant problems, the existing facility components will be kept in service and continue to function much as they do currently, except as described in the Alternatives Considered Section of this report.

4.5 FINANCIAL STATUS OF EXISTING FACILITIES

The City currently provides wastewater service to 1,460 accounts (2,195 units) and approximately 264 non-residential accounts. Table 5-1 shows the current monthly charges as adopted December 8, 2014, following the Proposition 218 process. These charges were established to accommodate the Recommended Project, as described in this report.

Table 4-3
Existing Monthly Wastewater Rates

	Monthly Rate
Residential (1)	$36.61 per EDU (2)
Commercial (3)	$25.58 to $905.33 per account, Plus $2.16 to $6.88 per HCF (4)

(1) Rates presented for the 2014-2015 fiscal year; rates will increase annually to $57.05 in 2018-2019, as presented in the City of Jackson Sewer Rate Study, August 2014.
(2) EDU is an equivalent dwelling unit, equal to a single family unit.
(3) Commercial costs vary based on water usage and wastewater strength. There are seven commercial group categories in the City commercial wastewater rate structure.
(4) HCF represents "hundred cubic feet" of water used.

The median household income (MHI) of Jackson residents is estimated by the State Water Board to be $44,386. At this time, the City has a small existing debt of $9,775 annually, related wastewater facilities.

4.6 RECENT WATER/ENERGY/WASTE AUDITS

There are no recent water, energy or waste audits associated with the City's wastewater infrastructure.

5.0 INFLOW AND INFILTRATION EVALUATION

The I/I analysis described and results presented in this section were developed based on analytical work completed in 2012, with WWTF influent data from 2007 through 2011. Subsequent to this analysis the City determined that it was most appropriate to utilize the precipitation records from their WWTF as opposed to the Camp Pardee station, which is referenced here. The WWTF precipitation data will be incorporated into the final version of this report, but its inclusion is not anticipated to materially change the results presented herein.

This section will present the results of an evaluation of WWTF influent flow records and findings relative to per capita flows to determine if excessive I/I is occurring as defined by the State Water Board, Division of Financial Assistance (DFA), Clean Water State Revolving Fund (CWSRF). Figure 5-1 is an illustration of the City's existing collection system.

5.1 EXCESSIVE I/I DEFINED

The CWSRF policy (amended March 2009) states the following:

> "If the average daily flow during periods of sustained high groundwater is less than 120 gallons per capita per day (gpcd), a Sewer System Evaluation Survey (SSES) is not required. If it is above 120 gpcd, the applicant must perform a SSES to determine whether it is cost-effective to treat or correct the I/I. If an SSES is not submitted, funding will be based on a maximum flow rate of 120 gpcd. If the peak flow during a storm event (highest three-hour average) exceeds 275 gpcd, a SSES must be completed or funding will be based on a maximum peak flow rate of 275 gpcd. Cost-effective corrections under these criteria are eligible for funding."

The current CWSRF policy (May 2013) no longer includes this explicit language regarding I/I. However the Financial Assistance Application Technical Package references the need for an I/I evaluation. The language contained in the suggested content for publicly-owned treatment works projects indicates that an evaluation of excessive infiltration/inflow (I/I) to the system is required (Item II J, Attachment T1, Technical Package).

5.2 METHODOLOGY

To perform an assessment of the magnitude of I/I in the City's collection system, Stantec utilized daily influent flow data from the City's WWTF monitoring records for the period January 2007 through December 2011.

In evaluating I/I in the City's system, Stantec utilized the standard described in the U.S. EPA publication, *I/I Analysis and Project Certification*. This standard is the same as the CWSRF policy described above. The approach is intended to identify whether a system has excessive I/I or not, but also to determine whether a community's system is more impacted by inflow or infiltration.

The approaches to assessing the magnitude of I/I in a wastewater system inherently require the application of engineering experience and judgment. Accepted standards or industry norms alone do not lend themselves to determining the best approach to managing wastewater for a particular system. Site specific environmental, community and facility conditions must always be taken into consideration.

5.3 ANALYSIS

A summary of the results of influent flow data analysis are provided in this section. Two time periods exhibiting elevated influent flow were identified using the WWTF data provided by the City. These included periods in February/March 2007 and February/March 2009. The circumstances in the 2007 case were such that this data is well suited to assess inflow, while the 2009 data were considered reasonably well suited for assessing system infiltration.

In each instance, daily flow exceeded 0.6 Mgal/d for a number of days after precipitation began and the eventual peak daily flow exceeded 1.3 Mgal/d (in the February 2007 case the peak exceeded 1.4 Mgal/d) before gradually dropping below 0.6 Mgal/d. The average dry weather flow (ADWF) at the WWTF was approximately 0.47 Mgal/d at the time. The daily influent flows for the two events of interest are presented in Appendix B.

5.3.1 Precipitation and Influent Flow

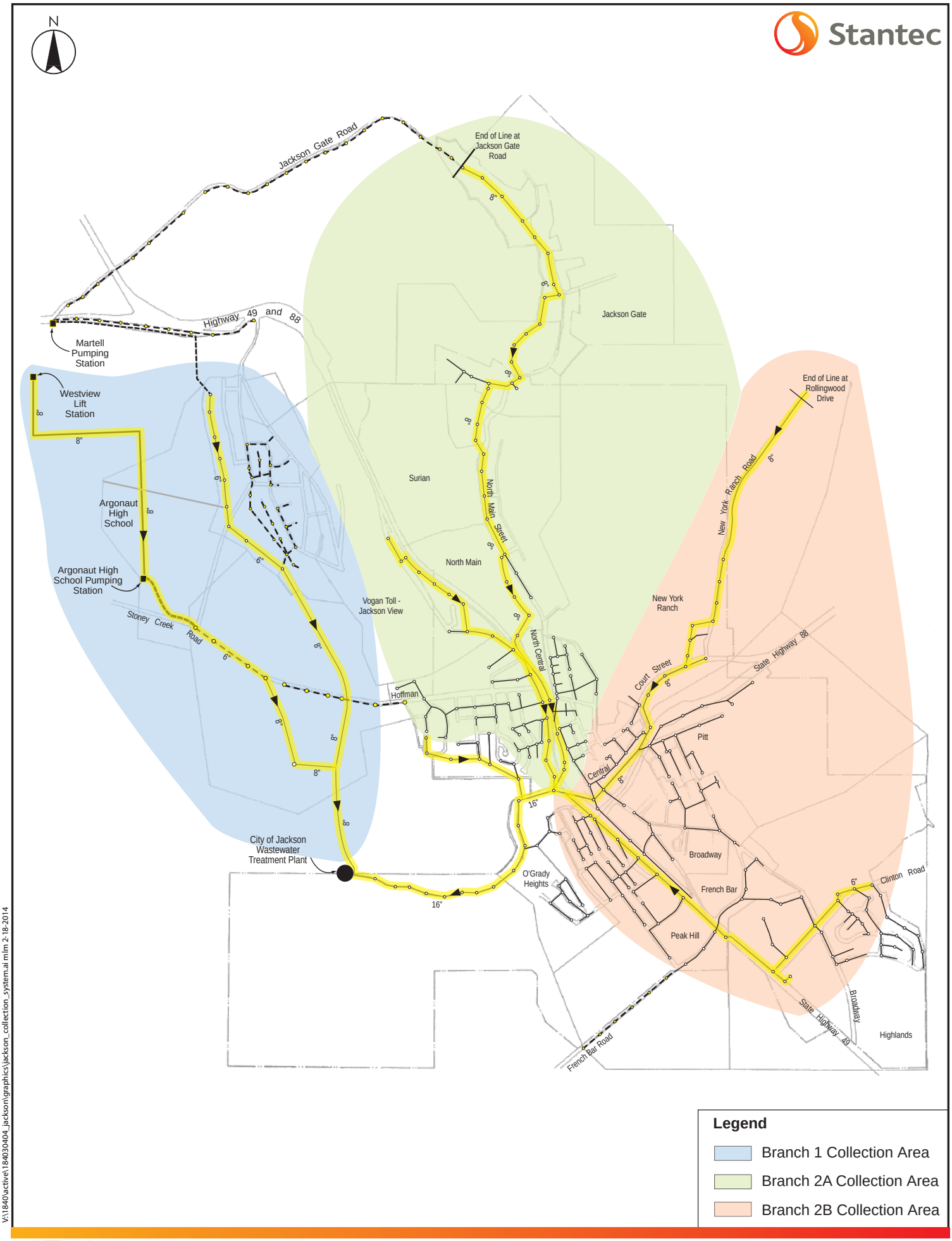
Precipitation data for the WWTF was provided by City staff using a local rain gauge.

Precipitation for the period February 1, 2007 through March 7, 2007 totaled 7.9 inches. Conditions in January 2007 were dry proceeding February 7, 2007, the first date of recorded precipitation in this period. The last recorded precipitation prior to this date was January 4. Total rainfall for January 2007 is reported to have been approximately 1.35 inches. Average rainfall in January and February is reported as 4.23 inches and 4.10 inches respectively at the WWTF.

Precipitation for the period February 1, 2009 through March 9, 2009 was preceded by a January in which 3.55 inches were reported at the WWTF with the last reported rainfall occurring on January 24. Total precipitation for the February 1 through March 9 period was approximately 9.3 inches.

Precipitation data for February/March 2007 and February/March 2009 just preceding and during the periods of elevated influent flow are presented in Appendix B. Plots of daily influent flow and Jackson WWTF precipitation are presented in Figures 5-2 and 5-3.

The 2007 precipitation data reflects two discrete periods of rainfall preceded by and separated by at least seven days with no reported rainfall. The February/March 2009 precipitation data are more reflective of storm events which occurred with at most three days with no reported rainfall separating them. These different rainfall patterns lend themselves well to the EPA guidance in that the 2007 data provide a relatively dry period presumably allowing groundwater in the Jackson vicinity to drop prior to each event which provides an opportunity to assess inflow impacts to the system. The 2009 data provide a period of extended rainfall with little separation between storms which may allow an assessment of infiltration during a period when groundwater elevations may be elevated.



V:\1840\active\184030404_jackson\graphics\jackson_collection_system.ai m\m 2-18-2014

City of Jackson
Wastewater Treatment Facility Improvements
Project Report

Figure 5-1
City of Jackson Collection System

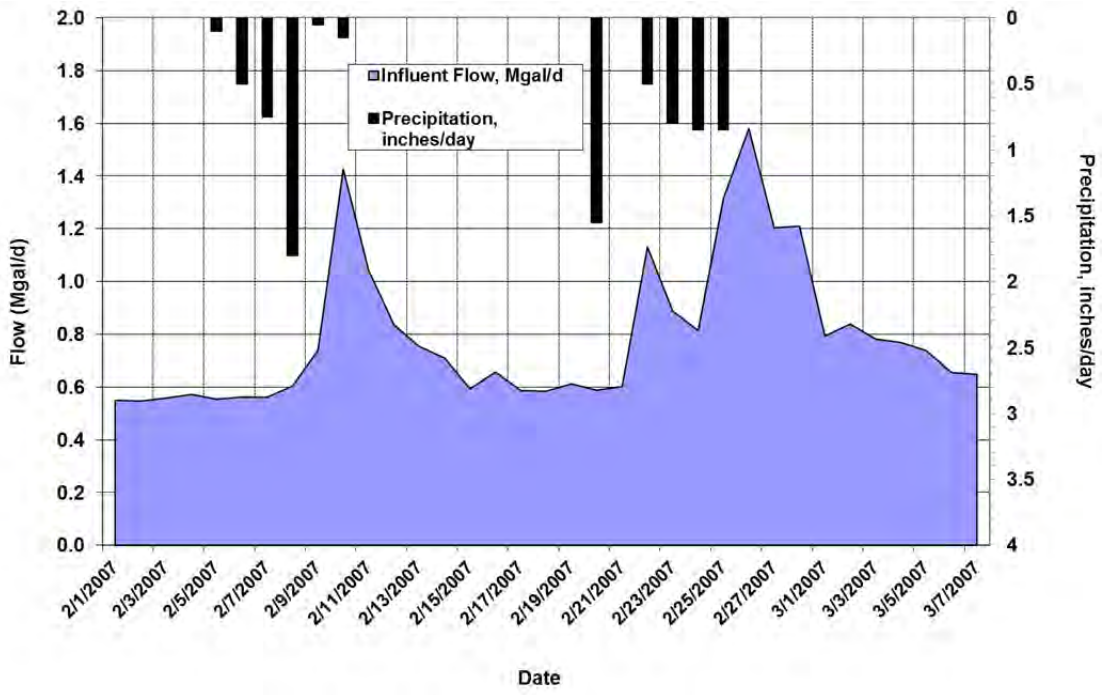


Figure 5-2
Jackson WWTF Influent Flow & Precipitation 2007

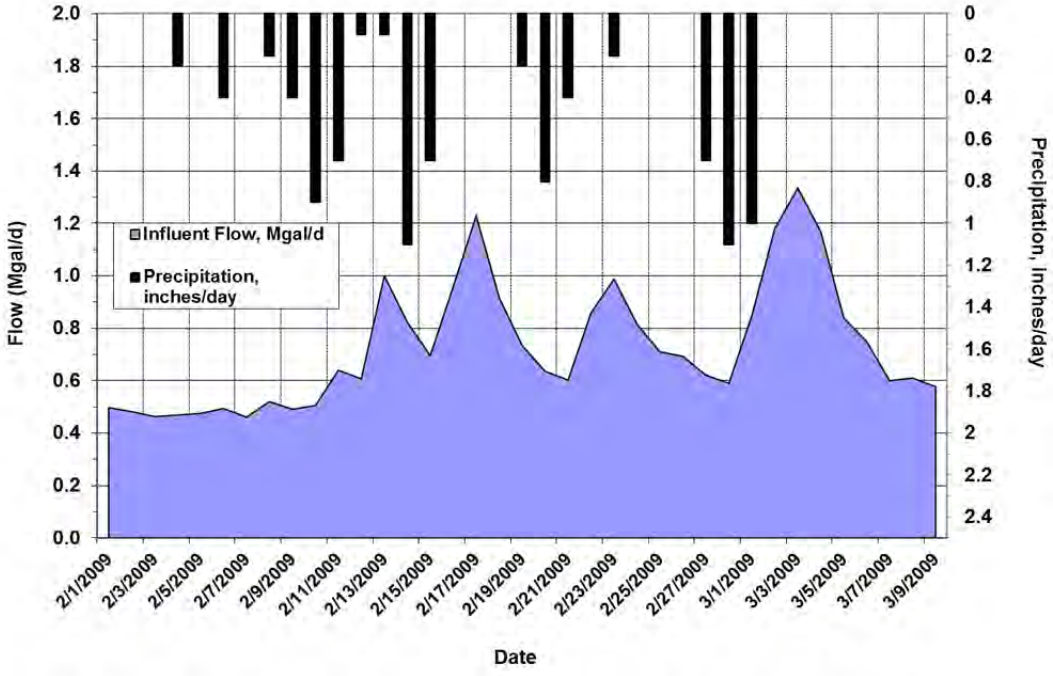


Figure 5-3
Jackson WWTF Influent Flow & Precipitation 2009

The February 2007 data indicates that increases in influent flow lag rain events only slightly. The February/March 2009 data appears to show a similar response pattern with elevated flows into the WWTF between events beginning on approximately February 10 and continuing through approximately March 9. As with the 2007 data, the 2009 data indicates significant response in influent flow to more intense rain events with a relatively rapid drop in flow as precipitation tapers off, or ceases altogether.

The 2007 and 2009 patterns both suggest a system that may have a higher proportion of total I/I occurring due to inflow. This is based on the very sharp response in influent flow to precipitation events illustrated in Figures 5-2 and 5-3.

It should be noted that the findings of this limited analysis reveal what is a commonly reported situation in communities throughout the western slope of the Sierra foothills. Infiltration due to elevated groundwater is not typically a significant concern. The fractured rock and soils unique to this area, as well as the topography, generally lend themselves to quickly conveying precipitation run off to stream courses and there is a general lack of sustained shallow groundwater underlying the region. The infiltration pattern in the 2009 Jackson data is likely a result of rainfall responsive infiltration into the system, which in some respects behaves more similarly to inflow in its effect on WWTF influent flow, unlike valley locations where shallow groundwater can create a significant concern as a longer duration source of I/I.

5.3.2 U.S. EPA Criteria & Excessive I/I

The U.S. EPA has established specific per capita flow criteria for use in determining whether a collection system is experiencing excessive I/I. There are two established criteria. During periods of dry weather, but seasonal high groundwater, if flows (highest average daily flow recorded over a 7 to 14 day dry period with seasonal high groundwater) are less than 120 gpcd, the amount of infiltration into the system is considered non-excessive. During wet conditions when seasonal groundwater is high, if flows are less than 275 gpcd, inflow into the system is considered non-excessive.

During the February 2007 period, daily flows reached approximately 1.4 Mgal/d. This correlates to a 321 gpcd flow when divided by the population estimate for the City's sewer service area at the time of 4,361 (CA DOF, 2007). This supports the finding based on interpretation of graphical data in Figure 5-2 that the City's system experiences some degree of excessive infiltration, although this flow is only slightly higher than the EPA and CWSRF criteria of 275 gpcd.

Similarly, daily flow during the somewhat wet periods of February and March 2009 reached 1.3 Mgal/d. This correlates to a per capita flow of 322 gpcd when divided by the population estimate for the City's sewer service at the time of 4,034 (CA DOF, 2009).

The results of this analysis indicate that the City's sewer system has experienced excessive I/I recently. As measured against the EPA criteria, inflow appears to be a greater contributing factor in this system than infiltration.

5.4 FINDINGS

Based on the results of the I/I evaluation conducted by Stantec, it is apparent that the City of Jackson wastewater system experiences some level of I/I which is excessive. The results of the analysis of precipitation and influent flow data suggest the City's system is likely to be experiencing sufficient inflow to warrant further investigation. Assessment of WWTF influent flows relative to the CWSRF and EPA per capita flow criteria suggest infiltration may be excessive as well.

As a result of these findings, it is suggested the City develop a plan and schedule to address I/I in their system. The implications of these findings relative to CWSRF policy and funding specific to the City's proposed WWTF and effluent disposal improvements are discussed in Chapter 8 of this Facility Plan.

6.0 NEED FOR PROJECT

The City owns and operates a wastewater treatment plant serving the needs of the people and businesses located in the City. Treated effluent from this WWTF is discharged year-round to Jackson Creek, a water of the United States. This discharge is regulated by State and Federal laws administered by the Regional Water Board through the issuance and regular renewal (including amendments) of Waste Discharge Requirements, aka "Orders".

6.1 HEALTH, SANITATION, SECURITY AND REGULATORY COMPLIANCE

Project Need

The City's need for a wastewater treatment and disposal project was originally created by Waste Discharge Requirements adopted by the Regional Water Board in 2007 in Order No. R5-2007-0133 (2007 Order). These requirements affected the quantity of City effluent that can be discharged to Jackson Creek (relative to the accumulated percentage of effluent in Lake Amador, a downstream reservoir serving as a source of water for a public water supply), and the quality of City effluent that can be discharged to Jackson Creek (based on what was known about Jackson Creek and the effluent discharge in 2007). Specifics of these requirements included:

- By 25 October 2012, the City is prohibited from discharging effluent to Jackson Creek in amounts that cause Lake Amador to contain more than five percent effluent on a volume basis. The basis for compliance determination is limiting the volume of effluent discharged to Jackson Creek in any given month such that the resultant percent effluent in Lake Amador does not exceed five percent.
- New effluent limitations for copper, zinc, dichlorobromomethane (DCBM), and ammonia.

The 2007 Order requirements defined the project need in the ensuing years, including the project descriptions provided in the City's Final Environmental Impact Report (EIR) for the project (February 2013). However, the City has since received new Waste Discharge Requirements adopted by the Regional Water Board in December 2013 in Order No. R5-2013-0146 (Order). This new Order modified the requirement for calculating the five percent effluent limit in Lake Amador to consider a harmonic annual mean, as opposed to the monthly average in the 2007 Order. This eliminates the necessity for the City to remove effluent from the creek to comply with this requirement and therefore changes the recommended alternative as presented in the EIR. Specifics of the new Order requirements include:

- The City is prohibited from discharging effluent to Jackson Creek in amounts that cause Lake Amador to contain more than five percent effluent on a volume basis. The basis for compliance will be determined in December of each year from the harmonic mean of annual inflows into Lake Amador, excluding effluent discharged to Jackson Creek, and using the current year's average dry weather flow (ADWF) discharged to Jackson Creek to estimate the percentage effluent in Lake Amador. The annual inflows into Lake Amador, excluding effluent discharged to Jackson Creek, will be comprised of upstream Jackson Creek flow, estimated runoff into Lake Amador, rainfall into Lake Amador, and Lake Pardee water transferred into Lake Amador.

- There are new effluent limitations for BOD, TSS, copper, zinc, dichlorobromomethane, chlorodibromomethane, ammonia, nitrate and THM.

Additionally, historical compliance problems with effluent limitations on turbidity and coliform need to be addressed as part of this compliance project. These compliance issues were identified in a series of Administrative Civil Liability (ACL) Orders issued by the Regional Water Board over the past several years. These included a number of violations of effluent limitations for:

- Ammonia
- Copper
- Cyanide
- Zinc
- Nitrate
- Dichlorobromomethane
- Aluminum
- Total Coliform Organisms
- Turbidity

A series of these ACL Orders were combined and the Regional Water Board issued a comprehensive ACL Order No. R5-2012-0560. In parallel with this administrative effort, the Regional Water Board adopted a Time Schedule Order (TSO) which set forth a compliance schedule for each of the constituents listed in the ACL Order No. R5-2012-0560.

In March 2011, the Regional Water Board adopted TSO R5-2011-0909. That TSO includes interim effluent limits for aluminum, ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, turbidity, and zinc, as well as a compliance schedule for the City to meet final effluent limits for each.

In addition, TSO R5-2013-0147, adopted in December 2013 at the same time as the Order, includes interim effluent limits, final effluent limits, and a compliance schedule for Chlorodibromomethane and Total Trihalomethanes. The deadline for compliance with final effluent limitations is March 1, 2018. The City's compliance strategy for these constituents involves replacing their existing chlorine disinfection system with a UV disinfection system.

Currently, the City is completing the steps identified in TSO R5-2011-0909 and ACL R5-2012-0560 including improvements to WWTF processes which are expected to bring the City into final compliance by March 1, 2015 with final effluent limits for ammonia and zinc.

After the treatment plant improvements are complete (required by December 2014), there will remain potential for the City to violate effluent limits for certain constituents covered by TSO R5-2011-0909 (now (R5-2011-0909-02, as amended by the Regional Water Board) including:

- Copper
- Cyanide
- Dichlorobromomethane
- Nitrate
- Total Coliform Organisms
- Turbidity

The City has determined a compliance strategy to address each of the foregoing, portions of which are in varying stages of completion.

Copper: Treatment to remove copper at levels measured in single digits of parts per billion is not practical. But, EPA regulations allow for establishment of site specific water quality objectives which can serve as a basis for recalculated effluent limitations for copper. This requires a Water Effect Ratio (WER) Study to be conducted to establish a site specific water quality objective for copper in Jackson Creek. The City is proceeding with a WER study for copper.

Cyanide: The new Order allows the City to propose alternative methods for sample preservation and analysis for cyanide. It is expected that the Regional Water Board's recent approval of the use of unpreserved samples of City effluent will eliminate cyanide (a potential contaminant from the sample preservation process) as a constituent of concern in the City's effluent. In addition, WWTF improvements proposed to address concerns with disinfection by-products will be expected to further reduce the risk of cyanide generation in the WWTF disinfection process contributing to reasonable potential for water quality objectives in Jackson Creek, namely, conversion to UV disinfection.

Dichlorobromomethane, Nitrate, Total Coliform Organisms, and Turbidity: These four constituents will continue to pose a threat of effluent limitation exceedence after WWTF improvements are completed in 2014. This is due to a number of factors, which are summarized in Table 6-1.

Table 6-1
Effluent Limitation Exceedance

Constituent	Reason for Concern	Solution
Dichlorobromomethane	Chlorination DBP	Alternative Disinfection (UV)
Nitrate	Simultaneous Nitrification-Denitrification Process Stability	Anoxic Basins
Total Coliform Organisms / Turbidity	Filter capacity / Effectiveness	Capacity for anticipated High Flows and provide for chemical addition to allow that removal to be more effective

Project Benefits

The primary benefits of the project are:

1. Increase water quality in Lake Amador.
2. Increase water quality in Jackson Creek.
3. Compliance with Regional Water Board Basin Plan, and adopted Orders.

Project Objectives

The over-riding objective of the project is to provide an improved wastewater treatment plant and effluent disposal system to meet the existing needs of the City of Jackson, and to the extent reasonable, the future needs of the City of Jackson within the limits of the permitted capacity of the existing WWTF. To achieve this overall objective requires the planning, design, construction, and operation/maintenance of various WWTF improvements that are cost-effective and minimize impacts to rate payers, while complying with the intent of the latest Order and anticipated requirements in future Orders. Specific project objectives include:

1. Reducing the potential toxicity of the effluent discharge to aquatic life in Jackson Creek.
2. Improving the City's wastewater effluent quality and disposal method in a manner that protects the existing beneficial uses of Jackson Creek and Lake Amador to the maximum extent reasonable.

In the City's efforts to achieve these objectives, public involvement is an important aspect of the overall improvement plan so that City residents and businesses know what the City is doing with their wastewater, why, and how the City intends to 1) protect public health and the environment, 2) comply with pertinent laws and regulations, and 3) protect the value of properties served by the wastewater utility.

6.2 AGING INFRASTRUCTURE

The existing WWTF was constructed in 1985 and has been in continuous operation for almost 29 years. While some of the facilities are aged and in need of improvements, the majority of the plant is in good condition and has been well maintained. Components of the plant that can be upgraded are primarily limited to controls, which can be modernized to provide improved automation, alarming and operational flexibility. Some of these improvements have already been initiated by the City to install new instrumentation and develop a WWTF SCADA system. Other improvements that should be included in this project are identified in the Present Condition section of this Report and include:

- Improvements to the aeration process in the oxidation ditches. This relates to improved dissolved oxygen monitoring (SCADA) and supplemental aeration capacity and control. This need is not so much a deficiency due to aged infrastructure as it is a new need driven by more stringent permit standards than the original treatment plant needed to meet. This is an improvement underway currently to address compliance with Final ammonia effluent limitations in the order as directed by TSO R5-2011-0909-02.

- Improvements to the chlorination process to enhance disinfection would be warranted if the chlorination were to remain the primary means of disinfection, but this is not required because this project proposes to switch to UV disinfection.
- Improvements to the tertiary filters to address operational difficulties and provide additional peak flow capacity in order to come into compliance with current waste discharge requirements. This need is also driven by more stringent treatment standards that have evolved over time requiring filtration of all flows with no bypassing of peak flows. The operational difficulties will be remedied with the proposed project which will include a new control panel and PLC.
- Chemical storage tanks may require new coating systems or replacement. These systems will be evaluated during detailed design and provided with the proposed project as needed.

The main process structures and buildings all appear to be in sound condition and there is no indication that these facilities are unsuitable for continued use.

6.3 REASONABLE GROWTH

The flows and loads section of this report cites the current permitted capacity of the plant at 0.71 Mgal/d ADWF, treating 1,421 pounds per day of BOD. However, based on changed demographics or water conservation, the current wastewater strength has increased and the plant capacity, in terms of flow, will be about 0.55 Mgal/d serving the same BOD load. Comparing current flows and loads to the flows and loads anticipated at capacity of the existing facility indicates that there is approximately 17% growth potential remaining at the WWTF, relative to BOD loading (lb/d).

Table 2-3 provides population projections based on the California 2010 census. This indicates that the 17% of available capacity at the WWTF could be consumed in about 10 years. However, empirical observations of City planning and growth rates indicate that it could take longer to consume the available capacity, perhaps 30 years or more.

7.0 ALTERNATIVES CONSIDERED

The City has considered many alternatives for providing wastewater treatment and disposal to maximize compliance with the Basin Plan, Order requirements, Department of Public Health guidance, Water Rights and City service needs over many years. Several alternatives have been considered in detail; those are presented in this report or referenced. Other alternatives, such as regionalization or changed ownership structures have been considered and dismissed. These alternatives are presented in this section in concept or in detail, as appropriate.

7.1 ALTERNATIVE APPROACHES TO OWNERSHIP AND MANAGEMENT

One alternative considered participating with the Amador Water Agency (AWA) and several other Amador County wastewater service providers in a plan to regionalize treatment and effluent management. This effort is memorialized in the Amador County Regional Wastewater Management Plan (ECO:LOGIC, 2005). The Regional Plan included a Regional WWTF to be located Martell. This concept involved maximizing discharge of Jackson effluent to Jackson Creek, within the limitations of the City treatment facility and ability to comply with Order requirements. Beyond this limiting point, City wastewater and/or effluent would be exported to the proposed Martell facility. AWA would then manage the effluent resources as appropriate to supplement Agency water supply. This concept would have involved a joint approach to ownership and management of the wastewater facilities. This idea was dismissed at the time for a number of reasons without development of the ownership details. It was fundamentally complex and was not feasible within the time frames required to serve the City. It does remain a potential longer-term solution to challenges faced by all the participating agencies.

7.2 ALTERNATIVE DESIGN

Alternative concepts were considered as the project alternatives discussed in this section. These included, but were not limited to; changed effluent management strategies, land disposal, effluent dilution, regional facilities and others. However, alternative designs considered within each project alternative were limited for the following reason: the City has an existing and operational WWTF. All alternatives that considered continued use of this facility were based on expanding or improving the existing WWTF to minimize cost and maximize the service value of the existing facilities. Of course, some of the on-site improvements decisions did require design alternative analyses, such as changing from chlorine disinfection to UV disinfection as opposed to ozone. Alternatives that considered off-site options, such as land disposal, new discharge locations or regional facilities did not advance far enough to consider the details of treatment design alternatives, beyond considering the concepts themselves. However several off-site effluent management facility options were considered over the years. These conceptual designs differed with respect to location, effluent management strategies (land disposal v. reclamation v. combination of both) and scope/size.

7.3 SHARING OF SERVICES

Two alternatives considered sharing of services. One is the option to provide wastewater service through a regional project with AWA and other wastewater agencies in Amador County. This option has been dismissed to date and is discussed in other sections of this report. Another option is to have an agreement with a local land owner for storage and land disposal of the effluent. The land owner would share the delivery, storage and application infrastructure with the City. This is described as Alternative A in this report and discussed in further detail below.

7.4 NEW CENTRALIZED FACILITIES

One alternative considered development of centralized facilities. This is the option described previously to construct a new WWTF with AWA in Martell to serve multiple communities. This idea has been dismissed at this time for a number of reasons outlined below. It was fundamentally complex and not feasible within the time frames required to serve the City.

7.5 OPTIMIZATION OF EXISTING FACILITIES

Given that the City has an existing and operational WWTF, development of all compliance alternatives started with the premise that use of the existing facilities would be optimized to save costs and maximize the value of this existing utility to the rate payers inherent in its remaining useful life. The Recommended Project makes the most use of the existing facilities by continuing to use all of them (with the exception of the chlorine disinfection facilities), with the addition of new treatment components. The chlorine disinfection facilities will be replaced with UV disinfection as part of the strategy to comply with the current Order.

7.6 CENTRALLY MANAGED DE-CENTRALIZED FACILITIES

With the exception of the Recommended Project, Alternative B described in the CEQA document, and the alternative to regionalize with AWA, all the alternatives considered included de-centralized components. Decentralized components of project alternatives include off-site storage and land disposal improvements, new effluent discharge systems to remote locations, in-town reclamation development, or new creek storage facilities. Project Alternative A described in this report incorporates off-site piping, storage and land disposal improvements on the Busi property southwest of the City.

7.7 TECHNICALLY INFEASIBLE ALTERNATIVES

In the next section the City presents in detail project alternatives to achieve the project needs. However, in addition to these alternatives, the City has also considered several other compliance projects, but dismissed from further analysis for various reasons. Considered and dismissed project alternatives include the following:

1. Discharge dry season effluent to the Mokelumne River which had adequate effluent assimilative capacity through the 1975-77 drought. Reasons not considered further:
    a. The Mokelumne River is a potable water supply for East Bay Municipal Utility District (EBMUD).

b. Requires approval from the Division of Water Rights to stop dry season effluent discharges to Jackson Creek.

c. If the Division of Water Rights approved stopping dry season effluent discharges to Jackson Creek, then a local land disposal project would be more appropriate than discharging the dry season effluent to the Mokelumne River based on Basin Plan policy.

d. The city feels they can comply with new language for determining compliance with prohibitions on percent effluent in Lake Amador that in contained in the current Order.

2. Participate with AWA in a Regional WWTF Project in Martell. Reasons not considered further:

a. A joint regional project is infeasible within the time frames involved, and within the current economy.

b. Regionalization also requires approval from the Division of Water Rights to stop dry season effluent discharges to Jackson Creek.

c. If the Division of Water Rights approved stopping dry season effluent discharges to Jackson Creek, then then a local land disposal project would be more implementable than a Regional WWTF within the foreseeable future. However, future participation in a Regional WWTF is a possibility open to the City, not excluded by implementing the Recommended Project presented in this document.

d. The city feels they can comply with new language for determining compliance with prohibitions on percent effluent in Lake Amador that in contained in the current Order.

3. Use dry season effluent on City parks, school yards, cemeteries, and landscaping in general in addition to some pasture land irrigation. Reasons not considered further:

a. Larger tracts of landscaped land are needed than are available currently; thus, pasture irrigation and seasonal effluent storage (i.e., a somewhat smaller scale land disposal project) are still needed in addition to a landscape irrigation project.

b. Requires a higher level of treatment. Specifically, disinfected tertiary effluent would be needed as described in Title 22 of the California Code of Regulations.

c. Requires approval from the Division of Water Rights to stop dry season effluent discharges to Jackson Creek.

d. If the Division of Water Rights approved stopping dry season effluent discharges to Jackson Creek, then a single land disposal project would be more cost effective than reclamation on landscaping plus pasture irrigation and storage because of the higher level of treatment needed for unrestricted reuse, and the more costly effluent distribution and irrigation system needed.

e. The city feels they can comply with new language for determining compliance with prohibitions on percent effluent in Lake Amador that in contained in the current Order.

4. Use dry season effluent on pasture land and discharge effluent to Jackson Creek during periods of high creek flow. Reasons not considered further:
   a. With the 2013 Order, the harmonic mean averaging allowed for determination of the amount of effluent in Lake Amador does not require effluent to be diverted to off-site disposal fields (pasture irrigation).
   b. Requires approval from the Division of Water Rights to stop dry season effluent discharges to Jackson Creek.
   c. This alternative requires a local land disposal project, which would not be necessary with the recommended project.
   d. This alternative would still require a higher level of treatment at the existing treatment facility for seasonal discharge to Jackson Creek in accordance with the new Order.
   e. Development of both off-site effluent disposal improvements and on-site treatment improvements is cost prohibitive. This alternative would require very large off-site storage and land disposal improvements as compared to Alternative A, which includes a creek diffuser, allowing for a creek discharge at lower flows with dilution credits.
5. Store wet season creek flow for dry season release to Jackson creek for dilution to meet five percent effluent limitations in a potable water supply. Reasons not considered further:
   a. With the 2013 Order, the harmonic mean averaging allows for the determination of the amount of effluent in Lake Amador and does not require additional dilution for compliance.
   b. Requires approval from the Division of Water Rights to divert flow in Jackson creek to storage.
   c. Requires compliance with Division of Safety of Dams requirements, which would not be necessary with the recommended project.

7.8 TECHNICALLY FEASIBLE ALTERNATIVES

In the next section the City presents technically feasible project alternatives to achieve the project needs. The alternatives will target meeting the same or equivalent design criteria and serve the same community flows and loads.

7.8.1 Common Design Criteria

In order to develop a fair comparison of alternatives, it is important to establish common design criteria on which to base the evaluation. Key design parameters are discussed below:

- **Design Wastewater Flow:** The design criteria for upgraded facilities will match the capacity of the existing WWTF. The existing average dry weather flow capacity of the City's treatment facilities

(based on current BOD concentrations) is 0.55 Mgal/d[3], with a corresponding peak flow of 3.5 Mgal/d.

- **Design Wastewater Loads:** The design criteria for the upgraded facilities will match the capacity of the existing WWTF. The existing average annual and peak month BOD loads are 1200 lb/d and 1800 lb/day respectively. TSS loads are equal to BOD loads.
- **Design Wastewater Temperature:** Temperature ranges from 50 F (10 C) to 79 F (26 C), as reported by City operations staff.
- **20-CITY Engineering News Record Construction Cost Index (ENR CCI):** 9,681 (February 2014)

7.8.2 Alternatives Considered

Based on the project objectives and means of compliance discussed in the preceding sections, the City has considered many possible compliance projects from the perspective of level of compliance with the current and probable regulatory setting and cost effectiveness. Based on this consideration this section provides a detailed discussion of two alternatives considered by the City in the 2013 EIR. Other alternatives considered by the City, but dismissed from further consideration prior to the CEQA process were presented in the previous section for completeness.

With the receipt of the current Order, effluent limitations and prohibitions applicable to the City's effluent discharge have changed compared to the regulatory setting prior to and during the CEQA process. This has resulted in a change to the recommended project. The following table provides an explanation of the project alternatives and the recommended project presented in this report, including the naming convention and the corresponding projects described in the 2013 EIR:

[3] Current water quality characteristics put the capacity of the WWTF at an equivalent ADWF of 0.55 Mgal/d. Permitted capacity is 0.71 Mgal/d. Both flow rates will serve the original design service area of the City based On organic loading Even if water conservation indicates that it arrives with less water, as suggested by the 0.55 Mgal/d flow rate. See section on flows and loads for further explanation. For design purposes, the sizing of significant structures is driven by both BOD load and hydraulics (flows).

Table 7-1
CEQA Project Alternatives

This Project Report	CEQA Document (2013 EIR)
Recommended Project	Continue Year-Round Effluent Discharge to Jackson Creek without Providing Additional Dilution to the Effluent Discharge – CEQA Alternative A
Alternative A	Disposal of WWTF Effluent by Application to Pasture Land and Discharge to Jackson Creek – CEQA Recommended Project
Dismissed CEQA Alternative – see previous section	Seasonal Equalization of Natural Jackson Creek Flows to Allow Continued Year-Round Discharge of Effluent to Jackson Creek – CEQA Alternative C
Dismissed CEQA Alternative – see previous section	CEQA Proposed Project without the 5 Percent Effluent Limit in Lake Amador or Daily Dilution Requirements in Jackson Creek – CEQA Alternative B

7.8.3 Project Alternatives

As presented in the previous section, there are two project alternatives considered in detail for this report, including the following:

- Continue Year-Round Effluent Discharge to Jackson Creek without Providing Additional Dilution to the Effluent Discharge – Recommended Project
- Disposal of WWTF Effluent by Application to Pasture Land and Discharge to Jackson Creek – Alternative A

7.8.4 Continue Year-Round Effluent Discharge to Jackson Creek without Providing Additional Dilution to the Effluent Discharge – Recommended Project

The recommended project is a form of "No Project" alternative in that it essentially maintains status quo hydraulic conditions in the area, i.e., the City continues to discharge effluent to Jackson Creek, year-round. The Recommended Project appears to be the City's preferred project based on the new 2013 Order and the current interpretation of the five percent rule for effluent in Lake Amador.

During the CEQA Process this project was the City's default project (Alternative A) if the California Department of Fish and Wildlife (CDFW) or others' concerns resulted in the Division of Water Rights (Division) not approving the City's wastewater change petition under the CEQA Proposed Project to reduce (including to the point of stopping) effluent discharges to Jackson Creek in dry seasons. However, with the current interpretation of the determination of compliance with the five percent rule for effluent in a Lake Amador, keeping the water in the creek is a viable option and avoids the need to submit a wastewater change petition and risk the petition being challenged by the CDFW or others. It also avoids allowing Jackson Creek downstream of the WWTF to become an ephemeral stream and the impacts that would have occurred.

Though this Recommended Project is a form of "No Project" project with respect to changing the effluent discharge and disposal plan, it is not a "do nothing" project. With this project, the City undertakes considerable improvements to the wastewater treatment process and conducts special studies to provide some mitigation to the water quality impacts resulting from continued discharge to the creek and to provide greater confidence in the ability of the WWTF to reliably comply with discharge prohibitions and effluent limitations in the new Order.

The Recommended Project does not require approval from the Division of Water Rights (Division).

7.8.5 Disposal of WWTF Effluent by Application to Pasture Land and Discharge to Jackson Creek – Alternative A

The key element of Alternative A is that it reduces (to the point of stopping, when needed) effluent discharges to Jackson Creek during dry seasons when creek flows can be very low to zero. Reducing the current effluent discharges to Jackson Creek requires approval from the Division. Effluent would no longer be discharged to the creek, the water would either be applied to grazing land or stored in a reservoir for subsequent disposal to grazing land or Jackson Creek at a later time. The proposed effluent storage reservoir(s) and effluent application lands would be located on the Busi Ranch, which is situated about a mile south and west of the WWTF. Effluent will continue to be discharged to Jackson Creek to the extent reasonable. This alternative also improves the existing wastewater treatment process in various ways.

The net effect of this alternative is a substantial reduction in the amount of effluent discharged to Jackson Creek, particularly during dry seasons. This reduction results in:

- Compliance with the 2007 Order interpretation of the five percent effluent limit in downstream Lake Amador. However, the current Order interpretation of the five percent rule and how compliance with it is determined have rendered this concern a non-factor for the City of Jackson within the current permitted flow limits. The existing effluent flows, undiluted and without equalization or storage, meet the permit requirements with respect to effluent in Lake Amador. This means that no change to the discharge, as provided in this project alternative, is required.
- Avoidance of effluent dominated conditions in Jackson Creek per Basin Plan policies, which thereby opens the possibility for the City to receive effluent dilution credits in Jackson Creek per the State Implementation Policy, if needed, after proposed treatment process improvements.
- Increased effluent reclamation and decreased effluent discharges to surface waters, particularly in dry seasons, per Basin Plan policies.
- Jackson Creek (already an ephemeral stream upstream of the WWTF) becoming an ephemeral stream downstream from the WWTF. Currently, Jackson Creek downstream from the WWTF is a perennial stream solely because of the City's year-round effluent discharge to the creek.

7.9 PROJECT ALTERNATIVE ANALYSIS

The following sections provide detail and analysis of each of the two project alternatives considered in this report.

7.9.1 Continue Year-Round Effluent Discharge to Jackson Creek without Providing Additional Dilution to the Effluent Discharge – Recommended Project

With the Recommended Project, City effluent will continue to be discharged to Jackson Creek on a year-round basis. The Recommended Project is very viable for the City because:

- The Department of Public Health provided a revised interpretation for the calculation of the five percent effluent rule, as reflected in the current Order.
- Due to the changed five percent rule in the current Order, there is no need to petition the Division to reduce effluent discharges to Jackson Creek, or to affect the downstream ecology by doing so.
- Life cycle costs are estimated to be less than the Alternative A project.

With the Recommended Project, Lake Amador would not contain more than five percent effluent based on the current Order application of the five percent effluent rule. At higher future WWTF flow rates (beyond those presented in this report), the possibility, frequency and magnitude of five percent exceedances could become a factor.

Toward the end of many dry seasons, Jackson Creek base flows downstream of the WWTF will be effluent dominated with the Recommended Project. In a critical drought, it is estimated that Jackson Creek will be effluent dominated much of the year. Considering these estimates, receiving effluent dilution credits under the Recommended Project is unlikely, based on the current Order. Therefore, with the Recommended Project, the WWTF treatment process (and source control) must be upgraded to result in compliance with WQOs without the benefit of dilution credits. This appears to be possible with the current list of effluent contaminants of regulatory concern, including zinc, or which used to be added to the City's potable water supply by the Amador Water Agency (AWA, an independent public agency) in the form of zinc orthophosphate to reduce the corrosivity of the water supply, AWA has since stopped using zinc orthophosphate.

The proposed means by which the Recommended Project will achieve compliance with the City's current list of effluent constituents of concern are identified in Table 7-2. Possible changes to the wastewater utility physical plant potentially needed to achieve project objectives to the extent reasonable via the Recommended Project are presented in Table 7-3. Table 7-4 is a summary of the Estimates of Possible Changes in Water Resource Quantity and Quality. A preliminary layout for these changes in the physical plant is presented in Figure 7-1.

Converting the WWTF effluent disinfection system from chlorine to UV increases the possibility of increased pathogen concentrations in effluent discharged to Jackson Creek in the event of a treatment process upset. This is because during an upset, chlorine can still disinfect effluent of substandard quality by increasing the chlorine dose. It is difficult for UV light to disinfect substandard effluent regardless of how much the UV

light "dose" (i.e., intensity) is increased. To mitigate this potential pathogen risk, it is recommended that the existing chlorine system (or a system converted to use with hypochlorite instead of chlorine gas) be kept as backup to be used in the event of a treatment process upset that renders UV disinfection relatively ineffective. Influent or effluent storage is also recommended to allow the discharge to be temporarily halted if there is a treatment process upset until the process is restored. Another option that can be evaluated during preliminary design is the possibility of including an ozonation process for additional disinfection reliability.

Table 7-2
Recommended Project – Regulatory Concerns and Means of Compliance

Regulatory Concern	Means of Compliance
More than five percent effluent in a potable water supply	▪ Current Order provides an interpretation of the five percent rule that the City can comply with for permitted flow rates.
Nitrate and Ammonia	▪ Enhance control of dissolved oxygen concentrations in the oxidation ditches to maximize simultaneous nitrification/denitrification (currently being implemented). ▪ Automate addition of magnesium hydroxide to the oxidation ditches to stabilize the process pH for optimal nitrification/denitrification (currently being implemented). ▪ Add denitrification basins and associated pumps and piping to the front end of the treatment process.
Copper and Zinc	▪ Continue coordination with AWA to reduce the corrosiveness of the City's water supply to copper water pipes without excessive use of zinc orthophosphate (the commonly used corrosion control agent). AWA has ceased use of this material for corrosion control. ▪ If the foregoing does not result in compliance, then conduct water effect ratio studies and/or translator studies to determine site-specific water quality objectives for copper and zinc. ▪ If the foregoing does not result in compliance, then add calcium to the effluent to neutralize any potential toxicity posed by copper or zinc.

Regulatory Concern	Means of Compliance
Dichlorobromomethane (DCBM), dichlorodibromomethane and Cyanide	▪ Convert from chlorine disinfection to UV disinfection. ▪ Develop an emergency response plan designed to mitigate the inherent risks posed by UV disinfection in the event of a process upset when emergency effluent storage is not provided, e.g., retain the existing chlorine disinfection system as emergency backup), or provide influent or effluent storage. ▪ Institute alternative analytical methods as approved by Regional Water Board to reduce or eliminate interference from sample preservation step leading to false cyanide "hits".
Coliform and Turbidity	▪ Improvements to the effluent filtration system and disinfection system.
Basin Plan objective to avoid effluent dominated conditions in surface waters	▪ None
Basin Plan objective to maximize reclamation and land disposal of effluent, and minimize effluent discharges to surface waters.	▪ None

Table 7-3
Recommended Project – Physical Plant Improvements

Recommended Project may include the following physical improvements:
1. Improved dissolved oxygen control in the oxidation ditches to maximize the efficiency of the simultaneous nitrification and denitrification process. Improvements include 1) the addition of dissolved oxygen sensors in each oxidation ditch; 2) improvements to the existing aeration rotors to optimize their control and response to input, including putting variable speed drives on the motors; 3) improvements to the oxidation ditch effluent weirs to maximize control of the water level and optimize the corresponding control and response of the rotor oxygenation process; 4) installation of a Supervisory Control and Data Acquisition (SCADA) system to receive input from the oxygen sensors and a) provide that input to operators who can then manually adjust the aeration equipment, b) allow the SCADA system to automatically adjust the aeration equipment in response to programed algorithm to maintain a preset oxygen concentration in the oxidation ditch, and c) collect historical data records. Any dissolved oxygen improvements would include any and all necessary appurtenances for a whole and complete operating system, including electrical improvements, mounting and hardware equipment, site work improvements, computer hardware and software, etc. (Some portions of these improvements have been, or are being, implemented).
2. Addition of magnesium hydroxide storage and feed facilities at the headworks of the treatment plant to provide pH control through the treatment process and optimize the simultaneous nitrification and denitrification process. Improvements include chemical storage and containment facilities; mixing equipment; insulation and/or heating equipment for thermal control; chemical feed pumps and controls; piping and site improvements; electrical and instrumentation equipment; and all ancillary facilities for a whole and complete pH control facility. SCADA facilities may also be included to provide automation, alarms, historical data collection and efficient operations (Some portions of these improvements have been, or are being, implemented).

Recommended Project may include the following physical improvements:

3. Addition of separate denitrification facilities, if needed, to provide stable nitrification and denitrification through the treatment process to remove ammonia and nitrate from the effluent. Improvements include separate anoxic basins upstream of the oxidation ditches; mixing equipment; flow measuring and flow splitting equipment; recycle pumps and piping; electrical and instrumentation improvements; site and piping work; and all ancillary facilities to provide a complete and operating nitrification and denitrification process. SCADA facilities may also be included to provide automation, alarms, historical data collection and efficient operations.
4. Addition of effluent filter capacity and filtration related improvements to improve filter performance and capacity. Improvements include the addition of new sand filters or similar filtration equipment to augment capacity; improvements to the filter coagulation chemical feed, mixing, and flocculation facilities; improvements to the backwash storage and pumping facilities; improvements to the backwash waste facilities; control and alarm improvements; electrical and instrumentation; site and piping improvements; and all ancillary facilities for a whole and complete effluent filter facility.
5. Addition of UV disinfection to the treatment process. Improvements include UV hydraulic structures; lamp channels; motor control center building; compressors; protective canopy or building; overhead crane; electrical and instrumentation; site and piping improvements; and all ancillary facilities for a whole and complete UV disinfection facility. SCADA facilities may also be included to provide automation, alarms, historical data collection and efficient operations. The chlorine disinfection facilities may be retained for emergency use in the event of a treatment process upset that renders the UV disinfection system ineffective. Modifications to existing chlorine facilities may be as noted for Alternative A . See Table 7-6, Item 5.
6. Addition of ozonation and activated carbon filter facilities to remove refractory organics from the effluent, if needed. Improvements include liquid oxygen storage and containment facilities; ozone generation equipment; ozone contact and mixing basin; and all necessary pump, pipe and control facilities. The activated carbon filters will include the activated carbon filter vessels, mounting/foundation facilities, feed pump, backwash pump, and pipe and control facilities. Both facilities will require electrical and instrumentation improvements, site and pipe improvements and ancillary facilities for a whole, complete, and operable system. SCADA facilities may also be included to provide automation, alarms, and historical data collection for an efficient operation.
7. Influent or effluent storage to allow for a temporary cease in the discharge to Jackson Creek if there is a plant upset and the possibility for an effluent or receiving water violation. The storage would only be until the plant could be restored to optimal performance. Any water diverted to storage would be returned for treatment and discharge to Jackson Creek. The storage could be in the form of a lined earthen basin upstream of the plant, utilizing a gravity diversion from the influent sewer or a pumped fill from the plant influent headworks area or effluent facilities. The storage basin could also be a concrete basin or a steel tank near the plant.
8. Solids dewatering improvements to increase the percent solids of the waste sludge for disposal at landfill facilities. The existing belt filter press is aged and no longer can produce solids that meet the current % solids standards of most landfills. Possible new facilities could consist of a new belt filter press, centrifuge or other dewatering technology.
9. Electrical, instrumentation, standby power, yard piping, site work and other ancillary improvements to make a whole and complete operable project.

Table 7-4

Recommended Project – Estimates of Possible Changes in Water Resource Quantity and Quality

Water Resource	Estimates of Possible Changes
Lake Amador	Quantity: No change from status quo. As effluent flows increase to design flows, the amount of effluent in Lake Amador will increase. Quality: Based on the 2013 Order and its interpretation of the five percent effluent limitation in a potable water supply, Lake Amador will not contain more than five percent effluent with current permitted flows.
Jackson Creek	Quantity: No change from status quo. Quality: Under most critical low creek flow conditions when the creek will be 100% effluent under the Recommended Project, the following changes in creek water quality are forecast.

Parameter	*Forecast Jackson Creek Water Quality Range*		*WQO [a]*
	Downstream Creek Status Quo	*Downstream Creek With Recommended Project*	
Nitrate Nitrate (mg/L) (as N)	0.9-13.8	0.9-10 [b]	10
Ammonia (mg/L) (as N)	<0.5-6	<0.5-1.6 [b]	2.3/5.5 [i] [g]
Copper (µg/L)	<0.5-9.7	<0.5-9.7	3.9/6.2 [c] [d] [g]
Zinc (µg/L)	50-121	50-121 [e]	42/57 [c] [d] [g]
Cyanide (µg/L)	<2-13	<2 [b]	4.2/8.8 [g]
Dichlorobromomethane (µg/L)	<0.37-10	<0.37 [b]	0.56/14
Chlorodibromomethande ((µg/L)	<0.37-0.82	<0.37	0.41/0.82
Total Trihalomethanes (µg/L)	<0.37-10	<0.37	80

(a) WQO = water quality objective.
(b) Reduced from current effluent values via WWTF improvements: those currently underway, and those specific to the Recommended Project, if needed.
(c) Based on a minimum effluent hardness of 42 mg/L and 100% effluent in the creek.
(d) These WQO's are expected to increase as a result of increased effluent hardness (to 75 mg/L) and a Water Effect Ratio study and/or translator study as demonstrated in similar foothill settings
(e) Further source control and/or treatment may be necessary.
(g) Chronic aquatic life WQO and acute aquatic life WQO.
(i) Chronic aquatic life WQO and acute aquatic life WQO for ammonia (salmonids absent, but early life stages being present) based on a maximum pH (1 day/30 day average) and maximum temperature of 8.0/8.0 and 21.5° C, respectively.

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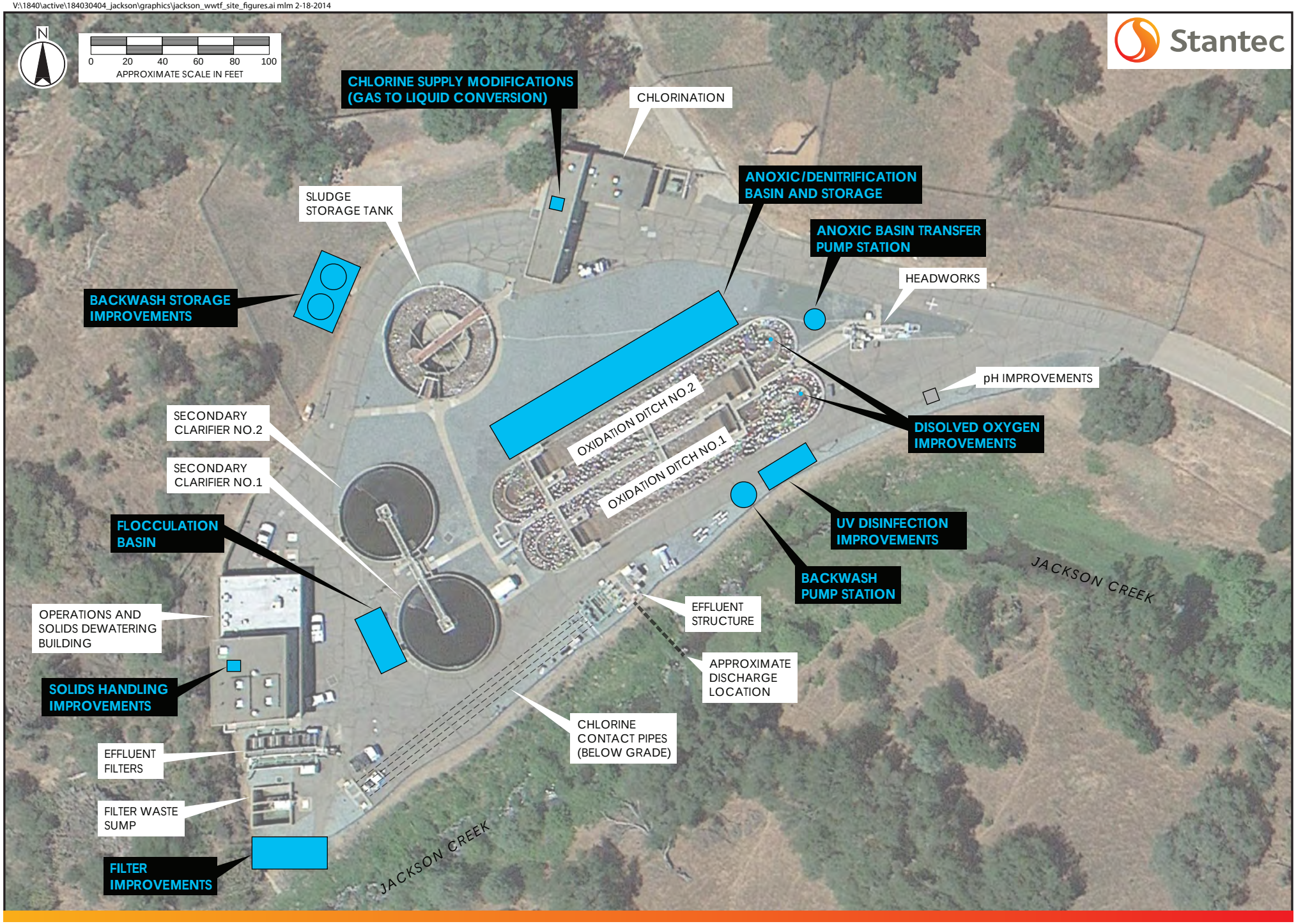

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Figure 7-1
Recommended Project - WWTF Physical Improvements

7.9.2 Disposal of WWTF Effluent by Application to Pasture Land and Discharge to Jackson Creek –Alternative A

With the Alternative A Project, City effluent would be reused and/or disposed of, to the extent reasonable, on grazing land (Busi Ranch) near the WWTF. Effluent would continue to be discharged to Jackson Creek to the extent that 1) it cannot be disposed on land reasonably, 2) effluent dominated conditions in Jackson Creek do not occur, and 3) exceedances of California Toxics Rule (CTR) and related limitations in Jackson Creek do not occur. Effluent that cannot be discharged to land or the creek will be stored at Busi Ranch for subsequent disposal via land application and/or retreatment at the WWTF for discharge to Jackson Creek.

Effluent discharges to land would be controlled to the extent that there is effluent in need of disposal, and operating the effluent application system will not cause:

- Effluent runoff
- Vegetation damage
- Soil damage
- Significant hindrance of the ranching operation
- Degradation of groundwater quality not acceptable to the Regional Water Board
- Excessive surfacing of shallow groundwater at some distant downslope location. It is worth noting that effluent infiltrated into soil eventually surfaces some place, in some manner. The regulatory issues with such surfacings are proximity, volumes, and resulting impacts on the environment.

Effluent discharges to Jackson Creek would be controlled on a daily basis to prevent the creek from containing more than 50 percent effluent (to avoid being designated an effluent dominated stream), and to comply with all effluent dilution requirements and dilution credits assigned to the City as the basis for receiving revised, dilution-based, effluent limitations in a revised new Order. In other words, water quality objectives (WQOs) will not be exceeded under any foreseeable conditions, including aquatic life WQOs under drought conditions more severe than 1-in-10 years when exceedances are permitted under the State Implementation Policy (SIP) per SIP Chapter 1.4.2.1, specifically Table 3, therein, which specifies the basis for developing effluent limitations for aquatic life WQOs when effluent dilution is involved at 1-in-10 year drought receiving water flow rates.

The Alternative A Project applies effluent to a large parcel of private property (Busi Ranch) whose owner has expressed willingness to enter into a long-term contract with the City to accept effluent application on his land. The Alternative A Project takes advantage of the fact that in wet years Jackson Creek contain greater amounts of dilution water allowing increased effluent discharges when the ability of land to dispose of effluent is reduced. Conversely, in dry years when stream assimilative capacity is reduced, the ability of the land to dispose of effluent is increased. In a severe drought such as 1975-1977, it is estimated that sustained Jackson Creek flows will be essentially zero, such that all effluent is planned to be applied to land. As will be discussed, complete containment of all effluent on land in severe droughts is the critical design condition in sizing the land need and effluent storage requirements of the Alternative A Project.

Based on these principles, an effluent disposal water balance model was prepared for the Alternative A Project based on the following input variables:

- Design Average Dry Weather Flow (ADWF) = 0.55 Mgal/d
- 15 percent reduction in effluent flows in "somewhat dry" years to 1-in-10 year drought conditions as a result of water conservation with a proportionate reduction in I/I flows from lack of rainfall. This is what was observed in general in the recent 2007-2009 drought. If this level of water conservation does not occur, then the effluent storage and land application area needed would be approximately 20 percent greater than forecast by the water balance model.
- 20 percent reduction in effluent flows in critical droughts, such as 1975-1977, as a result of water conservation with essentially no I/I flow. City records on effluent flows and reductions during the 1975-1977 drought to provide some verification of this estimate are not available currently.
- Annual projected rainfall amounts used in the water balance model were derived using the long-term historical precipitation data from the Camp Pardee (CPD) weather station near the bottom of the Jackson Creek watershed (1927 – 2011) correlated to rainfall data from other sites with shorter periods of record. The other sites include the Pine Grove (PIN) weather station at the top of the Jackson Creek watershed (1987 – 2011) and rainfall records from the City's WWTF (1994 – 2011).
- Jackson Creek flows at the WWTF for "somewhat dry" and drier disposal years after completion of the Amador Water Agency (AWA) transmission pipeline project (current creek hydrological conditions) are estimated from the measured creek flows at the WWTF from June 1, 2008 through May 31, 2009, a below normal rainfall year following two dry years (2007 and 2008). Thus, using the June 2008 – May 2009 Disposal Year as the basis for extrapolating creek flows under other rainfall conditions does not include residual influences from preceding wet years. In other words, June 2008 – May 2009 appears to be a reasonable worst-case base condition from which to generate other hypothetical climatic and stream flow conditions in the post-AWA transmission pipeline project time period.
- The typical annual Jackson Creek flow volume at the WWTF as a function of estimated average annual rainfall over the upper Jackson Creek watershed is estimated by the following equation developed by exponential regression of the limited data available.

  $y = 5.62x^{1.8859}$ This equation has an R^2 value of 0.9207.

  Where:

  y = Estimated typical annual Jackson Creek flow at the WWTF for a given amount of rainfall on the upper Jackson Creek watershed, Mgal/year

  x = Estimated annual rainfall averaged over the upper Jackson Creek watershed, inches/year

  R^2 = Coefficient of variation for this equation relative to the available data. In essence, this coefficient indicates that about 92% (i.e., 0.92) of the variability in the available data is "explained" by the foregoing equation.

Example: In a typical rainfall year when rainfall on the upper watershed averages about 30.32 inches, the foregoing equation estimates annual creek runoff at the WWTF to be about 3,500 Mgal/yr. By way of comparison, 30.32 inches of rainfall on the 22,000 acre upper watershed represents 18,000 Mgal/yr of water. Thus, under average rainfall conditions, only about 19 percent (3,500/18,000 = 0.19) of the rainfall typically runs off past the WWTF on an annual basis. The remainder of the rainfall water is believed to be evaporated, evapotranspirated, and percolated into the soils, rocks, and mine shafts of the upper watershed.

Though this equation explains 92 percent of the variability in the available dataset, it is not the entire story from the perspectives of environmental protection and wastewater regulation. Specifically, the actual amount of rainfall runoff that will occur, and when it occurs, are a function of not only the total annual amount of rainfall, but also when it occurs and at what intensity relative to the moisture content of the soil at the time the rainfall occurs. In other words, for a given amount of annual rainfall, there are innumerable specific rainfall frequencies, durations, intensities, and soil conditions; and therefore, there are innumerable possible flow patterns and flow volumes in Jackson Creek over the course of a Disposal Year for a given amount of rainfall. As an example, the regression equation explaining 92 percent of the variability in the existing rainfall vs. runoff dataset estimates that "typically" the annual Jackson Creek flow at the WWTF in Disposal Year June 2008-May 2009 (upper watershed rainfall estimated to be 25.52 inches) would be 2,529 Mgal/yr. The actual flow was measured to be 2,008 Mgal/yr, roughly 80 percent of the estimated "typical" value. This lower than "typical" runoff is believed to be a result of the drought conditions leading up to Disposal Year June 2008-May 2009 (i.e., there was little residual water or soil moisture on the watershed from the previous year), and the specific rainfall frequencies, durations, and intensities that occurred in this Disposal Year. To account for this uncertainty in actual Jackson Creek flows that would occur more frequently in droughts, the equation-derived "typical" Jackson Creek flow estimates for 10-year drought rainfall amounts and critical drought rainfall amounts were reduced by 20 percent. Thus, the annual flow volumes of Jackson Creek used in developing the Alternative A Project are as presented in Table 7-5.

Table 7-5
Jackson Creek Annual Flow Volumes

Rainfall Condition	Estimated Average Rainfall over Upper Watershed, inches	"Typical" Annual Jackson Creek Flow at WWTF, Mgal/yr	Annual Jackson Creek flow at WWTF used in Analysis, Mgal/yr	Notes Regarding Flow used in Analysis
Above Average	40.64	6082	6082	From regression equation
Average	30.32	3500	3500	From regression equation
Somewhat Dry (2008-2009)	25.52	2529	2008	Actual creek flow measured
10-year Drought	19.58	1534	1227	80% of regression equation
Critical Drought (1976-1977)	10.61	483 (a)	386(a)	80% of regression equation

(a) This flow is expected to occur only during and shortly after rainfall events. It is not expected that there will be any material sustained flow in Jackson Creek under critical drought conditions. Accordingly, it is assumed for the purposes of these analyses that Jackson Creek flows in critical droughts will be essentially zero, year-round, from an effluent disposal perspective.

- These annual flow volumes, with the exception of critical drought flows (as noted above), are distributed into daily creek flow rates based on the creek flow pattern monitored at the WWTF in the below normal rainfall Disposal Year of June 2008-May 2009.
- Effluent hardness for regulatory purposes equals 70 mg/L based on the City's treatment process pH stabilization improvements.
- 25 percent of the creek flow is reserved as a zone of passage that cannot be used in the development of dilution credits "D" for aquatic life based water quality objectives.
- The most restrictive daily "D" value for acute aquatic life criteria is 1.6 (for cyanide), which is a defacto "D" of 2.13 (1.6/(1-0.25) = 2.13) when the 25 percent zone of passage water is considered.
- The most restrictive 4-day "D" value for chronic aquatic life criteria is 1.6.
- The nitrate human health 30-day "D" is 0.3.
- The most restrictive carcinogen long-term average "D" is 3.2.
- The minimum daily "D" to avoid effluent dominated conditions is 1.0.
- No effluent is discharged to Jackson Creek from June through September, regardless of creek flows or weather conditions because land application of effluent in these months is considered to be reasonable.
- No effluent is discharged to Jackson Creek when its flow is less than 0.13 Mgal/d for design 0.55 Mgal/d effluent flows. This lower limit establishes the basis for calculating the harmonic mean flow of the creek for calculating dilution credits for carcinogens under SIP.

- The overall average effluent percolation rate on the proposed effluent application lands is estimated to range from 0.035 inch/day (estimated worst case) to 0.10 inch/day (estimated best case) based on site-specific soil tests and field experiences with other effluent disposal sites in somewhat similar foothill locations. The actual overall average percolation rate for the site can be determined accurately only by long-term, extensive field trials (which include monitoring downslope areas for surfacing of effluent seepage). For the purposes of the Alternative 1 Project, the 0.035 inch/day value was used to provide a reasonable worst-case estimate of how large facilities on Busi Ranch may need to be.
- Rainfall on the Busi Ranch effluent application areas is estimated to be 26.38 inches in average years, 22.20 inches in somewhat dry years (e.g., 6/08 through 5/09), 17.03 inches in a 10-year drought, and 9.23 inches in a critical drought (e.g., 6/76 through 5/77) based on Camp Pardee rainfall data adjusted to the Busi Ranch locale using the WWTF/Camp Pardee rainfall ratio of 1.27 developed from monthly rainfall data at both sites for water years 2005-2010. Rainfall patterns are derived from the 6/08 through 5/09 rainfall data set.

Results from the model for 0.55 Mgal/d design flows and 0.035 inch/day percolation rates require:

- 45 Mgal
- 240 acres

For effluent storage and land disposal area under critical drought conditions when all effluent must be applied to land. For project flexibility and to cover unforeseen conditions that may arise during detailed design, additional storage and land disposal area of approximately 50 Mgal and 300 acres are recommended.

A preliminary layout for these possible changes in physical plant at the current WWTF site is presented in Figure 7-2. The off-site facilities that make up the effluent storage and land application components of the Alternative A Project include: an effluent force main from the WWTF site to Busi Ranch, plus improvements on Busi Ranch including effluent storage reservoirs, three zones of irrigation areas (upper, middle, and lower), sprinkler irrigation facilities, possible flood irrigation facilities, and site irrigation runoff containment facilities. A preliminary layout of these off-site improvements is presented in Figure 7-3.

Possible changes to the wastewater utility physical plant potentially needed to achieve project objectives to the extent reasonable via the Alternative A Project are presented in Table 7-6.

Table 7-6
Alternative A Project – Physical Plant Improvements

The Alternative A Project may include the following physical improvements:
1. Improved dissolved oxygen control in the oxidation ditches to maximize the efficiency of the simultaneous nitrification and denitrification process. Improvements include 1) the addition of dissolved oxygen sensors in each oxidation ditch; 2) improvements to the existing aeration rotors to optimize their control and response to input, including putting variable speed drives on the motors; 3) improvements to the oxidation ditch effluent weirs to maximize control of the water level and optimize the corresponding control and response of the rotor oxygenation process; 4) installation of a Supervisory Control and Data Acquisition (SCADA) system to receive input from the oxygen sensors and a) provide that input to operators who can then manually adjust the aeration equipment, b) allow the SCADA system to automatically adjust the aeration equipment in response to programed algorithm to maintain a preset oxygen concentration in the oxidation ditch, and c) collect historical data records. Any dissolved oxygen improvements would include any and all necessary appurtenances for a whole and complete operating system, including electrical improvements, mounting and hardware equipment, site work improvements, computer hardware and software, etc. (Some portions of these improvements have been, or are being, implemented).
2. Addition of magnesium hydroxide storage and feed facilities at the headworks of the treatment plant to provide pH control through the treatment process and optimize the simultaneous nitrification and denitrification process. Improvements include chemical storage and containment facilities; mixing equipment; insulation and/or heating equipment for thermal control; chemical feed pumps and controls; piping and site improvements; electrical and instrumentation equipment; and all ancillary facilities for a whole and complete pH control facility. SCADA facilities may also be included to provide automation, alarms, historical data collection and efficient operations (Some portions of these improvements have been, or are being, implemented).
3. Addition of effluent filter capacity and filtration related improvements to improve filter performance and capacity. Improvements include the addition of new sand filters or similar filtration equipment to augment capacity; improvements to the filter coagulation chemical feed, mixing, and flocculation facilities; improvements to the backwash storage and pumping facilities; improvements to the backwash waste facilities; control and alarm improvements; electrical and instrumentation; site and piping improvements; and all ancillary facilities for a whole and complete effluent filter facility.
4. SCADA facilities may also be included to provide automation, alarms, historical data collection and efficient operations.
5. Modifications to the chlorine disinfection system to improve the disinfection process and reduce disinfection byproducts. Modifications include changing the chlorine injection location; increasing the initial mixing energy; modifying the contact pipes to eliminate unwanted solids deposition and accumulation; removing the filter backwash pumps from the chlorine channels; providing separate backwash storage and pump facilities (thus minimizing chlorine contact flow variations and surges); replacing chlorine gas with liquid hypochlorite facilities; relocating chemical instrumentation to improve responsiveness and control; electrical and instrumentation improvements; site and piping improvements; and all ancillary facilities for a whole and complete chlorine disinfection facility. SCADA facilities may also be included to provide automation, alarms, historical data collection, and efficient operations.
6. Addition of an effluent pump station to convey effluent to an off-site storage and land disposal facility. Improvements include a new wet well and pump equipment located at the WWTF; site and piping improvements; electrical and instrumentation improvements; and all ancillary facilities for a whole and complete pumping facility. SCADA facilities may also be included to provide automation, alarms, historical data collection, and efficient operations.

The Alternative A Project may include the following physical improvements:

7. Addition of an effluent pipeline from the new pump station to the off-site storage and land disposal facility. Improvements include incorporating the effluent pipeline into the weir structure across Jackson Creek, and placement of new pipe along a designated alignment to connect the WWTF and off-site facilities hydraulically. Flow in the pipe may be bidirectional allowing for conveyance of effluent to the off-site facilities and return of said water back to the treatment plant for possible retreatment and discharge to Jackson Creek.
8. Installation of a low concrete weir in Jackson Creek. Improvements include an effluent diffuser on the weir with multiple ports to distribute effluent into the creek flow to optimize mixing and allow passage of aquatic life. The weir would be constructed to include the cross-creek effluent force main (to off-site storage on the Busi Ranch) and would include creek flow measurement. The weir and diffuser project element includes all necessary ancillary improvements for a whole and complete diffuser facility, including necessary site, piping, electrical, and instrumentation improvements.
9. Addition of off-site effluent storage basin(s). Improvements include one or more earthen basins to store effluent during periods when discharge and/or land application of effluent are not desirable or permitted. Improvements also include embankments; overflow structure; inlet/outlet piping; level instrumentation; booster pump stations for sprinkler applications; site and piping improvements; electrical and instrumentation improvements; miscellaneous hydraulic improvements; and all ancillary facilities for whole and complete storage basins. SCADA facilities may also be included to provide automation, alarms, historical data collection, and optimize efficiency. The basins will not be lined in the normal engineering sense. However, the basins will be over excavated and backfilled to finish grade with fine-grained soils to provide additional filtration of any water percolating from the basins.
10. Addition of spray and flood irrigation fields for land application of effluent. Improvements include distribution piping; sprinkler risers and nozzles; run-off containment ditches/berms; run-off containment basins with alarms and return pumping facilities; and run-off hydraulic structures allowing preservation of natural drainage courses during periods of non-effluent application. SCADA facilities may also be included to provide alarms and historical data collection.
11. Solids handling improvements to increase the percent solids if the waste sludge for disposal at landfill facilities. The existing belt filter press is aged and no longer can produce solids to the current standards of most landfills. Possible new facilities could consist of a new belt filter press, centrifuge or other press technology.
12. Electrical, instrumentation, standby power, yard piping, site work and other ancillary improvements to make a whole and complete operable project.

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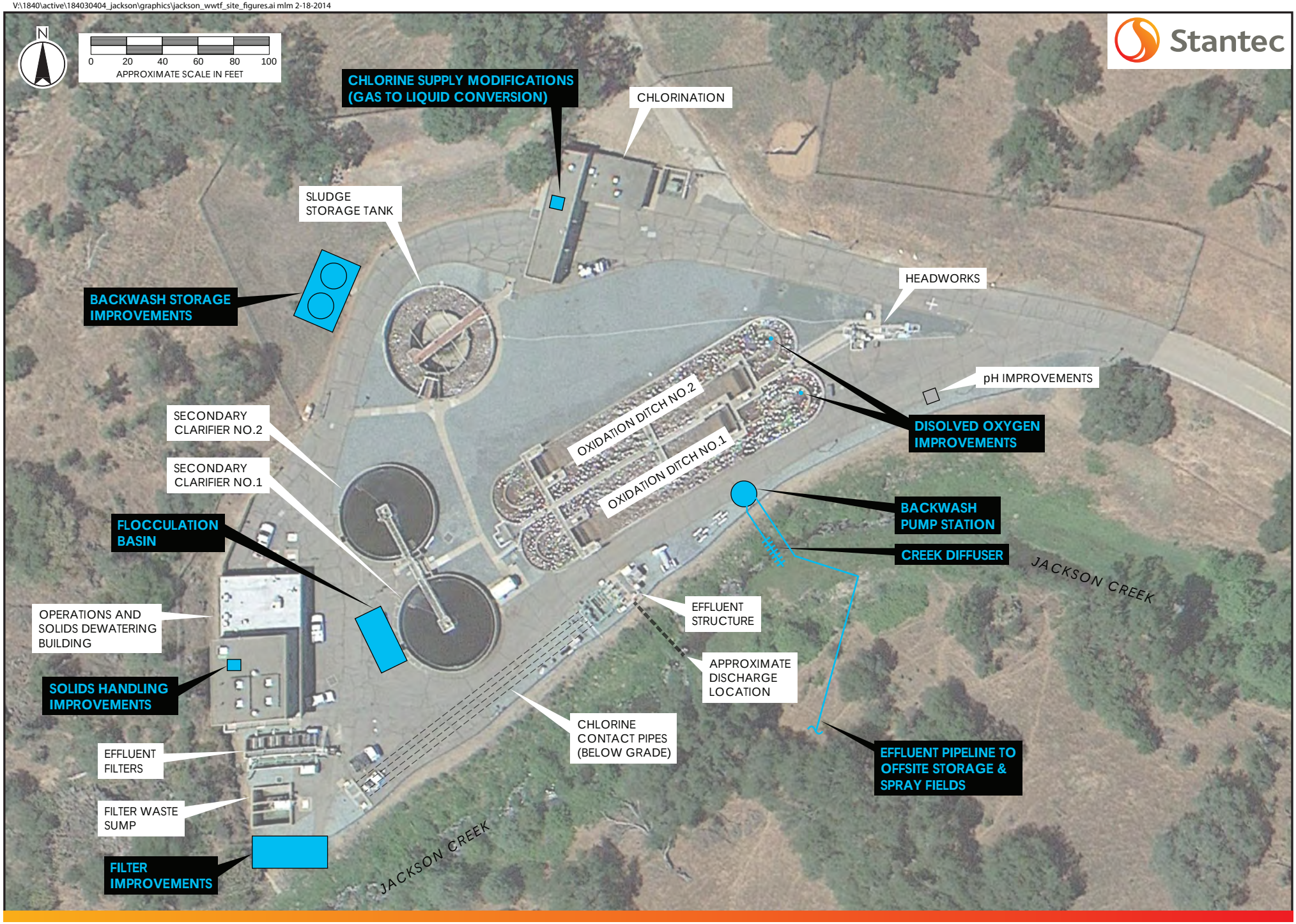

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Figure 7-2
Alternative A Project - WWTF Physical Improvements

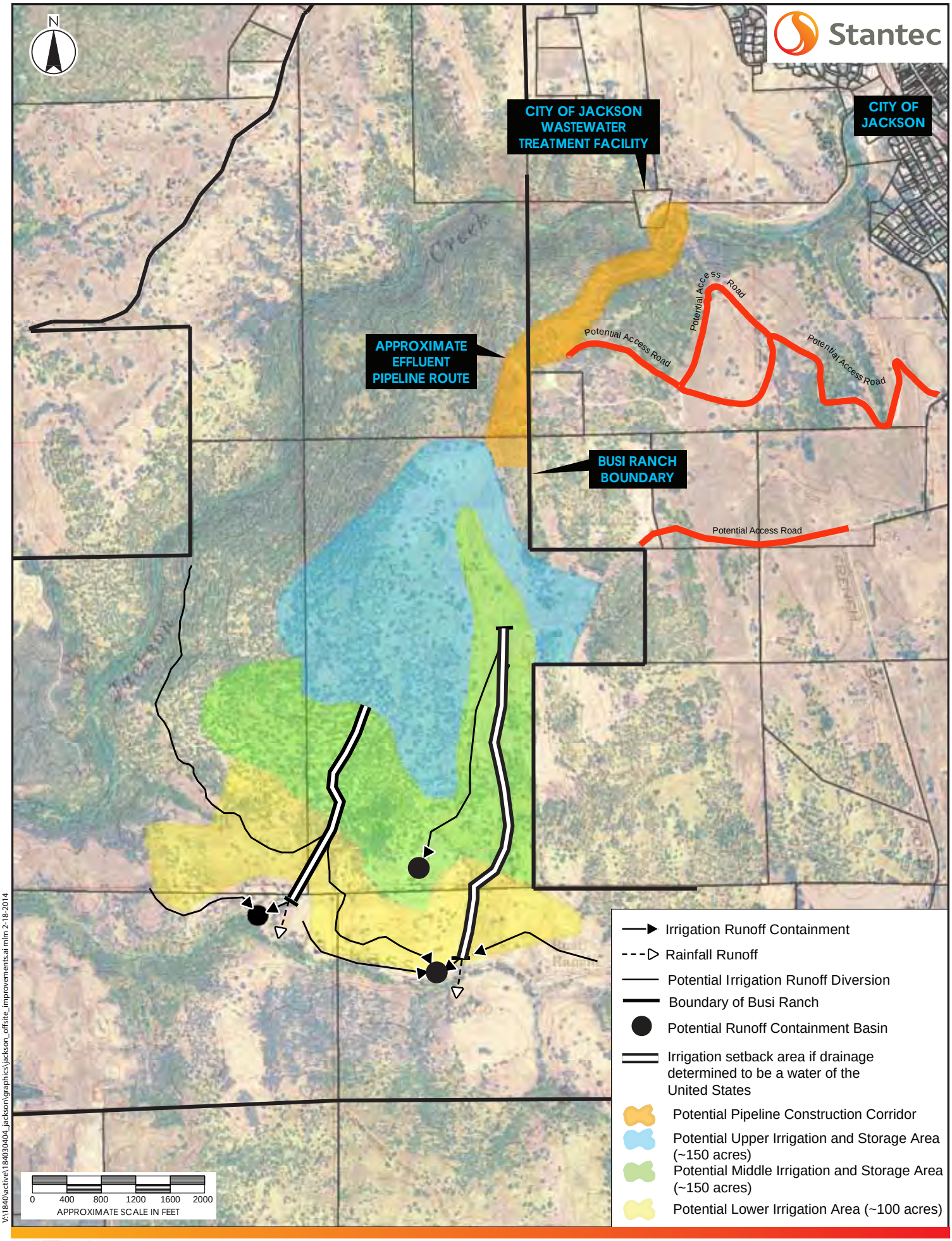

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Figure 7-3
Alternative A Project - Offsite Physical Improvements

7.9.3 ENVIRONMENTAL IMPACTS/CONSTRAINTS

Environmental impacts for both the Recommended Project and the Alternative A Project will be similar. Based on information contained in the *City of Jackson Wastewater Treatment Plant Improvement Plan Draft Environmental Impact Report*, (PMC, 2012):

1. Greenhouse Gas (GHG) emissions associated with the proposed project would predominantly be in the form of CO2 from heavy equipment related to construction. Although emissions of other GHGs, such as methane (CH4) and nitrous oxide (N_2O) are important with respect to global climate change, the emission levels of these GHGs are relatively small compared with carbon dioxide (C02) emissions, even considering their higher global warming potential.

2. Construction activities associated with construction of the WWTF improvements would occur over a one to two year period, beginning possibly in late 2015. The construction would occur in separate phases so that WWTF operations would continue during construction of proposed improvements. During this time, a new increase in GHG emissions would result from various construction activities. Construction related GHG emissions would be associated with engine exhaust from heavy-duty construction equipment, material (e .g., building materials, soil) transport trucks, and worker commute trips. Although any increase in GHG emissions would add to the quantity of emissions that contribute to global climate change, it is noteworthy that emissions associated with construction of the proposed project would occur over a finite period. Following full build out of the project, all construction emissions would cease. Despite the intensity and duration of construction activities and the lack of available mitigation measures to completely abate GHG emissions from heavy-duty construction equipment and on-road hauling emissions, the incremental contribution to climate change by the project's construction emissions would be minimal and would not be a considerable contribution to the cumulative global impact.

3. The proposed project would not generate any long-term sources of GHG beyond existing conditions and short-term construction generated GHG emissions would be finite in nature and below Air Resources Board (ARB) reporting levels. As such, the proposed project would not conflict with the successful implementation of Assembly Bill (AB) 32, the AB32 Scoping Plan, and Executive Order S-14-08. Similarly, the proposed project would not conflict with any other applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Because the project would not conflict with any applicable plan, policy or regulation for GHG reduction or managing global climate change, this impact would be less than significant.

7.9.4 POTENTIAL CONSTRUCTION PROBLEMS

Anticipated construction problems for both the Recommended Project and the Alternative A Project are primarily limited to the confined working space around the existing WWTF site and the likely presence of rock found during construction excavations. Working in close proximity to Jackson Creek will also create a challenge in that it will confine the working site space near the WWTF and it will require exclusion and silt fencing to protect the creek from construction activities. The most significant construction challenge for the Recommended Project will be the limited working area to construct new denitrification basins north of the oxidation ditches and flocculation basis between the operations Building and the secondary clarifiers. These challenges can be overcome with a metered and deliberate pace to construction activities.

For the Alternative A Project, construction challenges will also include diverting the creek to cross the creek with the effluent pipeline and install an in-stream diffuser, required for dilution credits. Alternative A could also encounter technical challenges in the construction of the effluent pipeline up the south bank of the Jackson Creek canyon and possibly ground water during construction of the storage basins. No geotechnical investigation has been performed. The City does deliver treated water (provided to the City by AWA from their WTP located near Amador Co. Airport) through their own distribution system to potable water customers within City limits. The City bills these people directly for their usage.

7.9.5 SUSTAINABILITY CONSIDERATIONS

The following describes how the project addresses each of the planning practices as defined in Section 65041.1 of the California Government Code and sustainable water resources management priorities.

Infill Development

The City promotes infill development and equity by rehabilitating, maintaining, and improving existing infrastructure that supports infill development and appropriate reuse and redevelopment of previously developed, underutilized land that is presently served by transit, streets, water, sewer, and other essential services, particularly in underserved areas, and to preserving cultural and historic resources.

Environmental Resources

The City protects environmental resources by protecting, preserving, and enhancing the state's most valuable natural resources, including forest lands, natural lands such as wetlands, watersheds, wildlife habitats, and other wildlands, recreation lands such as parks, trails and other open space, and landscapes with locally unique features and areas identified by the state as deserving special protection.

Efficient Development Patterns

The City encourages efficient development patterns by ensuring that any infrastructure associated with development that is not infill supports new development, uses land efficiently, is built adjacent to existing developed areas to the extent possible and is placed in areas appropriately planned for growth, is served by adequate transportation and other essential utilities and services, and minimizes ongoing costs to taxpayers.

Water Resources Management

The City encourages sustainable water resources management by ensuring that sustainable water resources measures are implemented, such as conserving water, conserving energy, and applying Low Impact Development Best Management Practices to the maximum extent practicable. It should be noted that the City is not the water supplier within the City limits. The water purveyor is the Amador Water Agency (AWA).

7.9.6 COST ESTIMATES

Planning level opinions of probable costs for the Recommended Project and the Alternative A Project are presented in Table 7-7 and Table 7-8, respectively. Also included in these tables are the approximate annual operation and maintenance costs associated with each project.

Non-construction related and, as of yet, unquantified costs include the development of working agreements for the Alternative A Project to use Busi's property and/or to develop easements. These cost factors do not exist for the Recommended Project which will be located entirely on the City WWTF site. There would also be engineering costs and the risk of delays, possibly resulting in fines and price escalations, with the process of filing a petition with the Division to remove the discharge from Jackson Creek associated with Alternative A. Successful protests to the Division against removal of water from Jackson Creek could eliminate Alternative A as an option.

Table 7-7
Opinion of Probable Cost

City of Jackson Wastewater Treatment Facility Recommended Project – WWTF Continued Creek Discharge	
Item	February-2014 Cost
Denitrification Facility	$1,117,000
Existing Aeration System Improvements	$305,000
RAS Pump Improvements	$102,000
Flocculation/Coagulation Improvements (1)	$482,000
Filtration Improvements	$883,000
Solids Dewatering Improvements	$386,000
UV Disinfection	$1,685,000
Subtotal 1	$4,960,000
Electrical & Instrumentation @ 25% of Subtotal 1	$1,240,000
Site work @ 5% of Subtotal 1	$248,000
Site Piping @ 10% of Subtotal 1	$496,000
Subtotal 2	$6,944,000
General Conditions, Overhead & Profit @ 20% of Subtotal 2	$1,389,000
Construction Cost	$8,333,000
Construction Contingency @ 20% of Construction Costs (2)	$1,666,600
Total Construction Costs	$9,999,600
Engineering, Administration @ 20%	$2,000,000
Total Project Cost (rounded)	**$12,000,000**
Approximate Total Annual O&M Costs (rounded)	**$1,515,000**

(1) Improvement costs assume ACL/TSO improvements are built separately.

(2) Includes $25,000 for permitting.

Table 7-8
Opinion of Probable Cost

City of Jackson Wastewater Treatment Facility	
Alternative A Project – WWTF Off-site Effluent Disposal	
Item	February-2014 Cost
Flocculation/Coagulation Improvements	482,000
Filtration Improvements	883,000
Chlorine Disinfection Modifications	81,200
Existing Aeration System Improvements	305,000
Solids Dewatering Improvements	386,000
Effluent Pump Station (0.5 MGD)	365,400
Effluent PS Pipeline & Conduit (8-inch)	426,300
Weir/Effluent Diffuser/Creek Crossing	152,250
Storage Basin	1,624,000
Effluent Irrigation System & Remote Pump Facility	324,800
Runoff Controls	81,200
Subtotal 1	5,111,150
Electrical & Instrumentation @ 25% of Subtotal 1	1,277,788
Site work @ 5% of Subtotal 1	255,558
Site Piping @ 10% of Subtotal 1	511,115
Subtotal 2	7,155,610
General Conditions, Overhead & Profit @ 20% of Subtotal 2	1,431,122
Construction Cost	8,586,732
Construction Contingency @ 20% of Construction Costs	1,717,346
Total Construction Costs	10,304,078
Engineering, Administration @ 20%	2,060,816
Total Project Cost (rounded)	**12,365,000**
Approximate Total Annual O&M Costs (rounded)	**$1,590,000**

8.0 SELECTION OF PREFERRED ALTERNATIVE

The preceding sections identified the Recommended Project and alternative projects, including costs. This section will further evaluate the project alternatives with respect to life cycle costs and non-monetary factors that may influence the Recommended Project.

8.1 LIFE CYCLE COSTS ANALYSIS

Costs for construction and engineering were presented in the previous section. Assuming a useful life for the project of 20 years and a time value of money of 1.6% per year (real 20-year federal discount rate from the Office of Management and Budget), the following table summarizes the present worth of the Recommended Project and the Alternative A Project.

Table 8-1
Life Cycle Cost

Project Alternative	Capital Costs (from Table 7-7 and 7-8)	Annual O&M Costs (rounded)	Total Present Worth
Recommended project	$12,000,000	$1,515,000	$37,740,000
Alternative A Project	$12,365,000	$1,590,000	$39,400,000

8.2 NON-MONETARY FACTORS

Non-monetary factors that affect the project include environmental and recreational impacts associated with the Alternative A Project, which would allow Jackson Creek to dry up during the summer. This alternative would also require the City to enter into an Agreement with the Busi Ranch. Busi is a willing partner and good neighbor, but the legal commitments of such an agreement would require City attention to manage. These non-monetary factors do not exist with the Recommended Project.

8.3 I/I RELATIVE TO WWTF IMPROVEMENTS

Based on the results of the I/I evaluation presented in Section 3, it is apparent that the City of Jackson wastewater system experiences some level of I/I which is excessive and it is suggested that the City develop a plan and schedule to address I/I in their system. However, the I/I evaluation also reveals that influent flows are within the hydraulic capacity of the existing WWTF, with the exception of the filters, and will therefore not affect proposed improvements. The filters are affected by the I/I because they are undersized and they are undersized because previous Orders allowed them to be bypassed during peak flows. The current Oder requires that all flows be filtered with no filter bypass allowed. As a result, both the Recommended Project and the Alternative A Project propose to add filter capacity to match the capacity of the rest of the WWTF. I/I does not further affect the Recommended Project improvements.

8.4 RECOMMENDED PROJECT

The Recommended Project includes continued discharge to Jackson Creek and improvements to meet the compliance criteria contained in the current Order. This project is summarized in detail in the next section.

8.5 USEFUL LIFE AND AFFORDABILITY OF RECOMMENDED PROJECT

The useful life of the project is anticipated to be approximately 25 years. Many of the project structural components (basins, filters, channels) will have a much longer useful life, but equipment will wear out and require service or replacement sooner and 25 years is an industry standard life span for treatment works.

The current monthly wastewater charges are as presented in Table 4-3, accommodating the cost estimates presented in the previous section, Table 7-7, for the Recommended Project. The basis for these charges is the capital cost of the proposed improvements in addition to operation and maintenance costs and other non-project related costs estimated to be incurred during the next five years. The current rates, as presented in Table 4-3, were adopted by the City in compliance with the Proposition 218 process on December 8, 2014, with new rates being applied on January 1, 2015.

As presented in Section 4, the residential user rates will vary from $36.61/mo/EDU in 2014-2015 to $57.05/mo/EDU in 2018-2019, which is equivalent to a residential wastewater rate of 1% to just over 1.5%, respectively, with a 2014 MHI of $44,386 per year. The 1.5% of MHI is based on the assumption that there are no changes in the City MHI by 2018-2019.

Table 8-2 is a summary of the 2014 adopted City residential rates (not yet implemented) and projected annual revenues and expenses. The positive net revenues indicate that the projected budgets are balanced with a small surplus appropriate for establishing utility rates.

Table 8-2
Estimated Revenues and Operating Expenses (1)

	2014-15	2015-16	2016-17	2017-18	2018-19
Residential User Rate per EDU	$36.61	$42.17	$48.28	$55.94	$57.05
Total Projected Revenues (2)	$1,381,888	$1,593,993	$1,827,161	$2,119,615	$2,161,439
Total Projected Expenses (3)	$1,369,888	$1,581,393	$1,813,931	$2,105,724	$2,146,853
Net Revenues	$12,000	$12,600	$13,230	$13,892	$14,586

1. Data from City of Jackson Sewer Rate Study, August 2014.
2. Includes residential and commercial rate and other revenues.
3. Includes O&M, existing debt, CIP reserves and Project loan debt service and related costs.

9.0 RECOMMENDED PROJECT (PROPOSED ALTERNATIVE)

This section Outlines The Recommended Project.

9.1 PRELIMINARY PROJECT LAYOUT

The preliminary layout for the Recommended Project can be seen in Figure 9-1. The primary project components include:

- New Annoxic Basins
- New Flocculation Basins
- New Filter Capacity
- New UV Disinfection
- Improved Filter Backwash Facilities
- Modified Chemical Feed Systems
- Improved Solids Dewatering Facilities
- New Emergency Storage Facilities

The Recommended Project also includes ancillary improvements to make the new facilities function and operate in an integrated fashion with the existing plant, including piping and pumping modifications, modified site and yard piping and improved electrical, instrumentation and SCADA systems.

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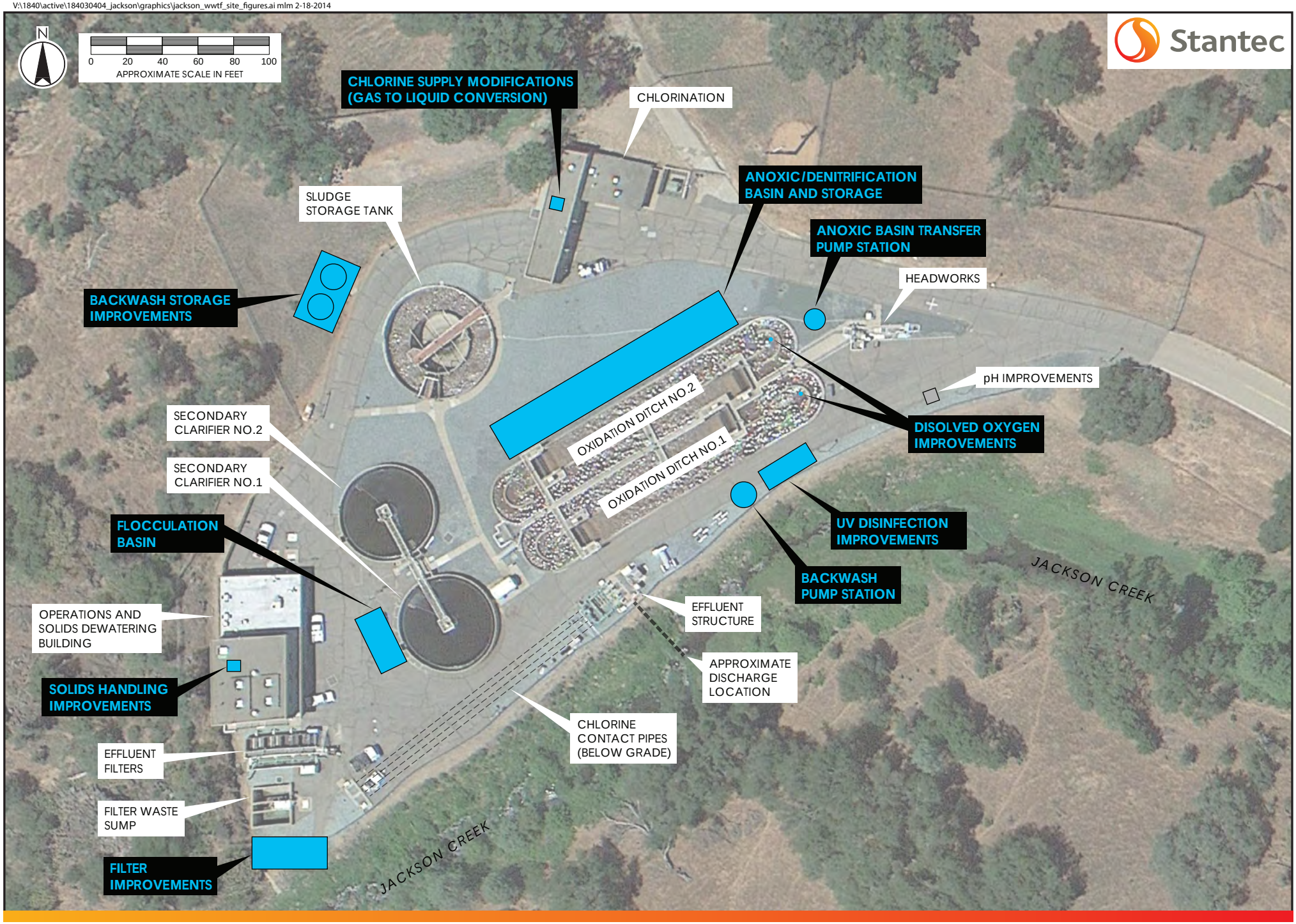

City of Jackson
Wastewater Treatment Facility Improvements
Project Report

Figure 9-1
Recommended Project - WWTF Physical Improvements

9.2 PROJECT SCHEDULE

Implementation of the project will follow the timeline outlined in the City's Time Schedule Order R5-2013-0147 (TSO) with the intent to complete steps/milestones as soon as practical. See Table 9-1 for a copy of the TSO timeline. The timeline requires:

- Submittal of this report (in Draft form) by February 28, 2014,
- User charge adjustments sufficient to cover costs of the project construction, operations and maintenance, including the Proposition 218 process, completed by 31, December 2014.
- Design and bidding process completed near the end of 2015.
- Construction completed near the end of 2017.

Table 9-1
City of Jackson Wastewater Treatment Facility Improvements
Recommended Project Schedule

Task	Compliance Date
Submitted documentation of public education and outreach and initiate 45-day Proposition 218 protest period	August 2014
Submitted documentation of Proposition 218 protest period and hearing completion and adoption of new rate structure by the City Council	December 2014
Submit Progress Reports	31 January, annually
Submit Project Report/Preliminary Engineering Report	February 2015
Submit documentation that the design of required treatment plant improvements have been initiated	31 March 2015
Submit documentation that the design is complete and bids have been requested	30 November 2015
Submit documentation that bid has been awarded	28 February 2016
Submit documentation that construction has initiated	30 June 2016
Submit documentation that construction has completed	30 November 2017
Submit documentation of project startup	28 February 2018

Some constituents covered by existing enforcement orders including total coliform turbidity and nitrate may leave the City open to MMP's after march 1, 2015 when protection from interim limits in R5-2011-0909-02 ends.

9.3 PERMIT REQUIREMENTS

The current 2013 Order, TSOs and ACLs are all included in Appendix C of this report. The Order defines all wastewater compliance requirements. Specific items in the permit that are driving this project include effluent limits for the following constituents:

- copper
- zinc
- total coliform
- turbidity
- dichlorobromomethane
- chlorodibromomethane
- ammonia
- nitrate
- THM

Additionally, historical compliance problems with effluent limitations on turbidity and coliform need to be addressed as part of this compliance project, as mentioned previously.

9.4 SUSTAINABILITY CONSIDERATIONS

Water use in the City has become very efficient over the last few years, possibly due to changed demographics or explicit water conservation efforts. This is exemplified by the reduction in average dry weather flow sent to the WWTF in recent years from 0.47 Mgal/d to 0.41 Mgal/d, a nearly 15% reduction. See the flows and loads section of this report for a description of the flows.

All new improvements completed with this project will utilize premium efficient motors were feasible and new PLC controls and SCADA alarming will help the WWTF to operate efficiently. This will be especially important around the modified oxidation ditch and new anoxic basins where precise oxygen control not only provides improved efficiency, but improved performance as well. It will also be important for operation of the new UV disinfection system which will create a new electrical demand where efficient control and operation will be important for energy conservation.

9.5 TOTAL PROJECT CAPITAL COSTS

The complete project costs are summarized in Table 9-2, with a reformatted cost breakdown as compared to the costs presented in Table 7-6 for engineering and construction costs. The difference between these two project cost estimates is that Table 9-2 also includes estimates for environmental, permitting and legal costs. The formatting for Table 9-2 is per USDA guidelines for “Total Project Costs”.

Table 9-2
City of Jackson Wastewater Treatment Facility Improvements
Recommended Project – Opinion of Total Probable Costs

City of Jackson Wastewater Treatment Facility		
Recommended Project - WWTF Continued Creek Discharge		
Opinion of Total Probable Cost		
ITEM	Subtotal	Total
Property Purchase/Lease Agreements		$0
Easement Acquisition / Right of Way / Water Rights		$0
Bond Council		$0
Legal Council		$10,000
Interest / Refinancing Expense		$0
Other		N/A
Environmental Services		
CEQA Environmental Report	$300,000	
NEPA Environmental Report	$0	
Environmental Mitigation Contract Services	$0	
Total Environmental Services (not in Table 7-6):		$310,000
Engineering Services		
Basic Services		
Preliminary Engineering Report (PER)	$125,000	
Preliminary and Final Design Phase Services	$700,000	
Bidding/Contract Award Phase Services	$50,000	
Construction and Post-construction Phase Services (w/o inspection)	$300,000	
Resident Project Representative Servcies (resident inspector)	$650,000	
Additional Services		
Permitting	$25,000	
Regulatory Compliance Reports		
Environmental Mitigation Services (Construction Phase)		
Easement Acquisition/ROW Services (Construction Phase)	$0	
Surveying Services (Construction Phase)	$25,000	
Operation and Maintenance Manual(s)	$40,000	
Geotechnical Services	$50,000	
Hydrogeologist Services	$0	
Materials Testing Services (Construction Phase)	$60,000	
Other Services		
Total Engineering Services:		$2,025,000
Equipment/Materials (Direct Purchases)		$0
Construction Cost Estimate		$8,333,000
Contingency		$1,642,000
TOTAL PROJECT COST ESTIMATE (ROUNDED):		$12,310,000

9.6 PROJECT OPERATING COSTS

The following sections provide a detailed breakdown of the anticipated operating costs associated with the Recommended Project.

9.6.1 Proposed Rate Schedule

The proposed schedule for residential wastewater rates was presented in Section 4 and Section 8 of this report. These rates were adopted by the City on December 8, 2014 and will be in effect on January 1, 2015. Table 9-3 is a summary of these rates for the next five year span. Commercial rates are as presented in Section 4, with additional detail as presented in the City of Jackson Sewer Rate Study, August, 2014.

Table 9-3
Proposed Rate Schedule with the Recommended Project

	2014-15	2015-16	2016-17	2017-18	2018-19
Residential User Rate per EDU	$36.61	$42.17	$48.28	$55.94	$57.05

9.6.2 Annual Operations and Maintenance (O&M) Costs

The following Table 9-4 represents the estimated O&M costs with the Recommended Project:

Table 9-4
Estimated O&M Recommended Project

WWTF O&M Cost Estimate with Recommended Project (1)	
Personnel (salary, benefits, payroll tax, insurance, Medical, PERS, training)(2)	$496,947
Administrative Costs (Postal supplies, office supplies, printing, telephones, etc.)	$13,650
Energy Costs (electricity, fuel)	$209,240
Process Chemicals	$72,517
Monitoring and Testing	$61,000
Professional Services (excludes Residual Waste Disposal Cost)	$196,000
Residuals/Waste Disposal	$54,000
Liability Insurance, Property Damage, Vehicle Ins., Misc. Insurance	$31,485
Legal Services	$5,000
Maint. of Equipment, Maint. of Facility(3), Maint. of Buildings	$35,500
Small Tools, Special Supplies, Prot. Clothing	$6,500
Equipment	$18,000
Capital Projects	$124,200
Maintenance of Vehicle(4)	$8,000
Other Agency Costs, Medical Services, Furniture, Communications	$9,805
Bonds Principal and Interest	$9,775
Book Keeping entry: Cost Allocation	$162,175
Total:	**$1,513,794**

(1) O&M Budget with 2014 basis; excludes Recommended Project loan payment. Note that this O&M budget is close, but does not exactly match that of the City of Jackson Draft Sewer Rate Study, 2014, budget. The differences have to do with the budget presented above being for a calendar year and the rate study being for a July to June fiscal year. The rate study also escalates costs over time, increasing the project loan repayment in step with annual rate increases. For comparison, the rate study indicates a 2014/2015 total annual expense of $1,369,888, and a 2015/2016 annual expense of $$1,581,393, bracketing the calendar budget presented in this table. The rate study includes a 2018/2019 total annual expense of $2,146,853, reflecting additional operation and maintenance costs and additional project loan payments as the rates escalate over time.

(2) Small portion of "Salaries" is allocated to the Public Works Department. For the Recommended Project it is assumed that one new full time employee is required at a rate of $50/hour (full burden rate as determined by City Staff based on current staffing).

(3) "Maintenance of Facility" is shared with the Public Works Streets Department (it is possible that 90% could be allocated to the WWTF).

(4) $7,000 is allocated to Public Works Streets Department

9.6.3 Debt Repayments

There is a small existing debt associated with the existing City wastewater utility of approximately $9,775 per year. This is reflected in the estimated O&M of the Recommended Project as shown in Table 9-4.

9.6.4 Reserves

The City currently has a wastewater reserve of approximately $194,200. The City's new rate structure will add to this account at a rate of 5% per year for five years with new funds, plus interests earned over time on the account, estimated at 2.5% per year. A new debt service coverage amount will also be added as a reserve to be in compliance with the loan, as needed and determined annually. Refer to the City of Jackson Sewer Rate Study, August 2014.

Short-lived assets that may require replacement and therefore should be accounted for in the establishment of a reserve fund include the following equipment:

Table 9-5
Short-Lived Asset Reserves

	Useful Life (years)	Replacement Costs (a)	Annual Reserve
Influent Screen	20	$15,000	$750
Samplers (influent, effluent)	15	$20,000	$1,333
Aeration Rotors	20	$50,000	$2,500
Anoxic Basin Transfer Pumps	15	$20,000	$1,333
Anoxic Mixers	10	$15,000	$1,500
Clarifier Mechanisms	25	$75,000	$3,000
RAS Pumps	10	$20,000	$2,000
Flocculation Mixers	15	$20,000	$1,333
Chemical Feed Pumps	15	$15,000	$1,000
Chemical Storage Tanks	15	$15,000	$1,000
Filter Media	10	$10,000	$1,000
Filter Backwash Pumps	15	$20,000	$1,333
Plant Water Pumps	15	$15,000	$1,000
Sludge Dewatering Equipment	20	$100,000	$5,000
Back-up Generator	25	$50,000	$2,000
SCADA System (computers/telemetry)	10	$15,000	$1,500
Collective Instrumentations (DO/pH, flow meters, etc.)	20	$40,000	$2,000
UV lamps	5	$20,000	$4,000
Total:			**$33,583**

(a) All cost in 2014 dollars. To match inflation, the reserve amount should be escalated annually using the ENRCCI index.

10.0 CONCLUSIONS AND RECOMMENDATIONS

The Recommended Project is the best apparent project to achieve wastewater compliance with the City's new Order and existing TSOs. This project has the lowest capital costs and the lowest operation and maintenance costs of the project alternatives considered. It is also the simplest to implement in that almost all the project improvements occur on the existing City WWTF site and no third party coordination (other property owners or agencies) are involved. It also avoids dewatering Jackson Creek and the potential environmental impact that could cause, if that were to be allowed by the Division of Water Rights.

Appendix A Effluent Filters Evaluation and Improvement

ECO:LOGIC
ENGINEERS · CONSULTANTS

101 Providence Mine Road, Suite 202
Nevada City, CA 95959

530.470.0515 TEL
530.470.0518 FAX

April 28, 2010

Mr. Michael Daly
City of Jackson
33 Broadway
Jackson, CA 95642

Subject: City of Jackson WWTP
Effluent Filters Evaluation and Improvement Project

Dear Mr. Daly:

ECO:LOGIC has assessed the performance issues with the City's WWTP effluent filters, and we are pleased to present the attached evaluation memo. A number of possible issues were identified and evaluated, but it appears that in addition to minor repairs and maintenance items, that the fundamental issue affecting filter performance is limited capacity. You'll see in the memo that roughly twice the filter capacity is required to provide filtration of all plant flows at recommended loading rates.

The original scope identified a number of items that required review. These are all addressed in the memo. Some of the recommendations include maintenance, such as leveling and replacing weirs and splash plates, and others involve operational changes, such as lengthening the backwash cycle when flows are low (summer time), and experimenting with the chlorine feed point and coagulant addition. Another proposed improvement is to use the filter waste sump to equalize backwash return flows. With respect to difficulty using the filter controller, the manufacturer says that the existing controller should perform all the desired functions and so we recommend field training with the possibility of upgrading the controller if it continues to be too inflexible or cumbersome. All of these ideas should help to optimize performance of the existing filters, but none will overcome the capacity limitations.

Based on the conclusions reached during the effluent filter evaluation, we recommend that the next items of work under this scope and budget include:

1) Evaluate options for providing additional filter capacity, and

2) Evaluate the disinfection system. Operators expressed concerns related to chemical feed back control due to the presence of the backwash pumps in the chlorine contact basin, which create a discontinuous flow through the basin. The significant distance between the chlorine residual analyzers and the contact basin also create chemical feedback control issues and delays. Controls for the chemical feed system will be further complicated if the recommended short term improvement to relocate the chlorine feed point to downstream of the filters is implemented.

Please let us know if you have any questions about the filter evaluation memo. We consider it a draft until you and your staff have reviewed it and confirmed that our conclusions are consistent with field observations. In the meantime we'll start the process of evaluating options for providing additional filtration capacity and assessing the disinfection process.

Sincerely,

ECO:LOGIC Engineering

Gabe Aronow

Gabe Aronow, P.E.
Supervising Engineer

cc: Harold Welborn, Dave Price, ECO:LOGIC Engineering

Attachment: Filter Evaluation Technical Memorandum No. 1

ECO:LOGIC
ENGINEERS · CONSULTANTS

City of Jackson Wastewater Treatment Plant Filter Evaluation
Technical Memorandum No. 1

Rapid Sand Filters

Prepared By: Gabe Aronow, P.E.

Reviewed By: Harold Welborn, P.E.

Date: April 28, 2010

1.1 PURPOSE

This memo includes an evaluation of the City's sand filters at the wastewater treatment plant and is intended to serve as a guide to improving the filtration facilities. The impetus for this evaluation includes plant discharge violations due to turbidity, and general difficulty controlling filter performance.

1.2 BACKGROUND

The City's wastewater treatment plant, including the sand filters, was constructed in 1985 and produces filtered disinfected effluent under most flow conditions. During extreme high flows, however, the filters are bypassed resulting in disinfected secondary effluent being discharged to Jackson Creek. The primary and secondary treatment facilities include influent headworks with mechanical screening, oxidation ditches and secondary clarifiers.

The filters are Hydroclear Rapid Sand Filters, consisting of four individual filter cells, each with 110 square feet of filtration area. The chlorine contact basin functions as the clear well for back-wash supply and a separate filter waste sump receives backwash waste. Table 1-1 is a summary of the filter design flow and load conditions. Table 1.2 is a summary of the operating conditions at different filter loading rates.

Table 1-1
Filter Design Flow and Load Conditions

Parameter	Flow & Load Conditions		Comments
Peak Plant Influent Flow:	3.5 Mgal/d	2,430 gpm	Per 1985 Design Criteria.
Backwash Return:	0.5 Mgal/d	370 gpm	
Peak Flow to Filters:	4.0 Mgal/d	2,800 gpm	
Backwash Pump Capacity:	2.1 Mgal/d	1,460 gpm	
Backwash Loading Rate:		13.3 gpm/sf	Calculated. Design criteria says 12 gpm/sf
Peak Filter Loading Rate:		8.48 gpm/sf	With 1 filter out of service or in backwash
Limited Filter Flow:	2.0 Mgal/d	1,388 gpm	Limited flow controlled by staff
Limited Filter Loading Rate:		4.21 gpm/sf	With 1 filter out of service or in backwash
Desirable Loading Rate:		3.5 - 4.0 gpm/sf preferred, 5.0 gpm/sf upper limit	Manufacturer's recommendation.

(a) Flow and loading data is from the 1985 Design Drawings, Design Criteria page, unless noted otherwise.

The 8.48 gpm/sf loading rate for the peak plant influent and backwash return flows is higher than the manufacturer's recommended loading rate of approximately 4 gpm/sf. This corresponds to the operators manual filter bypass of plant flow greater than about 2 Mgal/d, which brings the filter loading rate to approximately 4.2 gpm/sf.

Table 1-2
Filter Capacity at Different Loading Rates

Parameter	From Filter Operations Manual (a)	Manufacturer Recommended Maximum	Manufacturer Recommended	Comments
Filter Loading Rate:	8.48 gpm/sf	5 gpm/sf	4 gpm/sf	
Filter Flow Rate:	2,798 gpm 4.0 Mgal/d	1,650 gpm 2.4 Mgal/d	1,320 gpm 1.9 Mgal/d	With 1 filter out of service or in backwash
Backwash Waste Return Rate:	370 gpm 0.5 Mgal/d	370 gpm 0.5 Mgal/d	370 gpm 0.5 Mgal/d	
Maximum Plant Influent Flow to Meet Filter Loading Rate with Return Flow.	3.5 Mgal/d	1.9 Mgal/d	1.4 Mgal/d	

(a) The value 8.48 gpm/sf is from the City's Operations Manual, which describes it as a "maximum rate that will rapidly consume the operating head resulting in short filter run times". This has been observed empirically. The 8.48 gpm/sf value with one filter out of service or in backwash is equivalent to 6.36 gpm/sf with all filters in service.

1.3 OBSERVED FILTER AND OPERATIONAL PROBLEMS

The following operational problems have been observed with the filters:

1. The backwash cycle results in effluent turbidity spikes.
2. The backwash controller is difficult to use and inflexible.
4. The influent weirs may not be distributing flow evenly to the filter beds.
5. The air-actuated valves operate too rapidly.
6. There is a noticeable accumulation of detritus on the filter surface after backwash.
7. There are missing influent splash plates.
8. Air-scour of the sand bed prior to backwash does not appear to function.

1.4 DISCUSSION ABOUT EACH OBSERVED FILTER AND OPERATIONAL PROBLEM

1. **The backwash cycle results in effluent turbidity spikes.** With the backwash cycle set for a three minute duration, the filter backwashes to waste (filter waste sump) and then the pneumatic valves switch from backwash to normal operation. The valves operate quickly and upon resumption of normal filtration, there can be a spike in turbidity. This is believed to be caused by the rapid draining of the filter contents through a relatively clean filter bed. The filter drains rapidly because during backwash the filter water level is above the filter influent weir level, giving it hydraulic head (driving force) and because the valves operate quickly, the hydraulic head creates a high velocity discharge. The high velocity can scour any remaining detritus in the filter, now loosened by the backwash process, and discharge it with the filter effluent causing a turbidity spike. The filter manufacturer cites that this increase in turbidity can last from 10 to 30 seconds, but should not exceed maximum limits or average limits over time, with standard secondary influent and recommended loading rates.

   This turbidity spike effect has been indirectly verified by increasing the backwash duration, which resulted in reduced turbidity spikes. This is believed to be because a longer backwash cycle produces a cleaner filter bed, which results in less detritus discharged, and hence lower turbidities, when normal filtration commences.

   Possible solutions include:

   a. Increase the backwash duration. This is a viable solution, but has the negative consequence of creating more backwash water, which recycles through the plant, requiring retreatment and refiltration. This solution may be best implemented during average or low flows when the filters can accommodate the extra recycle flow.

   b. Modify the valve controls to open more slowly. This could help to prevent a high velocity discharge and associated scour of detritus from the filter when normal filter operation is resumed after a backwash. Replacement of the existing pneumatic valves with electric operated valves may be required to control the rate of valve opening and closing.

   c. Modify the filter effluent piping and valves to create a filter to waste option. With this solution, the filter could be brought back on line after a backwash, but have the

effluent routed to the filter waste sump until the high turbidity spike passes. When the effluent turbidity is acceptable, normal effluent routing could resume. To achieve this, additional piping and valves need to be constructed on the discharge side of the filter. This function would have to be integrated with the filter controls and would probably operate on a timer, such that after a backwash, the filter effluent is wasted for a short period. Like the longer backwash option (solution "a', above), this solution would create more plant recycle flow.

2. **The backwash controller is difficult to use and inflexible.** The filter controllers are from the 1985 installation and are difficult to use. However, the filter supplier, Siemens Water Technologies Corporation, believes that the existing controls can perform all the desired functions, including spacing out the backwash cycles so they do not "stack-up" upon each other, a common filter occurrence under high flows and/or high turbidity conditions.

   The term "stack-up" refers to the filter backwash sequencing whereby backwash cycles for each filter cell become closer and closer together in time as the filters operate. As one of the four filters goes into a backwash cycle, the balance of the filter influent goes to the remaining three filters. Those three filters then see more filter load and more flow, which causes additional headloss and forces the next filter into a backwash cycle sooner than it might have otherwise. The filters may even be tripped into a backwash due to hydraulic headloss alone, not because of the accumulation of solids. This phenomenon continues until all the filters require backwashing at nearly the same time. This can be a problem, in that flow needs to pass through the plant, which cannot happen effectively if too many filters are backwashing.

   A common solution to this problem is to force the backwashes to be spaced out over time even if the headloss set point calls for a backwash to initiate in a particular filter cell. This is typically done through the filter controls, which in the case of Jackson, are difficult to use. Two solutions include:

   a. Have a filter manufacturer representative or qualified filter operators come to the site to inspect the controls and provide training on the backwash timing and general filter controls. The City of Lincoln plant operators have a relatively new Hydroclear Fitler system that is working effectively and they are amendable to providing operational assistance to Jackson. Siemens, is also prepared to send representatives to provide this training. Again, Siemens believes the existing controls should provide the desired functions if properly set.

   b. Install updated controls. New controls would provide all the required functions for the filtration process, but would be easier to use, with a new graphical user interface and easy to use set points.

3. **The influent weirs may not be distributing flow evenly to the filter beds.** There are two sets of weirs to each filter: 1) one weir off the distribution channel to each filter cell, and 2) two weirs on either side of the distribution channel <u>within</u> each filter cell.

   The weirs off the main distribution channel to each filter cell are straight edge rectangular weir plates. To create an even distribution to each filter cell, these weirs should all be set level at the exact same elevation. During a site visit, it was observed that the weirs did not

visually appear to be at the same height with respect to the frame of the overall structure. They may require adjusting. The level and elevation of the main distribution weirs is easily confirmed with a laser level and can easily be corrected in the field.

Operations staff indicated that Filter Cell 4 gets more load than Cell 1, indicating that some weir adjustment is required. However, this may only occur when the filters are hydraulically overloaded. They are designed for flows under 2 Mgal/d, but if 2 Mgal/d or more is sent through the main distribution channel, the channel velocity may carry more load to the downstream-most filter, in this case, Filter Cell 4. The conditions under which this uneven distribution occurs should be confirmed.

Note that the 2 Mgal/d filter limit (per operations staff) consists of plant influent flow plus the filter backwash recycle flow. Therefore, the filter bypass should occur not when the plant influent flow is 2 Mgal/d or higher, but when the filter feed flow is 2 Mgal/d or higher.

The distribution weirs within each filter cell are v-notch weir plates. The v-notch weirs must be level and at the same elevation in each filter cell. Some of these weir plates are corroded and failing, which may result in uneven distribution of flow within the filters (the two sides of each filter cell), and they should be replaced. New weirs can be supplied by Siemens or any metal fabrication shop can make them to the required specifications.

4. **There are missing influent splash plates.** The splash plates help prevent streamlets from the v-notch weir from causing short circuiting through the filter media. However, once the headloss in the filter is sufficient to flood the media, the streamlets are dissipated in the water column above the media, which functions as its own splash plate, and any holes in the media caused by the streamlets collapse once submerged. Further, because filter performance does not appear inhibited during normal filter operation, i.e. after the backwash turbidities have passed, the lack of splash plates does not appear to be a problem. However, replacing the splash plates would be good practice and is recommended.

5. **The air-actuated valves operate too rapidly.** Air actuated (pneumatic) valves are typically open or closed, with limited ability to control the rate of opening or closing. It is possible to force the air through an orifice such that they don't get too much operating air too quickly, but they tend to stick until the pressure builds up sufficiently to open or close them, at which time they quickly open or close all the way. To control the rate of operation, the preferred technology for this application is a geared electric operator, which will probably require the whole valve-operator system to be replaced.

   An alternative to replacing the operator mechanism is to install a smaller pneumatic valve or place an orifice plate over the discharge end of the existing valves. Both of these options would create headloss which could limit the discharge velocity and scour effect in the filter. However, this idea could limit the free flow of the underdrain system, significantly impeding the air pulse function.

   The filter representative explained that while there may be a slight increase in turbidity immediately after a backwash, it should not exceed maximum or average limits if the filters are operated within design filtration limits. It is proposed that any ideas that might

impede the filter discharge rate be discussed with the filter manufacturer's representative prior to implementation.

6. **There is a noticeable accumulation of detritus on the filter surface after backwash.** During the backwash cycle, the detritus that was trapped on and in the filter media is brought to the media surface with the desired result of flushing as much of it out with the backwash overflow as possible. Any material that is not removed with the backwash can settle back on the media surface when normal filtration resumes.

   Some material on the media surface is normal. It is not an operational problem for the filters, except to the extent that it shortens the life of the next filter run. The only solution to eliminate this accumulation is to run the backwash cycle for a longer duration. However, a longer duration backwash results in additional return flow through the plant.

7. **Air-scour of the sand bed prior to backwash does not appear to function.** There are two forms of air addition that are supposed to aid the filter performance and run time. They are: 1) air scour, which is the air added to the filter through the air drops on the side of each filter cell, and 2) the air pulse, which involves opening and closing the valves as though to initiate a backwash, but only long enough to drive the air in the under-drain system into the filter media during the normal filtration process.

   The air scour system creates a rolling current in the water above the filter media, which aids in the suspension of detritus that could accumulate on the media surface and blind the filter. In this way, the air scour prolongs the run of the filter. The air scour system is trigged into operation by a water level set point above the media surface.

   The air pulse function is also intended to extend the filter run time by lifting the sand periodically during the filter process thereby allowing detritus to pass further into the media bed, i.e. use more of the media depth than just the top surface to capture filterable materials. The air pulse system is also set based on headloss through the filter and may be set to operate six to eight times before a backwash cycle is initiated. The air pulse set point would be at a water level slightly higher than for the air scour set point. (The backwash cycle would then be triggered by an even higher headless set point than for the air pulse.) Both forms of air addition are considered crucial to getting good performance from the filter.

   Note that too many air pulses could cause some turbidity bleed through. This could occur if the pulse has allowed materials to migrate too far into the media and breakthrough to the under-drain. In this case, less pulses should be programmed prior to initiating a backwash.

   Operations staff indicate that they do see turbidity spikes during the air pulse indicating that the programming needs adjusting. It was also stated that the pulses occur every five minutes (or so) during normal filtration, which is probably too frequent. Under normal operations, if a filter run time is 24 hours between backwashes, then an appropriate pulse frequency may be every two or three hours.

1.5 ADDITIONAL IMPROVEMENT IDEAS/COMMENTS

Through the course of investigating the City's filters, additional ideas were proposed by engineering staff and the filter supplier to improve the filter performance, including:

1. Siemens recommends regular cleaning of the filter media with a dilute hypochlorite solution or a compound like Simple Green. Based on operator input, the media has never been cleaned, however the current pre-filter chlorination practice minimizes media fouling and therefore a specific cleaning operation may not be that helpful at this time. However, if the chlorination point is located downstream of the filters, cleaning should be a regular part of filter operation and maintenance.

2. The media cannot be too old. Old media becomes weathered over time (rounded as opposed to granular) and therefore less effective at trapping material. The operations staff state that the media has been replaced over time and that the proper media was installed. However, this is an important parameter to remember over time – replace the media at regular intervals.

3. Feeding chlorine prior to filtration can destabilize flocs and reduce filter performance. It may be helpful to chlorinate downstream of the filtration process and see if that improves filter performance. Chlorine inhibition of floc formation may be case specific so ideally the City would have the option of pre- or post-filter chlorination.

4. Add a filtration aid (polymer/coagulant) prior to filtration. For this to be effective, a mixing system would be required, although it may suffice to add the filter aid at an upstream location where turbulents exist. The addition of a flocculation basin would also assist in the formation of large, capturable flocs, but in the absence of a flocculation basin, the further upstream the filter aid is added, the more contact time there will be for floc formation.

5. Operations staff indicated that they had more problems with turbidity during the summer (lower plant flows) than during the winter. It could be that the plant biology produces a different floc during different climatic conditions. In the summer, the floc may be smaller and more difficult to capture in the filter; summer floc may also be more susceptible to chlorine breakdown (see chlorine note above). A coagulant upstream of the filtration would help to form larger floc.

   The comment that turbidity varies seasonally may be correct, but it may also be related to the upset that occurred during the summer of 2009. Seasonal variations in secondary effluent and turbidity were not explored in detail for preparation of this memo.

6. The screen part of the under drain system should be checked to verify there are no breaches. Operations staff has indicated that during past inspections the screens were in good conditions, but this is something to check during the next filter bed inspection.

7. Modify the filter waste sump to return an equalized flow to the extent possible to minimize backwash return flow rates. For example, the backwash pumps supply backwash water to the filter waste sump at a flow rate of nearly 1,460 gpm, but the filter waste sump pumps only return a recycle rate to the plant of 370 gpm, or nearly 0.5 Mgal/d. If the filter waste sump pumps can be put on a variable speed control system and utilize more of the sump

volume for equalization, the recycle rate might be limited to 0.1 Mgal/d or 0.2 Mgal/d. In this way, the recycle rate might be lower, but would operate for longer durations to convey the same overall backwash volume back through the plant.

1.6 RECOMMENDED SHORT TERM FILTER IMPROVEMENTS

The following action items are recommended to improve the existing filter performance. Long term improvements, including providing additional capacity, will be addressed separately.

1. Have a qualified Hydroclear Filter operator or filter representative come to the plant to provide operations training of the filter and controls and verify that all systems function properly
    a. Modify the controls to off-set the backwash cycles.
    b. During low flows, when the plant can accommodate higher recycle flows, increase the duration of the backwash cycle.
    c. Verify or repair the air scour system and utilize it per the manufacturer's recommendations.
    d. Verify or repair the air pulse system and utilize it per the manufacturer's recommendations. Be sure to limit the number and frequency of the pulses to prevent turbidity breakthrough.
    e. If the controls continue to be cumbersome and inflexible, consult with the manufacturer about updating the controls.
2. Verify that the main distribution channel weirs to each filter cell are level and at the exact same elevation.
3. Replace damaged v-notch weirs within the filters and verify that existing and new weirs are level and at the same elevation within each cell.
4. Replace missing splash plates.
5. Clean the filters per the manufacturer's recommendation. Note that this may not be required at this time due to the current chlorine pre-filter feed location, but should be discussed further with the filter representative. They may recommend a cleaning solution other than chlorine or hypochlorite.
6. Verify that the filter media does not require replacement; replace it if it does. Also verify that the appropriate depth of media is in the filter beds.
7. During low flow conditions, when a filter can be taken off-line, evaluate the under-drain system and make sure the screen is undamaged. Make repairs as required. A separate brief memo will be prepared when this is completed over the summer of 2010 (during low flows).
8. Experiment with relocating the chlorine feed point to downstream of the filters. If this causes chemical feed control issues, they should be addressed independently of the filters (separate memo). It would be ideal for operations staff to be able to select a pre- or post-

filter chlorination point, perhaps varying the location seasonally (if floc or other conditions change seasonally).

9. Experiment with adding a filter aid at an upstream turbulent location. A small amount of coagulant may significantly aid performance.
10. Modify the filter waste sump pumps to operate on variable speed control and maximize use of the sump volume for equalization of the backwash return flows to the plant. New level instrumentation may also be required to facilitate this operational change.

Other physical improvements identified in this memo, such as replacing the pneumatic valves with electric operated valves, or adding an orifice restrictive plate or adding a filter to waste system should be further evaluated after the above items have been completed, and then only if problems persist. These added features should also be considered when evaluating additional filter capacity to provide full filtration at all plant flow rates.

1.7 RECOMMENDED LONG TERM FILTER IMPROVEMENTS

The obvious long-term solution to improving filter performance is to provide additional filter capacity. As noted in the Background Section of this Technical Memorandum No. 1, the design loading rate of 8.48 gpm/sf exceeds the manufacturer's recommended loading rate of less than 5 gpm/sf.

It is recognized that bypassing the filters was considered an option at high flows in the original design based on the maximum loading rate of 2.0 Mgal/d indicated by operations staff (see Table 1-1). However, the current waste discharge permit does not allow such bypassing on a routine basis, such as during normal winter peak flows. To provide reliable filter capacity during peak influent flows with acceptable loading rates, roughly double the current filter capacity will be required.

Appendix B Influent Flow and Rainfall Data (I/I Analysis)

Date	Plant Influent Flow, Mgal/d	Precipitation (inches)
2/1/2007	0.547	0
2/2/2007	0.558	0
2/3/2007	0.572	0
2/4/2007	0.554	0
2/5/2007	0.562	0.1
2/6/2007	0.561	0.5
2/7/2007	0.604	0.75
2/8/2007	0.739	1.8
2/9/2007	1.426	0.05
2/10/2007	1.043	0.15
2/11/2007	0.836	0
2/12/2007	0.754	0
2/13/2007	0.71	0
2/14/2007	0.593	0
2/15/2007	0.657	0
2/16/2007	0.587	0
2/17/2007	0.584	0
2/18/2007	0.612	0
2/19/2007	0.588	0
2/20/2007	0.602	1.55
2/21/2007	1.131	0
2/22/2007	0.888	0.5
2/23/2007	0.814	0.8
2/24/2007	1.316	0.85
2/25/2007	1.58	0.85
2/26/2007	1.204	0
2/27/2007	1.21	0
2/28/2007	0.793	0
3/1/2007	0.839	0
3/2/2007	0.782	0
3/3/2007	0.769	0
3/4/2007	0.738	0
3/5/2007	0.655	0
3/6/2007	0.648	0
3/7/2007	0.625	0

Date	Plant Influent Flow, Mgal/d		Precipitation (inches)
2/1/2009	0.482		0
2/2/2009	0.463		0
2/3/2009	0.469		0
2/4/2009	0.475		0.25
2/5/2009	0.494		0
2/6/2009	0.461		0.4
2/7/2009	0.52		0
2/8/2009	0.491		0.2
2/9/2009	0.505		0.4
2/10/2009	0.64		0.9
2/11/2009	0.607		0.7
2/12/2009	1		0.1
2/13/2009	0.823		0.1
2/14/2009	0.696		1.1
2/15/2009	0.959		0.7
2/16/2009	1.229		0
2/17/2009	0.917		0
2/18/2009	0.734		0
2/19/2009	0.636		0.25
2/20/2009	0.602		0.8
2/21/2009	0.859		0.4
2/22/2009	0.988		0
2/23/2009	0.816		0.2
2/24/2009	0.71	T	
2/25/2009	0.693		0
2/26/2009	0.621		0
2/27/2009	0.59		0.7
2/28/2009	0.848		1.1
3/1/2009	1.181		1
3/2/2009	1.335	T	
3/3/2009	1.169		0
3/4/2009	0.84		0
3/5/2009	0.749		0
3/6/2009	0.6		0
3/7/2009	0.61		0

Appendix C ORDER R5-2013-0146, TSO R5-2011-0909-02, TSO R5-2013-0147 and ACL R5-2012-0560

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

CENTRAL VALLEY REGION

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ORDER R5-2013-0146
NPDES NO. CA0079391

WASTE DISCHARGE REQUIREMENTS FOR THE CITY OF JACKSON WASTEWATER TREATMENT PLANT AMADOR COUNTY

The following Discharger is subject to waste discharge requirements as set forth in this Order:

Table 1. Discharger Information

Discharger	City of Jackson
Name of Facility	Wastewater Treatment Plant
Facility Address	39 North Highway 49-88
	Jackson, CA 95642
	Amador County
The U.S. Environmental Protection Agency (USEPA) and the Regional Water Quality Control Board have classified this discharge as a minor discharge.	

The discharge by the City of Jackson from the discharge points identified below is subject to waste discharge requirements as set forth in this Order:

Table 2. Discharge Location

Discharge Point	Effluent Description	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
001	Treated Municipal Wastewater	38° 30’ 28” N	120° 14’ 04” W	Jackson Creek

Table 3. Administrative Information

This Order was adopted by the Regional Water Quality Control Board on:	**5 December 2013**
This Order shall become effective on:	**24 January 2014**
This Order shall expire on:	**1 December 2018**
The Discharger shall file a Report of Waste Discharge in accordance with title 23, California Code of Regulations, as application for issuance of new waste discharge requirements no later than:	**180 days prior to the Order expiration date**

I, **PAMELA C. CREEDON**, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on **5 December 2013**.

Original Signed by

_____

PAMELA C. CREEDON, Executive Officer

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I. FACILITY INFORMATION

The following Discharger is subject to waste discharge requirements as set forth in this Order:

Table 4. Facility Information

Discharger	City of Jackson
Name of Facility	Wastewater Treatment Plant
Facility Address	39 North Highway 49-88
	Jackson, CA 95642
	Amador County
Facility Contact, Title, and Phone	Eric Neuschmid, Chief Plant Operator, (209) 223-1607
Mailing Address	33 Broadway, Jackson, CA 95642
Type of Facility	Publicly Owned Treatment Works (POTW)
Facility Design Flow	0.71 million gallons per day (MGD), average dry weather flow

II. FINDINGS

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

A. Background. The City of Jackson (hereinafter Discharger) was authorized to discharge pursuant to Order R5-2007-0133-01 and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0079391. The Discharger submitted a Report of Waste Discharge, dated 29 March 2012, and applied for a NPDES permit renewal to discharge up to 0.71 MGD of treated wastewater from the City of Jackson Wastewater Treatment Plant, hereinafter Facility. The application was deemed complete on 9 October 2012.

For the purposes of this Order, references to the “discharger” or “permittee” in applicable federal and state laws, regulations, plans, or policy are held to be equivalent to references to the Discharger herein.

B. Facility Description. The Discharger owns and operates a POTW. The treatment system consists of a headworks, two oxidation ditches, two secondary clarifiers, chlorine injection, one train of four sand filters, chlorine contact basin, and sulfur dioxide dechlorination. Wastewater is discharged from Discharge Point No. 001 (see table on cover page) to the Jackson Creek, a water of the United States, and a tributary to Amador Lake within the Mokelumne River watershed. Attachment B provides a map of the area around the Facility. Attachment C provides a flow schematic of the Facility.

C. Legal Authorities. This Order is issued pursuant to section 402 of the Clean Water Act (CWA) and implementing regulations adopted by USEPA and chapter 5.5, division 7 of the California Water Code (Water Code; commencing with section 13370). It shall serve as a NPDES permit for point source discharges from this facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to article 4, chapter 4, division 7 of the Water Code (commencing with section 13260).

D. Background and Rationale for Requirements. The Central Valley Water Board developed the requirements in this Order based on information submitted as part of the application, through monitoring and reporting programs, and other available information. The Fact Sheet (Attachment F), which contains background information and rationale for Order requirements, is hereby incorporated into this Order and constitutes part of the Findings for this Order. Attachments A through E and G through J are also incorporated into this Order.

E. California Environmental Quality Act (CEQA). Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of CEQA, Public Resources Code sections 21100-21177.

F. Technology-based Effluent Limitations. Section 301(b) of the CWA and implementing USEPA permit regulations at section 122.44, title 40 of the Code of Federal Regulations (40 CFR 122.44), require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. The discharge authorized by this Order must meet minimum federal technology-based requirements based on Secondary Treatment Standards at 40 CFR Part 133. A detailed discussion of the technology-based effluent limitations development is included in the Fact Sheet.

G. Water Quality-based Effluent Limitations (WQBELs). Section 301(b) of the CWA and 40 CFR 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards. This Order contains requirements, expressed as technology equivalence requirements, which are necessary to achieve water quality standards. The Central Valley Water Board has considered the factors listed in Water Code section 13241 in establishing these requirements. The rationale for these requirements, which consist of tertiary treatment or equivalent requirements, is discussed in the Fact Sheet.

40 CFR 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established using: (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in 40 CFR 122.44(d)(1)(vi).

H. Water Quality Control Plans. The Central Valley Water Board adopted a *Water Quality Control Plan, Fourth Edition (Revised October 2011)*, for the Sacramento and San Joaquin River Basins (hereinafter Basin Plan) that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. The Basin Plan

at page II-2.00 states that the "…*beneficial uses of any specifically identified water body generally apply to its tributary streams*." Table II-1 of the Basin Plan identifies the beneficial uses of certain specific water bodies. The Basin Plan does not specifically identify beneficial uses for Jackson Creek, but does identify present and potential uses in Table II-1 for the Sacramento-San Joaquin Delta, to which Jackson Creek, via Amador Lake, Dry Creek, and the Mokelumne River, is tributary. In addition, the Basin Plan implements State Water Resources Control Board (State Water Board) Resolution No. 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. Thus, as discussed in detail in the Fact Sheet, beneficial uses applicable to Jackson Creek are as follows:

Table 5. Basin Plan Beneficial Uses

Discharge Point	Receiving Water Name	Beneficial Use(s)
001	Jackson Creek	<u>Existing uses from Table II-1 of the Basin Plan:</u> Municipal and domestic supply (MUN); Agricultural supply, including irrigation and stock watering (AGR); Industrial process supply (PROC); Industrial service supply (IND); Water contact recreation (REC-1); Non-contact water recreation (REC-2); Warm freshwater habitat (WARM); Cold freshwater habitat (COLD); Migration of aquatic organisms, warm and cold (MIGR); Spawning, reproduction, and/or early development, warm (SPWN); Wildlife habitat (WILD); and Navigation (NAV).

The Basin Plan includes a list of Water Quality Limited Segments (WQLSs), which are defined as "…*those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources (40 CFR 130, et seq.)*." The Basin Plan also states, "*Additional treatment beyond minimum federal standards will be imposed on dischargers to WQLSs. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment*." Jackson Creek is not listed as a WQLS on the 2010 303(d) list. Amador Lake is listed as a WQLS for high pH on the 303(d) list of impaired water bodies. Effluent limitations for pH are included in this Order.

Requirements of this Order implement the Basin Plan.

I. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** USEPA adopted the NTR on 22 December 1992, and later amended it on 4 May 1995 and 9 November 1999. About 40 criteria in the NTR applied in California. On 18 May 2000, USEPA adopted the CTR. The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the

state. The CTR was amended on 13 February 2001. These rules contain water quality criteria for priority pollutants.

J. State Implementation Policy. On 2 March 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on 28 April 2000 with respect to the priority pollutant criteria promulgated for California by USEPA through the NTR and to the priority pollutant objectives established by the Central Valley Water Board in the Basin Plan. The SIP became effective on 18 May 2000 with respect to the priority pollutant criteria promulgated by USEPA through the CTR. The State Water Board adopted amendments to the SIP on 24 February 2005 that became effective on 13 July 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.

K. Compliance Schedules and Interim Requirements. In general, an NPDES permit must include final effluent limitations that are consistent with CWA section 301 and with 40 CFR 122.44(d). There are exceptions to this general rule. The State Water Board's *Policy for Compliance Schedules in National Pollutant Discharge Elimination System Permits* (Compliance Schedule Policy) allows compliance schedules for new, revised, or newly interpreted water quality objectives or criteria, or in accordance with a total maximum daily load (TMDL). All compliance schedules must be as short as possible, and may not exceed ten years from the effective date of the adoption, revision, or new interpretation of the applicable water quality objective or criterion, unless a TMDL allows a longer schedule. A Regional Water Board, however, is not required to include a compliance schedule, but may issue a Time Schedule Order pursuant to Water Code section 13300 or a Cease and Desist Order pursuant to Water Code section 13301 where it finds that the discharger is violating or threatening to violate the permit. The Central Valley Water Board will consider the merits of each case in determining whether it is appropriate to include a compliance schedule in a permit, and, consistent with the Compliance Schedule Policy, should consider feasibility of achieving compliance, and must impose a schedule that is as short as possible to achieve compliance with the effluent limit based on the objective or criteria.

The Compliance Schedule Policy and the SIP do not allow compliance schedules for priority pollutants beyond 18 May 2010, except for new or more stringent priority pollutant criteria adopted by USEPA after 17 December 2008.

Where a compliance schedule for a final effluent limitation exceeds one year, the Order must include interim numeric limitations for that constituent or parameter, interim milestones and compliance reporting within 14 days after each interim milestone. The permit may also include interim requirements to control the pollutant, such as pollutant minimization and source control measures.

L. Alaska Rule. On 30 March 2000, USEPA revised its regulation that specifies when new and revised state and tribal water quality standards become effective for CWA purposes. (40 CFR 131.21 and 65 FR 24641 (27 April 2000).) Under the revised

regulation (also known as the Alaska rule), new and revised standards submitted to USEPA after 30 May 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by 30 May 2000 may be used for CWA purposes, whether or not approved by USEPA.

M. Stringency of Requirements for Individual Pollutants. This Order contains both technology-based effluent limitations and WQBELs for individual pollutants. The technology-based effluent limitations consist of restrictions on flow and percent removal requirements for 5-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS). The WQBELs consist of restrictions on ammonia, BOD_5, chlorine residual, chlorodibromomethane, copper, cyanide, dichlorobromomethane, mercury, nitrate plus nitrite, pH, total coliform organisms, total trihalomethanes, TSS, and zinc. This Order's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. In addition, this Order includes effluent limitations for BOD_5, total coliform organisms, and TSS to meet numeric objectives or protect beneficial uses.

WQBELs have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. To the extent that toxic pollutant WQBELs were derived from the CTR, the CTR is the applicable standard pursuant to 40 CFR 131.38. The scientific procedures for calculating the individual WQBELs for priority pollutants are based on the CTR-SIP, which was approved by USEPA on 18 May 2000. All beneficial uses and water quality objectives contained in the Basin Plan were approved under state law and submitted to and approved by USEPA prior to 30 May 2000. Any water quality objectives and beneficial uses submitted to USEPA prior to 30 May 2000, but not approved by USEPA before that date, are nonetheless "*applicable water quality standards for purposes of the [Clean Water] Act*" pursuant to 40 CFR 131.21(c)(1). Collectively, this Order's restrictions on individual pollutants are no more stringent than required to implement the technology-based requirements of the CWA and the applicable water quality standards for purposes of the CWA.

N. Antidegradation Policy. 40 CFR 131.12 requires that the state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Central Valley Water Board's Basin Plan implements, and incorporates by reference, both the state and federal antidegradation policies. As discussed in detail in the Fact Sheet, the permitted discharge is consistent with the antidegradation provision of 40 CFR 131.12 and Resolution No. 68-16.

O. Anti-Backsliding Requirements. Sections 303(d)(4) and 402(o)(2) of the CWA and federal regulations at 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as

stringent as those in the previous permit, with some exceptions. Some effluent limitations in this Order are less stringent that those in Order R5-2007-0133-01. As discussed in detail in the Fact Sheet, this relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

P. Endangered Species Act. This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). This Order requires compliance with effluent limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the state. The Discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

Q. Monitoring and Reporting. 40 CFR 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. Water Code sections 13267 and 13383 authorize the Central Valley Water Board to require technical and monitoring reports. The Monitoring and Reporting Program establishes monitoring and reporting requirements to implement federal and State requirements. The Monitoring and Reporting Program is provided in Attachment E.

The technical and monitoring reports in this Order are required in accordance with Water Code section 13267, which states the following in subsection (b)(1), "*In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report 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 Discharger owns and operates the Facility subject to this Order. The monitoring reports required by this Order are necessary to determine compliance with this Order. The need for the monitoring reports is discussed in the Fact Sheet.

R. Standard and Special Provisions. Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42, are provided in Attachment D. The discharger must comply with all standard provisions and with those additional conditions that are applicable under 40 CFR 122.42. The Central Valley Water Board has also included in this Order special provisions applicable to the Discharger. Some special provisions require submittal of technical reports. All technical reports are required in accordance with Water Code section 13267. The

rationale for the special provisions and need for technical reports required in this Order is provided in the Fact Sheet.

S. Provisions and Requirements Implementing State Law. The provisions/requirements in section VI.A.2.o of this Order are included to implement State law only. These provisions/requirements are not required or authorized under the federal CWA; consequently, violations of these provisions/requirements are not subject to the enforcement remedies that are available for NPDES violations.

T. Notification of Interested Parties. The Central Valley Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe WDRs for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet of this Order.

U. Consideration of Public Comment. The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. Details of the Public Hearing are provided in the Fact Sheet.

THEREFORE, IT IS HEREBY ORDERED, that Order R5-2007-0133-01 is rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions contained in division 7 of the Water Code (commencing with section 13000) and regulations adopted thereunder, and the provisions of the federal CWA and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order.

III. DISCHARGE PROHIBITIONS

A. Discharge of wastewater at a location or in a manner different from that described in the Findings is prohibited.

B. The by-pass or overflow of wastes to surface waters is prohibited, except as allowed by Federal Standard Provisions I.G. and I.H. (Attachment D).

C. Neither the discharge nor its treatment shall create a nuisance as defined in section 13050 of the Water Code.

D. The Discharger shall not allow pollutant-free wastewater to be discharged into the treatment, or 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.

E. Effective immediately, the Discharger is prohibited from discharging wastewater into Jackson Creek in amounts that cause the downstream Lake Amador water to exceed greater than five percent volume of wastewater in Lake Amador (one part wastewater in 20 parts of lake water, or 20:1 dilution).

IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

A. Effluent Limitations – Discharge Point No. 001

1. Final Effluent Limitations – Discharge Point No. 001

a. The Discharger shall maintain compliance with the following effluent limitations at Discharge Point No. 001, with compliance measured at Monitoring Location EFF-001 as described in the Monitoring and Reporting Program:

Table 6. Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Conventional Pollutants						
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	10	15	20	--	--
	lbs/day[1]	60	90	120	--	--
pH	standard units	--	--	--	6.5	8.0
Total Suspended Solids	mg/L	10	15	20	--	--
	lbs/day[1]	60	90	120	--	--
Priority Pollutants						
Chlorodibromomethane	µg/L	0.41	--	0.82	--	--
Copper, Total Recoverable	µg/L	3.9	--	6.2	--	--
Cyanide, Total (as CN)	µg/L	4.2	--	8.8	--	--
Dichlorobromomethane	µg/L	0.56	--	1.4	--	--
Zinc, Total Recoverable	µg/L	42	--	57	--	--
Non-Conventional Pollutants						
Ammonia Nitrogen, Total (as N)	mg/L	2.3	--	5.5	--	--
	lbs/day[1]	14	--	33	--	--
Nitrate Plus Nitrite (as N)	mg/L	10	--	--	--	--
Total Trihalomethanes[2]	µg/L	80	--	--	--	--

[1] Based upon an average dry weather flow of 0.71 MGD.
[2] Applies to the sum of bromoform, chlorodibromomethane, chloroform, and dichlorobromomethane.

b. Percent Removal. The average monthly percent removal of BOD_5 and TSS shall not be less than 85 percent.

c. Acute Whole Effluent Toxicity. Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:

i. 70%, minimum for any one bioassay; and
ii. 90%, median for any three consecutive bioassays.

d. Total Residual Chlorine. Effluent total residual chlorine shall not exceed:

i. 0.011 mg/L, as a 4-day average; and

ii. 0.019 mg/L, as a 1-hour average.

e. Total Coliform Organisms. Effluent total coliform organisms shall not exceed:

i. 2.2 most probable number (MPN) per 100 mL, as a 7-day median;
ii. 23 MPN/100 mL, more than once in any 30-day period; and
iii. 240 MPN/100 mL, at any time.

f. Average Dry Weather Flow. The average dry weather discharge flow shall not exceed 0.71 MGD.

g. Mercury, Total Recoverable. The total monthly mass discharge of total mercury shall not exceed 0.0016 lbs/month.

2. Interim Effluent Limitations – Not Applicable

B. Land Discharge Specifications – Not Applicable

C. Reclamation Specifications – Not Applicable

V. RECEIVING WATER LIMITATIONS

A. Surface Water Limitations

Receiving water limitations are based on water quality objectives contained in the Basin Plan and are a required part of this Order. Compliance determination for surface water limitations is to be measured or observed at RSW-002, except as specified for individual constituents below (temperature and turbidity). The discharge shall not cause the following in Jackson Creek:

1. Bacteria. The fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, to exceed a geometric mean of 200 MPN/100 mL, nor more than 10 percent of the total number of fecal coliform samples taken during any 30-day period to exceed 400 MPN/100 mL.

2. Biostimulatory Substances. Water to contain biostimulatory substances which promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses.

3. Chemical Constituents. Chemical constituents to be present in concentrations that adversely affect beneficial uses.

4. Color. Discoloration that causes nuisance or adversely affects beneficial uses.

5. Dissolved Oxygen:

a. The monthly median of the mean daily dissolved oxygen concentration to fall below 85 percent of saturation in the main water mass;

b. The 95 percentile dissolved oxygen concentration to fall below 75 percent of saturation; nor

c. The dissolved oxygen concentration to be reduced below 7.0 mg/L at any time.

6. **Floating Material.** Floating material to be present in amounts that cause nuisance or adversely affect beneficial uses.

7. **Oil and Grease.** Oils, greases, waxes, or other materials to be present in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.

8. **pH.** The pH to be depressed below 6.5 nor raised above 8.5.

9. **Pesticides:**

a. Pesticides to be present, individually or in combination, in concentrations that adversely affect beneficial uses;

b. Pesticides to be present in bottom sediments or aquatic life in concentrations that adversely affect beneficial uses;

c. Total identifiable persistent chlorinated hydrocarbon pesticides to be present in the water column at concentrations detectable within the accuracy of analytical methods approved by USEPA or the Executive Officer;

d. Pesticide concentrations to exceed those allowable by applicable antidegradation policies (see State Water Board Resolution No. 68-16 and 40 CFR 131.12.);

e. Pesticide concentrations to exceed the lowest levels technically and economically achievable;

f. Pesticides to be present in concentration in excess of the maximum contaminant levels (MCLs) set forth in CCR, Title 22, division 4, chapter 15; nor

g. Thiobencarb to be present in excess of 1.0 µg/L.

10. **Radioactivity:**

a. Radionuclides to be present in concentrations that are harmful to human, plant, animal, or aquatic life nor that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.

b. Radionuclides to be present in excess of the MCLs specified in Table 64442 of section 64442 and Table 64443 of section 64443 of Title 22 of the California Code of Regulations.

11. **Suspended Sediments.** The suspended sediment load and suspended sediment discharge rate of surface waters to be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

12. **Settleable Substances.** Substances to be present in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

13. **Suspended Material.** Suspended material to be present in concentrations that cause nuisance or adversely affect beneficial uses.

14. **Taste and Odors.** Taste- or odor-producing substances to be present in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.

15. **Temperature.** The natural temperature to be increased by more than 5°F. Compliance to be determined based on the difference in temperature at Monitoring Locations RSW-001 and RSW-002.

16. **Toxicity.** Toxic substances to be present, individually or in combination, in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.

17. **Turbidity.** Compliance to be determined based on the difference in turbidity at Monitoring Locations RSW-001 and RSW-002.

    a. Shall not exceed 2 Nephelometric Turbidity Units (NTU) where natural turbidity is less than 1 NTU;

    b. Shall not increase more than 1 NTU where natural turbidity is between 1 and 5 NTUs (When wastewater is treated to a tertiary level, including coagulation, a one-month averaging period may be used when determining compliance);

    c. Shall not increase more than 20 percent where natural turbidity is between 5 and 50 NTUs;

    d. Shall not increase more than 10 NTU where natural turbidity is between 50 and 100 NTUs; nor

    e. Shall not increase more than 10 percent where natural turbidity is greater than 100 NTUs.

B. Groundwater Limitations – Not Applicable

VI. PROVISIONS

A. Standard Provisions

1. The Discharger shall comply with all Standard Provisions (federal NPDES standard conditions from 40 CFR Part 122) included in Attachment D of this Order.

2. The Discharger shall comply with the following provisions:

a. If the Discharger's wastewater treatment plant is publicly owned or subject to regulation by California Public Utilities Commission, it shall be supervised and operated by persons possessing certificates of appropriate grade according to Title 23, CCR, division 3, chapter 26.

b. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:

i. violation of any term or condition contained in this Order;

ii. obtaining this Order by misrepresentation or by failing to disclose fully all relevant facts;

iii. a change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge; and

iv. a material change in the character, location, or volume of discharge.

The causes for modification include:

- *New regulations.* New regulations have been promulgated under section 405(d) of the CWA, or the standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision after the permit was issued.

- *Land application plans.* When required by a permit condition to incorporate a land application plan for beneficial reuse of sewage sludge, to revise an existing land application plan, or to add a land application plan.

- *Change in sludge use or disposal practice.* Under 40 CFR 122.62(a)(1), a change in the Discharger's sludge use or disposal practice is a cause for modification of the permit. It is cause for revocation and reissuance if the Discharger requests or agrees.

The Central Valley Water Board may review and revise this Order at any time upon application of any affected person or the Central Valley Water Board's own motion.

c. If a toxic effluent standard or prohibition (including any scheduled compliance specified in such effluent standard or prohibition) is established under section 307(a) of the CWA, or amendments thereto, for a toxic pollutant that is present in the discharge authorized herein, and such standard or prohibition is more stringent than any limitation upon such pollutant in this Order, the Central Valley Water Board will revise or modify this Order in accordance with such toxic effluent standard or prohibition.

The Discharger shall comply with effluent standards and prohibitions within the time provided in the regulations that establish those standards or prohibitions, even if this Order has not yet been modified.

d. This Order shall be modified, or alternately revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the CWA, if the effluent standard or limitation so issued or approved:

i. Contains different conditions or is otherwise more stringent than any effluent limitation in the Order; or

ii. Controls any pollutant limited in the Order.

The Order, as modified or reissued under this paragraph, shall also contain any other requirements of the CWA then applicable.

e. The provisions of this Order are severable. If any provision of this Order is found invalid, the remainder of this Order shall not be affected.

f. The Discharger shall take all reasonable steps to minimize any adverse effects to waters of the State or users of those waters resulting from any discharge or sludge use or disposal in violation of this Order. Reasonable steps shall include such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge or sludge use or disposal.

g. The Discharger shall ensure compliance with any existing or future pretreatment standard promulgated by USEPA under section 307 of the CWA, or amendment thereto, for any discharge to the municipal system.

h. A copy of this Order shall be maintained at the discharge facility and be available at all times to operating personnel. Key operating personnel shall be familiar with its content.

i. Safeguard to electric power failure:

i. The Discharger shall provide safeguards to assure that, should there be reduction, loss, or failure of electric power, the discharge shall comply with the terms and conditions of this Order.

ii. Upon written request by the Central Valley Water Board, the Discharger shall submit a written description of safeguards. Such safeguards may include alternate power sources, standby generators, retention capacity, operating procedures, or other means. A description of the safeguards provided shall include an analysis of the frequency, duration, and impact of power failures experienced over the past 5 years on effluent quality and on the capability of the Discharger to comply with the terms and conditions of the Order. The adequacy of the safeguards is subject to the approval of the Central Valley Water Board.

iii. Should the treatment works not include safeguards against reduction, loss, or failure of electric power, or should the Central Valley Water Board not approve the existing safeguards, the Discharger shall, within 90 days of having been advised in writing by the Central Valley Water Board that the existing safeguards are inadequate, provide to the Central Valley Water Board and USEPA a schedule of compliance for providing safeguards such that in the event of reduction, loss, or failure of electric power, the Discharger shall comply with the terms and conditions of this Order. The schedule of compliance shall, upon approval of the Central Valley Water Board, become a condition of this Order.

j. The Discharger, upon written request of the Central Valley Water Board, shall file with the Board a technical report on its preventive (failsafe) and contingency (cleanup) plans for controlling accidental discharges, and for minimizing the effect of such events. This report may be combined with that required under the Central Valley Water Board Standard Provision contained in section VI.A.2.i of this Order.

The technical report shall:

i. Identify the possible sources of spills, leaks, untreated waste by-pass, and contaminated drainage. Loading and storage areas, power outage, waste treatment unit outage, and failure of process equipment, tanks and pipes should be considered.

ii. Evaluate the effectiveness of present facilities and procedures and state when they became operational.

iii. Predict the effectiveness of the proposed facilities and procedures and provide an implementation schedule containing interim and final dates when they will be constructed, implemented, or operational.

The Central Valley Water Board, after review of the technical report, may establish conditions which it deems necessary to control accidental discharges and to minimize the effects of such events. Such conditions shall be incorporated as part of this Order, upon notice to the Discharger.

k. A publicly owned treatment works whose waste flow has been increasing, or is projected to increase, shall estimate when flows will reach hydraulic and treatment capacities of its treatment and disposal facilities. The projections shall be made in January, based on the last 3 years' average dry weather flows, peak wet weather flows and total annual flows, as appropriate. When any projection shows that capacity of any part of the facilities may be exceeded in 4 years, the Discharger shall notify the Central Valley Water Board by 31 January. A copy of the notification shall be sent to appropriate local elected officials, local permitting agencies and the press. Within 120 days of the notification, the Discharger shall submit a technical report showing how it will prevent flow volumes from exceeding capacity or how it will increase capacity to handle the larger flows. The Central Valley Water Board may extend the time for submitting the report.

l. The Discharger shall submit technical reports as directed by the Executive Officer. All technical reports required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code, sections 6735, 7835, and 7835.1. To demonstrate compliance with Title 16, CCR, sections 415 and 3065, all technical reports must contain a statement of the qualifications of the responsible registered professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.

m. The Central Valley Water Board is authorized to enforce the terms of this permit under several provisions of the Water Code, including, but not limited to, sections 13385, 13386, and 13387.

n. For publicly owned treatment works, prior to making any change in the point of discharge, place of use, or purpose of use of treated wastewater that results in a permanent decrease of flow in any portion of a watercourse, the Discharger must file a petition with the State Water Board, Division of Water Rights, and receive approval for such a change. (Water Code section 1211).

o. In the event the Discharger does not comply or will be unable to comply for any reason, with any prohibition, maximum daily effluent limitation, 1-hour average effluent limitation, or receiving water limitation contained in this Order, the Discharger shall notify the Central Valley Water Board by telephone (916) 464-3291 within 24 hours of having knowledge of such noncompliance, and shall confirm this notification in writing within 5 days, unless the Central Valley Water Board waives confirmation. The written notification shall include the information required by the Standard Provision contained in Attachment D section V.E.1. [40 CFR 122.41(l)(6)(i)].

p. Failure to comply with provisions or requirements of this Order, or violation of other applicable laws or regulations governing discharges from this facility, may

subject the Discharger to administrative or civil liabilities, criminal penalties, and/or other enforcement remedies to ensure compliance. Additionally, certain violations may subject the Discharger to civil or criminal enforcement from appropriate local, state, or federal law enforcement entities.

q. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Central Valley Water Board.

To assume operation 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, address and telephone number of the persons responsible for contact with the Central Valley Water Board and a statement. The statement shall comply with the signatory and certification requirements in the federal Standard Provisions (Attachment D, section V.B) 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 Water Code. Transfer shall be approved or disapproved in writing by the Executive Officer.

B. Monitoring and Reporting Program Requirements

The Discharger shall comply with the Monitoring and Reporting Program, and future revisions thereto, in Attachment E of this Order.

C. Special Provisions

1. Reopener Provisions

a. Conditions that necessitate a major modification of a permit are described in 40 CFR 122.62, including, but not limited to:

i. If new or amended applicable water quality standards are promulgated or approved pursuant to section 303 of the CWA, or amendments thereto, this permit may be reopened and modified in accordance with the new or amended standards.

ii. When new information, that was not available at the time of permit issuance, would have justified different permit conditions at the time of issuance.

b. This Order may be reopened for modification, or revocation and reissuance, as a result of the detection of a reportable priority pollutant generated by special conditions included in this Order. These special conditions may be, but are not limited to, fish tissue sampling, whole effluent toxicity, monitoring requirements on internal waste stream(s), and monitoring for surrogate parameters. Additional

requirements may be included in this Order as a result of the special condition monitoring data.

c. **Mercury.** If mercury is found to be causing toxicity based on acute or chronic toxicity test results, or if a TMDL program is adopted, this Order shall be reopened and the mass effluent limitation modified (higher or lower) or an effluent concentration limitation imposed. If the Central Valley Water Board determines that a mercury offset program is feasible for Dischargers subject to a NPDES permit, then this Order may be reopened to reevaluate the mercury mass loading limitation(s) and the need for a mercury offset program for the Discharger.

d. **Whole Effluent Toxicity.** As a result of a Toxicity Reduction Evaluation (TRE), this Order may be reopened to include a chronic toxicity limitation, a new acute toxicity limitation, and/or a limitation for a specific toxicant identified in the TRE. Additionally, if the State Water Board revises the SIP's toxicity control provisions that would require the establishment of numeric chronic toxicity effluent limitations, this Order may be reopened to include a numeric chronic toxicity effluent limitation based on the new provisions.

e. **Water Effects Ratios (WER) and Metal Translators.** A default WER of 1.0 has been used in this Order for calculating criteria for applicable inorganic constituents. In addition, default dissolved-to-total metal translators have been used to convert water quality objectives from dissolved to total recoverable when developing effluent limitations for copper and zinc. If the Discharger performs studies to determine site-specific WERs and/or site-specific dissolved-to-total metal translators, this Order may be reopened to modify the effluent limitations for the applicable inorganic constituents.

f. **Drinking Water Policy.** On 26 July 2013, the Central Valley Water Board adopted Resolution No. R5-2013-0098 amending the Basin Plan and establishing a Drinking Water Policy. The State Water Board will consider adoption of the Drinking Water Policy at a future meeting. This Order may be reopened to incorporate monitoring of drinking water constituents to implement the Drinking Water Policy.

g. **20:1 Dilution in Lake Amador (Prohibition III.E)**. This prohibition is based on California Department of Public Health's (CDPH) recommendation that discharges from wastewater treatment plants to municipal water supplies maintain a minimum of 20:1 dilution to ensure the protection of the downstream domestic beneficial use of Jackson Creek and public health. Once CDPH determines and provides written notification that the 20:1 dilution for the disinfected tertiary-level treated effluent discharge is no longer necessary, this Order may be reopened to remove Prohibition III.E (20:1 dilution prohibition in Lake Amador).

2. Special Studies, Technical Reports and Additional Monitoring Requirements

a. Chronic Whole Effluent Toxicity. For compliance with the Basin Plan's narrative toxicity objective, this Order requires the Discharger to conduct chronic whole effluent toxicity (WET) testing, as specified in the Monitoring and Reporting Program (Attachment E, section V). Furthermore, this Provision requires the Discharger to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity. If the discharge exhibits toxicity, as described in subsection ii below, the Discharger is required to initiate a TRE in accordance with an approved TRE Workplan, and take actions to mitigate the impact of the discharge and prevent recurrence of toxicity. A TRE is a site-specific study conducted in a stepwise process to identify the source(s) of toxicity and the effective control measures for effluent toxicity. TREs are designed to identify the causative agents and sources of effluent toxicity, evaluate the effectiveness of the toxicity control options, and confirm the reduction in effluent toxicity. This Provision includes requirements for the Discharger to develop and submit a TRE Workplan and includes procedures for accelerated chronic toxicity monitoring and TRE initiation.

i. Initial Investigative TRE Workplan. Within 90 days of the effective date of this Order, the Discharger shall submit to the Central Valley Water Board an Initial Investigative TRE Workplan for approval by the Executive Officer. This should be a one to two page document including, at a minimum:

(a) A description of the investigation and evaluation techniques that will be used to identify potential causes and sources of effluent toxicity, effluent variability, and treatment system efficiency;

(b) A description of the facility's methods of maximizing in-house treatment efficiency and good housekeeping practices, and a list of all chemicals used in operation of the facility; and

(c) A discussion of who will conduct the Toxicity Identification Evaluation (TIE), if necessary (e.g., an in-house expert or outside contractor).

ii. Accelerated Monitoring and TRE Initiation. When the numeric toxicity monitoring trigger is exceeded during regular chronic toxicity monitoring, the Discharger shall initiate accelerated monitoring as required in the Accelerated Monitoring Specifications. The Discharger shall initiate a TRE to address effluent toxicity if any WET testing results exceed the numeric toxicity monitoring trigger during accelerated monitoring.

iii. Numeric Toxicity Monitoring Trigger. The numeric toxicity monitoring trigger to initiate a TRE is > **1 TU_C** (where TU_C = 100/NOEC). The monitoring trigger is not an effluent limitation; it is the toxicity threshold at which the Discharger is required to begin accelerated monitoring and initiate a TRE when the effluent exhibits toxicity.

iv. Accelerated Monitoring Specifications. If the numeric toxicity monitoring trigger is exceeded during regular chronic toxicity testing, the Discharger shall initiate accelerated monitoring within 14 days of notification by the laboratory of the exceedance. Accelerated monitoring shall consist of four (4) chronic toxicity tests conducted once every 2 weeks using the species that exhibited toxicity. The following protocol shall be used for accelerated monitoring and TRE initiation:

(a) If the results of four (4) consecutive accelerated monitoring tests do not exceed the monitoring trigger, the Discharger may cease accelerated monitoring and resume regular chronic toxicity monitoring. However, notwithstanding the accelerated monitoring results, if there is evidence of effluent toxicity, the Executive Officer may require that the Discharger initiate a TRE.

(b) If the source(s) of the toxicity is easily identified (e.g., temporary plant upset), the Discharger shall make necessary corrections to the facility and shall continue accelerated monitoring until four (4) consecutive accelerated tests do not exceed the monitoring trigger. Upon confirmation that the effluent toxicity has been removed, the Discharger may cease accelerated monitoring and resume regular chronic toxicity monitoring.

(c) If the result of any accelerated toxicity test exceeds the monitoring trigger, the Discharger shall cease accelerated monitoring and begin a TRE to investigate the cause(s) of, and identify corrective actions to reduce or eliminate effluent toxicity. Within thirty (30) days of notification by the laboratory of any test result exceeding the monitoring trigger during accelerated monitoring, the Discharger shall submit a TRE Action Plan to the Central Valley Water Board including, at minimum:

(1) Specific actions the Discharger will take to investigate and identify the cause(s) of toxicity, including a TRE WET monitoring schedule;

(2) Specific actions the Discharger will take to mitigate the impact of the discharge and prevent the recurrence of toxicity; and

(3) A schedule for these actions.

Within sixty (60) days of notification by the laboratory of the test results, the Discharger shall submit to the Central Valley Water Board a TRE Workplan for approval by the Executive Officer. The TRE Workplan shall outline the procedures for identifying the source(s) of, and reducing or eliminating effluent toxicity. The TRE Workplan must be developed in accordance with USEPA guidance[1].

[1] See the Fact Sheet (Attachment F, section VII.B.2.a.) for a list of USEPA guidance documents that must be considered in development of the TRE Workplan.

3. Best Management Practices and Pollution Prevention

a. Salinity and Chemical Additives Evaluation and Minimization Plan. The Discharger shall update and continue to implement a salinity evaluation and minimization plan to identify and address sources of salinity from the Facility. The plan shall be updated and submitted to the Central Valley Water Board **by 6 September 2014**.

The Salinity and Chemical Additives Evaluation and Minimization Plan shall include an evaluation that identifies and quantifies chemical additives necessary for the proper operation and treatment of the Facility (e.g., calcium hydroxide for alkalinity control, polymer addition for filter performance). The Plan shall evaluate and propose feasible methods for reducing the amount of chemical additives that increase the salinity and other constituent concentrations or levels in the discharge, while still providing adequate treatment.

4. Construction, Operation and Maintenance Specifications

a. Turbidity. The Discharger shall operate the treatment system to ensure that turbidity prior to disinfection shall not exceed any of the following:

i. 2 NTU, as a daily average;
ii. 5 NTU, more than 5% of the time within a 24-hour period;
iii. 10 NTU, at any time.

b. Ultraviolet (UV) Disinfection System Operating Specifications. The Discharger shall notify the Central Valley Water Board at least 30 days prior to start-up of the UV disinfection system. Once in operation, the Discharger shall operate the UV disinfection system to provide a minimum UV dose per channel of 100 millijoules per square centimeter (mJ/cm^2) at peak daily flow and shall maintain an adequate dose for disinfection while discharging to Jackson Creek, unless otherwise approved by the Executive Officer or California Department of Public Health. The Discharger shall meet the following specifications to provide virus inactivation equivalent to Title 22 Disinfected Tertiary Recycled Water:

i. The Discharger shall provide continuous, reliable monitoring of flow, UV transmittance, and turbidity.

ii. The Discharger shall operate the treatment system to insure that turbidity prior to disinfection shall not exceed 2 NTU as a daily average, and 5 NTU more than 5 percent of the time within a 24-hour period, and 10 NTU, at any time.

iii. The UV transmittance (at 254 nanometers) in the wastewater exiting the UV disinfection system shall not fall below 55 percent of maximum at any time.

iv. The quartz sleeves and cleaning system components must be visually inspected per the manufacturer's operations manual for physical wear

(scoring, solarization, seal leaks, cleaning fluid levels, etc.) and to check the efficacy of the cleaning system.

v. The lamp sleeves must be cleaned periodically as necessary to meet the requirements.

vi. Lamps must be replaced per the manufacturer's operations manual, or sooner, if there are indications the lamps are failing to provide adequate disinfection. Lamp age and lamp replacement records must be maintained.

vii. The Facility must be operated in accordance with an operations and maintenance program that assures adequate disinfection.

5. Special Provisions for Municipal Facilities (POTWs Only)

a. Sludge/Biosolids Treatment or Discharge Specifications. Sludge in this document means the solid, semisolid, and liquid residues removed during primary, secondary, or advanced wastewater treatment processes. Solid waste refers to grit and screening material generated during preliminary treatment. Residual sludge means sludge that will not be subject to further treatment at the wastewater treatment plant. Biosolids refer to sludge that has been treated and tested and shown to be capable of being beneficially and legally used pursuant to federal and state regulations as a soil amendment for agricultural, silvicultural, horticultural, and land reclamation activities as specified under 40 CFR Part 503.

i. Collected screenings, residual sludge, biosolids, and other solids removed from liquid wastes shall be disposed of in a manner approved by the Executive Officer, and consistent with Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste, as set forth in Title 27, CCR, division 2, subdivision 1, section 20005, et seq. Removal for further treatment, storage, disposal, or reuse at sites (e.g., landfill, composting sites, soil amendment sites) that are operated in accordance with valid waste discharge requirements issued by a Regional Water Board will satisfy these specifications.

Sludge and solid waste shall be removed from screens, sumps, ponds, clarifiers, etc. as needed to ensure optimal plant performance.

The treatment of sludge generated at the Facility shall be confined to the Facility property and conducted in a manner that precludes infiltration of waste constituents into soils in a mass or concentration that will violate groundwater limitations in section V.B. of this Order. In addition, the storage of residual sludge, solid waste, and biosolids on Facility property shall be temporary and controlled, and contained in a manner that minimizes leachate formation and precludes infiltration of waste constituents into soils in a mass or concentration that will violate groundwater limitations included in section V.B. of this Order.

ii. The use, disposal, storage, and transportation of biosolids shall comply with existing federal and state laws and regulations, including permitting requirements and technical standards included in 40 CFR Part 503. If the State Water Board and the Central Valley Water Board are given the authority to implement regulations contained in 40 CFR Part 503, this Order may be reopened to incorporate appropriate time schedules and technical standards. The Discharger must comply with the standards and time schedules contained in 40 CFR Part 503 whether or not they have been incorporated into this Order.

iii. The Discharger shall comply with Section IX.A. Biosolids of the Monitoring and Reporting Program, Attachment E.

iv. Any proposed change in biosolids use or disposal practice from a previously approved practice shall be reported to the Executive Officer and USEPA Regional Administrator at least **90 days** in advance of the change.

v. **By 6 June 2014,** the Discharger shall review and update its existing biosolids use or disposal plan, and submit it to the Central Valley Water Board. The updated plan shall describe at a minimum:

(a) Sources and amounts of biosolids generated annually.

(b) Location(s) of on-site storage and description of the containment area.

(c) Plans for ultimate disposal. For landfill disposal, include the Central Valley Water Board's waste discharge requirement numbers that regulate the particular landfill; the present classification of the landfill; and the name and location of the landfill.

b. Collection System. On 2 May 2006, the State Water Board adopted State Water Board Order No. 2006-0003-DWQ, Statewide General WDRs for Sanitary Sewer Systems. The Discharger shall be subject to the requirements of Order No. 2006-0003-DWQ and any future revisions thereto. Order No. 2006-0003-DWQ requires that all public agencies that currently own or operate sanitary sewer systems apply for coverage under the general WDRs. The Discharger has applied for and has been approved for coverage under Order 2006-0003-DWQ for operation of its wastewater collection system.

6. Other Special Provisions

a. Wastewater shall be oxidized, coagulated, filtered, and adequately disinfected pursuant to the Department of Public Health (DPH; formerly the Department of Health Services) reclamation criteria, CCR, Title 22, division 4, chapter 3, (Title 22), or equivalent. This Order does not include the requirements for unrestricted beneficial reuse contained in Chapter 3. For wastewater disposal, the Discharger is required to meet Title 22 tertiary numeric effluent quality (hence the use of "or equivalent"), but not the monitoring, alarm, process design,

redundancy and storage requirements for beneficial reuse that is the full suite of Title 22 requirements.

7. Compliance Schedules – Not Applicable

VII. COMPLIANCE DETERMINATION

A. BOD_5 and TSS Effluent Limitations (Sections IV.A.1.a and IV.A.1.b). Compliance with the final effluent limitations for BOD_5 and TSS required in Limitations and Discharge Requirements section IV.A.1.a shall be ascertained by 24-hour composite samples. Compliance with effluent limitations required in Limitations and Discharge Requirements section IV.A.1.b for percent removal shall be calculated using the arithmetic mean of BOD_5 and TSS in effluent samples collected over a monthly period as a percentage of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period.

B. Total Mercury Mass Loading Effluent Limitations (Section IV.A.1.g). The procedures for calculating mass loadings are as follows:

1. The total pollutant mass load for each individual calendar month shall be determined using an average of all concentration data collected that month and the corresponding total monthly flow. All effluent monitoring data collected under the monitoring and reporting program, pretreatment program, and any special studies shall be used for these calculations.

2. In calculating compliance, the Discharger shall count all non-detect measures at one-half of the detection level. If compliance with the effluent limitation is not attained due to the non-detect contribution, the Discharger shall improve and implement available analytical capabilities and compliance shall be evaluated with consideration of the detection limits.

C. Average Dry Weather Flow Effluent Limitations (Section IV.A.1.f). The average dry weather discharge flow represents the daily average flow when groundwater is at or near normal and runoff is not occurring. Compliance with the average dry weather flow effluent limitations will be determined annually based on the average daily flow over three consecutive dry weather months (e.g., July, August, and September).

D. Total Coliform Organisms Effluent Limitations (Section IV.A.1.e). For each day that an effluent sample is collected and analyzed for total coliform organisms, the 7-day median shall be determined by calculating the median concentration of total coliform bacteria in the effluent utilizing the bacteriological results of the last 7 days. For example, if a sample is collected on a Wednesday, the result from that sampling event and all results from the previous 6 days (i.e., Tuesday, Monday, Sunday, Saturday, Friday, and Thursday) are used to calculate the 7-day median. If the 7-day median of total coliform organisms exceeds a most probable number (MPN) of 2.2 per 100 milliliters, the Discharger will be considered out of compliance.

E. Total Residual Chlorine Effluent Limitations (Section IV.A.1.d). Continuous monitoring analyzers for chlorine residual or for dechlorination agent residual in the effluent are appropriate methods for compliance determination. A positive residual dechlorination agent in the effluent indicates that chlorine is not present in the discharge, which demonstrates compliance with the effluent limitations. This type of monitoring can also be used to prove that some chlorine residual exceedances are false positives. Continuous monitoring data showing either a positive dechlorination agent residual or a chlorine residual at or below the prescribed limit are sufficient to show compliance with the total residual chlorine effluent limitations, as long as the instruments are maintained and calibrated in accordance with the manufacturer's recommendations.

Any excursion above the 1-hour average or 4-day average total residual chlorine effluent limitations is a violation. If the Discharger conducts continuous monitoring and the Discharger can demonstrate, through data collected from a back-up monitoring system, that a chlorine spike recorded by the continuous monitor was not actually due to chlorine, then any excursion resulting from the recorded spike will not be considered an exceedance, but rather reported as a false positive. Records supporting validation of false positives shall be maintained in accordance with Section IV Standard Provisions (Attachment D).

F. 20:1 Dilution of Wastewater in Lake Amador (Section III.E.). Compliance with Prohibition III.E will be determined in December of each year from the harmonic mean of annual inflows into Lake Amador, excluding effluent discharged to Jackson Creek, and using the current year's average dry weather flow (ADWF) discharged to Jackson Creek to estimate the percentage effluent in Lake Amador. The annual inflows into Lake Amador, excluding effluent discharged to Jackson Creek, will be comprised of upstream Jackson Creek flow, estimated runoff into Lake Amador, rainfall into Lake Amador, and Lake Pardee water transferred into Lake Amador. The harmonic mean, which is the lowest estimate of the central tendency of a dataset, has been chosen to conservatively estimate dilution in Lake Amador.

G. Mass Effluent Limitations. The mass effluent limitations contained in the Final Effluent Limitations IV.A.1.a are based on the permitted average dry weather flow and calculated as follows:

Mass (lbs/day) = Flow (MGD) x Concentration (mg/L) x 8.34 (conversion factor)

If the effluent flow exceeds the permitted average dry weather flow during wet-weather seasons, the effluent mass limitations contained in Final Effluent Limitations IV.A.1.a shall not apply. If the effluent flow is below the permitted average dry weather flow during wet-weather seasons, the effluent mass limitations do apply.

H. Priority Pollutant Effluent Limitations. Compliance with effluent limitations for priority pollutants shall be determined in accordance with Section 2.4.5 of the SIP, as follows:

1. Dischargers shall be deemed out of compliance with an effluent limitation, if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reporting level (RL).

2. Dischargers shall be required to conduct a Pollutant Minimization Program (PMP) in accordance with section 2.4.5.1 of the SIP when there is evidence that the priority pollutant is present in the effluent above an effluent limitation and either:

   a. A sample result is reported as detected, but not quantified (DNQ) and the effluent limitation is less than the RL; or

   b. A sample result is reported as non-detect (ND) and the effluent limitation is less than the method detection limit (MDL).

3. When determining compliance with an average monthly effluent limitation (AMEL) and more than one sample result is available in a month, the discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of DNQ or ND. In those cases, the discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

   a. The data set shall be ranked from low to high, reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

   b. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

4. If a sample result, or the arithmetic mean or median of multiple sample results, is below the RL, and there is evidence that the priority pollutant is present in the effluent above an effluent limitation and the discharger conducts a PMP (as described in section 2.4.5.1), the discharger shall not be deemed out of compliance.

I. Receiving Water Dissolved Oxygen. If monitoring point RSW-002 meets the receiving water limits, then the Discharger is in compliance. However, if monitoring point RSW-002 does not meet the limits, then staff will review the data for monitoring point RSW-001. If RSW-001 is in compliance, then it can be concluded that the discharge of wastewater caused an exceedence of the receiving water limits and the Discharger will be considered in violation.

J. Reporting Due Dates. Reporting requirements shall be in accordance with due dates specified in this Order. If the due date is on a Saturday, Sunday, State holiday, or a day the corresponding Water Board(s) office(s) is(are) closed, the due date shall be on the next business day.

ATTACHMENT A – DEFINITIONS

Arithmetic Mean (μ)
Also called the average, is the sum of measured values divided by the number of samples. For ambient water concentrations, the arithmetic mean is calculated as follows:

Arithmetic mean = $\mu = \Sigma x / n$ where: Σx is the sum of the measured ambient water concentrations, and n is the number of samples.

Average Monthly Effluent Limitation (AMEL)
The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Effluent Limitation (AWEL)
The highest allowable average of daily discharges over a calendar week (Sunday through Saturday), calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Bioaccumulative
Those substances taken up by an organism from its surrounding medium through gill membranes, epithelial tissue, or from food and subsequently concentrated and retained in the body of the organism.

Carcinogenic
Pollutants are substances that are known to cause cancer in living organisms.

Coefficient of Variation (CV)
CV is a measure of the data variability and is calculated as the estimated standard deviation divided by the arithmetic mean of the observed values.

Daily Discharge
Daily Discharge is defined as either: (1) the total mass of the constituent discharged over the calendar day (12:00 am through 11:59 pm) or any 24-hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g., concentration).

The daily discharge may be determined by the analytical results of a composite sample taken over the course of 1 day (a calendar day or other 24-hour period defined as a day) or by the arithmetic mean of analytical results from one or more grab samples taken over the course of the day.

For composite sampling, if 1 day is defined as a 24-hour period other than a calendar day, the analytical result for the 24-hour period will be considered as the result for the calendar day in which the 24-hour period ends.

Detected, but Not Quantified (DNQ)
DNQ are those sample results less than the RL, but greater than or equal to the laboratory's MDL. Sample results reported as DNQ are estimated concentrations.

Dilution Credit
Dilution Credit is the amount of dilution granted to a discharge in the calculation of a water quality-based effluent limitation, based on the allowance of a specified mixing zone. It is calculated from the dilution ratio or determined through conducting a mixing zone study or modeling of the discharge and receiving water.

Effluent Concentration Allowance (ECA)
ECA is a value derived from the water quality criterion/objective, dilution credit, and ambient background concentration that is used, in conjunction with the coefficient of variation for the effluent monitoring data, to calculate a long-term average (LTA) discharge concentration. The ECA has the same meaning as waste load allocation (WLA) as used in USEPA guidance (Technical Support Document For Water Quality-based Toxics Control, March 1991, second printing, EPA/505/2-90-001).

Enclosed Bays
Enclosed Bays means indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays include, but are not limited to, Humboldt Bay, Bodega Harbor, Tomales Bay, Drake's Estero, San Francisco Bay, Morro Bay, Los Angeles-Long Beach Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay. Enclosed bays do not include inland surface waters or ocean waters.

Estimated Chemical Concentration
The estimated chemical concentration that results from the confirmed detection of the substance by the analytical method below the ML value.

Estuaries
Estuaries means waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater. Estuarine waters included, but are not limited to, the Sacramento-San Joaquin Delta, as defined in Water Code section 12220, Suisun Bay, Carquinez Strait downstream to the Carquinez Bridge, and appropriate areas of the Smith, Mad, Eel, Noyo, Russian, Klamath, San Diego, and Otay rivers. Estuaries do not include inland surface waters or ocean waters.

Inland Surface Waters
All surface waters of the State that do not include the ocean, enclosed bays, or estuaries.

Instantaneous Maximum Effluent Limitation
The highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

Instantaneous Minimum Effluent Limitation
The lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

Maximum Daily Effluent Limitation (MDEL)
The highest allowable daily discharge of a pollutant, over a calendar day (or 24-hour period). For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

Median
The middle measurement in a set of data. The median of a set of data is found by first arranging the measurements in order of magnitude (either increasing or decreasing order). If the number of measurements (*n*) is odd, then the median = $X_{(n+1)/2}$. If *n* is even, then the median = $(X_{n/2} + X_{(n/2)+1})/2$ (i.e., the midpoint between the *n*/2 and *n*/2+1).

Method Detection Limit (MDL)
MDL is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in 40 CFR Part 136, Attachment B, revised as of 3 July 1999.

Minimum Level (ML)
ML is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

Mixing Zone
Mixing Zone is a limited volume of receiving water that is allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall water body.

Not Detected (ND)
Sample results which are less than the laboratory's MDL.

Ocean Waters
The territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. Discharges to ocean waters are regulated in accordance with the State Water Board's California Ocean Plan.

Persistent Pollutants
Persistent pollutants are substances for which degradation or decomposition in the environment is nonexistent or very slow.

Pollutant Minimization Program (PMP)
PMP means waste minimization and pollution prevention actions that include, but are not limited to, product substitution, waste stream recycling, alternative waste management methods, and education of the public and businesses. The goal of the PMP shall be to reduce all potential sources of a priority pollutant(s) through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the water quality-based effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants where there is evidence that beneficial uses are being impacted. The Central Valley Water Board may consider cost effectiveness when establishing the requirements of a PMP. The completion and implementation of a Pollution Prevention Plan, if required pursuant to Water Code section 13263.3(d), shall be considered to fulfill the PMP requirements.

Pollution Prevention
Pollution Prevention means any action that causes a net reduction in the use or generation of a hazardous substance or other pollutant that is discharged into water and includes, but is not limited to, input change, operational improvement, production process change, and product reformulation (as defined in Water Code section 13263.3). Pollution prevention does not include actions that merely shift a pollutant in wastewater from one environmental medium to another environmental medium, unless clear environmental benefits of such an approach are identified to the satisfaction of the State Water Resources Control Board (State Water Board) or Central Valley Water Board.

Satellite Collection System
The portion, if any, of a sanitary sewer system owned or operated by a different public agency than the agency that owns and operates the wastewater treatment facility that a sanitary sewer system is tributary to.

Source of Drinking Water
Any water designated as municipal or domestic supply (MUN) in a Regional Water Board Basin Plan.

Standard Deviation (σ)
Standard Deviation is a measure of variability that is calculated as follows:

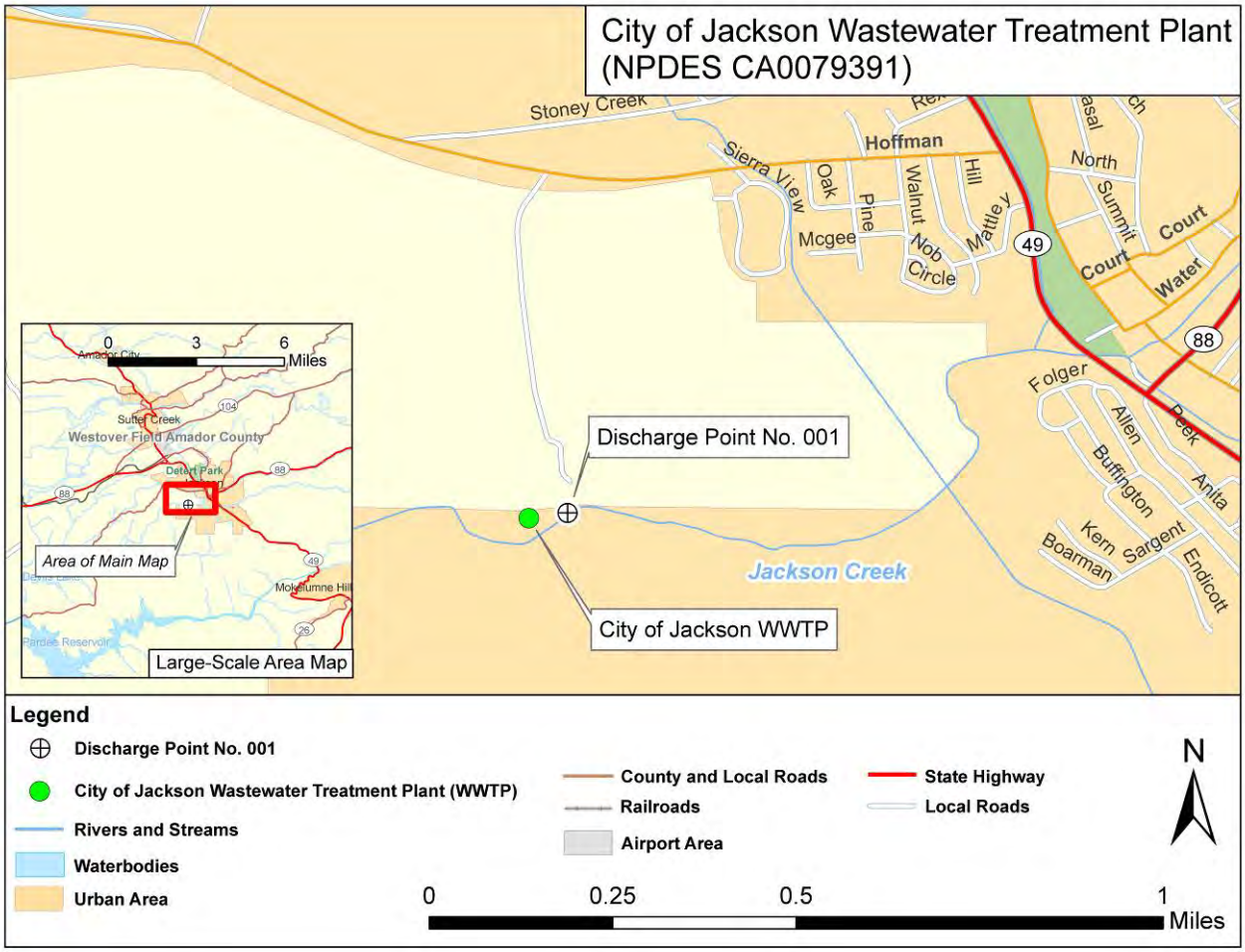
$$\sigma = (\sum[(x - \mu)^2]/(n - 1))^{0.5}$$

where:
x is the observed value;
μ is the arithmetic mean of the observed values; and
n is the number of samples.

Toxicity Reduction Evaluation (TRE)
TRE is a study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A Toxicity Identification Evaluation (TIE) may be required as part of the TRE, if appropriate. (A

TIE is a set of procedures to identify the specific chemical(s) responsible for toxicity. These procedures are performed in three phases (characterization, identification, and confirmation) using aquatic organism toxicity tests.)

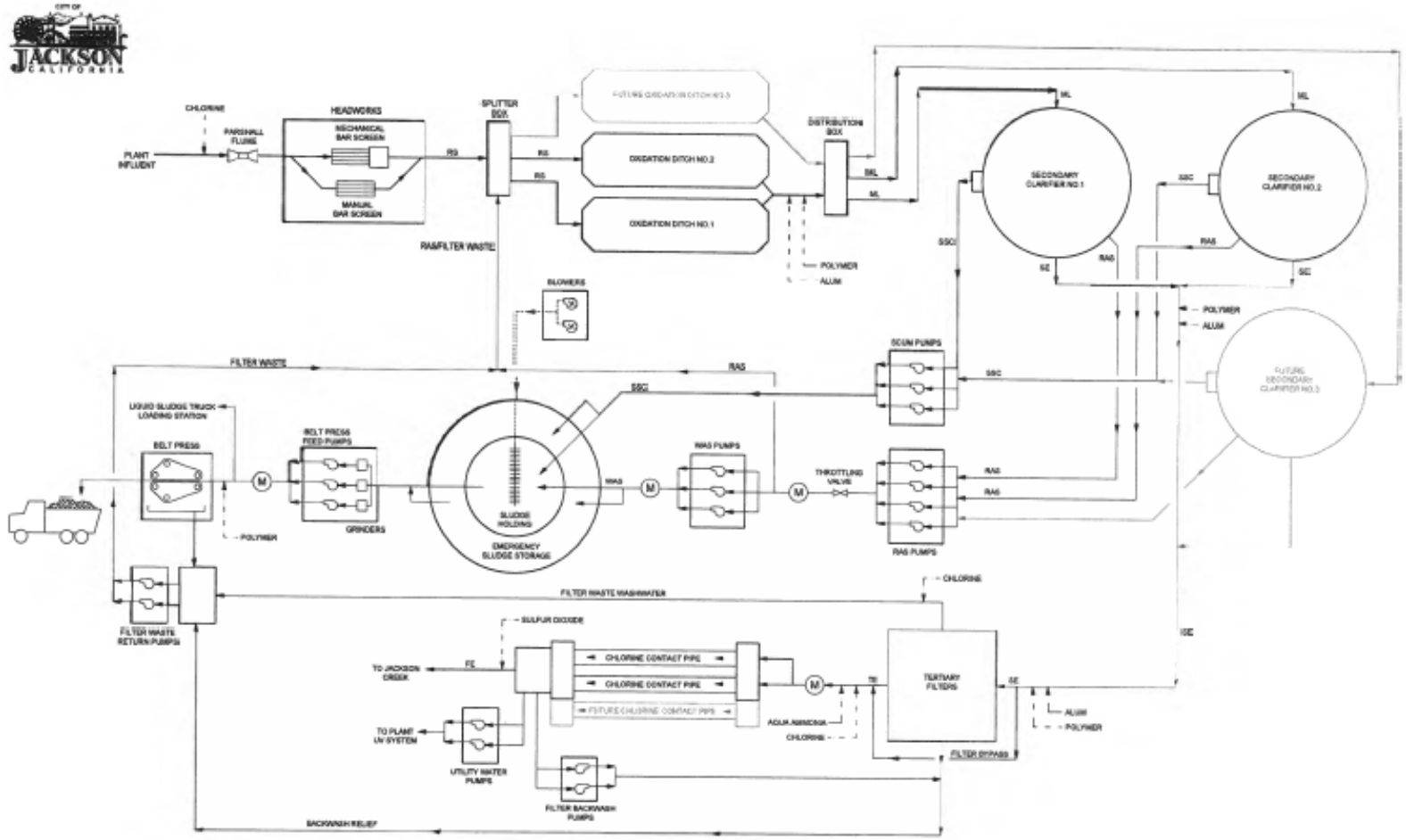
ATTACHMENT B – MAPS



SITE LOCATION MAP

CITY OF JACKSON
WASTEWATER TREATMENT PLANT
AMADOR COUNTY

ATTACHMENT C – FLOW SCHEMATIC



Legend & Abbreviations

(M) FLOW METER	PRIMARY WASTEWATER FLOW	FE	Final Effluent
PUMP	FLOW	ML	Mixed Liquor
(W) BLOWER	AERATION AIR	RAS	Return Activated Sludge
AERATION EQUIPMENT	CHEMICAL	RS	Raw Sewage
	FUTURE	SE	Secondary Effluent
		SSC	Secondary Scum
		TE	Tertiary Effluent
		WAS	Waste Activated Sludge

City of Jackson Wastewater Treatment Plant Flow Diagram

ATTACHMENT D – STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger must comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code (Water Code) and is grounds for enforcement action, for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. (40 CFR 122.41(a).)

2. The Discharger shall comply with effluent standards or prohibitions established under section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. (40 CFR 122.41(a)(1).)

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order. (40 CFR 122.41(c))

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment. (40 CFR 122.41(d))

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of this Order. (40 CFR 122.41(e).)

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 CFR 122.41(g))

2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations. (40 CFR 122.5(c))

F. Inspection and Entry

The Discharger shall allow the Regional Water Board, State Water Board, United States Environmental Protection Agency (USEPA), and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (40 CFR 122.41(i); Water Code section 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (40 CFR 122.41(i)(1));

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (40 CFR 122.41(i)(2));

3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (40 CFR 122.41(i)(3)); and

4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the Water Code, any substances or parameters at any location. (40 CFR 122.41(i)(4))

G. Bypass

1. Definitions

a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. (40 CFR 122.41(m)(1)(i))

b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. (40 CFR 122.41(m)(1)(ii))

2. Bypass not exceeding limitations. The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3, I.G.4, and I.G.5 below. (40 CFR 122.41(m)(2))

3. Prohibition of bypass. Bypass is prohibited, and the Regional Water Board may take enforcement action against a Discharger for bypass, unless (40 CFR 122.41(m)(4)(i)):

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage (40 CFR 122.41(m)(4)(i)(A));

b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance (40 CFR 122.41(m)(4)(i)(B)); and

c. The Discharger submitted notice to the Regional Water Board as required under Standard Provisions – Permit Compliance I.G.5 below. (40 CFR 122.41(m)(4)(i)(C))

4. The Regional Water Board may approve an anticipated bypass, after considering its adverse effects, if the Regional Water Board determines that it will meet the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above. (40 CFR 122.41(m)(4)(ii))

5. Notice

a. Anticipated bypass. If the Discharger knows in advance of the need for a bypass, it shall submit a notice, if possible at least 10 days before the date of the bypass. (40 CFR 122.41(m)(3)(i))

b. Unanticipated bypass. The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below (24-hour notice). (40 CFR 122.41(m)(3)(ii))

H. Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. (40 CFR 122.41(n)(1))

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Standard Provisions – Permit Compliance I.H.2 below are met. No determination made during administrative review of claims that noncompliance was

caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. (40 CFR 122.41(n)(2))

2. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that (40 CFR 122.41(n)(3)):

a. An upset occurred and that the Discharger can identify the cause(s) of the upset (40 CFR 122.41(n)(3)(i));

b. The permitted facility was, at the time, being properly operated (40 CFR 122.41(n)(3)(ii));

c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b below (24-hour notice) (40 CFR 122.41(n)(3)(iii)); and

d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C above. (40 CFR 122.41(n)(3)(iv))

3. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof. (40 CFR 122.41(n)(4))

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition. (40 CFR 122.41(f))

B. Duty to Reapply

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must apply for and obtain a new permit. (40 CFR 122.41(b))

C. Transfers

This Order is not transferable to any person except after notice to the Regional Water Board. The Regional Water Board may require modification or revocation and reissuance of the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the Water Code. (40 CFR 122.41(l)(3) and 122.61)

III. STANDARD PROVISIONS – MONITORING

A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 CFR 122.41(j)(1))

B. Monitoring results must be conducted according to test procedures under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503 unless other test procedures have been specified in this Order. (40 CFR 122.41(j)(4) and 122.44(i)(1)(iv))

IV. STANDARD PROVISIONS – RECORDS

A. Except for records of monitoring information required by this Order related to the Discharger's sewage sludge use and disposal activities, which shall be retained for a period of at least 5 years (or longer as required by 40 CFR Part 503), the Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Water Board Executive Officer at any time. (40 CFR 122.41(j)(2))

B. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements (40 CFR 122.41(j)(3)(i));

2. The individual(s) who performed the sampling or measurements (40 CFR 122.41(j)(3)(ii));

3. The date(s) analyses were performed (40 CFR 122.41(j)(3)(iii));

4. The individual(s) who performed the analyses (40 CFR 122.41(j)(3)(iv));

5. The analytical techniques or methods used (40 CFR 122.41(j)(3)(v)); and

6. The results of such analyses. (40 CFR 122.41(j)(3)(vi))

C. Claims of confidentiality for the following information will be denied (40 CFR 122.7(b)):

1. The name and address of any permit applicant or Discharger (40 CFR 122.7(b)(1)); and

2. Permit applications and attachments, permits and effluent data. (40 CFR 122.7(b)(2))

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the Regional Water Board, State Water Board, or USEPA within a reasonable time, any information which the Regional Water Board, State Water Board, or USEPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Regional Water Board, State Water Board, or USEPA copies of records required to be kept by this Order. (40 CFR 122.41(h); Wat. Code, § 13267)

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the Regional Water Board, State Water Board, and/or USEPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below. (40 CFR 122.41(k))

2. All permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of USEPA). (40 CFR 122.22(a)(3)).

3. All reports required by this Order and other information requested by the Regional Water Board, State Water Board, or USEPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above (40 CFR 122.22(b)(1));

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 CFR 122.22(b)(2)); and

c. The written authorization is submitted to the Regional Water Board and State Water Board. (40 CFR 122.22(b)(3))

4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard

Provisions – Reporting V.B.3 above must be submitted to the Regional Water Board and State Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 CFR 122.22(c))

5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification:

"*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*" (40 CFR 122.22(d))

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program (Attachment E) in this Order. (40 CFR 122.22(l)(4))

2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the Regional Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices. (40 CFR 122.41(l)(4)(i))

3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Regional Water Board. (40 CFR 122.41(l)(4)(ii))

4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order. (40 CFR 122.41(l)(4)(iii))

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date. (40 CFR 122.41(l)(5))

E. Twenty-Four Hour Reporting

1. The Discharger shall notify the Office of Emergency Services of any noncompliance that may endanger health or the environment within two (2) hours from the time the Discharger becomes aware of the circumstances. The Discharger shall notify the

Central Valley Water Board of the noncompliance by telephone or fax within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided to the Central Valley Water Board within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. (40 CFR 122.41(l)(6)(i))

2. The following shall be included as information that must be reported within 24 hours under this paragraph (40 CFR 122.41(l)(6)(ii)):

a. Any unanticipated bypass that exceeds any effluent limitation in this Order. (40 CFR 122.41(l)(6)(ii)(A))

b. Any upset that exceeds any effluent limitation in this Order. (40 CFR 122.41(l)(6)(ii)(B))

3. The Regional Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours. (40 CFR 122.41(l)(6)(iii))

F. Planned Changes

The Discharger shall give notice to the Regional Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required under this provision only when (40 CFR 122.41(l)(1)):

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b) (40 CFR 122.41(l)(1)(i)); or

2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are not subject to effluent limitations in this Order. (40 CFR 122.41(l)(1)(ii))

3. The alteration or addition results in a significant change in the Discharger's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the previous permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan. (40 CFR 122.41(l)(1)(iii))

G. Anticipated Noncompliance

The Discharger shall give advance notice to the Regional Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with General Order requirements. (40 CFR 122.41(l)(2))

H. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.E above. (40 CFR 122.41(l)(7))

I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, State Water Board, or USEPA, the Discharger shall promptly submit such facts or information. (40 CFR 122.41(l)(8))

VI. STANDARD PROVISIONS – ENFORCEMENT

A. The Regional Water Board is authorized to enforce the terms of this permit under several provisions of the Water Code, including, but not limited to, sections 13385, 13386, and 13387.

VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS

A. Publicly-Owned Treatment Works (POTWs)

All POTWs shall provide adequate notice to the Regional Water Board of the following (40 CFR 122.42(b)):

1. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to sections 301 or 306 of the CWA if it were directly discharging those pollutants (40 CFR 122.42(b)(1)); and

2. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of adoption of the Order. (40 CFR 122.42(b)(2))

3. Adequate notice shall include information on the quality and quantity of effluent introduced into the POTW as well as any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.
(40 CFR 122.42(b)(3).

ATTACHMENT E – MONITORING AND REPORTING PROGRAM

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ATTACHMENT E – MONITORING AND REPORTING PROGRAM

Title 40 of the Code of Federal Regulations (CFR), section 122.48 (40 CFR 122.48) requires that all NPDES permits specify monitoring and reporting requirements. California Water Code (Water Code) sections 13267 and 13383 also authorize the Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) to require technical and monitoring reports. This Monitoring and Reporting Program establishes monitoring and reporting requirements, which implement the federal and California regulations.

I. GENERAL MONITORING PROVISIONS

A. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring locations specified below and, unless otherwise specified, before the monitored flow joins or is diluted by any other waste stream, body of water, or substance. Monitoring locations shall not be changed without notification to and the approval of the Central Valley Water Board.

B. Effluent samples shall be taken downstream of the last addition of wastes to the treatment or discharge works where a representative sample may be obtained prior to mixing with the receiving waters. Samples shall be collected at such a point and in such a manner to ensure a representative sample of the discharge.

C. Chemical, bacteriological, and bioassay analyses of any material required by this Order shall be conducted by a laboratory certified for such analyses by the Department of Public Health (DPH). Laboratories that perform sample analyses must be identified in all monitoring reports submitted to the Central Valley Water Board. In the event a certified laboratory is not available to the Discharger for any onsite field measurements such as pH, dissolved oxygen, turbidity, temperature and residual chlorine, such analyses performed by a noncertified laboratory will be accepted provided a Quality Assurance-Quality Control Program is instituted by the laboratory. A manual containing the steps followed in this program for any onsite field measurements such as pH, dissolved oxygen, turbidity, temperature and residual chlorine must be kept onsite in the treatment facility laboratory and shall be available for inspection by Central Valley Water Board staff. The Discharger must demonstrate sufficient capability (qualified and trained employees, properly calibrated and maintained field instruments, etc.) to adequately perform these field measurements. The Quality Assurance-Quality Control Program must conform to USEPA guidelines or to procedures approved by the Central Valley Water Board.

D. Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. All monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary, at least yearly, to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once per year to ensure continued accuracy of the devices.

E. Monitoring results, including noncompliance, shall be reported at intervals and in a manner specified in this Monitoring and Reporting Program.

F. Laboratories analyzing monitoring samples shall be certified by DPH, in accordance with the provision of Water Code section 13176, and must include quality assurance/quality control data with their reports.

G. The Discharger shall conduct analysis on any sample provided by USEPA as part of the Discharge Monitoring Quality Assurance (DMQA) program. The results of any such analysis shall be submitted to USEPA's DMQA manager.

H. The Discharger shall file with the Central Valley Water Board technical reports on self-monitoring performed according to the detailed specifications contained in this Monitoring and Reporting Program.

I. The results of all monitoring required by this Order shall be reported to the Central Valley Water Board, and shall be submitted in such a format as to allow direct comparison with the limitations and requirements of this Order. Unless otherwise specified, discharge flows shall be reported in terms of the monthly average and the daily maximum discharge flows.

II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

Table E-1. Monitoring Station Locations

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
--	INF-001	A location where a representative sample of the influent into the Facility can be collected prior to any plant return flows or treatment processes.
--	UVS-001	Ultraviolet Light Disinfection System
001	EFF-001	A location where a representative sample of the effluent from the Facility can be collected after all treatment processes and prior to commingling with other waste streams or being discharged into Jackson Creek.
--	RSW-001	Jackson Creek, 200 feet upstream of Discharge Point No. 001.
--	RSW-002	Jackson Creek, 200 feet downstream of Discharge Point No. 001.
--	SPL-001	A location where a representative sample of the municipal water supply can be obtained.
--	BIO-001	A location where a representative sample of the biosolids can be obtained.

III. INFLUENT MONITORING REQUIREMENTS

A. Monitoring Location INF-001

1. The Discharger shall monitor influent to the Facility at Monitoring Location INF-001 as follows:

Table E-2. Influent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	MGD	Meter	Continuous	[1]
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	24-hr Composite[2]	1/Week	[1]
Total Suspended Solids	mg/L	24-hr Composite[2]	1/Week	[1]

[1] Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136; or by methods approved by the Central Valley Water Board or the State Water Board.
[2] 24-hour flow proportional composite.

IV. EFFLUENT MONITORING REQUIREMENTS

A. Monitoring Location EFF-001

1. The Discharger shall monitor treated wastewater at Monitoring Location EFF-001 as follows. If more than one analytical test method is listed for a given parameter, the Discharger must select from the listed methods and corresponding Minimum Level. Where a CTR constituent is listed in Appendix 4 of the SIP, the reporting level specified in Attachment I must be achieved by the laboratory conducting the analysis.

Table E-3. Effluent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method	Reporting Level
Flow	MGD	Meter	Continuous	[1]	--
Conventional Pollutants					
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	24-hr Composite[2]	2/Week	[1]	--
	lbs/day	Calculate	2/Week	--	--
pH	standard units	Grab	2/Week[3,4]	[1]	--
Total Suspended Solids	mg/L	24-hr Composite[2]	2/Week	[1]	--
	lbs/day	Calculate	2/Week	--	--
Priority Pollutants					
Chlorodibromomethane	µg/L	Grab	1/Month	[1]	0.5
Copper, Total Recoverable	µg/L	24-hr Composite[2]	1/Month	[1]	2
Cyanide, Total (as CN)	µg/L	24-hr Composite[2]	1/Month	[1]	5
Dichlorobromomethane	µg/L	Grab	1/Month	[1]	5
Mercury, Total Recoverable	µg/L	Grab	1/Quarter	[1,7]	0.2

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method	Reporting Level
	lbs/month	Calculate	1/Quarter	--	--
Zinc, Total Recoverable	µg/L	24-hr Composite[2]	1/Month	[1]	1
Priority Pollutants and Other Constituents of Concern	µg/L	See Att. I	See Att. I	[1,5]	--
Non-Conventional Pollutants					
Ammonia Nitrogen, Total (as N)	mg/L	Grab	2/Week[3,8]	[1]	--
	lbs/day	Calculate	2/Week	--	--
Chlorine, Total Residual[14]	mg/L	Meter	Continuous	[1,9]	--
Electrical Conductivity @ 25°C	µmhos/cm	Grab	1/Week	[1]	--
Hardness (as $CaCO_3$)	mg/L	Grab	1/Month[10]	[1]	--
Nitrate Nitrogen, Total (as N)	mg/L	Grab	1/Month[11]	[1]	--
Nitrite Nitrogen, Total (as N)	mg/L	Grab	1/Month[11]	[1]	--
Temperature	°C	Grab	2/Week[3,4]	[1]	--
Total Coliform Organisms	MPN/ 100 mL	Grab	3/Week[12]	[1]	--
Total Dissolved Solids	mg/L	Grab	1/Quarter	[1]	--
Total Trihalomethanes[13]	µg/L	Grab	1/Month	[1]	--
Turbidity	NTU	Meter	Continuous	[1]	--

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method	Reporting Level

[1] Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136 or by methods approved by the Central Valley Water Board or the State Water Board.
[2] 24-hour flow proportional composite.
[3] pH and temperature shall be recorded at the time of ammonia sample collection.
[4] A hand-held field meter may be used, provided the meter utilizes a USEPA-approved algorithm/method and is calibrated and maintained in accordance with the manufacturer's instructions. A calibration and maintenance log for each meter used for monitoring required by this Monitoring and Reporting Program shall be maintained at the Facility.
[5] The maximum required Reporting Level is specified in Attachment I, Table I-1, Priority Pollutants and Other Constituents of Concern.
[6] In order to verify if bis (2-ethylhexyl) phthalate is truly present in the effluent discharge, the Discharger shall take steps to assure that sample containers, sampling apparatus, and analytical equipment are not sources of the detected contaminant.
[7] Unfiltered methylmercury and total mercury samples shall be taken using clean hands/dirty hands procedures, as described in USEPA method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels, for collection of equipment blanks (section 9.4.4.2), and shall be analyzed by USEPA method 1630/1631 (Revision E) with a method detection limit of 0.02 ng/L for methylmercury and 0.2 ng/L for total mercury.
[8] Concurrent with whole effluent toxicity monitoring.
[9] Total chlorine residual must be monitored with a method sensitive to and accurate at the permitted level of 0.01 mg/L.
[10] Hardness samples shall be collected concurrently with metals samples.
[11] Monitoring for nitrite and nitrate shall be conducted concurrently.
[12] Samples for total coliform organisms may be collected at any point following disinfection.
[13] Applies to the sum of bromoform, chlorodibromomethane, chloroform, and dichlorobromomethane.
[14] The Discharger shall monitor chlorine residual continuously through 28 February 2018 or until UV system upgrades are fully operational. After which time, the Discharger may request in writing that chlorine residual monitoring be reduced to only periods when chlorine is used at the facility. Approval for this change shall be based on whether or not previous monitoring results show that chlorine residual effluent limits have been met. The monitoring change may only be implemented after the Discharger receives written approval from the Executive Officer.

V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

A. Acute Toxicity Testing. The Discharger shall conduct acute toxicity testing to determine whether the effluent is contributing acute toxicity to the receiving water. The Discharger shall meet the following acute toxicity testing requirements:

1. *Monitoring Frequency* – The Discharger shall perform semi-annual acute toxicity testing, concurrent with effluent ammonia sampling.

2. *Sample Types* – The Discharger may use flow-through, static non-renewal, or static renewal testing. For static non-renewal and static renewal testing, the samples shall be flow proportional 24-hour composites and shall be representative of the volume and quality of the discharge. The effluent samples shall be taken at Monitoring Location EFF-001.

3. *Test Species* – Test species shall be rainbow trout (*Oncorhynchus mykiss*).

4. *Methods* – The acute toxicity testing samples shall be analyzed using EPA-821-R-02-012, Fifth Edition. Temperature, total residual chlorine, and pH shall be recorded at the time of sample collection. No pH adjustment may be made unless approved by the Executive Officer.

5. *Test Failure* – If an acute toxicity test does not meet all test acceptability criteria, as specified in the test method, the Discharger must re-sample and re-test as soon as possible, not to exceed 7 days following notification of test failure.

B. Chronic Toxicity Testing. The Discharger shall conduct three species chronic toxicity testing to determine whether the effluent is contributing chronic toxicity to the receiving water. The Discharger shall meet the following chronic toxicity testing requirements:

1. *Monitoring Frequency –* The Discharger shall perform semi-annual three species chronic toxicity testing.

2. *Sample Types* – Effluent samples shall be flow proportional 24-hour composites and shall be representative of the volume and quality of the discharge. The effluent samples shall be taken at Monitoring Location EFF-001. The receiving water control shall be a grab sample obtained from Monitoring Location RSW-001, as identified in this Monitoring and Reporting Program.

3. *Sample Volumes* – Adequate sample volumes shall be collected to provide renewal water to complete the test in the event that the discharge is intermittent.

4. *Test Species* – Chronic toxicity testing measures sublethal (e.g., reduced growth, reproduction) and/or lethal effects to test organisms exposed to an effluent compared to that of the control organisms. The Discharger shall conduct chronic toxicity tests with:

   - The cladoceran, water flea, *Ceriodaphnia dubia* (survival and reproduction test);
   - The fathead minnow, *Pimephales promelas* (larval survival and growth test); and
   - The green alga, *Selenastrum capricornutum* (growth test).

5. *Methods* – The presence of chronic toxicity shall be estimated as specified in *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition*, EPA/821-R-02-013, October 2002.

6. *Reference Toxicant* – As required by the SIP, all chronic toxicity tests shall be conducted with concurrent testing with a reference toxicant and shall be reported with the chronic toxicity test results.

7. *Dilutions* – For regular and accelerated chronic toxicity monitoring, it is not necessary to perform the test using a dilution series. The test may be performed using 100% effluent and two controls. For Toxicity Reduction Evaluation (TRE) monitoring, the chronic toxicity testing shall be performed using the dilution series

identified in Table E-4, below, unless use of an alternative diluent is detailed in the submitted TRE Action Plan, or when the receiving water is toxic.

Table E-4. Chronic Toxicity Testing Dilution Series

Sample	Dilutions (%)					Controls	
	100	75	50	25	12.5	Receiving Water	Laboratory Water
% Effluent	100	75	50	25	12.5	0	0
% Receiving Water	0	25	50	75	87.5	100	0
% Laboratory Water	0	0	0	0	0	0	100

8. *Test Failure* – The Discharger must re-sample and re-test as soon as possible, but no later than fourteen (14) days after receiving notification of a test failure. A test failure is defined as follows:

a. The reference toxicant test or the effluent test does not meet all test acceptability criteria as specified in the *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition*, EPA/821-R-02-013, October 2002 (Method Manual), and its subsequent amendments or revisions; or

b. The percent minimum significant difference (PMSD) measured for the test exceeds the upper PMSD bound variability criterion in Table 6 on page 52 of the Method Manual. (A retest is only required in this case if the test results do not exceed the monitoring trigger specified in the Special Provision at section VI. 2.a.iii. of the Order.)

C. WET Testing Notification Requirements. The Discharger shall notify the Central Valley Water Board within 24-hours after the receipt of test results exceeding the monitoring trigger during regular or accelerated monitoring, or an exceedance of the acute toxicity effluent limitation.

D. WET Testing Reporting Requirements. All toxicity test reports shall include the contracting laboratory's complete report provided to the Discharger and shall be in accordance with the appropriate "Report Preparation and Test Review" sections of the method manuals. At a minimum, whole effluent toxicity monitoring shall be reported as follows:

1. Chronic WET Reporting. Regular chronic toxicity monitoring results shall be reported to the Central Valley Water Board with the monthly discharger self-monitoring reports, and shall contain, at minimum:

c. The results expressed in TUc, measured as 100/NOEC, and also measured as 100/LC50, 100/EC25, 100/IC25, and 100/IC50, as appropriate.

d. The statistical methods used to calculate endpoints;

e. The statistical output page, which includes the calculation of the percent minimum significant difference (PMSD);

f. The dates of sample collection and initiation of each toxicity test; and

g. The results compared to the numeric toxicity monitoring trigger.

Additionally, the monthly discharger self-monitoring reports shall contain an updated chronology of chronic toxicity test results expressed in TUc, and organized by test species, type of test (survival, growth or reproduction), and monitoring frequency, i.e., either quarterly, monthly, accelerated, or TRE.

2. **Acute WET Reporting.** Acute toxicity test results shall be submitted with the monthly discharger self-monitoring reports and reported as percent survival.

3. **TRE Reporting.** Reports for TREs shall be submitted in accordance with the schedule contained in the Discharger's approved TRE Workplan, or as amended by the Discharger's TRE Action Plan.

4. **Quality Assurance (QA).** The Discharger must provide the following information for QA purposes:

   a. Results of the applicable reference toxicant data with the statistical output page giving the species, NOEC, LOEC, type of toxicant, dilution water used, concentrations used, PMSD, and dates tested.

   b. The reference toxicant control charts for each endpoint, which include summaries of reference toxicant tests performed by the contracting laboratory.

   c. Any information on deviations or problems encountered and how they were dealt with.

VI. LAND DISCHARGE MONITORING REQUIREMENTS – NOT APPLICABLE

VII. RECLAMATION MONITORING REQUIREMENTS – NOT APPLICABLE

VIII. RECEIVING WATER MONITORING REQUIREMENTS – SURFACE WATER AND GROUNDWATER

A. Monitoring Locations RSW-001 and RSW-002

1. The Discharger shall monitor Jackson Creek at Monitoring Locations RSW-001 and RSW-002 as follows:

Table E-5. Receiving Water Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	MGD	Meter	1/Day[1]	
Lake Amador Percent Effluent	%	Calculate[6]	1/Year	--

Conventional Pollutants				
pH	standard units	Grab	2/Week	[2,3,4]
Priority Pollutants				
Priority Pollutants and Other Constituents of Concern	µg/L	Att. I	Att. I[1]	[2,5]
Non-Conventional Pollutants				
Dissolved Oxygen	mg/L	Grab	2/Week	[2,3]
Electrical Conductivity @ 25°C	µmhos/cm	Grab	2/Week	[2,3]
Fecal Coliform Organisms	MPN/100 mL	Grab	1/Quarter	[2]
Hardness, Total (as $CaCO_3$)	mg/L	Grab	1/Quarter	[2,3]
Temperature	°F	Grab	2/Week	[2,3,4]
Turbidity	NTU	Grab	2/Week	[2,3]

[1] Monitoring required at Monitoring Location RSW-001 only.
[2] Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136 or by methods approved by the Central Valley Water Board or the State Water Board.
[3] A hand-held field meter may be used, provided the meter utilizes a USEPA-approved algorithm/method and is calibrated and maintained in accordance with the manufacturer's instructions. A calibration and maintenance log for each meter used for monitoring required by this Monitoring and Reporting Program shall be maintained at the Facility.
[4] pH and temperature shall be recorded at the time of ammonia sample collection.
[5] Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136; for priority pollutants the methods must meet the lowest MLs specified in Appendix 4 of the SIP, where no methods are specified for a given pollutant, by methods approved by this Central Valley Water Board or the State Water Board.
[6] Calculations shall be in accordance with Section VII.F of the Order, Compliance Determination for 20:1 Dilution of Wastewater in Lake Amador.

2. In conducting the receiving water sampling, a log shall be kept of the receiving water conditions throughout the reach bounded by Monitoring Locations RSW-001 and RSW-002. Attention shall be given to the presence or absence of:

a. Floating or suspended matter;
b. Discoloration;
c. Bottom deposits;
d. Aquatic life;
e. Visible films, sheens, or coatings;
f. Fungi, slimes, or objectionable growths; and
g. Potential nuisance conditions.

Notes on receiving water conditions shall be summarized in the monitoring report.

IX. OTHER MONITORING REQUIREMENTS

A. Biosolids

1. Monitoring Location BIO-001

a. A composite sample of sludge shall be collected annually at Monitoring Location BIO-001 in accordance with USEPA's *POTW Sludge Sampling and Analysis Guidance Document*, August 1989, and tested for the metals listed in Title 22.

b. Sampling records shall be retained for a minimum of **5 years**. A log shall be maintained of sludge quantities generated and of handling and disposal activities. The frequency of entries is discretionary; however, the log must be complete enough to serve as a basis for part of the annual report.

B. Municipal Water Supply

1. Monitoring Location SPL-001

The Discharger shall monitor the municipal water supply at Monitoring Location SPL-001 as follows. Publicly available data may be used in lieu of the monitoring established in Table E-6 below to demonstrate the average quality of the water supply.

Table E-6. Municipal Water Supply Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Electrical Conductivity @ 25°C[1]	µmhos/cm	Grab	1/Year	[2]
Standard Minerals[3]	mg/L	Grab	1/Year	[2]
Total Dissolved Solids[1]	mg/L	Grab	1/Year	[2]

[1] If the water supply is from more than one source, the total dissolved solids and electrical conductivity shall be reported as a weighted average and include copies of supporting calculations.
[2] Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136 or by methods approved by the Central Valley Water Board or the State Water Board.
[3] Standard minerals shall include all major cations and anions and include verification that the analysis is complete (i.e., cation/anion balance).

C. Ultraviolet Light (UV) Disinfection System

1. Monitoring Location UVS-001

The Discharger shall monitor the UV disinfection system at UVS-001 as follows:

Table E-7. Ultraviolet Light Disinfection System Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency
Flow	MGD	Meter	Continuous [1]
Turbidity	NTU	Meter [2]	Continuous [1, 3]
Number of UV banks in operation	Number	Meter	Continuous [1]
UV Transmittance	Percent (%)	Meter	Continuous [1]
UV Dose [3]	MW-sec/cm^2	Calculated	Continuous [1]
Total Coliform Organisms	MPN/100 mL	Grab	1/Day

[1] For continuous analyzers, the Discharger shall report documented routine meter maintenance activities including date, time of day, and duration, in which the analyzer(s) is not in operation. If analyzer(s) fail to provide continuous monitoring for more than two hours and influent and/or effluent from the disinfection process is not diverted for retreatment, the Discharger shall obtain and report hourly manual and/or grab sample results. The Discharger shall not decrease power settings or reduce the number of UV lamp banks in operation while the continuous analyzers are out of service and water is being disinfected.

[2] The turbidity meter shall be stationed immediately after the filters, prior to the UV disinfection process.

[3] Report daily average and maximum turbidity.

[4] Report daily minimum hourly UV dose and daily average UV dose. The minimum hourly average dose shall consist of lowest hourly average dose provided in any channel that had at least one bank of lamps operating during the hour interval. For channels that did not operate for the entire hour interval, the dose will be averaged based on the actual operation time.

X. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

1. The Discharger shall comply with all Standard Provisions (Attachment D) related to monitoring, reporting, and recordkeeping.

2. Upon written request of the Central Valley Water Board, the Discharger shall submit a summary monitoring report. The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year(s).

3. **Compliance Time Schedules.** For compliance time schedules included in the Order, the Discharger shall submit to the Central Valley Water Board, on or before each compliance due date, the specified document or a written report detailing compliance or noncompliance with the specific date and task. If noncompliance is reported, the Discharger shall state the reasons for noncompliance and include an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Central Valley Water Board by letter when it returns to compliance with the compliance time schedule.

4. The Discharger shall report to the Central Valley 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.

5. Reporting requirements shall be in accordance with due dates specified in this Order. If the due date is on a Saturday, Sunday, State holiday, or a day the corresponding Water Board(s) office(s) is(are) closed, the due date shall be on the next business day.

B. Self Monitoring Reports (SMRs)

1. The Discharger shall continue to submit eSMRs using the State Water Board's CIWQS Program Web site (http:www.waterboards.ca.gov/ciwqs/index.html). The Discharger shall maintain sufficient staffing and resources to ensure it submits eSMRs during the effective duration of this Order. This includes provision of training and supervision of individuals (e.g., Discharger personnel or consultant) on how to prepare and submit eSMRs.

2. Monitoring periods and reporting for all required monitoring shall be completed according to the following schedule:

Table E-8. Monitoring Periods and Reporting Schedule

Sampling Frequency	Monitoring Period Begins On…	Monitoring Period	SMR Due Date
Continuous	Permit effective date	Continuous	Submit with monthly SMR
1/Day	Permit effective date	(Midnight through 11:59 PM) or any 24-hour period that reasonably represents a calendar day for purposes of sampling.	Submit with monthly SMR
1/Week	Permit effective date	Sunday through Saturday	Submit with monthly SMR
2/Week	Permit effective date	Sunday through Saturday	Submit with monthly SMR
3/Week	Permit effective date	Sunday through Saturday	Submit with monthly SMR
1/Month	Permit effective date	First day of calendar month through last day of calendar month	1st day of the second month following the sampling period
1/Quarter	Permit effective date	1 January through 31 March 1 April through 30 June 1 July through 30 September 1 October through 31 December	1 May 1 August 1 November 1 February (of the following year)
2/Year	Permit effective date	1 January through 31 March 1 July through 30 September	1 May 1 November
1/Year	Permit effective date	1 January through 31 December	1 February (of the following year)

3. Reporting Protocols. The Discharger shall report with each sample result the applicable reported Reporting Level (RL) and the current laboratory's Method Detection Limit (MDL), as determined by the procedure in 40 CFR Part 136.

The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

a. Sample results greater than or equal to the RL shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).

b. Sample results less than the RL, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported.

For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated Concentration" (may be shortened to "Est. Conc."). The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (+

a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.

c. Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.

d. Dischargers are to instruct laboratories to establish calibration standards so that the Minimum Level (ML) value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from extrapolation beyond the lowest point of the calibration curve. The Discharger's laboratory(ies) may, as allowed for by the rules governing alterations to minimum level (ML) values in section 2.4.3 of the SIP, employ a calibration standard lower than the ML value in Appendix 4 of the SIP.

4. Multiple Sample Data. When determining compliance with an AMEL for priority pollutants and more than one sample result is available, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of "Detected, but Not Quantified" (DNQ) or "Not Detected" (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure.

a. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

b. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

5. Reporting Requirements. In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible.

a. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with interim and/or final effluent limitations or with other waste discharge requirements (e.g., discharge specifications, receiving water limitations, special provisions, etc.).

b. Reports must clearly show when discharging to Discharge Point No. 001 or other permitted discharge locations. Reports must show the date and time that the discharge started and stopped at each location.

c. The highest daily maximum for the month and monthly and weekly averages shall be determined and recorded as needed to demonstrate compliance.

6. **Calculation Requirements.** The following shall be calculated and reported in the eSMRs:

   a. **Daily Dry Weather Flow.** Calculate and report in Annual Report.

   b. **Mass Loading Limitations.** For BOD_5, TSS, and ammonia, the Discharger shall calculate and report the mass loading (lbs/day) in the eSMRs. The mass loading shall be calculated as follows:

      Mass Loading (lbs/day) = Flow (MGD) x Concentration (mg/L) x 8.34

      When calculating daily mass loading, the daily average flow and constituent concentration shall be used. For weekly average mass loading, the weekly average flow and constituent concentration shall be used. For monthly average mass loading, the monthly average flow and constituent concentration shall be used.

   c. **Removal Efficiency (BOD_5 and TSS).** The Discharger shall calculate and report the percent removal of BOD_5 and TSS in the eSMRs. The percent removal shall be calculated as specified in Section VII.A. of the Limitations and Discharge Requirements.

   d. **Monthly Mercury Effluent Limitations.** The Discharger shall calculate and report the monthly mercury mass loading for the effluent. The monthly mass loading shall be calculated as specified in Section VII.B. of the Limitations and Discharge Requirements.

   e. **Total Coliform Organisms Effluent Limitations.** The Discharger shall calculate and report the 7-day median of total coliform organisms for the effluent. The 7-day median of total coliform organisms shall be calculated as specified in Section VII.D. of the Limitations and Discharge Requirements.

   f. **Dissolved Oxygen Receiving Water Limitations.** The Discharger shall calculate and report monthly in the self-monitoring report: i) the dissolved oxygen concentration, ii) the percent of saturation in the main water mass, and iii) the 95th percentile dissolved oxygen concentration.

   g. **Turbidity Receiving Water Limitations.** The Discharger shall calculate and report the turbidity increase in the receiving water applicable to the natural turbidity condition specified in Section V.A.17.a-e. of the Limitations and Discharge Requirements.

   h. **Temperature Receiving Water Limitations.** The Discharger shall calculate and report the temperature increase in the receiving water based on the difference in temperature at Monitoring Locations RSW-001 and RSW-002.

   i. **Lake Amador Percent Effluent (Compliance with the 20:1 Dilution Ratio).** The Discharger shall calculate the percent effluent in Lake Amador as described

in the Compliance Determination section and reported in the December monitoring report.

7. The Discharger shall submit eSMRs in accordance with the following requirements:

a. When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format within the system, the Discharger shall electronically submit the data in a tabular format as an attachment. The Discharger is not required to duplicate the submittal of data that is entered in a tabular format within CIWQS.

b. The Discharger shall include a cover letter with the eSMR. The information contained in the cover letter shall clearly identify violations of the WDRs; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.

c. Individual Reports must be submitted to the Central Valley Water Board, signed and certified as required by the Standard Provisions (Attachment D), to the address listed below:

Regional Water Quality Control Board
Central Valley Region
NPDES Compliance and Enforcement Unit
11020 Sun Center Dr., Suite #200
Rancho Cordova, CA 95670-6114

C. Discharge Monitoring Reports (DMRs) – Not Applicable

D. Other Reports

1. Special Study Reports and Progress Reports. As specified in the Special Provisions contained in section VI of the Order, special study reports and progress reports shall be submitted in accordance with the following reporting requirements. At minimum, the progress reports shall include a discussion of the status of final compliance, whether the Discharger is on schedule to meet the final compliance date, and the remaining tasks to meet the final compliance date.

Table E-9. Reporting Requirements for Special Provisions Reports

Special Provision	Reporting Requirements
Salinity and Chemical Additives Evaluation and Minimization Plan (Section VI.C.3.a)	**By 6 September 2014**
Biosolids Use and Disposal Plan (Section VI.C.5.a.v)	**By 6 June 2014**

2. The Discharger shall report the results of any special studies, acute and chronic toxicity testing, or TRE/TIE required by Special Provisions VI.C. of this Order. The Discharger shall report the progress in satisfaction of compliance schedule dates

specified in the Special Provision at section VI.C.7 of this Order. The Discharger shall submit reports with the first monthly SMR scheduled to be submitted on or immediately following the report due date.

3. Within 60 days of permit adoption, the Discharger shall submit a report outlining reporting levels (RLs), method detection limits, and analytical methods for approval. The Discharger shall comply with the monitoring and reporting requirements for CTR constituents as outlined in section 2.3 and 2.4 of the SIP. The maximum required reporting levels for priority pollutant constituents shall be based on the Minimum Levels (MLs) contained in Appendix 4 of the SIP, determined in accordance with Section 2.4.2 and Section 2.4.3 of the SIP. In accordance with Section 2.4.2 of the SIP, when there is more than one ML value for a given substance, the Central Valley Water Board shall include as RLs, in the permit, all ML values, and their associated analytical methods, listed in Appendix 4 that are below the calculated effluent limitation. The Discharger may select any one of those cited analytical methods for compliance determination. If no ML value is below the effluent limitation, then the Central Valley Water Board shall select the lowest ML value, and its associated analytical method, listed in Appendix 4 for inclusion in the permit. Table I-1 (Attachment I) provides required maximum reporting levels in accordance with the SIP.

4. Annual Operations Report. By 30 January of each year, the Discharger shall submit a written report to the Executive Officer containing the following:

a. The names, certificate grades, and general responsibilities of all persons employed at the Facility.

b. The names and telephone numbers of persons to contact regarding the plant for emergency and routine situations.

c. A statement certifying when the flow meter(s) and other monitoring instruments and devices were last calibrated, including identification of who performed the calibration.

d. A statement certifying whether the current operation and maintenance manual, and contingency plan, reflect the wastewater treatment plant as currently constructed and operated, and the dates when these documents were last revised and last reviewed for adequacy.

e. The Discharger may also be requested to submit an annual report to the Central Valley Water Board with both tabular and graphical summaries of the monitoring data obtained during the previous year. Any such request shall be made in writing. The report shall discuss the compliance record. If violations have occurred, the report shall also discuss the corrective actions taken and planned to bring the discharge into full compliance with the waste discharge requirements.

ATTACHMENT F – FACT SHEET

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ATTACHMENT F – FACT SHEET

As described in the Findings in section II of this Order, this Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

This Order has been prepared under a standardized format to accommodate a broad range of discharge requirements for Dischargers in California. Only those sections or subsections of this Order that are specifically identified as "not applicable" have been determined not to apply to this Discharger. Sections or subsections of this Order not specifically identified as "not applicable" are fully applicable to this Discharger.

I. PERMIT INFORMATION

The following table summarizes administrative information related to the Facility.

Table F-1. Facility Information

WDID	5B030103001
Discharger	City of Jackson
Name of Facility	Wastewater Treatment Plant
Facility Address	39 North Highway 49-88
	Jackson, CA 95642
	Amador County
Facility Contact, Title and Phone	Eric Neuschmid, Chief Plant Operator, (209) 223-1607
Authorized Person to Sign and Submit Reports	Michael Daly, City Manager, (209) 233-1646 or Eric Neuschmid, Chief Plant Operator, (209) 223-1607
Mailing Address	33 Broadway, Jackson, CA 95642
Billing Address	Same as Mailing Address
Type of Facility	Publicly Owned Treatment Works (POTW)
Major or Minor Facility	Minor
Threat to Water Quality	1
Complexity	A
Pretreatment Program	Not Applicable
Reclamation Requirements	Not Applicable
Facility Permitted Flow	0.71 million gallons per day (MGD), average dry weather flow
Facility Design Flow	0.71 MGD
Watershed	Mokelumne River
Receiving Water	Jackson Creek
Receiving Water Type	Inland surface water

A. The City of Jackson (hereinafter Discharger) is the owner and operator of the City of Jackson Wastewater Treatment Plant (hereinafter Facility), a POTW.

For the purposes of this Order, references to the "discharger" or "permittee" in applicable federal and state laws, regulations, plans, or policy are held to be equivalent to references to the Discharger herein.

B. The Facility discharges wastewater to Jackson Creek, a water of the United States, and a tributary to the Mokelumne River within the Sacramento-San Joaquin Delta, via Amador Lake and Dry Creek. The Discharger was regulated by Order R5-2007-0133-01 which was adopted on 25 October 2007, amended on 4 October 2012, and expired on 1 October 2012. The terms and conditions of Order R5-2007-0133-01 were automatically continued and remained in effect until new Waste Discharge Requirements (WDRs) and National Pollutant Discharge Elimination System (NPDES) permit were adopted pursuant to this Order.

C. The Discharger filed a report of waste discharge and submitted an application for renewal of its WDRs and NPDES permit on 29 March 2012. A site visit was conducted on 23 May 2012, to observe operations and collect additional data to develop permit limitations and conditions.

II. FACILITY DESCRIPTION

The Discharger owns and operates a wastewater collection, treatment and disposal system for the City of Jackson, serving a population of approximately 4,600 individuals with approximately 1,650 connections. The Facility design flow capacity is 0.71 MGD.

A. Description of Wastewater and Biosolids Treatment or Controls

The treatment system consists of a mechanical bar screen and spiral augur with a washer compactor for screenings, two oxidation ditches, two secondary clarifiers, chlorine injection, four single media sand filters, chlorine contact basins, and dechlorination. Solids are digested in an aerated sludge holding tank and dewatered using a belt filter press. Solids are hauled to the Potrero Hills Landfill once per week.

In an e-mail dated 29 April 2013 the California Department of Health (CDPH) indicated that a new surface water treatment plant has been constructed by Jackson Valley Irrigation District (JVID) that treats raw water from Pardee Reservoir to replace drinking water provided from Lake Amador. Lake Amador, which receives water from Jackson Creek including tertiary treated effluent from the Facility, was the drinking water source for the JVID's Lake Amador Recreation Area and the Oaks Mobile Home Park. The Lake Amador Recreation Area drinking water source should be replaced by the newly constructed JVID treatment plant around September 2013. JVID is in the process of working on an additional project that will replace the Oaks Mobile Home Park drinking water source around 2016. The e-mail states that, "Given that the City of Jackson's current wastewater treatment plant provides disinfected tertiary treatment and the City usually provides 20:1 dilution in Lake Amador, our Department believes that adequate public health protection is being provided until both domestic water supply intakes are removed from Lake Amador." Once the Lake Amador Recreation Area and Oaks Mobile Home Park drinking water sources are removed from Lake Amador there will be no primary drinking water intakes remaining in Lake Amador. The CDPH e-mail further states, "In regard to recreation and irrigation uses of Lake Amador, provided the City's wastewater treatment plant's disinfected tertiary effluent meets the requirements specified in our Recycled Water Regulations for body contact and food crop irrigation, we have no objection to continued discharge into Jackson Creek."

Further discussions with CDPH and JVID, proceeding the 29 April 2013 CDPH e-mail, have brought to the attention of the Central Valley Water Board that there are additional users of raw water from Lake Amador that are not part of the Lake Amador Recreation Area or the Oaks Mobile Home Park that have connected to JVID's irrigation water pipeline to use it as a domestic water source. CDPH required JVID to survey their customers, determine if they are using the raw water as a domestic water source, notify the customers of the potential dangers of using raw irrigation water for domestic use, and provide these customers with bottled drinking water for drinking and cooking. JVID determined that approximately 80 customers out of 190 were using raw Lake Amador water as a domestic source. Currently, JVID is in the process of designing a drinking water treatment system using a planning grant from CDPH's State Revolving Fund that will provide their remaining customers, who use raw water from Lake Amador as a domestic water source, treated potable water. However, JVID is unsure if the funding for this project will be enough to provide all the remaining customers with treated drinking water because the maximum grant is estimated at three million dollars and there will not be a loan component to complete the remainder of the construction. With the uncertainty of removing all raw water domestic users from JVID's irrigation system, CDPH has indicated that they would like the 20:1 dilution requirement to remain in place until all JVID customers are receiving treated potable water.

B. Discharge Points and Receiving Waters

1. The Facility is located in Section 29, T6N, R11E, MDB&M, as shown in Attachment B, a part of this Order.

2. Treated municipal wastewater is discharged at Discharge Point No. 001 to Jackson Creek, a water of the United States and a tributary to the Mokelumne River within the Sacramento-San Joaquin Delta via Dry Creek and Amador Lake at a point latitude 38° 30' 28" N and longitude 120° 14' 04" W

C. Summary of Previous Requirements and Self-Monitoring Report (SMR) Data

Effluent limitations contained in Order R5-2007-0133-01 for discharges from Discharge Point No. 001 (Monitoring Location EFF-001) and representative monitoring data from the term of Order R5-2007-0133-01 are as follows:

Table F-2. Historic Effluent Limitations and Monitoring Data

Parameter	Units	Effluent Limitation			Monitoring Data (From January 2008 To May 2012)		
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Flow	MGD	0.71	--	--	--	--	2.198
Conventional Pollutants							
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	10	15	30	7.2	11.5	12
	lbs/day[1]	60	90	180	39	75	106
	% removal	85	--	--	NR	--	--

Parameter	Units	Effluent Limitation			Monitoring Data (From January 2008 To May 2012)		
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
pH	standard units	--	--	6.5 – 8.0	--	--	6.1 – 7.9
Total Suspended Solids	mg/L	10	15	30	12	13	17
	lbs/day[1]	60	90	180	21	41	60
	% removal	85	--	--	NR	--	--
Priority Pollutants							
Copper, Total Recoverable	µg/L	--	--	37.32[2]	--	--	9.7
		3.22[3]	--	6.46[3]	7.3	--	7.3
Cyanide, Total (as CN)	µg/L	--	--	18.66[2]	--	--	2.8 J
		4.26[3]	--	8.54[3]	13	--	13
Dichlorobromomethane	µg/L	--	--	4.67[2]	--	--	7.0
		0.56[3]	--	1.12[3]	10	--	10
2,6-Dinitrotoluene	µg/L	--	--	3.42[2]	--	--	<0.6
		0.05[3]		0.10[3]	<0.36	--	<0.36
1,2-Diphenylhydrazine	µg/L	--	--	0.62[2]	--	--	<0.5
		0.04[3]	--	0.08[3]	0.43 J	--	0.43 J
Silver, Total Recoverable	µg/L	--	--	3.73[2]	--	--	<1
		0.49[3]	--	0.99[3]	<0.19	--	<0.19
Tetrachloroethene	µg/L	--	--	4.67[2]	--	--	<0.1
		0.8[3]	--	1.6[3]	<0.1	--	<0.1
Zinc, Total Recoverable	µg/L	--	--	311[2]	--	--	170
		30[3]	--	60[3]	140	--	140
Non-Conventional Pollutants							
Aluminum, Total Recoverable[4]	µg/L	--	--	342.1	--	--	360
		71.2	--	142.9	230	--	230
Ammonia Nitrogen, Total (as N)	mg/L	[5]	--	[5]	3.9		10
		1.2[6]	--	4.2[6]	2.4		7.3
		1.0[7]	--	3.7[7]	--	--	--
Chlorine, Total Residual	µg/L	--	0.011[8]	0.019[9]	--	--	0.167
Diazinon	µg/L	--	--	1.18[2]	--	--	<0.02
	µg/L	0.04[3]	--	0.08[3]	0.099	--	0.099 J
Electrical Conductivity @ 25°C	µmhos/cm	500[10]	--	--	517[11]	--	--
Iron, Total Recoverable	µg/L	300[10]	--	--	108[11]	--	--
Manganese, Total Recoverable	µg/L	50[10]	--	--	32[11]	--	--
Mercury, Total Recoverable	lbs/month	0.0016[12]	--	--	0.806	--	--
Nitrate Nitrogen, Total (as NO_3)	µg/L	45	--	--	62	--	--
Settleable Solids	ml/L	0.1	--	0.2	<0.1	--	<0.1
Total Coliform Organisms	MPN/100 mL	23[13]	2.2[14]	240[15]	452	900	2400
Turbidity	NTU	2[16]	5[17]	10[18]	8.5	9.7	14
Acute Toxicity	% Survival	--	70[19]	90[20]	--	--	100[21]

Parameter	Units	Effluent Limitation			Monitoring Data (From January 2008 To May 2012)		
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge

[1] Based on an average dry weather flow of 0.71 MGD.
[2] Interim effluent limitation effective until 17 May 2010.
[3] Final effluent limitation effective 18 May 2010.
[4] Compliance with the final effluent limitations for aluminum can be demonstrated using either total or acid-soluble (inductively coupled plasma/atomic emission spectrometry or inductively coupled plasma/mass spectrometry analysis methods, as supported by USEPA's Ambient Water Quality Criteria for Aluminum document (EPA 440/5-86-008), or other standard methods that exclude aluminum silicate particles as approved by the Executive Officer.
[5] Floating ammonia effluent limitations based on pH and temperature and effective for the period beginning the effective date of the Order through 17 May 2010.
[6] Effluent limitation effective 18 May 2010 until 5 years following the date of adoption of the Order.
[7] Effluent limitation effective 5 years following the date of adoption of the Order.
[8] Applied as a 4-day average effluent limitation.
[9] Applied as a 1-hour average effluent limitation.
[10] Applied as an annual average effluent limitation.
[11] Represents the maximum observed annual average effluent concentration.
[12] The total monthly mass discharge of total mercury shall not exceed 0.0016 lbs/month.
[13] Not to be exceeded more than once in any 30-day period.
[14] Applied as a 7-day median effluent limitation.
[15] Applied as an instantaneous maximum.
[16] Applied as a daily average effluent limitation.
[17] Not to be exceeded more than 5% of the time within a 24-hour period.
[18] Not to be exceeded at any time.
[19] Survival of aquatic organisms in 96-hour bioassays shall be no less than 70%.
[20] The median for any three or more consecutive bioassays is 90%.
[21] Represents the minimum observed percent survival.

D. Compliance Summary

1. The Central Valley Regional Water Quality Control Board (Central Valley Water Board) issued Administrative Civil Liability (ACL) Complaint No. R5-2010-0531 on 1 July 2010 which proposed to assess an administrative civil liability of $147,000 against the Discharger for 49 effluent limitation violations for aluminum, chlorine residual, dichlorobromomethane, electrical conductivity, nitrate, total coliform organisms, and turbidity from 1 January 2008 through 31 December 2009. The Discharger paid a mandatory minimum penalty of $12,000 and agreed to complete a compliance project.

2. The Central Valley Water Board issued ACL Complaint No. R5-2012-0560 on 7 September 2012 which proposed to assess an administrative civil liability of $411,000 against the Discharger for 137 effluent limitation violations for ammonia, copper, cyanide, dichlrobromomethane, nitrate, total coliform organisms, turbidity, and zinc from 1 January 2010 and 31 May 2012. The Discharger agreed to complete a compliance project.

3. A compliance inspection of the Facility was conducted 29 May 2008. Major findings from the inspection include the following:

a. The Discharger has in the past relied on bypassing the tertiary filters in order to handle sustained high wastewater flow events. Attachment D, Standard Provision I.G.3 of Order R5-2007-0133-01 prohibits bypass of wastes to surface waters.

b. A sulfur dixoide tank was not labeled. Chlorine gas and sulfur dioxide gas cylinders should be labeled full or empty at all times.

c. Reports sent to the Central Valley Water Board Executive Officer for approval were not properly addressed.

d. Glass mercury thermometers in the automatic composite samplers needed to be calibrated and kept submerged to obtain accurate readings.

4. A compliance inspection of the Facility was conducted 6 May 2009. Major findings from the inspection include the following:

a. The Discharger reported incorrect values in the self-monitoring report for November 2008 for the 11 November 2008 ammonia and total coliform organisms samples.

b. Storm water is collected and discharged to Jackson Creek without any treatment. No structural best management practices were in place to reduce pollutants in storm water.

5. A compliance inspection of the Facility was conducted 9 May 2011. Major findings from the inspection include the following:

a. Reports were not signed by a duly authorized representative of the executive officer, as required by Attachment D, Standard Provision V.B.3 of Order R5-2007-0133-01.

b. Transmittal letters for the monthly self-monitoring reports (SMRs) did not include the certification statement required by Attachment D, Standard Provision IV.B.5 of Order R5-2007-0133-01.

c. The Discharger reported effluent limitation exceedances in the SMRs for the period of November 2010 through January 2011 for copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, and zinc.

d. The Discharger's laboratory is not certified by DPH's Environmental Laboratory Accreditation Program (ELAP) and had not developed a Quality Assurance-Quality Control Program as required by Attachment E, Provision I.B of Order R5-2007-0133-01.

e. The Facility analyzes pH daily, but did not calibrate the pH meters on a daily basis as required by Attachment E, Provision I.D of Order R5-2007-0133-01.

6. The Central Valley Water Board adopted Time Schedule Order (TSO) R5-2011-0909 on 3 November 2011, which provides a time schedule for effluent limitations for

aluminum, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, turbidity, and zinc. TSO R5-2011-0909 requires compliance with the final effluent limitations for these parameters by 1 March 2015.

E. Planned Changes

The Discharger proposed several major projects to improve the Discharger's treatment process, (e.g., conversion to UV disinfection from chlorination/dechlorination disinfection, addition of filter cells and improvements to coagulation/flocculation, addition of anoxic basins, and upgrades to pH control system) thereby improving effluent quality.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in this Order are based on the applicable plans, policies, and regulations identified in the Findings in section II of this Order. The applicable plans, policies, and regulations relevant to the discharge include the following:

A. Legal Authorities

This Order is issued pursuant to regulations in the Clean Water Act (CWA) and the California Water Code (Water Code) as specified in the Finding contained at section II.C of this Order.

B. California Environmental Quality Act (CEQA)

This Order meets the requirements of CEQA as specified in the Finding contained at section II.E of this Order.

C. State and Federal Regulations, Policies, and Plans

1. **Water Quality Control Plans.** This Order implements the following water quality control plans as specified in the Finding contained at section II.H of this Order.

   a. *Water Quality Control Plan, Fourth Edition (Revised October 2011), for the Sacramento and San Joaquin River Basins* (Basin Plan)

2. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** This Order implements the NTR and CTR as specified in the Finding contained at section II.I of this Order.

3. **State Implementation Policy (SIP).** This Order implements the SIP as specified in the Finding contained at section II.J of this Order.

4. **Alaska Rule.** This Order is consistent with the Alaska Rule as specified in the Finding contained at section II.L of this Order.

5. **Antidegradation Policy.** As specified in the Finding contained at section II.N of this Order and as discussed in detail in the Fact Sheet (Attachment F, Section IV.D.4.),

the discharge is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Resources Control Board (State Water Board) Resolution 68-16.

6. **Anti-Backsliding Requirements.** This Order is consistent with anti-backsliding policies as specified in the Finding contained at section II.O of this Order. Compliance with the anti-backsliding requirements is discussed in the Fact Sheet (Attachment F, Section IV.D.3).

7. **Emergency Planning and Community Right to Know Act**

   Section 13263.6(a) of the Water Code, requires that "*the Regional Water Board shall prescribe effluent limitations as part of the waste discharge requirements of a POTW for all substances that the most recent toxic chemical release data reported to the state emergency response commission pursuant to Section 313 of the Emergency Planning and Community Right to Know Act of 1986 (42 U.S.C. Sec. 11023) (EPCRA) indicate as discharged into the POTW, for which the State Water Board or the Regional Water Board has established numeric water quality objectives, and has determined that the discharge is or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to, an excursion above any numeric water quality objective*".

   The most recent toxic chemical data report does not indicate any reportable off-site releases or discharges to the collection system for this Facility. Therefore, a reasonable potential analysis based on information from EPCRA cannot be conducted. Based on information from EPCRA, there is no reasonable potential to cause or contribute to an excursion above any numeric water quality objectives included within the Basin Plan or in any State Water Board plan, so no effluent limitations are included in this permit pursuant to Water Code section 13263.6(a).

   However, as detailed elsewhere in this Order, available effluent data indicate that there are constituents present in the effluent that have a reasonable potential to cause or contribute to exceedances of water quality standards and require inclusion of effluent limitations based on federal and state laws and regulations.

8. **Storm Water Requirements**

   USEPA promulgated federal regulations for storm water on 16 November 1990 in 40 CFR Parts 122, 123, and 124. The NPDES Industrial Storm Water Program regulates storm water discharges from wastewater treatment facilities. Wastewater treatment plants are applicable industries under the storm water program and are obligated to comply with the federal regulations. The State Water Board does not require wastewater treatment facilities with design flows less than 1 MGD to obtain coverage under the Industrial Storm Water General Order. This Order does not regulate storm water.

9. **Endangered Species Act.** This Order is consistent with the Endangered Species Act as specified in the Finding contained at section II.P of this Order.

D. Impaired Water Bodies on CWA 303(d) List

1. Under section 303(d) of the 1972 CWA, states, territories and authorized tribes are required to develop lists of water quality limited segments. The waters on these lists do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. On 12 November 2010 USEPA gave final approval to California's 2010 section 303(d) List of Water Quality Limited Segments. The Basin Plan references this list of Water Quality Limited Segments (WQLSs), which are defined as "…*those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources* (40 CFR Part 130, et seq.)." The Basin Plan also states, "*Additional treatment beyond minimum federal standards will be imposed on dischargers to [WQLSs]. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment*." Jackson Creek is not listed as a WQLS on the 2010 303(d) list.

2. **Total Maximum Daily Loads (TMDLs).** USEPA requires the Central Valley Water Board to develop TMDLs for each 303(d) listed pollutant and water body combination. No TMDLs have been developed for Jackson Creek or Amador Lake.

3. The 303(d) listings and TMDLs have been considered in the development of the Order. A pollutant-by-pollutant evaluation of each pollutant of concern is described in section VI.C.3. of this Fact Sheet.

E. Other Plans, Policies and Regulations

1. The discharge authorized herein and the treatment and storage facilities associated with the discharge of treated municipal wastewater, except for discharges of residual sludge and solid waste, are exempt from the requirements of Title 27, California Code of Regulations (CCR), section 20005 *et seq* (hereafter Title 27). 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 plant.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

Effluent limitations and toxic and pretreatment effluent standards established pursuant to sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 304 (Information and Guidelines), and 307 (Toxic and Pretreatment Effluent Standards) of the CWA and amendments thereto are applicable to the discharge.

The CWA mandates the implementation of effluent limitations that are as stringent as necessary to meet water quality standards established pursuant to state or federal law [33 U.S.C., §1311(b)(1)(C); 40 CFR 122.44(d)(1)]. NPDES permits must incorporate discharge limits necessary to ensure that water quality standards are met. This requirement applies to narrative criteria as well as to criteria specifying maximum amounts of particular pollutants. Pursuant to federal regulations, 40 CFR 122.44(d)(1)(i), NPDES permits must contain limits that control all pollutants that "*are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality*." Federal regulations, 40 CFR 122.44(d)(1)(vi), further provide that "[w]*here a state has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits*."

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations in the Code of Federal Regulations: 40 CFR 122.44(a) requires that permits include applicable technology-based limitations and standards; and 40 CFR 122.44(d) requires that permits include WQBELs to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water where numeric water quality objectives have not been established. The Basin Plan at page IV-17.00, contains an implementation policy, "*Policy for Application of Water Quality Objectives*", that specifies that the Central Valley Water Board "*will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives*." This Policy complies with 40 CFR 122.44(d)(1). With respect to narrative objectives, the Central Valley Water Board must establish effluent limitations using one or more of three specified sources, including: (1) USEPA's published water quality criteria, (2) a proposed state criterion (i.e., water quality objective) or an explicit state policy interpreting its narrative water quality criteria (i.e., the Central Valley Water Board's "*Policy for Application of Water Quality Objectives*")(40 CFR 122.44(d)(1)(vi)(A), (B) or (C)), or (3) an indicator parameter.

The Basin Plan includes numeric site-specific water quality objectives and narrative objectives for toxicity, chemical constituents, discoloration, radionuclides, and tastes and odors. The narrative toxicity objective states: "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*." (Basin Plan at III-8.00) The Basin Plan states that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. The narrative chemical constituents objective states that waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At minimum, "…*water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs)" in Title 22 of CCR.* The Basin Plan further states that, to protect all beneficial uses, the Central Valley Water Board may apply limits more stringent than MCLs.

The narrative tastes and odors objective states: *"Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses*."

A. Discharge Prohibitions

1. **Prohibition III.A (No discharge or application of waste other than that described in this Order).** This prohibition is based on Water Code section 13260 that requires filing of a report of waste discharge (ROWD) before discharges can occur. The Discharger submitted a ROWD for the discharges described in this Order; therefore, discharges not described in this Order are prohibited.

2. **Prohibition III.B (No bypasses or overflow of untreated wastewater, except under the conditions at 40 CFR 122.41(m)(4)).** As stated in section I.G of Attachment D, Standard Provisions, this Order prohibits bypass from any portion of the treatment facility. Federal regulations, 40 CFR 122.41(m), define "bypass" as the intentional diversion of waste streams from any portion of a treatment facility. This section of the federal regulations, 40 CFR 122.41(m)(4), prohibits bypass unless it is unavoidable to prevent loss of life, personal injury, or severe property damage. In considering the Central Valley Water Board's prohibition of bypasses, the State Water Board adopted a precedential decision, Order No. WQO 2002-0015, which cites the federal regulations, 40 CFR 122.41(m), as allowing bypass only for essential maintenance to assure efficient operation.

3. **Prohibition III.C (No controllable condition shall create a nuisance).** This prohibition is based on Water Code section 13050 that requires water quality objectives established for the prevention of nuisance within a specific area. The Basin Plan prohibits conditions that create a nuisance.

4. **Prohibition III.D (No inclusion of pollutant free wastewater shall cause improper operation of the Facility's systems).** This prohibition is based on 40 CFR 122.41 et seq. that requires the proper design and operation of treatment facilities.

5. **Prohibition III.E (Maintain dilution ratio of 20:1 or greater in Lake Amador).** This prohibition is based on California Department of Public Health's (CDPH) recommendation that discharges from wastewater treatment plants to municipal water supplies maintain a minimum of 20:1 dilution to ensure the protection of the downstream domestic beneficial use of Jackson Creek and public health. Discharge Prohibition III.E prohibits the discharge of wastewater by the Discharger to Jackson Creek, when a minimum dilution of 20:1 is not provided by Lake Amador located downstream of the discharge location into Jackson Creek. This prohibition is in effect until CDPH notifies the Central Valley Water Board that all customers have been provided an acceptable drinking water source that satisfies CDPH.

B. Technology-Based Effluent Limitations

1. Scope and Authority

Section 301(b) of the CWA and implementing USEPA permit regulations at 40 CFR 122.44 require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. The discharge authorized by this Order must meet minimum federal technology-based requirements based on Secondary Treatment Standards at 40 CFR Part 133.

Regulations promulgated in 40 CFR 125.3(a)(1) require technology-based effluent limitations for municipal Dischargers to be placed in NPDES permits based on Secondary Treatment Standards or Equivalent to Secondary Treatment Standards.

The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) established the minimum performance requirements for POTWs [defined in section 304(d)(1)]. Section 301(b)(1)(B) of that Act requires that such treatment works must, as a minimum, meet effluent limitations based on secondary treatment as defined by the USEPA Administrator.

Based on this statutory requirement, USEPA developed secondary treatment regulations, which are specified in 40 CFR Part 133. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH.

2. Applicable Technology-Based Effluent Limitations

a. BOD_5 and TSS. Federal regulations, 40 CFR Part 133, establish the minimum weekly and monthly average level of effluent quality attainable by secondary treatment for BOD_5 and TSS. Tertiary treatment is necessary to protect the beneficial uses of the receiving stream and the final effluent limitations for BOD_5 and TSS are based on the technical capability of the tertiary process. BOD_5 is a measure of the amount of oxygen used in the biochemical oxidation of organic matter. The secondary and tertiary treatment standards for BOD_5 and TSS are indicators of the effectiveness of the treatment processes. The principal design parameter for wastewater treatment plants is the daily BOD_5 and TSS loading rates and the corresponding removal rate of the system. In applying 40 CFR Part 133 for weekly and monthly average BOD_5 and TSS limitations, the application of tertiary treatment processes results in the ability to achieve lower levels for BOD_5 and TSS than the secondary standards; the 30-day average BOD_5 and TSS limitations have been maintained at 10 mg/L, which is technically based on the capability of a tertiary system. In addition to the average weekly and average monthly effluent limitations, a daily maximum effluent limitation for BOD_5 and TSS is included in the Order to ensure that the treatment works are not organically overloaded and operate in accordance with design capabilities. In addition, 40 CFR 133.102, in describing the minimum level of effluent quality

attainable by secondary treatment, states that the 30-day average percent removal shall not be less than 85 percent. If 85 percent removal of BOD_5 and TSS must be achieved by a secondary treatment plant, it must also be achieved by a tertiary (i.e., treatment beyond secondary level) treatment plant. This Order contains a limitation requiring an average of 85 percent removal of BOD_5 and TSS over each calendar month. This Order requires Water Quality Based Effluent Limitations (WQBELs) that are equal to or more stringent than the secondary technology-based treatment described in 40 CFR Part 133. (See section IV.C.3.d of this Attachment for the discussion on Pathogens which includes WQBELs for BOD_5 and TSS.)

b. Flow. The Facility was designed to provide a tertiary level of treatment for up to a design flow of 0.71 MGD. Therefore, this Order contains an average dry weather discharge flow effluent limit of 0.71 MGD.

c. pH. The secondary treatment regulations at 40 CFR Part 133 also require that pH be maintained between 6.0 and 9.0 standard units.

Summary of Technology-based Effluent Limitations
Discharge Point No. 001

Table F-3. Summary of Technology-based Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow	MGD		--	0.71 ADWF	--	--
Biochemical Oxygen Demand (5-day @ 20°C)[1]	mg/L	30	45	--	--	--
	lbs/day[2]	178	266	--	--	--
	% Removal	85	--	--	--	--
pH[1]	standard units	--	--	--	6.0	9.0
Total Suspended Solids[1]	mg/L	30	45	--	--	--
	lbs/day[2]	178	266	--	--	--
	% Removal	85	--	--	--	--

[1] Note that more stringent WQBELs for BOD_5, pH, and TSS are applicable and are established as final effluent limitations in this Order (see section IV.C.3.d of this Fact Sheet).
[2] Based on the design average dry weather flow of 0.71MGD.

C. Water Quality-Based Effluent Limitations (WQBELs)

1. Scope and Authority

Section 301(b) of the CWA and 40 CFR 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards. This Order contains requirements, expressed as a technology equivalence requirement, more stringent than secondary treatment requirements that are necessary to meet applicable water quality standards. The rationale for these requirements, which consist of tertiary

treatment or equivalent requirements, is discussed in section IV.C.3.d.ix of this Fact Sheet.

40 CFR 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established using: (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in 40 CFR 122.44(d)(1)(vi).

The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan, and achieve applicable water quality objectives and criteria that are contained in other state plans and policies, or any applicable water quality criteria contained in the CTR and NTR.

2. Applicable Beneficial Uses and Water Quality Criteria and Objectives

The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. In addition, the Basin Plan implements State Water Board Resolution No. 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply.

The Basin Plan on page II-1.00 states: "*Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning…*" and with respect to disposal of wastewaters states that "...*disposal of wastewaters is [not] a prohibited use of waters of the State; it is merely a use which cannot be satisfied to the detriment of beneficial uses.*"

The federal CWA section 101(a)(2), states: "*it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water be achieved by July 1, 1983.*" Federal Regulations, developed to implement the requirements of the CWA, create a rebuttable presumption that all waters be designated as fishable and swimmable. Federal Regulations, 40 CFR sections 131.2 and 131.10, require that all waters of the State regulated to protect the beneficial uses of public water supply, protection and propagation of fish, shell fish and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation. Section 131.3(e), 40 CFR, defines existing beneficial uses as those uses actually attained after 28 November 1975, whether or not they are included in the water quality standards. Federal Regulation, 40 CFR section

131.10 requires that uses be obtained by implementing effluent limitations, requires that all downstream uses be protected and states that in no case shall a state adopt waste transport or waste assimilation as a beneficial use for any waters of the United States.

a. **Receiving Water and Beneficial Uses.** The Facility discharges treated wastewater to Jackson Creek, a water of the United States and a tributary to the Mokelumne River within the Sacramento-San Joaquin Delta via Amador Lake and Dry Creek.

   The Basin Plan at II-2.00 states that the beneficial uses of any specifically identified water body generally apply to its tributary streams. The Basin Plan in Table II-1, Section II, does not specifically identify beneficial uses for Jackson Creek, but does identify present and potential uses for the Sacramento-San Joaquin Delta, to which Jackson Creek, via Amador Lake, Dry Creek, and the Mokelumne River, is tributary. Thus, beneficial uses applicable to Jackson Creek are as follows:

Table F-4. Basin Plan Beneficial Uses

Discharge Point	Receiving Water Name	Beneficial Use(s)
001	Jackson Creek	Existing uses from Table II-1 of the Basin Plan: Municipal and domestic supply (MUN); Agricultural supply, including irrigation and stock watering (AGR); Industrial process supply (PROC); Industrial service supply (IND); Water contact recreation (REC-1); Non-contact water recreation (REC-2); Warm freshwater habitat (WARM); Cold freshwater habitat (COLD); Migration of aquatic organisms, warm and cold (MIGR); Spawning, reproduction, and/or early development, warm (SPWN); Wildlife habitat (WILD); and Navigation (NAV). Suitable uses from State Water Board Resolution No. 88-63: Municipal and domestic supply (MUN).

b. **Effluent and Ambient Background Data.** The reasonable potential analysis (RPA), as described in section IV.C.3 of this Fact Sheet, was based on data from January 2008 through May 2012, which includes effluent and ambient background data submitted in SMRs.

c. **Assimilative Capacity/Mixing Zone.** Current flow data indicate that, at times, Jackson Creek is dominated by effluent water downstream of the discharge. Due to the uncertainty of upstream assimilative capacity and sufficient flow data as described below, no dilution credits will be granted for the calculation of effluent limitations.

The Discharger has not submitted flow data or a mixing zone/dilution study requesting dilution credits. Thus, consistent with the assumptions used for Order R5-2007-0133-01, the worst-case dilution is assumed to be zero to provide protection for the receiving water beneficial uses. The impact of assuming zero assimilative capacity within the receiving water is that discharge limitations are applied end-of-pipe with no allowance for dilution within the receiving water.

d. **Conversion Factors.** The CTR contains aquatic life criteria for arsenic, cadmium, chromium III, chromium VI, copper, lead, nickel, silver, and zinc which are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentrations to total concentrations. The default USEPA conversion factors contained in Appendix 3 of the SIP were used to convert the applicable dissolved criteria to total recoverable criteria.

e. **Hardness-Dependent CTR Metals Criteria.** The *California Toxics Rule* and the *National Toxics Rule* contain water quality criteria for seven metals that vary as a function of hardness. The lower the hardness the lower the water quality criteria. The metals with hardness-dependent criteria include cadmium, copper, chromium III, lead, nickel, silver, and zinc.

This Order has established the criteria for hardness-dependent metals based on the reasonable worst-case ambient hardness as required by the SIP[1], the CTR[2] and State Water Board Order No. WQO 2008-0008 (City of Davis). The SIP and the CTR require the use of "receiving water" or "actual ambient" hardness, respectively, to determine effluent limitations for these metals. (SIP, section 1.2; 40 CFR 131.38(c)(4)) The CTR does not define whether the term "ambient," as applied in the regulations, necessarily requires the consideration of upstream as opposed to downstream hardness conditions. Therefore, where reliable, representative data are available, the hardness value for calculating criteria can be the downstream receiving water hardness, after mixing with the effluent (Order WQO 2008-0008, p. 11). The Central Valley Water Board thus has considerable discretion in determining ambient hardness (Id., p.10).

As discussed below, scientific literature provides a reliable method for calculating protective hardness-dependent CTR criteria, considering all discharge conditions. This methodology produces hardness-dependent CTR criteria based on the reasonable worst-case downstream ambient hardness that ensure these metals do not cause receiving water toxicity under any downstream receiving water condition. Under this methodology, the Central Valley Water Board considers all hardness conditions that could occur in the ambient downstream

[1] The SIP does not address how to determine the hardness for application to the equations for the protection of aquatic life when using hardness-dependent metals criteria. It simply states, in Section 1.2, that the criteria shall be properly adjusted for hardness using the hardness of the receiving water.

[2] The CTR requires that, for waters with a hardness of 400 mg/L (as $CaCO_3$), or less, the actual ambient hardness of the surface water must be used. It further requires that the hardness values used must be consistent with the design discharge conditions for design flows and mixing zones.

receiving water after the effluent has mixed with the water body[1]. This ensures that effluent limitations are fully protective of aquatic life in all areas of the receiving water affected by the discharge under all flow conditions, at the fully mixed location, and throughout the water body including at the point of discharge into the water body.

i. Conducting the Reasonable Potential Analysis (RPA). The SIP in Section 1.3 states, "*The RWQCB shall…determine whether a discharge may: (1) cause, (2) have a reasonable potential to cause, or (3) contribute to an excursion above any applicable priority pollutant criterion or objective*." Section 1.3 provides a step-by-step procedure for conducting the RPA. The procedure requires the comparison of the maximum effluent concentration (MEC) and maximum ambient background concentration to the applicable criterion that has been properly adjusted for hardness. Unless otherwise noted, for the hardness-dependent CTR metals criteria the following procedures were followed for properly adjusting the criterion for hardness when conducting the RPA.

(a) The SIP requires WQBELs if the MEC is equal to or exceeds the applicable criterion, adjusted for hardness. For comparing the MEC to the applicable criterion, the "fully mixed" reasonable worst-case downstream ambient hardness was used to adjust the criterion. In this evaluation the portion of the receiving water affected by the discharge is analyzed. For hardness-dependent criteria, the hardness of the effluent has an impact on the determination of the applicable criterion in areas of the receiving water affected by the discharge. Therefore, for comparing the MEC to the applicable criterion, the reasonable worst-case downstream ambient hardness was used to adjust the criterion. For this situation it is necessary to consider the hardness of the effluent in determining the applicable hardness to adjust the criterion. The procedures for determining the applicable criterion after proper adjustment using the reasonable worst-case downstream ambient hardness after completely mixed is outlined in subsection ii, below.

(b) The SIP requires WQBELs if the receiving water is impaired upstream (outside the influence) of the discharge, i.e., if the maximum ambient background concentration of a pollutant exceeds the applicable criterion, adjusted for hardness[2]. For comparing the maximum ambient background concentration to the applicable criterion, the reasonable worst-case upstream ambient hardness was used to adjust the criteria. This is appropriate, because this area is outside the influence of the discharge. Since the discharge does not impact the upstream hardness, the effect of the effluent hardness was not included in this evaluation.

[1] All effluent discharges will change the ambient downstream metals concentration and hardness. It is not possible to change the metals concentration without also changing the hardness.
[2] The pollutant must also be detected in the effluent.

ii. Calculating WQBELs. The remaining discussion in this section relates to the development of WQBELs when it has been determined that the discharge has reasonable potential to cause or contribute to an exceedance of the CTR hardness-dependent metals criteria in the receiving water.

A 2006 Study[1] developed procedures for calculating the effluent concentration allowance (ECA)[2] for CTR hardness-dependent metals. The 2006 Study demonstrated that it is necessary to evaluate all discharge conditions (e.g., high and low flow conditions) and the hardness and metals concentrations of the effluent and receiving water when determining the appropriate ECA for these hardness-dependent metals. This method is superior to relying on downstream receiving water samples alone because it captures all possible mixed conditions in the receiving water. Both receiving water and effluent hardness vary based on flow and other factors, but the variability of receiving water and effluent hardness is sometimes independent. Using a calculated hardness value ensures that the Central Valley Water Board considers all possible mixed downstream values that may result from these two independent variables. Relying on receiving water sampling alone is less likely to capture all possible mixed downstream conditions.

The equation describing the total recoverable regulatory criterion, as established in the CTR[3], is as follows:

$$\text{CTR Criterion} = \text{WER} \times (e^{m[\ln(H)]+b}) \quad \text{(Equation 1)}$$

Where:

H = hardness (as $CaCO_3$)[4]
WER = water-effect ratio
m, b = metal- and criterion-specific constants

In accordance with the CTR, the default value for the WER is 1. A WER study must be conducted to use a value other than 1. The constants “m” and “b” are specific to both the metal under consideration, and the type of total recoverable criterion (i.e., acute or chronic). The metal-specific values for these constants are provided in the CTR at paragraph (b)(2), Table 1.

The equation for the ECA is defined in Section 1.4, Step 2, of the SIP and is as follows:

$$\text{ECA} = C \quad (\text{when } C \leq B)^1 \quad \text{(Equation 2)}$$

[1] Emerick, R.W.; Borroum, Y.; & Pedri, J.E., 2006. California and National Toxics Rule Implementation and Development of Protective Hardness Based Metal Effluent Limitations. WEFTEC, Chicago, Ill.
[2] The ECA is defined in Appendix 1 of the SIP (page Appendix 1-2). The ECA is used to calculate WQBELs in accordance with Section 1.4 of the SIP.
[3] 40 CFR § 131.38(b)(2).
[4] For this discussion, all hardness values are in mg/L as $CaCO_3$.

Where:

C = the priority pollutant criterion/objective, adjusted for hardness (see Equation 1, above)
B = the ambient background concentration

The 2006 Study demonstrated that the relationship between hardness and the calculated criteria is the same for some metals, so the same procedure for calculating the ECA may be used for these metals. The same procedure can be used for chronic cadmium, chromium III, copper, nickel, and zinc. These metals are hereinafter referred to as "Concave Down Metals". "Concave Down" refers to the shape of the curve represented by the relationship between hardness and the CTR criteria in Equation 1. Another similar procedure can be used for determining the ECA for acute cadmium, lead, and acute silver, which are referred to hereafter as "Concave Up Metals".

ECA for Chronic Cadmium, Chromium III, Copper, Nickel, and Zinc – For Concave Down Metals (i.e., chronic cadmium, chromium III, copper, nickel, and zinc) the 2006 Study demonstrates that when the effluent is in compliance with the CTR criteria and the upstream receiving water is in compliance with the CTR criteria, any mixture of the effluent and receiving water will always be in compliance with the CTR criteria[2]. The 2006 Study proves that regardless of whether the effluent hardness is lower or greater than the upstream hardness, the reasonable worst-case flow condition is the effluent dominated condition (i.e., no receiving water flow)[3]. Consequently, for Concave Down Metals, the CTR criteria have been calculated using the downstream ambient hardness under this condition.

The effluent hardness ranged from 42 mg/L to 107 mg/L, based on 20 samples collected between January 2008 and May 2012. The upstream receiving water hardness varied from 81 mg/L to 228 mg/L, based on 48 samples collected between January 2008 and May 2012. Under the effluent dominated condition, the reasonable worst-case downstream ambient hardness is 42 mg/L. As demonstrated in the example shown in Table F-5, below, using this hardness to calculate the ECA for all Concave Down Metals will result in WQBELs that are protective under all flow conditions, from the effluent dominated condition to high flow condition. This example for copper assumes the following conservative conditions for the upstream receiving water:

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[1] The 2006 Study assumes the ambient background metals concentration is equal to the CTR criterion (i.e., C ≤ B).

[2] 2006 Study, p. 5700

[3] There are two typographical errors in the 2006 Study in the discussion of Concave Down Metals when the effluent hardness is less than the receiving water hardness. The effluent and receiving water hardness were transposed in the discussion, but the correct hardness values were used in the calculations. The typographical errors were confirmed by the author of the 2006 Study, by email dated 1 April 2011, from Dr. Robert Emerick to Mr. James Marshall, Central Valley Water Board.

- Upstream receiving water always at the lowest observed upstream receiving water hardness (i.e., 81 mg/L)
- Upstream receiving water copper concentration always at the CTR criteria (i.e., no assimilative capacity).

Using these reasonable worst-case receiving water conditions, a simple mass balance (as shown in Equation 3, below) accounts for all possible mixtures of effluent and receiving water under all flow conditions.

$$C_{MIX} = C_{RW} \times (1\text{-}EF) + C_{Eff} \times (EF) \qquad \text{(Equation 3)}$$

Where:

C_{MIX} = Mixed concentration (e.g. metals or hardness)
C_{RW} = Upstream receiving water concentration
C_{Eff} = Effluent concentration
EF = Effluent Fraction

In this example, for copper, for any receiving water flow condition (high flow to low flow), the fully-mixed downstream ambient copper concentration is in compliance with the CTR criteria[1].

[1] This method considers the actual lowest observed upstream hardness and actual lowest observed effluent hardness to determine the reasonable worst-case ambient downstream hardness under all possible receiving water flow conditions. Table F-5 demonstrates that the receiving water is always in compliance with the CTR criteria at the fully-mixed location in the receiving water. It also demonstrates that the receiving water is in compliance with the CTR criteria for all mixtures from the point of discharge to the fully-mixed location. Therefore, a mixing zone is not used for compliance.

Table F-5. Copper ECA Evaluation

Lowest Observed Effluent Hardness					**42 mg/L (as $CaCO_3$)**
Lowest Observed Upstream Receiving Water Hardness					**81 mg/L (as $CaCO_3$)**
Highest Assumed Upstream Receiving Water Copper Concentration					**7.8 µg/L[1]**
Copper $ECA_{chronic}$[2]					**4.4 µg/L**
Effluent Fraction[6]		**Fully Mixed Downstream Ambient Concentration**			
		Hardness[3] (mg/L)	**CTR Criteria[4] (µg/L)**	**Copper[5] (µg/L)**	**Complies with CTR Criteria**
High Flow	1%	81	7.8	7.8	**Yes**
	5%	79	7.6	7.6	**Yes**
	15%	75	7.3	7.3	**Yes**
	25%	71	7.0	7.0	**Yes**
	50%	62	6.2	6.1	**Yes**
Low Flow	75%	52	5.3	5.3	**Yes**
	100%	42	4.4	4.4	**Yes**

1 Highest assumed upstream receiving water copper concentration calculated using Equation 1 for chronic criterion at a hardness of 81 mg/L.
2 ECA calculated using Equation 1 for chronic criterion at a hardness of 42 mg/L.
3 Fully mixed downstream ambient hardness is the mixture of the receiving water and effluent hardness at the applicable effluent fraction using Equation 3.
4 Fully mixed downstream ambient criteria are the chronic criteria calculated using Equation 1 at the mixed hardness.
5 Fully mixed downstream ambient copper concentration is the mixture of the receiving water and effluent copper concentrations at the applicable effluent fraction using Equation 3.
6 The effluent fraction ranges from 1% at the high receiving water flow condition, to 100% at the lowest receiving water flow condition (i.e., effluent dominated).

ECA for Acute Cadmium, Lead, and Acute Silver – For Concave Up Metals (i.e., acute cadmium, lead, and acute silver), the relationship between hardness and the metals criteria is different than for Concave Down Metals. The 2006 Study demonstrates that for Concave Up Metals, the effluent and upstream receiving water can be in compliance with the CTR criteria, but the resulting mixture may contain metals concentrations that exceed the CTR criteria and could cause toxicity. For these metals, the 2006 Study provides a mathematical approach to calculate the ECA that is protective of aquatic life, in all areas of the receiving water affected by the discharge, under all discharge and receiving water flow conditions (see Equation 4, below).

The ECA, as calculated using Equation 4, is based on the reasonable worst-case upstream receiving water hardness, the lowest observed effluent hardness, and assuming no receiving water assimilative capacity for metals (i.e., ambient background metals concentrations are at their respective CTR criterion). Equation 4 is not used in place of the CTR equation (Equation 1). Rather, Equation 4, which is derived using the CTR equation, is used as a direct approach for calculating the ECA. This replaces an iterative approach for calculating the ECA. The CTR equation has been used to evaluate the receiving water downstream of the discharge at all discharge and flow conditions to ensure the ECA is protective (e.g., see Table F-6).

$$\text{ECA}\ \eta = \left(\frac{m(H_e - H_{rw})\left(e^{m\{ln(H_{rw})\}+b}\right)}{H_{rw}} \right) + e^{m\{ln(H_{rw})\}+b} \qquad \text{(Equation 4)}$$

Where:

m, b = criterion specific constants (from CTR)
H_e = lowest observed effluent hardness
H_{rw} = reasonable worst-case upstream receiving water hardness

An example similar to the Concave Down Metals is shown for lead, a Concave Up Metal, in Table F-6, below. As previously mentioned, the lowest effluent hardness is 42 mg/L, while the upstream receiving water hardness ranged from 81 mg/L to 228 mg/L. In this case, the reasonable worst-case upstream receiving water hardness to use in Equation 4 to calculate the ECA is 81 mg/L.

In this case for lead, the lowest possible fully-mixed downstream hardness is 42 mg/L (see last row of Table F-6), which corresponds to a total recoverable chronic ECA of 1.1 µg/L, using Equations 1 and 2. However, a lower chronic ECA is required to ensure the discharge does not cause toxicity at any location in the receiving water, at or downstream of the discharge, which would be a violation the Basin Plan's narrative toxicity objective[1]. This is because for concave up metals, mixing two waters with different hardness with metals concentrations at their respective CTR criteria will always result in CTR criterion exceedances[2]. As shown in Table F-6, a chronic ECA of 0.94 µg/L is necessary to be protective under all discharge conditions. In this example for lead, for any receiving water flow condition (high flow to low flow), the fully-mixed downstream ambient lead concentration is in compliance with the CTR criteria.

Using the procedures discussed above to calculate the ECA for all Concave Up Metals will result in WQBELs that are protective under all potential effluent/receiving water flow conditions (high flow to low flow) and under all known hardness conditions, as demonstrated in Table F-6, for lead.

[1] "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*." (Basin Plan, p. III-8.01.)

[2] Emerick, R.W.; Borroum, Y.; & Pedri, J.E., 2006. California and National Toxics Rule Implementation and Development of Protective Hardness Based Metal Effluent Limitations. WEFTEC, Chicago, Ill. (p. 5702)

Table F-6. Lead ECA Evaluation

Lowest Observed Effluent Hardness	**42 mg/L**
Reasonable Worst-case Upstream Receiving Water Hardness	**81 mg/L**
Reasonable Worst-case Upstream Receiving Water Lead Concentration	**2.4 µg/L[1]**
Lead $ECA_{chronic}$[2]	**0.94 µg/L**

Effluent Fraction[6]		**Fully Mixed Downstream Ambient Concentration**			
		Hardness[3] (mg/L) (as $CaCO_3$)	**CTR Criteria[4] (µg/L)**	**Lead[5] (µg/L)**	**Complies with CTR Criteria**
High Flow	1%	81	2.4	2.4	**Yes**
	5%	79	2.4	2.4	**Yes**
	15%	75	2.2	2.2	**Yes**
	25%	71	2.1	2.1	**Yes**
	50%	62	1.7	1.7	**Yes**
	75%	52	1.4	1.3	**Yes**
Low Flow	100%	42	1.1	0.94	**Yes**

1 Reasonable worst-case upstream receiving water lead concentration calculated using Equation 1 for chronic criterion at a hardness of 81 mg/L.
2 ECA calculated using Equation 4 for chronic criteria.
3 Fully mixed downstream ambient hardness is the mixture of the receiving water and effluent hardness at the applicable effluent fraction.
4 Fully mixed downstream ambient criteria are the chronic criteria calculated using Equation 1 at the mixed hardness.
5 Fully mixed downstream ambient lead concentration is the mixture of the receiving water and effluent lead concentrations at the applicable effluent fraction.
6 The effluent fraction ranges from 1% at the high receiving water flow condition, to 100% at the lowest receiving water flow condition (i.e., effluent dominated).

Based on the procedures discussed above, Table F-7 lists all the CTR hardness-dependent metals and the associated ECA used in this Order.

Table F-7. Summary of ECA Evaluations for CTR Hardness-dependent Metals

CTR Metals	**ECA (µg/L, total recoverable)**	
	Acute	**Chronic**
Copper	6.2	4.4
Chromium III	853	102
Cadmium	1.6	1.2
Lead	24	0.94
Nickel	225	25
Silver	0.49	--
Zinc	57	57

3. Determining the Need for WQBELs

a. The Central Valley Water Board conducted the RPA in accordance with section 1.3 of the SIP. Although the SIP applies directly to the control of CTR priority pollutants, the State Water Board has held that the Regional Water Boards may use the SIP as guidance for water quality-based toxics control.[1] The SIP states

[1] See Order WQO 2001-16 (Napa) and Order WQO 2004-0013 (Yuba City).

in the introduction "*The goal of this Policy is to establish a standardized approach for permitting discharges of toxic pollutants to non-ocean surface waters in a manner that promotes statewide consistency*." Therefore, in this Order the RPA procedures from the SIP were used to evaluate reasonable potential for both CTR and non-CTR constituents based on information submitted as part of the application, in studies, and as directed by monitoring and reporting programs.

b. Constituents with No Reasonable Potential. WQBELs are not included in this Order for constituents that do not demonstrate reasonable potential (i.e., constituents were not detected in the effluent or receiving water); however, monitoring for those pollutants is established in this Order as required by the SIP. If the results of effluent monitoring demonstrate reasonable potential, this Order may be reopened and modified by adding an appropriate effluent limitation.

Most constituents with no reasonable potential are not discussed in this order. However, the following constituents were found to have no reasonable potential after assessment of the data:

i. Aluminum

Aluminum is the third most abundant element in the earth's crust and is ubiquitous in both soils and aquatic sediments. When mobilized in surface waters, aluminum has been shown to be toxic to various fish species. However, the potential for aluminum toxicity in surface waters is directly related to the chemical form of aluminum present, and the chemical form is highly dependent on water quality characteristics that ultimately determine the mechanism of aluminum toxicity. Surface water characteristics, including pH, temperature, colloidal material, fluoride and sulfate concentrations, and total organic carbon, all influence aluminum speciation and its subsequent bioavailability to aquatic life. Calcium [hardness] concentrations in surface water may also reduce aluminum toxicity by competing with monomeric aluminum (Al^{3+}) binding to negatively charged fish gills.

(a) WQO. The Code of Federal Regulations promulgated criteria for priority toxic pollutants for California's surface waters as part of section 131.38 Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California (California Toxics Rule or CTR), including metals criteria. However, aluminum criteria were not promulgated as part of the CTR. Absent numeric aquatic life criteria for aluminum, WQBEL's in the Central Valley Region's NPDES permits are based on the Basin Plans' narrative toxicity objective. The Basin Plans' *Policy for Application of Water Quality Objectives* requires the Central Valley Water Board to consider, "*on a case-by-case basis, direct evidence of beneficial use impacts, all material and relevant information submitted by the discharger and other interested parties, and relevant numerical criteria and guidelines developed and/or published by other agencies and organizations. In considering such criteria, the Board evaluates whether the specific numerical criteria which are available through these sources and through other information*

supplied to the Board, are relevant and appropriate to the situation at hand and, therefore, should be used in determining compliance with the narrative objective." Relevant information includes, but is not limited to (1) USEPA National Ambient Water Quality Criteria (NAWQC) and subsequent Correction, (2) site-specific conditions of Jackson Creek, the receiving water, and (3) site-specific aluminum studies conducted by dischargers within the Central Valley Region. (Basin Plan, p. IV.-17.00; see also, 40 CFR 122.44(d)(vi).)

USEPA NAWQC*.* USEPA recommended the NAWQC aluminum chronic criterion at 87 µg/L based upon the following two toxicity tests. All tests were conducted in water that contained pH range of 6.0 to 6.6 and hardness at 12 mg/L as $CaCO_3$.

(1) Acute toxicity tests at various aluminum doses were conducted in various acidic waters (pH 6.0 – 6.5) on 159- and 160-day old striped bass. The 159-day old striped bass showed no mortality in waters with pH at 6.5 and aluminum doses at 390 µg/L, and the 160-day old striped bass showed 58% mortality at a dose of 174.4 µg/L in same pH waters. However, the 160-day old striped bass showed 98% mortality at an aluminum dose of 87.2 µg/L in waters with pH at 6.0, which is USEPA's basis for the 87 µg/L chronic criterion. The varied results draw into question this study and the applicability of the NAWQC chronic criterion of 87 µg/L.

(2) Chronic toxicity effects on 60-day old brook trout were evaluated in circumneutral pH waters (6.5-6.9 pH) in five cells at various aluminum doses (4, 57, 88, 169, and 350 µg/L). Chronic evaluation started upon hatching of eyed eggs of brook trout, and their weight and length were measured after 45 days and 60 days. The 60-day old brook trout showed 24% weight loss at 169 µg/L of aluminum and 4% weight loss at 88 µg/L of aluminum, which is the basis for USEPA's chronic criteria. Though this test study shows chronic toxic effects of a 4% reduction in weight after exposure for 60-days, the chronic criterion is based on 4-day exposure; so again, the applicability of the NAWQC chronic criterion of 87 µg/L is questionable.

Site-specific Conditions. Effluent and Jackson Creek monitoring data indicate that the pH and hardness values are not similar to the low pH and hardness conditions under which the chronic criterion for aluminum was developed, as shown in the table below, and therefore, the Central Valley Water Board does not expect aluminum to be as reactive in Jackson Creek as in the previously described toxicity tests. The pH of Jackson Creek, the receiving water, ranged from 6.6 to 8.1 with an average of 7.4 based on 882 monitoring results obtained between January 2008 and May 2012. These water conditions are circumneutral pH where aluminum is predominately in the form of $Al(OH)_3$ and non-toxic to aquatic life. The hardness of Jackson Creek ranged from 81 mg/L to 228 mg/L based on

48 samples, which is above the conditions, and thus less toxic, than the tests used to develop the chronic criterion. Jackson Creek supports aquatic species such as steelhead (rainbow trout).

Parameter	Units	Test Conditions for Applicability of Chronic Criterion	Effluent	Jackson Creek
pH	standard units	6.0 – 6.5	6.1 – 7.9	6.6 – 8.1
Hardness, Total (as $CaCO_3$)	mg/L	12	42 – 107	81 – 228
Aluminum, Total Recoverable	µg/L	87.2 – 390	20 – 360	N/A

Local Environmental Conditions and Studies. Twenty-one site-specific aluminum toxicity tests have been conducted within the Central Valley Region. The pH and hardness of Jackson Creek are similar, as shown in the table below, and thus the results of these site-specific aluminum toxicity tests is relevant and appropriate for Jackson Creek. As shown in the following table, all EC_{50} toxicity study result values are at concentrations of aluminum above 5,000 µg/L. Thus, the toxic effects of aluminum in surface waters within the Central Valley Region, including Jackson Creek, is less toxic (or less reactive) to aquatic species than demonstrated in the toxicity tests that USEPA used for the basis of establishing the chronic criterion of 87 µg/L. This new information, and review of the toxicity tests USEPA used to establish the chronic criterion, indicates that 87 µg/L is overly stringent and not applicable to Jackson Creek.

Central Valley Region Site-Specific Toxicity Data

Discharger (City)	Species	Test Waters	Hardness Value	Total Aluminum EC_{50} Value	pH	WER
Auburn	***Ceriodaphnia dubia***	**Effluent**	**99**	**>5270**	**7.44**	**>19.3**
	“ “	**Surface Water**	**16**	**>5160**	**7.44**	**>12.4**
Manteca	“ “	Surface Water/Effluent	124	>8800	9.14	N/C
	“ “	Effluent	117	>8700	7.21	>27.8
	“ “	Surface Water	57	7823	7.58	25.0
	“ “	Effluent	139	>9500	7.97	>21.2
	“ “	Surface Water	104	>11000	8.28	>24.5
	“ “	Effluent	128	>9700	7.78	>25.0
	“ “	Surface Water	85	>9450	7.85	>25.7
	“ “	Effluent	106	>11900	7.66	>15.3
	“ “	Surface Water	146	>10650	7.81	>13.7
Modesto	“ “	Surface Water/Effluent	120/156	31604	8.96	211
Yuba City	“ “	Surface Water/Effluent	114/164[1]	>8000	7.60/7.46	>53.5
Placer County	“ “	Effluent	150	>5000	7.4 – 8.7	>13.7
Manteca	*Daphnia magna*	Surface Water/Effluent	124	>8350	9.14	N/C
Modesto	“ “	Surface Water/Effluent	120/156	>11900	8.96	>79.6
Yuba City	“ “	Surface Water/Effluent	114/164[1]	>8000	7.60/7.46	>53.5
Manteca	*Oncorhynchus mykiss* (rainbow trout)	Surface Water/Effluent	124	>8600	9.14	N/C
Auburn	**“ “**	**Surface Water**	**16**	**>16500**	**7.44**	**N/C**
Modesto	“ “	Surface Water/Effluent	120/156	>34250	8.96	>229
Yuba City	“ “	Surface Water/Effluent	114/164[1]	>8000	7.60/7.46	>53.5

Discharger (City)	Species	Test Waters	Hardness Value	Total Aluminum EC_{50} Value	pH	WER

[1] Hardness values may be biased high because the EDTA titrimetic method is subject to interferences that measure as hardness (barium, cadmium, lead, manganese, strontium, and zinc will be measured as hardness) producing hardness numbers that are likely to be greater than the calculation of hardness based upon the ICP analysis of calcium and magnesium. Upstream receiving water hardness ranged from 30 to 50.9 mg/L as $CaCO_3$ between January 2008 and August 2011. Furthermore, the upstream receiving water hardness was 37 mg/L as $CaCO_3$ on 4 October 2005, 7 days prior to the Feasibility Assessment (first phase of a Water Effects Ratio study) sample collection date of 11 October 2005. It is likely that matrix interferences from other metals were responsible for the unexpected hardness values reported by Pacific EcoRisk.

The Discharger has not conducted a toxicity test for aluminum; however, the City of Auburn conducted two toxicity tests in Auburn Ravine, shown highlighted in the previous table. The City of Auburn and the City of Jackson facilities are approximately 45 miles apart, and are both located in the foothills surrounding the Sacramento Valley at similar elevations. As shown, the test water quality characteristics of Auburn Ravine are critically lower than Jackson Creek, with the pH at 7.4 and hardness at 16 mg/L as $CaCO_3$ in comparison to the mean pH at 7.4 and the mean hardness at 124 mg/L as $CaCO_3$, respectively. Thus results of site-specific studies conducted on Auburn Ravine would represent conservative assumptions for Jackson Creek since Jackson Creek's water quality characteristics (pH and hardness) are higher, and therefore, aluminum is less toxic to aquatic life in Jackson Creek. Thus, based on these two similar primary water quality characteristics (pH and hardness) that drive aluminum speciation, the aluminum toxicity within Auburn Ravine is expected to be similar in Jackson Creek. Therefore, the Auburn Ravine aluminum toxicity test study is relevant and appropriate in this case for use in determining the specific numerical criteria to be used in determining compliance with the Basin Plan's narrative toxicity objective. The Auburn Ravine aluminum toxicity study resulted in a site-specific aluminum objective at 1,079 µg/L. Thus, these results support the conclusion that the 87 µg/L chronic criterion is overly stringent for Jackson Creek.

DPH has established Secondary MCLs to assist public drinking water systems in managing their drinking water for aesthetic conditions such as taste, color, and odor. The Secondary MCL for aluminum is 200 µg/L. USEPA has also adopted an NAWQC acute criterion of 750 µg/L for the protection of aquatic life.

(b) RPA Results. Secondary MCLs are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. Aluminum is not a priority pollutant and the RPA procedures in section 1.3 of the SIP are not required. To be consistent with how compliance with the standards is determined, the RPA was conducted based on the calendar annual average aluminum

concentrations. The maximum observed annual average effluent concentration for aluminum was 84 µg/L, based on 54 effluent samples collected between January 2008 and May 2012, and of these same 54 samples the MEC was 360 µg/L. Upstream receiving water data for aluminum is not available. Therefore, aluminum in the discharge does not demonstrate reasonable potential to cause or contribute to an in-stream excursion above the Secondary MCL of 200 µg/L or the NAWQC acute aquatic life criterion of 750 µg/L, and the effluent limitations for aluminum have not been retained in this Order. Removal of these effluent limitations is in accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

ii. Diazinon

(a) WQO. Order R5-2007-0133-01 established effluent limitations based on DFG acute (1-hour average) and chronic (4-day average) criteria of 0.08 µg/L and 0.05 µg/L to implement the Basin Plan's narrative toxicity objective. The acute and chronic criteria of 0.08 µg/L and 0.05 µg/L published in 2000[1] were calculated using questionable *Gammarus fasciatus* toxicity test results. DFG recalculated the diazinon criteria to exclude the questionable toxicity test values for *Gammarus fasciatus* in 2004[2]. The recalculated DFG acute and chronic criteria for diazinon are 0.16 µg/L and 0.10 µg/L, respectively. The Central Valley Water Board confirmed these recalculated values in Appendix D of the *Basin Plan Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Diazinon and Chlorpyrifos Runoff into the Sacramento and Feather Rivers, May 2007 Final Staff Report*. Thus, the applicable acute and chronic criteria to implement the Basin Plan's narrative toxicity objective for diazinon are 0.16 µg/L and 0.10 µg/L, respectively.

(b) RPA Results. Diazinon was detected, but not quantified, in the effluent in two out of 53 samples collected between January 2008 and May 2012 (minimum method detection limit (MDL) 0.01 µg/L, minimum reporting level (RL) 0.05 µg/L). All other effluent samples were non-detect. The maximum estimated effluent concentration was 0.099 µg/L. Upstream receiving water data for diazinon is not available. Therefore, diazinon in the discharge does not demonstrate reasonable potential to cause or contribute to an in-stream excursion above the Basin Plan's narrative toxicity objective, and the effluent limitations for diazinon have not been retained in this Order. Removal of these effluent limitations is in

[1] Siepmann, S, and B.J. Finlayson. 2000. Water quality criteria for diazinon and chlorpyrifos. California Department of Fish and Game. Office of Spill Prevention and Response Administrative Report 00-3. Sacramento, CA.

[2] Finlayson, B. 2004. Memo from Brian Finlayson, Chief, Pesticide Investigations Unit, California Department of Fish and Game. Re: Water Quality for Diazinon. 30 July 2004.

accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

iii. Iron

(a) WQO. The Secondary MCL – Consumer Acceptance Limit for iron is 300 µg/L, which is used to implement the Basin Plan's chemical constituent objective for the protection of municipal and domestic supply. Order R5-2007-0133-01 included an effluent limitation for iron based on the Secondary MCL.

(b) RPA Results. Secondary MCLs are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. Iron is not a priority pollutant and the RPA procedures in section 1.3 of the SIP are not required. To be consistent with how compliance with the standards is determined, the RPA was conducted based on the calendar annual average effluent iron concentrations. The maximum observed annual average effluent concentration for iron was 108 µg/L (minimum MDL 20 µg/L, minimum RL 20 µg/L) based on 54 samples collected between January 2008 and May 2012. Therefore, iron in the discharge does not demonstrate reasonable potential to cause or contribute to an in-stream excursion above the Secondary MCL of 300 µg/L and the effluent limitation for iron has not been retained in this Order. Removal of this effluent limitation is in accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

iv. Manganese

(a) WQO. The Secondary MCL – Consumer Acceptance Limit for manganese is 50 µg/L, which is used to implement the Basin Plan's chemical constituent objective for the protection of municipal and domestic supply. Order R5-2007-0133-01 included an effluent limitation for manganese based on the Secondary MCL.

(b) RPA Results. Secondary MCLs are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. Manganese is not a priority pollutant and the RPA procedures in section 1.3 of the SIP are not required. To be consistent with how compliance with the standards is determined, the RPA was conducted based on the calendar annual average effluent manganese concentrations. The maximum observed annual average effluent concentration for manganese was 32 µg/L (minimum MDL 1 µg/L, minimum RL 5 µg/L) based on 54 samples collected between January 2008 and May 2012. Therefore, manganese in the discharge does not demonstrate reasonable potential to cause or contribute to an in-

stream excursion above the Secondary MCL of 50 µg/L and the effluent limitation for manganese has not been retained in this Order. Removal of this effluent limitation is in accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

v. Salinity

(a) WQO. The Basin Plan contains a chemical constituent objective that incorporates state MCLs, contains a narrative objective, and contains numeric water quality objectives for certain specified water bodies for electrical conductivity, total dissolved solids, sulfate, and chloride. The USEPA Ambient Water Quality Criteria for Chloride recommends acute and chronic criteria for the protection of aquatic life. There are no USEPA water quality criteria for the protection of aquatic life for electrical conductivity, total dissolved solids, sulfate, and chloride. Additionally, there are no USEPA numeric water quality criteria for the protection of agricultural, livestock, and industrial uses. Numeric values for the protection of these uses are typically based on site specific conditions and evaluations to determine the appropriate constituent threshold necessary to interpret the narrative chemical constituent Basin Plan objective.

Table F-8. Salinity Water Quality Criteria/Objectives

Parameter	Secondary MCL[3]	USEPA NAWQC	Effluent	
			Average	Maximum
Electrical Conductivity (µmhos/cm)	900, 1600, 2200	N/A	461	729
Total Dissolved Solids (mg/L)	500, 1000, 1500	N/A	298	411
Sulfate (mg/L)	250, 500, 600	N/A	N/A	N/A
Chloride (mg/L)	250, 500, 600	860 1-hr 230 4-day	N/A	N/A

[1] Narrative chemical constituent objective of the Basin Plan. Procedures for establishing the applicable numeric limitation to implement the narrative objective can be found in the *Policy for Application of Water Quality*, Chapter IV, Section 8 of the Basin Plan. However, the Basin Plan does not require improvement over naturally occurring background concentrations. In cases where the natural background concentration of a particular constituent exceeds an applicable water quality objective, the natural background concentration will be considered to comply with the objective.

[3] The Secondary MCLs are stated as a recommended level, upper level, and a short-term maximum level.

(1) Chloride. The Secondary MCL for chloride is 250 mg/L, as a recommended level, 500 mg/L as an upper level, and 600 mg/L as a short-term maximum.

The Central Valley Water Board is currently implementing the CV-SALTS initiative to develop a Basin Plan Amendment that will establish a salt and nitrate Management Plan for the Central Valley. Through this effort the Basin Plan will be amended to define how the narrative water quality objective is to be interpreted for the protection of agricultural use. All studies conducted through this Order to establish an agricultural limit to implement the narrative objective will be

reviewed by and consistent with the efforts currently underway by CV-SALTS.

(2) Electrical Conductivity. The Secondary MCL for electrical conductivity is 900 µmhos/cm as a recommended level, 1600 µmhos/cm as an upper level, and 2200 µmhos/cm as a short-term maximum.

The Central Valley Water Board is currently implementing the CV-SALTS initiative to develop a Basin Plan Amendment that will establish a salt and nitrate Management Plan for the Central Valley. Through this effort the Basin Plan will be amended to define how the narrative water quality objective is to be interpreted for the protection of agricultural use. All studies conducted through this Order to establish an agricultural limit to implement the narrative objective will be reviewed by and consistent with the efforts currently underway by CV-SALTS

(3) Sulfate. The Secondary MCL for sulfate is 250 mg/L as a recommended level, 500 mg/L as an upper level, and 600 mg/L as a short-term maximum.

(4) Total Dissolved Solids. The Secondary MCL for total dissolved solids is 500 mg/L as a recommended level, 1000 mg/L as an upper level, and 1500 mg/L as a short-term maximum.

The Central Valley Water Board is currently implementing the CV-SALTS initiative to develop a Basin Plan Amendment that will establish a salt and nitrate Management Plan for the Central Valley. Through this effort the Basin Plan will be amended to define how the narrative water quality objective is to be interpreted for the protection of agricultural use. All studies conducted through this Order to establish an agricultural limit to implement the narrative objective will be reviewed by and consistent with the efforts currently underway by CV-SALTS.

(b) RPA Results

(1) Chloride. Effluent and upstream receiving water data for chloride is not available.

(2) Electrical Conductivity. A review of the Discharger's monitoring reports shows an average effluent electrical conductivity of 461 µmhos/cm, with a range from 287 µmhos/cm to 729 µmhos/cm based on 474 samples collected between January 2008 and May 2012. These levels do not exceed the Secondary MCL. The background receiving water EC averaged 270 µmhos/cm based on 451 samples collected between January 2008 and May 2012.

(3) Sulfate. Effluent and upstream receiving water data for sulfate is not available.

(4) Total Dissolved Solids. The average total dissolved solids effluent concentration was 299 mg/L with concentrations ranging from 224 mg/L to 411 mg/L based on 17 samples collected between January 2008 and May 2012. These levels do not exceed the Secondary MCL. Upstream receiving water data for total dissolved solids is not available.

Order R5-2007-0133-01 included a performance-based annual average effluent limitation of 500 µmhos/cm. Based on the relatively low reported salinity, the discharge does not have reasonable potential to cause or contribute to an in-stream excursion of water quality objectives for salinity, and the WQBEL for electrical conductivity has not been retained in this Order. Removal of this effluent limitation is in accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

vi. Settleable Solids

(a) WQO. For inland surface waters, the Basin Plan states that "[w]*ater shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.*" Order R5-2007-0133-01 established an average monthly effluent limitation (AMEL) of 0.1 ml/L and a maximum daily effluent limitation (MDEL) of 0.2 ml/L for settleable solids to implement the narrative settleable solids objective.

(b) RPA Results. Settleable solids were not detected in the effluent based on 456 samples collected between January 2008 and May 2012. Because settleable solids have not been detected in the effluent and because the Discharger provides tertiary treatment, the discharge from the Facility does not have reasonable potential to cause or contribute to an excursion above the Basin Plan's narrative objective for settleable solids and the effluent limitations for settleable solids have not been retained in this Order. Removal of these effluent limitations is in accordance with federal antibacksliding regulations (see section IV.D.3 of the Fact Sheet).

vii. Silver

(a) WQO. The CTR includes a hardness-dependent criterion for the protection of freshwater aquatic life for silver. This criterion for silver is presented in dissolved concentration. USEPA recommends conversion factors to translate dissolved concentrations to total concentrations. The default USEPA translator was used in this Order. Order R5-2007-0133-01 included effluent limitations for silver based on the CTR acute aquatic life criterion.

(b) RPA Results. Section IV.C.2.e includes procedures for conducting the RPA for silver. Silver was not detected in the upstream receiving water based on four samples collected between January 2008 and May 2012 (minimum MDL 0.1 µg/L, minimum RL 1 µg/L). Based on the lowest observed upstream receiving water hardness of 81 mg/L (as $CaCO_3$) the applicable total recoverable acute criterion for evaluating the ambient background concentration is 2.8 µg/L. Based on this data, the maximum ambient background silver concentration does not exceed the applicable CTR criterion.

As discussed in Section IV.C.2.e for comparing the MEC to the criterion, the reasonable worst-case downstream ambient hardness should be used. Based on the reasonable worst-case downstream hardness, the applicable total recoverable acute criterion is 0.49 µg/L. Silver was not detected in the effluent based on four samples collected between January 2008 and May 2012 (minimum MDL 0.19 µg/L, minimum RL 1 µg/L). Based on this data, the MEC does not exceed the CTR criterion.

Order R5-2007-0133-01 included effluent limitations for silver based on the CTR hardness dependent criteria for the protection of freshwater aquatic life. The MEC for silver and the maximum ambient background for silver do not exceed the applicable criterion. Therefore, the discharge does not demonstrate reasonable potential to cause or contribute to an in-stream excursion above the CTR criteria. Therefore, the effluent limitations for silver have not been retained in this Order. Removal of these effluent limitations is in accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

viii. Tetrachloroethylene

(a) WQO. The CTR includes a criterion of 0.8 µg/L for tetrachloroethylene for the protection of human health for waters from which both water and organisms are consumed. Order R5-2007-0133-01 included effluent limitations for tetrachloroethylene based on the CTR human health criterion.

(b) RPA Results. Tetrachloroethylene was not detected in the effluent based on 54 samples collected between January 2008 and May 2012 (minimum MDL 0.1 µg/L, minimum RL 0.5 µg/L). Tetrachloroethylene was not detected in the upstream receiving water based on four samples collected between January 2008 and May 2012 (minimum MDL 0.17 µg/L, minimum RL 0.5 µg/L). Therefore, tetrachloroethylene in the discharge does not demonstrate reasonable potential to cause or contribute to an in-stream excursion above the CTR human health criterion and the effluent limitations for tetrachloroethylene have not been retained in this Order. Removal of these effluent limitations is in accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

ix. 2,6-Dinitrotoluene

(a) WQO. 2,6-Dinitrotoluene is a priority pollutant; however, CTR criteria for 2,6-dinitrotoluene have not been developed. Order R5-2007-0133-01 established effluent limitations for 2,6-dinitrotoluene based on the USEPA Integrated Risk Information System (IRIS) and USEPA suggested no-adverse-response level (SNARL) for one-in-a-million incremental cancer risk estimates for drinking water of 0.05 µg/L.

(b) RPA Results. 2,6-Dinitrotoluene was not detected in the effluent out of 54 samples collected between January 2008 and May 2012 (minimum MDL 0.36 µg/L, minimum RL 1 µg/L). 2,6-Dinitrotoluene was not detected in the upstream receiving water based on four samples collected between January 2008 and May 2012 (MDL 1.9 µg/L, RL 5 µg/L). Therefore, 2,6-dinitrotoluene in the discharge does not demonstrate reasonable potential to cause or contribute to an in-stream excursion above the USEPA IRIS and USEPA SNARL for one-in-a-million incremental cancer risk estimates for drinking water and the effluent limitations for 2,6-dinitrotoluene have not been retained in this Order. Removal of these effluent limitations is in accordance with federal anti-backsliding regulations (see section IV.D.3 of the Fact Sheet).

c. Constituents with Insufficient or Limited Data. Reasonable potential cannot be determined for the following constituents because effluent and receiving water data are limited or insufficient. The Discharger is required to continue to monitor for these constituents in the effluent using analytical methods that provide the best feasible detection limits. When additional data become available, further analysis will be conducted to determine whether to add numeric effluent limitations or to continue monitoring.

i. Carbon Tetrachloride

(a) WQO. The CTR includes a criterion of 0.25 µg/L for carbon tetrachloride for the protection of human health for waters from which both water and organisms are consumed.

(b) RPA Results. Carbon tetrachloride was detected, but not quantified, in the effluent in two out of five samples collected between January 2008 and May 2012, as shown in the table below. Carbon tetrachloride was not detected in the upstream receiving water based on four samples collected between January 2008 and May 2012 (MDL 0.15 µg/L, RL 0.5 µg/L).

Table F-9. Carbon Tetrachloride Effluent Data

Date	Effluent Carbon Tetrachloride Concentration (µg/L)	MDL (µg/L)	RL (µg/L)	SIP ML (µg/L)
10 February 2010 (grab)	ND	0.15	0.5	0.5
10 February 2010 (composite)	ND	0.15	0.5	0.5
11 May 2010	ND	0.15	0.5	0.5
10 August 2010	0.28 (J)	0.15	0.5	0.5
9 November 2010	0.22 (J)	0.15	0.5	0.5

The SIP Section 2.4.2 states that the minimum level (ML) is the lowest quantifiable concentration in a sample based on the proper application of all method-based analytical procedures and the absence of any matrix interferences. The SIP further defines the Estimated Chemical Concentration as "*the estimated chemical concentration that results from the confirmed detection of the substance by the analytical method below the ML value.*"

Estimated chemical concentrations (J-Flags) may not be valid due to possible matrix interferences during the analytical procedure. These analytical results are not sufficient to determine whether the discharge demonstrates reasonable potential to cause or contribute to an instream excursion above the applicable water quality criterion/objective.

(1) SIP Section 1.2 states that the Central Valley Water Board has the discretion to consider if any data are inappropriate or insufficient for use in implementing the SIP.

(2) Therefore, in accordance with Section 1.2 of the SIP, the Central Valley Board has determined that data reported below the ML is inappropriate and insufficient to be used in the RPA.

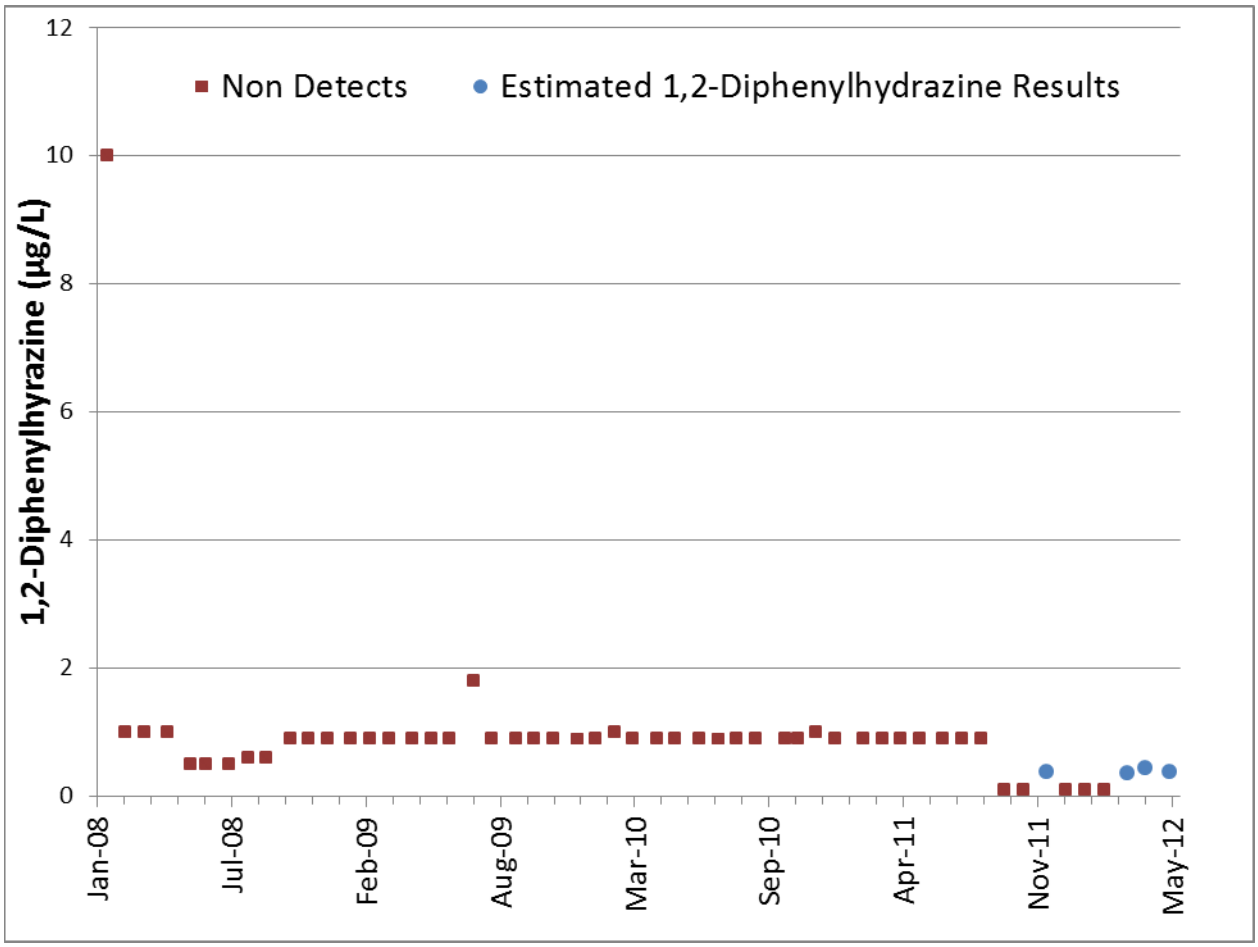
In implementing its discretion, the Central Valley Water Board is not finding that carbon tetrachloride does not exhibit reasonable potential to cause or contribute to an exceedance of a water quality criterion; rather the Central Valley Water Board cannot make such a determination given the data is insufficient to determine whether concentrations in the effluent exceed the water quality criterion for carbon tetrachloride or not.

Section 1.3, Step 8 of the SIP allows the Central Valley Water Board to require additional monitoring for a pollutant in place of an effluent limitation if data are unavailable or insufficient. Therefore, the Central Valley Water Board will require additional monitoring for such constituents until such time a determination can be made in accordance with the SIP policy. Instead of limitations, additional monitoring has been established for carbon tetrachloride. Should monitoring results indicate that the discharge has the reasonable potential to cause or contribute to an exceedance of a water quality standard, this Order may be reopened and modified by adding an appropriate effluent limitation.

ii. 1,2-Diphenylhydrazine

(a) WQO. The CTR includes a criterion of 0.040 µg/L for 1,2-diphenylhydrazine for the protection of human health for waters from which both water and organisms are consumed. Order R5-2007-0133-01 included effluent limitations for 1,2-diphenylhydrazine based on the CTR human health criterion.

(b) RPA Results. 1,2-Diphenylhydrazine was detected, but not quantified, in the effluent in 4 out of 53 samples collected between January 2008 and May 2012, as shown in the graph below (minimum MDL 0.1 µg/L, minimum RL 1 µg/L). 1,2-Diphenylhdrazine was not detected in the upstream receiving water based on four samples collected between January 2008 and May 2012 (MDL 1 µg/L, RL 1 µg/L).



The SIP Section 2.4.2 states that the ML is the lowest quantifiable concentration in a sample based on the proper application of all method-based analytical procedures and the absence of any matrix interferences. The SIP further defines the Estimated Chemical Concentration as "*the estimated chemical concentration that results from the confirmed detection of the substance by the analytical method below the ML value.*"

Estimated chemical concentrations (J-Flags) may not be valid due to possible matrix interferences during the analytical procedure. These analytical results are not sufficient to determine whether the discharge demonstrates reasonable potential to cause or contribute to an instream excursion above the applicable water quality criterion/objective.

(1) SIP Section 1.2 states that the Central Valley Water Board has the discretion to consider if any data are inappropriate or insufficient for use in implementing the SIP.

(2) Therefore, in accordance with Section 1.2 of the SIP, the Central Valley Board has determined that data reported below the ML is inappropriate and insufficient to be used in the RPA.

In implementing its discretion, the Central Valley Water Board is not finding that 1,2-diphenylhydrazine does not exhibit reasonable potential to cause or contribute to an exceedance of a water quality criterion; rather the Central Valley Water Board cannot make such a determination given data is insufficient to determine whether concentrations in the effluent exceed the water quality criterion for 1,2-diphenylhydrazine or not.

Section 1.3, Step 8 of the SIP allows the Central Valley Water Board to require additional monitoring for a pollutant in place of an effluent limitation if data are unavailable or insufficient. Therefore, the Central Valley Water Board will require additional monitoring for such constituents until such time a determination can be made in accordance with the SIP policy. Instead of limitations, additional monitoring has been established for 1,2-diphenylhydrazine. Should monitoring results indicate that the discharge has the reasonable potential to cause or contribute to an exceedance of a water quality standard, this Order may be reopened and modified by adding an appropriate effluent limitation.

iii. Bis (2-Ethylhexyl) Phthalate

(a) WQO. The CTR includes a criterion of 1.8 µg/L for bis (2-ethylhexyl) phthalate for the protection of human health for waters from which both water and organisms are consumed.

(b) RPA Results. The MEC for bis (2-ethylhexyl) phthalate was 8.1 µg/L based on four samples collected between February 2010 and November 2010 (MDL 2.3 µg/L, RL 5 µg/L), as part of year three quarterly priority pollutant sampling requirement. The Discharger believed the analytical results from the 2010 sampling events were in error because there are no plastics manufacturing or any other known uses of plastic that enter the wastewater collection system. The Discharger collected an additional sample on 25 July 2011 and submitted it to PHYSIS Environmental Laboratory, Inc. instead of Sierra Foothill Laboratory, which subcontracted the analysis to E. S. Babcock & Sons, Inc. PHYSIS

Environmental Laboratory specializes in analyzing for trace levels of organics at very low detection levels and avoiding contamination of samples during the analytical process (bis (2-ethylhexyl) phthalate is a common laboratory contaminant). The analytical result from the 25 July 2011 sample shown in the following table was below the bis (2-ethylhexyl) phthalate criterion of 1.8 µg/L.

Table F-10. Bis (2-Ethylhexyl) Phthalate Effluent Data

Date	Analytical Laboratory	Effluent Concentration (µg/L)	Blank #1	Blank #2	MDL (µg/L)	RL (µg/L)
10 February 2010	Babcock	< 2.3	<10	< 5	5.0	2.3
11 May 2010	Babcock	< 2.3	<10	< 5	5.0	2.3
10 August 2010	Babcock	8.1	<10	< 5	5.0	2.3
9 November 2010	Babcock	3.6 (J)	<10	< 5	5.0	2.3
25 July 2011	PHYSIS	0.058	0.01354	--	0.02	0.01

Without additional data supporting the presence of laboratory contamination from the Babcock analytical results the Central Valley Water Board cannot conclude if reasonable potential is or is not exhibited by the discharge. The Discharger, in their 8 March 2013 memorandum to the Central Valley Water Board titled *RE: City of Jackson, Preliminary Draft NPDES Order Review*, stated that, "the City intends to use PHYSIS (or equal) for all future analyses of bis (2-ethylhexyl) phthalate." The Central Valley Water Board is in agreement with the Discharger that PHYSIS Environmental Laboratory or an equivalent laboratory should be used for all future bis (2-ethylhexyl) phthalate analytical samples.

The SIP Section 2.4.2 states that the ML is the lowest quantifiable concentration in a sample based on the proper application of all method-based analytical procedures and the absence of any matrix interferences. The SIP further defines the Estimated Chemical Concentration as "*the estimated chemical concentration that results from the confirmed detection of the substance by the analytical method below the ML value.*"

The bis (2-ethylhexyl) phthalate analytical results are not sufficient to determine whether the discharge demonstrates reasonable potential to cause or contribute to an instream excursion above the applicable water quality criterion/objective.

(1) SIP Section 1.2 states that the Central Valley Water Board has the discretion to consider if any data are inappropriate or insufficient for use in implementing the SIP.

(2) Therefore, in accordance with Section 1.2 of the SIP, the Central Valley Board has determined that conflicting analytical results are inappropriate and insufficient to be used in the RPA.

In implementing its discretion, the Central Valley Water Board is not finding that bis (2-ethylhexyl) phthalate does not exhibit reasonable potential to cause or contribute to an exceedance of a water quality criterion; rather the Central Valley Water Board cannot make such a determination given data is insufficient to determine whether concentrations in the effluent exceed the water quality criterion for bis (2-ethylhexyl) phthalate or not.

Section 1.3, Step 8 of the SIP allows the Central Valley Water Board to require additional monitoring for a pollutant in place of an effluent limitation if data are unavailable or insufficient. Therefore, the Central Valley Water Board will require additional monitoring for such constituents until such time a determination can be made in accordance with the SIP policy. Instead of limitations, additional monitoring has been established for bis (2-ethylhexyl) phthalate. Should monitoring results indicate that the discharge has the reasonable potential to cause or contribute to an exceedance of a water quality standard, this Order may be reopened and modified by adding an appropriate effluent limitation.

d. Constituents with Reasonable Potential. The Central Valley Water Board finds that the discharge has a reasonable potential to cause or contribute to an in-stream excursion above a water quality standard for ammonia, BOD_5, chlorine residual, chlorodibromomethane, copper, cyanide, dichlorobromomethane, mercury, nitrate plus nitrite, pH, total coliform organisms, total trihalomethanes, TSS, and zinc. WQBELs for these constituents are included in this Order. A summary of the RPA is provided in Attachment G, and a detailed discussion of the RPA for each constituent is provided below.

i. Ammonia

(a) WQO. The NAWQC for the protection of freshwater aquatic life for total ammonia, recommends acute (1-hour average; criteria maximum concentration or CMC) standards based on pH and chronic (30-day average; criteria continuous concentration or CCC) standards based on pH and temperature. USEPA also recommends that no 4-day average concentration should exceed 2.5 times the 30-day CCC. USEPA found that as pH increased, both the acute and chronic toxicity of ammonia increased. Salmonids were more sensitive to acute toxicity effects than other species. However, while the acute toxicity of ammonia was not influenced by temperature, it was found that invertebrates and young fish experienced increasing chronic toxicity effects with increasing temperature. Because Jackson Creek has a beneficial use of cold freshwater habitat and the presence of salmonids and early fish life stages in Jackson Creek is well-documented, the recommended criteria for waters where salmonids and early life stages are present were used.

The Basin Plan objective for pH in the receiving stream is the range of 6.5 to 8.5. Order R5-2007-0133-01 included a more stringent instantaneous

maximum pH limitation of 8.0 based on a 30 July 2007 request from the Discharger. Data collected over the term of Order R5-2007-0133-01 indicate that pH in the effluent was consistently below 8.0. Therefore, consistent with Order R5-2007-0133-01, this Order establishes a more stringent instantaneous maximum pH limitation of 8.0. In order to protect against the worst-case short-term exposure of an organism, the permitted instantaneous maximum pH limitation of 8.0 was used to derive the acute criterion. The resulting acute criterion is 5.62 mg/L.

A chronic criterion was calculated for each day when paired temperature and pH were measured using receiving water data for temperature and pH recorded from the Discharger's SMRs from January 2008 through May 2012. Rolling 30-day average criteria were calculated from downstream receiving water data using the criteria calculated for each day and the minimum observed 30-day average criterion was established as the applicable 30-day average chronic criterion, or 30-day CCC. The resulting 30-day CCC is 2.05 mg/L (as N). The 4-day average concentration is derived in accordance with the USEPA criterion as 2.5 times the 30-day CCC. Based on the 30-day CCC of 2.05 mg/L (as N), the 4-day average concentration that should not be exceeded is 6.88 mg/L (as N)

(b) RPA Results. Federal regulations at 40 C.F.R. §122.44(d)(1)(i) requires that, "*Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.*" For priority pollutants, the SIP dictates the procedures for conducting the RPA. Ammonia is not a priority pollutant. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used professional judgment in determining the appropriate method for conducting the RPA for this non-priority pollutant constituent.

USEPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBELs are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBELs for pathogens in all permits for POTWs discharging to contact recreational waters).*" USEPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the*

reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data." With regard to POTWs, USPEA recommends that, "*POTWs should also be characterized for the possibility of chlorine and ammonia problems.*" (TSD, p. 50)

The Facility is a POTW that treats domestic wastewater. Untreated domestic wastewater contains ammonia. Nitrification is a biological process that converts ammonia to nitrite and nitrite to nitrate. Denitrification is a process that converts nitrate to nitrite or nitric oxide and then to nitrous oxide or nitrogen gas, which is then released to the atmosphere. The Discharger currently uses nitrification to remove ammonia from the waste stream. Inadequate or incomplete nitrification may result in the discharge of ammonia to the receiving stream. Ammonia is known to cause toxicity to aquatic organisms in surface waters. Discharges of ammonia in concentrations that produce detrimental physiological responses to human, plant, animal, or aquatic life would violate the Basin Plan narrative toxicity objective. Although the Discharger nitrifies the discharge, inadequate or incomplete nitrification creates the potential for ammonia to be discharged and provides the basis for the discharge to have a reasonable potential to cause or contribute to an in-stream excursion above the NAWQC. Therefore, the Central Valley Water Board finds the discharge has reasonable potential for ammonia and WQBELs are required.

The maximum effluent concentration for ammonia was 10 mg/L based on 1,361 samples collected between January 2008 and May 2012. The maximum observed upstream receiving water ammonia concentration was 3.2 mg/L based on 219 samples collected between January 2008 and May 2012.

(c) WQBELs. Applying 40 CFR section 122.44(d)(1)(vi)(B), effluent limitations for ammonia are included in this Order and are based on U.S. EPA's Ambient Water Quality Criteria for the protection of the beneficial use of freshwater aquatic habitat. This Order contains a final AMEL and MDEL for ammonia of 2.3 mg/L and 5.5 mg/L, respectively, based on the Basin Plan's narrative toxicity objective.

(d) Plant Performance and Attainability. Analysis of the effluent data shows that the maximum effluent concentration of 10 mg/L is greater than applicable WQBELs. TSO R5-2011-0909 provides a compliance schedule to achieve compliance with the final effluent limitations for ammonia by 1 March 2015, and was amended to reference this Order.

ii. Chlorine Residual

(a) WQO. USEPA developed NAWQC for protection of freshwater aquatic life for chlorine residual. The recommended 4-day average (chronic) and 1-hour average (acute) criteria for chlorine residual are 0.011 mg/L and 0.019 mg/L, respectively. These criteria are protective of the Basin Plan's narrative toxicity objective.

(b) RPA Results. The concentrations of chlorine used to disinfect wastewater are high enough to harm aquatic life and violate the Basin Plan's narrative toxicity objective if discharged to the receiving water. Reasonable potential therefore exists and WQBELs are required.

Federal regulations at 40 C.F.R. §122.44(d)(1)(i) requires that, "*Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.*" For priority pollutants, the SIP dictates the procedures for conducting the RPA. Chlorine is not a priority pollutant. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used its judgment in determining the appropriate method for conducting the RPA for this non-priority pollutant constituent.

USEPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBELs are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBELs for pathogens in all permits for POTWs discharging to contact recreational waters).*" USEPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data.*" With regard to POTWs, USEPA recommends that, "*POTWs should also be characterized for the possibility of chlorine and ammonia problems.*" (TSD, p. 50)

The Discharger uses chlorine for disinfection, which is extremely toxic to aquatic organisms. Although the Discharger uses a sulfur dioxide process

to dechlorinate the effluent prior to discharge to Jackson Creek, the existing chlorine use and the potential for chlorine to be discharged provides the basis for the discharge to have a reasonable potential to cause or contribute to an in-stream excursion above the NAWQC.

(c) WQBELs. The USEPA *Technical Support Document for Water Quality-Based Toxics Control* [EPA/505/2-90-001] contains statistical methods for converting chronic (4-day) and acute (1-hour) aquatic life criteria to average monthly and maximum daily effluent limitations based on the variability of the existing data and the expected frequency of monitoring. However, because chlorine is an acutely toxic constituent that can and will be monitored continuously, an average 1-hour limitation is considered more appropriate than an average daily limitation. Consistent with Order R5-2007-0133-01, this Order contains a 4-day average effluent limitation and 1-hour average effluent limitation for chlorine residual of 0.011 mg/L and 0.019 mg/L, respectively, based on USEPA's NAWQC, which implements the Basin Plan's narrative toxicity objective for protection of aquatic life.

(d) Plant Performance and Attainability. Prior to discharging, the Discharger dechlorinates the treated effluent using sodium bisulfite. The Central Valley Water Board concludes, therefore, that compliance with chlorine residual effluent limitations is feasible.

iii. Chlorodibromomethane

(a) WQO. The CTR includes a criterion of 0.41 µg/L for chlorodibromomethane for the protection of human health for waters from which both water and organisms are consumed.

(b) RPA Results. The MEC for chlorodibromomethane was 0.82 µg/L based on five samples collected between January 2008 and May 2012 (MDL 0.37 µg/L, RL 0.5 µg/L). Chlorodibromomethane was not detected in the upstream receiving water based on four samples collected between January 2008 and May 2012 (MDL 0.37 µg/L, RL 0.5 µg/L). Therefore, chlorodibromomethane in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.

(c) WQBELs. This Order contains a final AMEL and MDEL for chlorodibromomethane of 0.41 µg/L and 0.82 µg/L, respectively, based on the CTR criterion for the protection of human health.

(d) Plant Performance and Attainability. Analysis of the effluent data shows that the MEC of 0.82 µg/L is greater than the applicable WQBELs. The Discharger submitted a 20 August 2013 Infeasibility Analysis documenting the compliance strategy for meeting the final effluent limits for chlorodibromomethane. Therefore, a compliance time schedule of 1

March 2018 for compliance with the chlorodibromomethane effluent limitations is established in TSO R5-2013-0147.

iv. Copper

(a) WQO. The CTR includes hardness dependent criteria for the protection of freshwater aquatic life for copper. These criteria for copper are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentrations to total concentrations. Default USEPA translators were used in this Order.

(b) RPA Results. Section IV.C.2.e of this Fact Sheet includes procedures for conducting the RPA for copper. Based on the lowest observed upstream receiving water hardness of 81 mg/L (as $CaCO_3$), the applicable total recoverable criteria for evaluating the ambient background concentration are 11 µg/L and 7.8 µg/L for the acute and chronic criteria, respectively. The maximum observed upstream receiving water copper concentration was 1.8 µg/L based on four samples collected between January 2008 and May 2012 (MDL 0.1 µg/L, RL 0.5 µg/L). Based on this data, the maximum ambient background copper concentration does not exceed the applicable CTR criteria.

As discussed in Section IV.C.2.e for comparing the MEC to the criteria, the reasonable worst-case downstream ambient hardness should be used. Based on a hardness of 42 mg/L (as $CaCO_3$), the applicable total recoverable criteria are 6.2 µg/L and 4.4 µg/L for the acute and chronic criteria, respectively. The MEC for copper (total recoverable) was 9.7 µg/L, based on 53 samples collected by the Discharger between January 2008 and May 2012 (minimum MDL 0.1 µg/L, 0.5 µg/L). Therefore, copper in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of aquatic life.

(c) WQBELs. This Order contains a final AMEL and MDEL for copper of 3.9 µg/L and 6.2 µg/L, respectively, based on the CTR criterion for the protection of aquatic life.

(d) Plant Performance and Attainability. Analysis of the effluent data shows that the MEC of 9.7 µg/L is greater than the applicable WQBELs. TSO R5-2011-0909 provides a compliance schedule to achieve compliance with the final effluent limitations for copper by 1 March 2015. TSO R5-2011-0909 was amended to reference this Order.

v. Cyanide

(a) WQO. The CTR includes maximum 1-hour average and 4-day average criteria of 22 µg/L and 5.2 µg/L, respectively, for cyanide for the protection of freshwater aquatic life.

(b) RPA Results. The MEC for cyanide was 13 µg/L based on 54 samples collected between January 2008 and May 2012 (minimum MDL 2 µg/L, minimum RL 5 µg/L). The maximum observed upstream receiving water cyanide concentration was 1.3 µg/L based on four samples collected between January 2008 and May 2012 (minimum MDL 1 µg/L, RL 5 µg/L). Therefore, cyanide in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of freshwater aquatic life.

(c) WQBELs. This Order contains a final AMEL and MDEL for cyanide of 4.2 µg/L and 8.8 µg/L, respectively, based on the CTR criterion for the protection of freshwater aquatic life.

(d) Plant Performance and Attainability. Analysis of the effluent data shows that the MEC of 13 µg/L is greater than applicable WQBELs. TSO R5-2011-0909 provides a compliance schedule to achieve compliance with the final effluent limitations for cyanide by 1 March 2015. TSO R5-2011-0909 was amended to reference this Order.

vi. Dichlorobromomethane

(a) WQO. The CTR includes a criterion of 0.56 µg/L for dichlorobromomethane for the protection of human health for waters from which both water and organisms are consumed.

(b) RPA Results. The MEC for dichlorobromomethane was 10 µg/L based on 55 samples collected between January 2008 and May 2012 (minimum MDL 0.067 µg/L, minimum RL 0.5 µg/L). Dichlorobromomethane was not detected in the upstream receiving water based on four samples collected between January 2008 and May 2012 (MDL 0.5 µg/L, RL 0.5 µg/L). Therefore, dichlorobromomethane in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.

(c) WQBELs. This Order contains a final AMEL and MDEL for dichlorobromomethane of 0.56 µg/L and 1.4 µg/L, respectively, based on the CTR criterion for the protection of human health.

(d) Plant Performance and Attainability. Analysis of the effluent data shows that the MEC of 10 µg/L is greater than applicable WQBELs. TSO R5-2011-0909 provides a compliance schedule to achieve compliance with the final effluent limitations for dichlorobromomethane by 1 March 2015. TSO R5-2011-0909 was amended to reference this Order.

vii. Mercury

(a) WQO. The current NAWQC for protection of freshwater aquatic life, continuous concentration, for mercury is 0.77 µg/L (30-day average,

chronic criteria). The CTR contains a human health criterion (based on a threshold dose level causing neurological effects in infants) of 0.050 µg/L for waters from which both water and aquatic organisms are consumed. Both values are controversial and subject to change. In 40 CFR Part 131, USEPA acknowledges that the human health criteria may not be protective of some aquatic or endangered species and that "…*more stringent mercury limits may be determined and implemented through use of the State's narrative criterion.*" In the CTR, USEPA reserved the mercury criteria for freshwater and aquatic life and may adopt new criteria at a later date.

(b) RPA Results. The MEC for mercury was 0.0061 µg/L based on 13 samples collected between January 2008 and May 2012 (minimum MDL 0.0002 µg/L, minimum RL 0.0005 µg/L). The maximum observed upstream receiving water mercury concentration was 0.0037 µg/L based on four samples collected between January 2008 and May 2012 (MDL 0.0002 µg/L, RL 0.0005 µg/L). Mercury bioaccumulates in fish tissue and, therefore, the discharge of mercury to the receiving water may contribute to exceedances of the narrative toxicity objective and impact beneficial uses. Section 2.1.1 of the SIP states that "For bioaccumulative priority pollutants for which the receiving water has been included on the CWA Section 303(d) list, the RWQCB should consider whether the mass loading of the bioaccumulative pollutant(s) should be limited to representative, current levels pending TMDL development in order to implement the applicable water quality standard." The discharge of mercury to surface waters in the Central Valley draining to the Sacramento-San Joaquin Delta are being limited in order to protect the beneficial uses of the Delta. A mercury TMDL for Lake Amador may be proposed in the future.

(c) WQBELs. This Order retains the performance-based mass effluent limitation of 0.0016 lbs/month for mercury from Order R5-2007-0133-01. This limitation is based on maintaining the mercury loading at the current level until the concern of methylmercury concentrations in the receiving water are addressed, a TMDL is established, and/or USEPA develops mercury standards that are protective of human health. This permit may be reopened and the effluent limitations revisited as water quality standards for mercury are established, as appropriate.

(d) Plant Performance and Attainability. The mass limitations for mercury are based on the performance of the treatment system. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

viii. Nitrate and Nitrite

(a) WQO. DPH has adopted Primary MCLs for the protection of human health for nitrite and nitrate that are equal to 1 mg/L and 10 mg/L

(measured as nitrogen), respectively. DPH has also adopted a Primary MCL of 10 mg/L for the sum of nitrate and nitrite, measured as nitrogen.

USEPA has developed a Primary MCL and an MCL goal of 1 mg/L for nitrite (as nitrogen). For nitrate, USEPA has developed Drinking Water Standards (10 mg/L as Primary MCL) and NAWQC for protection of human health (10 mg/L for non-cancer health effects). Recent toxicity studies have indicated a possibility that nitrate is toxic to aquatic organisms.

Order R5-2007-0133-01 included an AMEL for nitrate (as NO_3) of 45 mg/L, which is equivalent to the Primary MCL of 10 mg/L for nitrate (as N).

(b) RPA Results. The Facility is a POTW that treats domestic wastewater. Untreated domestic wastewater contains ammonia in concentrations that, if untreated, will be harmful to fish and will violate the Basin Plan's narrative toxicity objective. This Order, therefore, requires removal of ammonia (i.e., nitrification). Nitrification is a biological process that converts ammonia to nitrite and nitrate. Nitrate concentrations in a drinking water supply above the primary MCL threatens the health of human fetuses and newborn babies by reducing the oxygen-carrying capacity of the blood (methemoglobinemia). Reasonable potential therefore exists and WQBELs are required.

Federal regulations at 40 CFR 122.44(d)(1)(i) require that, "*Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.*" For priority pollutants, the SIP dictates the procedures for conducting the RPA. Nitrate and nitrite are not priority pollutants. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used professional judgment in determining the appropriate method for conducting the RPA for these non-priority pollutant constituents.

USEPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBELs are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBELs for pathogens in all permits for POTWs discharging to contact recreational waters)*." USEPA's TSD also recommends that factors other than effluent data should be considered in

the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data*." With regard to POTWS, USEPA recommends that, "*POTWs should also be characterized for the possibility of chlorine and ammonia problems*." (TSD, p. 50)

As required by Order R5-2007-0133-01, the Discharger monitored for nitrate (as NO_3). The maximum effluent concentration for nitrate (as NO_3) was 124 mg/L based on 230 samples collected between January 2008 and May 2012. Using a conversion factor of 0.2259 to convert nitrate (as NO_3) to nitrate (as N), the maximum effluent concentration for nitrate (as N) was 28 mg/L. Effluent data for nitrite and receiving water data for nitrate and nitrite is not available.

(c) WQBELs. Order R5-2007-0133-01 included an AMEL for nitrate (as NO_3) of 45 mg/L. This Order contains a final AMEL for nitrate plus nitrite of 10 mg/L, based on the protection of the Basin Plan's narrative chemical constituents objective and to assure the treatment process adequately nitrifies and denitrifies the waste stream.

(d) Plant Performance and Attainability. Analysis of the effluent data shows that the maximum effluent concentration for nitrate (as N) of 28 mg/L is greater than applicable WQBEL for nitrate plus nitrite. TSO R5-2011-0909 provides a compliance schedule to achieve compliance with the final effluent limitations for nitrate (as NO_3) by 1 March 2015. TSO R5-2011-0909 was amended to reference this Order.

ix. Pathogens

(a) WQO. DPH has developed reclamation criteria, CCR, Division 4, Chapter 3 (Title 22), for the reuse of wastewater. Title 22 requires that for spray irrigation of food crops, parks, playgrounds, schoolyards, and other areas of similar public access, wastewater be adequately disinfected, oxidized, coagulated, clarified, and filtered, and that the effluent total coliform levels not exceed 2.2 MPN/100 mL as a 7-day median. To more effectively regulate total coliform organisms, this Order also contains additional effluent limitations; effluent total coliform organisms shall not exceed 23 MPN/100 mL more than once in any 30-day period and 240 MPN/100 mL at any time.

Title 22 also requires that recycled water used as a source of water supply for non-restricted recreational impoundments be disinfected tertiary recycled water that has been subjected to conventional treatment. A non-restricted recreational impoundment is defined as *"…an impoundment of*

recycled water, in which no limitations are imposed on body-contact water recreational activities." Title 22 is not directly applicable to surface waters; however, the Central Valley Water Board finds that it is appropriate to apply an equivalent level of treatment to that required by DPH's reclamation criteria because the receiving water is used for irrigation of agricultural land and for contact recreation purposes. The stringent disinfection criteria of Title 22 are appropriate since the undiluted effluent may be used for the irrigation of food crops and/or for body-contact water recreation. Coliform organisms are intended as an indicator of the effectiveness of the entire treatment train and the effectiveness of removing other pathogens.

(b) RPA Results. Raw domestic wastewater inherently contains human pathogens that threaten human health, and constitute a threatened pollution and nuisance under California Water Code section 13050 if discharged untreated to the receiving water. Reasonable potential therefore exists and WQBELs are required.

Federal regulations at 40 CFR 122.44(d)(1)(i) require that, "*Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality*." For priority pollutants, the SIP dictates the procedures for conducting the RPA. Pathogens are not a priority pollutant. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used professional judgment in determining the appropriate method for conducting the RPA for this non-priority pollutant constituent.

USEPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBELs are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBELs for pathogens in all permits for POTWs discharging to contact recreational waters).*" USEPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data*." (TSD, p. 50)

The beneficial uses of Jackson Creek include municipal and domestic supply, water contact recreation, and agricultural irrigation supply, and there is, at times, less than 20:1 dilution. To protect these beneficial uses, the Central Valley Water Board finds that the wastewater must be disinfected and adequately treated to prevent disease. Although the Discharger provides disinfection, inadequate or incomplete disinfection creates the potential for pathogens to be discharged and provides the basis for the discharge to have a reasonable potential to cause or contribute to an exceedance of the Basin Plan's narrative toxicity objective. Therefore, the Central Valley Water Board finds the discharge has reasonable potential for pathogens and WQBELs are required.

(c) WQBELs. The method of treatment is not prescribed by this Order, however, wastewater must be treated to a level equivalent to that recommended by DPH. In accordance with the requirements of Title 22, this Order includes effluent limitations for total coliform organisms of 2.2 MPN/100 mL as a 7-day median; 23 MPN/100 mL, not to be exceeded more than once in a 30-day period; and 240 MPN/100 mL as an instantaneous maximum. As coliform organisms are living and mobile, it is impracticable to quantify an exact number of coliform organisms and to establish weekly average limitations. Instead, coliform organisms are measured as a most probable number and regulated based on a 7-day median limitation.

In addition to coliform limitations, an operational specification for turbidity has been included to monitor the effectiveness of treatment filter performance, and to assure compliance with the required level of treatment.

The Title 22 tertiary treatment process utilized at the Facility is capable of reliably treating wastewater to a turbidity level of 2 nephelometric turbidity units (NTU). Failure of the filtration system such that virus removal is impaired would normally result in increased particles in the effluent, which result in higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance, allowing immediate detection of filter failure and rapid corrective action. Coliform testing, by comparison, is not conducted continuously and requires several hours, to days, to identify high coliform concentrations. In accordance with DPH recommendations, this Order includes operational specifications for turbidity of 2 NTU as a daily average, 5 NTU not to be exceeded more than 5 percent of the time within a 24-hour period; and 10 NTU as an instantaneous maximum.

This Order contains effluent limitations for BOD_5, total coliform organisms, and TSS, and requires a tertiary level of treatment, or equivalent, necessary to protect the beneficial uses of the receiving water. The Central Valley Water Board has previously considered the factors in Water Code section 13241 in establishing these requirements.

Final WQBELs for BOD_5 and TSS are based on the technical capability of the tertiary process, which is necessary to protect the beneficial uses of the receiving water. BOD_5 is a measure of the amount of oxygen used in the biochemical oxidation of organic matter. The tertiary treatment standards for BOD_5 and TSS are indicators of the effectiveness of the tertiary treatment process. The principal design parameter for wastewater treatment plants is the daily BOD_5 and TSS loading rates and the corresponding removal rate of the system. The application of tertiary treatment processes results in the ability to achieve lower levels for BOD_5 and TSS than the secondary standards currently prescribed. Therefore, this Order requires compliance with AMELs for BOD_5 and TSS of 10 mg/L and compliance with average weekly effluent limitations of 15 mg/L, which is based on the technical capability of a tertiary system. In addition to the average weekly and average monthly effluent limitations, a daily maximum effluent limitation for BOD_5 and TSS is included in the Order to ensure that the treatment works are not organically overloaded and operate in accordance with design capabilities.

(d) Plant Performance and Attainability. The Discharger is unable to consistently comply with the final effluent limitations for total coliform organisms. TSO R5-2011-0909 provides a compliance schedule to achieve compliance with the final effluent limitations for total coliform organisms by 1 March 2015. TSO R5-2011-0909 was amended to reference this Order. This Order contains effluent limitations for BOD_5 and TSS that the Discharger was able to meet over the previous permit term. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations for BOD_5 and TSS is feasible.

x. pH

(a) WQO. The Basin Plan includes a water quality objective for surface waters (except for Goose Lake) that the *"…pH shall not be depressed below 6.5 nor raised above 8.5.*"

(b) RPA Results. Raw domestic wastewater inherently has variable pH that if not properly controlled would violate the Basin Plan's numeric objective for pH in the receiving water. Therefore, reasonable potential exists and WQBELs for pH are required.

Federal regulations at 40 CFR 122.44(d)(1)(i) require that, "*Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality*." For priority pollutants, the SIP dictates the procedures for conducting the RPA. Therefore, the Central Valley Water Board is not restricted to one

particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used best professional judgment in determining the appropriate method for conducting the RPA for pH.

USEPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBELs are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBELs for pathogens in all permits for POTWs discharging to contact recreational waters)*." USEPA's TSD also recommends that factors other than effluent data should be considered in the RPA, "*When determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion for individual toxicants or for toxicity, the regulatory authority can use a variety of factors and information where facility-specific effluent monitoring data are unavailable. These factors also should be considered with available effluent monitoring data*." (TSD, p. 50)

The Facility is a POTW that treats domestic wastewater. Although the Discharger has proper pH controls in place, the pH for the Facility's influent varies due to the nature of municipal sewage, which provides the basis for the discharge to have a reasonable potential to cause or contribute to an in-stream excursion above the Basin Plan's numeric objective for pH in the receiving water. Therefore, WQBELs for pH are required in this Order.

(c) WQBELs. An effluent limitation for pH of 6.5 as an instantaneous minimum is included in this Order based on protection of the Basin Plan objective for pH. Order R5-2007-0133-01 included a more stringent instantaneous maximum pH limitation of 8.0 based on a 30 July 2007 request from the Discharger. Data collected over the term of Order R5-2007-0133-01 indicate that pH of the effluent was consistently below 8.0. Therefore, consistent with Order R5-2007-0133-01, this Order establishes a more stringent instantaneous maximum pH limitation of 8.0.

(d) Plant Performance and Attainability. The effluent pH ranged from 6.1 to 7.9. The effluent pH was observed below the instantaneous minimum effluent limitation only twice based on 1,547 samples collected between January 2008 and May 2012. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

xi. Total Trihalomethanes

(a) WQO. DPH has adopted a Primary MCL for total trihalomethanes of 80 µg/L, which is protective of the Basin Plan's chemical constituent objective. Total trihalomethanes include bromoform, chloroform, chlorodibromomethane, and dichlorobromomethane.

(b) RPA Results. Chloroform concentrations are often used as an indication of total trihalomethane concentrations. The MEC for chloroform was 160 µg/L based on five samples collected between January 2008 and May 2012 (MDL 0.17 µg/L, RL 0.5 µg/L). Bromoform was not detected in the effluent based on five samples collected between January 2008 and May 2012 (MDL 0.13 µg/L, RL 2 µg/L). The MECs for chlorodibromomethane and dichlorobromomethane were 0.82 µg/L (MDL 0.37 µg/L, RL 0.5 µg/L) and 10 µg/L (minimum MDL 0.067 µg/L, RL 0.5 µg/L), respectively. Thus, the MEC sum of the four CTR constituents is 173 µg/L, which is greater than the primary MCL for total trihalomethanes of 80 µg/L. No total trihalomethanes were detected in the upstream receiving water based on four samples collected between January 2008 and May 2012. Based on the total trihalomethanes detected in the discharge, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the Primary MCL.

(c) WQBELs. This Order contains an AMEL for total trihalomethanes of 80 µg/L based on the Basin Plan's narrative chemical constituents objective for protection of the MUN beneficial use.

(d) Plant Performance and Attainability. Analysis of the effluent data shows that the MEC for chloroform of 160 µg/L is greater than the applicable WQBEL. The Discharger submitted a 20 August 2013 Infeasibility Analysis documenting the compliance strategy for meeting the final effluent limits for chlorodibromomethane. Therefore, a compliance time schedule of 1 March 2018 for compliance with the chlorodibromomethane effluent limitations is established in TSO R5-2013-0147.

xii. Zinc

(a) WQO. The CTR includes hardness dependent criteria for the protection of freshwater aquatic life for zinc. These criteria for zinc are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentrations to total concentrations. Default USEPA translators were used in this Order.

(b) RPA Results. Section IV.C.2.e of this Fact Sheet includes procedures for conducting the RPA for zinc. Based on the lowest observed upstream receiving water hardness of 81 mg/L (as $CaCO_3$), the applicable total recoverable criteria for evaluating the ambient background concentration

are both 100 µg/L for the acute and chronic criteria. The maximum observed upstream receiving water zinc concentration was 4.4 µg/L (MDL 1 µg/L, RL 1 µg/L). Based on this data, the maximum ambient background zinc concentration does not exceed the applicable CTR criteria.

As discussed in Section IV.C.2.e for comparing the MEC to the criteria, the reasonable worst-case downstream ambient hardness should be used. Based on a hardness of 42 mg/L (as $CaCO_3$), the applicable total recoverable criteria are both 57 µg/L for the acute and chronic criteria. The MEC for zinc (total recoverable) was 170 µg/L, based on 54 samples collected by the Discharger between January 2008 and May 2012. Therefore, zinc in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of aquatic life.

(c) WQBELs. This Order contains a final AMEL and MDEL for zinc of 42 µg/L and 57 µg/L, respectively, based on the CTR criterion for the protection of aquatic life.

(d) Plant Performance and Attainability. Analysis of the effluent data shows that the MEC of 170 µg/L is greater than the applicable WQBELs. TSO R5-2011-0909 provides a compliance schedule to achieve compliance with the final effluent limitations for zinc by 1 March 2015. TSO R5-2011-0909 was amended to reference this Order

4. WQBEL Calculations

a. This Order includes WQBELs for ammonia, BOD_5, chlorine residual, chlorodibromomethane, copper, cyanide, dichlorobromomethane, mercury, nitrate plus nitrite, pH, total coliform organisms, total trihalomethanes, TSS, and zinc. The general methodology for calculating WQBELs based on the different criteria/objectives is described in subsections IV.C.4.b through e, below. See Attachment H for the WQBEL calculations.

b. Effluent Concentration Allowance. For each water quality criterion/objective, the ECA is calculated using the following steady-state mass balance equation from Section 1.4 of the SIP:

$$ECA = C + D(C - B) \quad \text{where } C>B, \text{ and}$$
$$ECA = C \quad \text{where } C \leq B$$

where:

ECA = effluent concentration allowance
D = dilution credit
C = the priority pollutant criterion/objective
B = the ambient background concentration.

According to the SIP, the ambient background concentration (B) in the equation above shall be the observed maximum with the exception that an ECA calculated from a priority pollutant criterion/objective that is intended to protect human health from carcinogenic effects shall use the arithmetic mean concentration of the ambient background samples. For ECAs based on MCLs, which implement the Basin Plan's chemical constituents objective and are applied as annual averages, an arithmetic mean is also used for B due to the long-term basis of the criteria.

c. **Basin Plan Objectives and MCLs.** For WQBELs based on site-specific numeric Basin Plan objectives or MCLs, the effluent limitations are applied directly as the ECA as either an MDEL, AMEL, or average annual effluent limitations, depending on the averaging period of the objective.

d. **Aquatic Toxicity Criteria.** WQBELs based on acute and chronic aquatic toxicity criteria are calculated in accordance with Section 1.4 of the SIP. The ECAs are converted to equivalent long-term averages (i.e., LTA_{acute} and $LTA_{chronic}$) using statistical multipliers and the lowest LTA is used to calculate the AMEL and MDEL using additional statistical multipliers.

e. **Human Health Criteria.** WQBELs based on human health criteria, are also calculated in accordance with Section 1.4 of the SIP. The ECAs are set equal to the AMEL and a statistical multiplier was used to calculate the MDEL.

$$AMEL = mult_{AMEL}\left[\min\left(\overbrace{M_A ECA_{acute}}^{LTA_{acute}}, M_C ECA_{chronic}\right)\right]$$

$$MDEL = mult_{MDEL}\left[\min\left(M_A ECA_{acute}, \underbrace{M_C ECA_{chronic}}_{LTA_{chronic}}\right)\right]$$

$$MDEL_{HH} = \left(\frac{mult_{MDEL}}{mult_{AMEL}}\right) AMEL_{HH}$$

where:
$mult_{AMEL}$ = statistical multiplier converting minimum LTA to AMEL
$mult_{MDEL}$ = statistical multiplier converting minimum LTA to MDEL
M_A = statistical multiplier converting acute ECA to LTA_{acute}
M_C = statistical multiplier converting chronic ECA to $LTA_{chronic}$

Summary of Water Quality-Based Effluent Limitations
Discharge Point No. 001

Table F-11. Summary of Water Quality-Based Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Conventional Pollutants						
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	10	15	30	--	--
	lbs/day[1]	60	90	180	--	--
pH	standard units	--	--	--	6.5	8.0
Total Suspended Solids	mg/L	10	15	30	--	--
	lbs/day[1]	60	90	180	--	--
Priority Pollutants						
Chlorodibromomethane	µg/L	0.41	--	0.82	--	--
Copper, Total Recoverable	µg/L	3.9	--	6.2	--	--
Cyanide, Total (as CN)	µg/L	4.2	--	8.8	--	--
Dichlorobromomethane	µg/L	0.56	--	1.4	--	--
Mercury, Total Recoverable	lbs/month	0.0016[2]	--	--	--	--
Zinc, Total Recoverable	µg/L	42	--	57	--	--
Non-Conventional Pollutants						
Ammonia Nitrogen, Total (as N)	mg/L	2.3	--	5.5	--	--
	lbs/day[1]	14	--	33	--	--
Chlorine, Total Residual	mg/L	--	0.011[3]	0.019[4]	--	--
Nitrate Plus Nitrite (as N)	mg/L	10	--	--	--	--
Total Coliform Organisms	MPN/100 mL	--	2.2[5]	23[6]	--	240
Total Trihalomethanes[7]	µg/L	80	--	--	--	--

1 Mass-based effluent limitations are based on a permitted average dry weather flow of 0.71 MGD.
2 The total monthly mass discharge of total mercury shall not exceed 0.0016 lbs/month.
3 Applied as a 4-day average effluent limitation.
4 Applied as a 1-hour average effluent limitation.
5 Applied as a 7-day median effluent limitation.
6 Not to be exceeded more than once in any 30-day period.
7 Applies to the sum of bromoform, chlorodibromomethane, chloroform, and dichlorobromomethane.

5. Whole Effluent Toxicity (WET)

For compliance with the Basin Plan's narrative toxicity objective, this Order requires the Discharger to conduct whole effluent toxicity testing for acute and chronic toxicity, as specified in the Monitoring and Reporting Program (Attachment E section V.). This Order also contains effluent limitations for acute toxicity and requires the Discharger to implement best management practices to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity.

a. Acute Aquatic Toxicity. The Basin Plan contains a narrative toxicity objective that states, "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" (Basin Plan at page III-8.00) The Basin Plan also states that, *"…effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate…*".

For priority pollutants, the SIP dictates the procedures for conducting the RPA. Acute toxicity is not a priority pollutant. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Acute whole effluent toxicity is not a priority pollutant. Therefore, due to the site-specific conditions of the discharge, the Central Valley Water Board has used professional judgment in determining the appropriate method for conducting the RPA . USEPA's September 2010 NPDES Permit Writer's Manual, page 6-30, states, "*State implementation procedures might allow, or even require, a permit writer to determine reasonable potential through a qualitative assessment process without using available facility-specific effluent monitoring data or when such data are not available…A permitting authority might also determine that WQBELs are required for specific pollutants for all facilities that exhibit certain operational or discharge characteristics (e.g., WQBELs for pathogens in all permits for POTWs discharging to contact recreational waters).*" Although the discharge has been consistently in compliance with the acute effluent limitations, the Facility is a POTW that treats domestic wastewater containing ammonia and other acutely toxic pollutants. Acute toxicity effluent limits are required to ensure compliance with the Basin Plan's narrative toxicity objective.

USEPA Region 9 provided guidance for the development of acute toxicity effluent limitations in the absence of numeric water quality objectives for toxicity in its document titled "Guidance for NPDES Permit Issuance", dated February 1994. In section B.2. "Toxicity Requirements" (pgs. 14-15) it states that, "*In the absence of specific numeric water quality objectives for acute and chronic toxicity, the narrative criterion 'no toxics in toxic amounts' applies. Achievement of the narrative criterion, as applied herein, means that ambient waters shall not demonstrate for acute toxicity: 1) less than 90% survival, 50% of the time, based on the monthly median, or 2) less than 70% survival, 10% of the time, based on any monthly median. For chronic toxicity, ambient waters shall not demonstrate a test result of greater than 1 TUc.*" Consistent with Order R5-2007-0133-01, effluent limitations for acute toxicity have been included in this Order as follows:

> **Acute Toxicity.** Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:
>
> Minimum for any one bioassay---------- 70%
> Median for any three consecutive bioassays ---------- 90%

b. Chronic Aquatic Toxicity. Basin Plan contains a narrative toxicity objective that states, "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or*

aquatic life." (Basin Plan at page III-8.00.) Based on chronic WET testing performed by the Discharger between January 2008 and May 2012, the discharge does not have reasonable potential to cause or contribute to an in-stream excursion above of the Basin Plan's narrative toxicity objective, as shown in the table below. Chronic toxicity to green algae growth was observed once in January 2010; however, it was not observed again in subsequent chronic toxicity testing.

Table F-12. Whole Effluent Chronic Toxicity Testing Results

Date	Fathead Minnow		Water Flea		Green Algae
	Pimephales promelas		*Ceriodaphnia dubia*		*Selenastrum capricornutum*
	Survival (TUc)	Growth (TUc)	Survival (TUc)	Reproduction (TUc)	Growth (TUc)
22 January 2008	1	--	1	1	1
23 July 2008	1	1	1	1	1
21 January 2009	1	1	1	1	1
20 July 2009	1	1	1	1	1
25 January 2010	1	1	1	1	8
22 February 2010	1	1	1	1	1
26 February 2010	--	--	--	--	1
15 March 2010	--	--	--	--	1
30 March 2010	--	--	--	--	1
11 July 2010	1	1	1	1	1
25 January 2011	1	1	1	1	1
8 August 2011	1	1	1	1	1

Consistent with Order R5-2007-0133-01, the Monitoring and Reporting Program of this Order requires semi-annual chronic WET monitoring for demonstration of compliance with the narrative toxicity objective. In addition to WET monitoring, the Special Provision in section VI.C.2.a of the Order requires the Discharger to submit to the Central Valley Water Board an Initial Investigative Toxicity Reduction Evaluation (TRE) Workplan for approval by the Executive Officer, to ensure the Discharger has a plan to immediately move forward with the initial tiers of a TRE, in the event effluent toxicity is encountered in the future. The provision also includes a numeric toxicity monitoring trigger, requirements for accelerated monitoring, and requirements for TRE initiation if toxicity is demonstrated.

Numeric chronic WET effluent limitations have not been included in this Order. The SIP contains implementation gaps regarding the appropriate form and implementation of chronic toxicity limits. This has resulted in the petitioning of a NPDES permit in the Los Angeles Region[1] that contained numeric chronic

[1] In the Matter of the Review of Own Motion of Waste Discharge Requirements Order Nos. R4-2002-0121 [NPDES No. CA0054011] and R4-2002-0123 [NPDES NO. CA0055119] and Time Schedule Order Nos. R4-2002-0122 and R4-2002-0124 for Los Coyotes and Long Beach Wastewater Reclamation Plants Issued by the California Regional Water Quality Control Board, Los Angeles Region SWRCB/OCC FILES A-1496 AND 1496(a)

toxicity effluent limitations. To address the petition, the State Water Board adopted WQO 2003-012 directing its staff to revise the toxicity control provisions in the SIP. The State Water Board states the following in WQO 2003-012, "*In reviewing this petition and receiving comments from numerous interested persons on the propriety of including numeric effluent limitations for chronic toxicity in NPDES permits for publicly-owned treatment works that discharge to inland waters, we have determined that this issue should be considered in a regulatory setting, in order to allow for full public discussion and deliberation. We intend to modify the SIP to specifically address the issue. We anticipate that review will occur within the next year. We therefore decline to make a determination here regarding the propriety of the final numeric effluent limitations for chronic toxicity contained in these permits."* The process to revise the SIP is currently underway. Proposed changes include clarifying the appropriate form of effluent toxicity limits in NPDES permits and general expansion and standardization of toxicity control implementation related to the NPDES permitting process. Since the toxicity control provisions in the SIP are under revision it is infeasible to develop numeric effluent limitations for chronic toxicity. Therefore, this Order requires that the Discharger meet best management practices for compliance with the Basin Plan's narrative toxicity objective, as allowed under 40 CFR 122.44(k).

To ensure compliance with the Basin Plan's narrative toxicity objective, the Discharger is required to conduct chronic WET testing, as specified in the Monitoring and Reporting Program (Attachment E section V.). Furthermore, the Special Provision contained at VI.C.2.a. of this Order requires the Discharger to investigate the causes of, and identify and implement corrective actions to reduce or eliminate effluent toxicity. If the discharge demonstrates toxicity exceeding the numeric toxicity monitoring trigger, the Discharger is required to initiate a TRE in accordance with an approved TRE workplan. The numeric toxicity monitoring trigger is not an effluent limitation; it is the toxicity threshold at which the Discharger is required to perform accelerated chronic toxicity monitoring, as well as, the threshold to initiate a TRE if effluent toxicity has been demonstrated.

D. Final Effluent Limitations

1. Mass-based Effluent Limitations

40 CFR 122.45(f)(1) requires effluent limitations be expressed in terms of mass, with some exceptions, and 40 CFR 122.45(f)(2) allows pollutants that are limited in terms of mass to additionally be limited in terms of other units of measurement. This Order includes effluent limitations expressed in terms of mass and concentration. In addition, pursuant to the exceptions to mass limitations provided in 40 CFR 122.45(f)(1), some effluent limitations are not expressed in terms of mass, such as pH and temperature, and when the applicable standards are expressed in terms of concentration (e.g., CTR criteria and MCLs) and mass limitations are not necessary to protect the beneficial uses of the receiving water.

Mass-based effluent limitations have been established in this Order for ammonia, BOD_5, and TSS because they are oxygen-demanding substances. A mass-based effluent limitation has been established for mercury because it is a bioaccumulative pollutant. Mass-based effluent limitations were calculated based upon the design flow (average dry weather flow) permitted in section IV.A.1.f of this Order. Except for the pollutants listed above, mass-based effluent limitations are not included in this Order for pollutant parameters for which effluent limitations are based on water quality objectives and criteria that are concentration-based.

2. Averaging Periods for Effluent Limitations

40 CFR 122.45 (d) requires average weekly and average monthly discharge limitations for POTWs unless impracticable. However, for toxic pollutants and pollutant parameters in water quality permitting, USEPA recommends the use of an MDEL in lieu of average weekly effluent limitations for two reasons. "*First, the basis for the 7-day average for POTWs derives from the secondary treatment requirements. This basis is not related to the need for assuring achievement of water quality standards. Second, a 7-day average, which could comprise up to seven or more daily samples, could average out peak toxic concentrations and therefore the discharge's potential for causing acute toxic effects would be missed.*" (TSD, pg. 96) This Order uses MDELs in lieu of average weekly effluent limitations for ammonia, chlorodibromomethane, copper, cyanide, dichlorobromomethane, and zinc as recommended by the TSD for the achievement of water quality standards and for the protection of the beneficial uses of the receiving stream. Furthermore, for BOD_5, chlorine residual, pH, total coliform organisms, and TSS, weekly average effluent limitations have been replaced or supplemented with effluent limitations utilizing shorter averaging periods. The rationale for using shorter averaging periods for these constituents is discussed in section IV.C.3 of this Fact Sheet.

For effluent limitations based on Primary and Secondary MCLs, except nitrate and nitrite, this Order includes annual average effluent limitations. The Primary and Secondary MCLs are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis (except for nitrate and nitrite), when sampling at least quarterly. Since it is necessary to determine compliance on an annual average basis, it is impracticable to calculate average weekly and average monthly effluent limitations.

3. Satisfaction of Anti-Backsliding Requirements

The CWA specifies that a revised permit may not include effluent limitations that are less stringent than the previous permit unless a less stringent limitation is justified based on exceptions to the anti-backsliding provisions contained in CWA sections 402(o) or 303(d)(4), or, where applicable, 40 CFR 122.44(l).

The effluent limitations in this Order are at least as stringent as the effluent limitations in Order R5-2007-0133-01, with the exception of effluent limitations for aluminum, diazinon, 2,6-dinitrotoluene, 1,2-diphenylhydrazine, electrical

conductivity, iron, manganese, settleable solids, silver, tetrachloroethylene, and turbidity. The effluent limitations for these pollutants are less stringent than those in Order R5-2007-0133-01 as described below. This relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

a. **CWA sections 402(o)(1) and 303(d)(4).** CWA section 402(o)(1) specifies that, in the case of effluent imitations established on the basis of CWA section 301(b)(1)(C) (i.e., WQBELs), a permit may not be renewed, reissued, or modified to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit except in compliance with CWA section 303(d)(4). The effluent limitations for aluminum, diazinon, 2,6-dinitrotoluene, 1,2-diphenylhydrazine, electrical conductivity, iron, manganese, settleable solids, silver, and tetrachloroethylene established in Order R5-2007-0133-01 are WQBELs and may be relaxed if the requirements of CWA section 303(d)(4) are satisfied.

   CWA section 303(d)(4) has two parts: paragraph (A) which applies to nonattainment waters and paragraph (B) which applies to attainment waters. For attainment waters, CWA section 303(d)(4)(B) specifies that a limitation based on a water quality standard may be relaxed where the action is consistent with the antidegradation policy. The 303(d) listings for Jackson Creek, as described in section III.D.1 of this Fact Sheet, do not include aluminum, diazinon, 2,6-dinitrotoluene, 1,2-diphenylhydrazine, electrical conductivity, iron, manganese, settleable solids, silver, or tetrachloroethylene. Thus the receiving water is an attainment water for these constituents.

   The removal of the WQBELs for 1,2-diphenylhydrazinewill not result in an increase in pollutant concentration or loading, a decrease in the level of treatment or control, or a reduction of water quality. Therefore, the removal of 1,2-diphenylhydrazine WQBELs complies with antidegradation requirements and does not violate anti-backsliding requirements. The removal or relaxation of WQBELs for aluminum, diazinon, 2,6-dinitrotoluene, 1,2-diphenylhydrazine, electrical conductivity, iron, manganese, settleable solids, silver, and tetrachloroethylene is consistent with CWA sections 402(o)(1) and 303(d)(4) and, as described in section IV.D.4 of this Fact Sheet, the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution No. 68-16. Therefore, the modifications to these effluent limitations do not violate anti-backsliding requirements.

b. **CWA section 402(o)(2).** CWA section 402(o)(2) provides several exceptions to the anti-backsliding regulations. CWA 402(o)(2)(B)(i) allows a renewed, reissued, or modified permit to contain a less stringent effluent limitation for a pollutant if information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance.

As described further in section IV.C.3.b of this Fact Sheet, updated information that was not available at the time Order R5-2007-0133-01 was issued indicates that aluminum, diazinon, 2,6-dinitrotoluene, electrical conductivity, iron, manganese, settleable solids, silver, tetrachloroethylene do not exhibit reasonable potential to cause or contribute to an exceedance of water quality objectives in the receiving water. As described further in section IV.C.3.c. of this Fact Sheet, updated information that was not available at the time Order R5-2007-0133-01 was issued indicates that removal of the effluent limitations for 2,6-dinitrotoluene and 1,2-diphenylhydrazine is appropriate. The updated information that supports the relaxation of effluent limitations for these constituents includes the following:

i. **Aluminum.** Receiving water monitoring data for water quality characteristics (e.g., pH and hardness) collected between January 2008 and May 2012, as well as local environmental conditions and aluminum toxicity study results indicates that the recommend NAWQC chronic criterion of 87 µg/L is not applicable to Jackson Creek. Effluent monitoring data collected between January 2008 and May 2012 indicates that the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the Secondary MCL or NAWQC acute criterion.

ii. **Diazinon.** As described in section IV.C.3.b.ii, Order R5-2007-0133-01 established effluent limitations based on DFG acute and chronic criteria of 0.08 µg/L and 0.05 µg/L to implement the Basin Plan's narrative toxicity objective. DFG recalculated the diazinon criteria to exclude questionable toxicity test values in 2004, which was subsequently confirmed by the Central Valley Water Board in the *Basin Plan Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Diazinon and Chlorpyrifos Runoff into the Sacramento and Feather Rivers, May 2007 Final Staff Report*. Thus, the applicable acute and chronic criteria to implement the Basin Plan's narrative toxicity objective for diazinon are 0.16 µg/L and 0.10 µg/L, respectively. Effluent and receiving water monitoring data collected between January 2008 and May 2012 indicates that diazinon in the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the Basin Plan's narrative toxicity objective.

iii. **Electrical Conductivity.** Effluent and receiving water monitoring data collected between January 2008 and May 2012 indicates that electrical conductivity in the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of water quality objectives for salinity.

iv. **Iron.** Effluent monitoring data collected between January 2008 and May 2012 indicates that iron in the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the Secondary MCL.

v. **Manganese.** Effluent monitoring data collected between January 2008 and May 2012 indicates that iron in the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the Secondary MCL.

vi. **Settleable Solids.** Effluent monitoring data collected between January 2008 and May 2012 for settleable solids indicates that the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the Basin Plan narrative objective for settleable solids.

vii. **Silver.** Effluent and receiving water monitoring data collected between January 2008 and May 2012 indicates that silver in the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the CTR aquatic life criterion.

viii. **Tetrachloroethylene.** Effluent and receiving water monitoring data collected between January 2008 and May 2012 indicates that tetrachloroethylene in the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the CTR human health criterion.

ix. **2,6-dinitrotoluene.** From samples collected between January 2008 and May 2012 indicates that 2,6-dinitrotoluene in the discharge does not exhibit reasonable potential to cause or contribute to an exceedance of the USEPA Integrated Risk Information System (IRIS) and USEPA suggested no-adverse-response level (SNARL) for one-in-a-million incremental cancer risk estimates for drinking water.

x. **1,2-diphenylhydrazine.** From 53 effluent and 4 receiving water samples collected between January 2008 and May 2012, 1,2-diphenylhydrazine was detected but not quantified in the effluent with a minimum MDL of 0.5 µg/L and was not detected in the receiving water with a minimum MDL of 1 µg/L. As detailed in section IV.C.3 of this Fact Sheet, estimated values, especially for volatile or semi-volatile organics such as 1,2-diphenylhydrazine, are false-positives due to possible matrix interferences during the analytical procedure, and therefore, the Central Valley Water Board consider the data inappropriate to determine whether concentrations in the effluent exceed the CTR criterion. However, the CTR criterion for 1,2-diphenylhydrazine is 0.040 µg/L, which is below the MDLs. Therefore, in accordance with the SIP section 1.3, Step 8, since the lowest MDL for the samples is greater than the CTR water quality criterion, monitoring is required in place of WQBELs. The removal of the WQBELs will not result in an increase in the pollutant concentration or loading, a decrease in the level of treatment or control, or a reduction of water quality.

Thus, removal or relaxation of the effluent limitations for aluminum, diazinon, electrical conductivity, iron, manganese, settleable solids, silver, tetrachloroethylene, 2,6-dinitrotoluene, and 1,2-diphenylhydrazine from Order R5-2007-0133-01 is in accordance with CWA section 402(o)(2)(B)(i), which allows for the removal of effluent limitations based on information that was not available at the time of permit issuance.

c. **Turbidity.** Order R5-2007-0133-01 contained effluent limitations for turbidity. The prior limitations were solely an operational check to ensure the treatment

system was functioning properly and could meet the limits for solids and coliform. The prior effluent limitations were not intended to regulate turbidity in the receiving water. Rather, turbidity is an operational parameter to determine proper system functioning and not a WQBEL.

This Order contains operational turbidity specifications to be met in lieu of effluent limitations. The revised Order does not include effluent limitations for turbidity. However, the performance-based specification in this Order is an equivalent limit that is not less stringent, and therefore does not constitute backsliding.

The revised operational specifications for turbidity are the same as the effluent limitations in Order R5-2007-0133-01. These revisions are consistent with State regulations implementing recycled water requirements. The revision in the turbidity limitation is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution 68-16 because this Order imposes equivalent or more stringent requirements than Order R5-2007-0133-01 and therefore does not allow degradation.

4. Satisfaction of Antidegradation Policy

This Order does not allow for an increase in flow or mass of pollutants to the receiving water. Therefore, a complete antidegradation analysis is not necessary. The Order requires compliance with applicable federal technology-based standards and with WQBELs where the discharge could have the reasonable potential to cause or contribute to an exceedance of water quality standards. The permitted discharge is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution No. 68-16. Compliance with these requirements will result in the use of best practicable treatment or control of the discharge. The impact on existing water quality will be insignificant.

This Order removes or relaxes existing effluent limitations for aluminum, diazinon, 2,6-dinitrotoluene, 1,2-diphenylhydrazine, electrical conductivity, iron, manganese, settleable solids, silver, tetrachloroethylene, and turbidity based on updated monitoring data which demonstrates that the effluent does not cause or contribute to an exceedance of the applicable water quality criteria or objectives in the receiving water. The Central Valley Water Board finds that the relaxation of the effluent limitations does not result in an allowed increase in pollutants or any additional degradation of the receiving water. Thus, the relaxation of effluent limitations is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution No. 68-16.

5. Stringency of Requirements for Individual Pollutants

This Order contains both technology-based effluent limitations and WQBELs for individual pollutants. The technology-based effluent limitations consist of restrictions on flow and percent removal requirements for BOD_5 and TSS. The WQBELs consist of restrictions on ammonia, BOD_5, chlorine residual, chlorodibromomethane,

copper, cyanide, dichlorobromomethane, mercury, nitrate plus nitrite, pH, total coliform organisms, total trihalomethanes, TSS, and zinc. This Order's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. In addition, this Order includes effluent limitations for BOD_5, total coliform organisms, and TSS to meet numeric objectives or protect beneficial uses.

WQBELs have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. To the extent that toxic pollutant WQBELs were derived from the CTR, the CTR is the applicable standard pursuant to 40 CFR 131.38. The scientific procedures for calculating the individual WQBELs for priority pollutants are based on the CTR-SIP, which was approved by USEPA on 18 May 2000. All beneficial uses and water quality objectives contained in the Basin Plan were approved under state law and submitted to and approved by USEPA prior to 30 May 2000. Any water quality objectives and beneficial uses submitted to USEPA prior to 30 May 2000, but not approved by USEPA before that date, are nonetheless "applicable water quality standards for purposes of the CWA" pursuant to 40 CFR 131.21(c)(1). Collectively, this Order's restrictions on individual pollutants are no more stringent than required to implement the requirements of the CWA.

Summary of Final Effluent Limitations
Discharge Point No. 001

Table F-13. Summary of Final Effluent Limitations

Parameter	Units	Effluent Limitations					Basis[1]
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum	
Average Dry Weather Flow	MGD	--	--	0.71	--	--	DC
Conventional Pollutants							
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	10	15	30	--	--	TTC
	lbs/day[2]	60	90	180	--	--	
	% Removal	85	--	--	--	--	CFR
pH	standard units	--	--	--	6.5	8.0	BP, DC
Total Suspended Solids	mg/L	10	15	30	--	--	TTC
	lbs/day[2]	60	90	180	--	--	
	% Removal	85	--	--	--	--	CFR
Priority Pollutants							
Chlorodibromomethane	µg/L	0.41	--	0.82	--	--	CTR
Copper, Total Recoverable	µg/L	3.9	--	6.2	--	--	CTR
Cyanide, Total (as CN)	µg/L	4.2	--	8.8	--	--	CTR
Dichlorobromomethane	µg/L	0.56	--	1.4	--	--	CTR
Mercury, Total Recoverable	lbs/month	0.0016[3]	--	--	--	--	PB

Parameter	Units	Effluent Limitations					Basis[1]
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum	
Zinc, Total Recoverable	µg/L	42	--	57	--	--	CTR
Non-Conventional Pollutants							
Ammonia Nitrogen, Total (as N)	mg/L	2.3	--	5.5	--	--	NAWQC
	lbs/day[2]	14	--	33	--	--	
Chlorine, Total Residual	mg/L	--	0.011[4]	0.019[5]	--	--	NAWQC
Nitrate Plus Nitrite (as N)	mg/L	10	--	--	--	--	MCL
Total Coliform Organisms	MPN/100 mL	--	2.2[6]	23[7]	--	240	Title 22
Total Trihalomethanes[8]	µg/L	80	--	--	--	--	MCL
Acute Toxicity	% Survival	--	--	[9]	--	--	BP

[1] DC – Based on the design capacity of the Facility.
TTC – Based on tertiary treatment capability. These effluent limitations reflect the capability of a properly operated tertiary treatment plant.
CFR – Based on secondary treatment standards contained in 40 CFR Part 133.
BP – Based on water quality objectives contained in the Basin Plan.
CTR – Based on water quality criteria contained in the California Toxics Rule and applied as specified in the SIP.
PB – Based on treatment plant performance.
NAWQC – Based on USEPA's National Ambient Water Quality Criteria for the protection of freshwater aquatic life.
MCL – Based on the Primary Maximum Contaminant Level.
Title 22 – Based on CA Department of Public Health Reclamation Criteria, CCR, Division 4, Chapter 3 (Title 22).

[2] Mass-based effluent limitations are based on a permitted average dry weather flow of 0.71 MGD.

[3] The total monthly mass discharge of total mercury shall not exceed 0.0016 lbs/month.

[4] Applied as a 4-day average effluent limitation.

[5] Applied as a 1-hour average effluent limitation.

[6] Applied as a 7-day median effluent limitation.

[7] Not to be exceeded more than once in any 30-day period.

[8] Applies to the sum of bromoform, chlorodibromomethane, chloroform, and dichlorobromomethane.

[9] Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:
Minimum for any one bioassay: 70%
Median for any three consecutive bioassays: 90%

E. Interim Effluent Limitations – Not Applicable

F. Land Discharge Specifications – Not Applicable

G. Reclamation Specifications – Not Applicable

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

Basin Plan water quality objectives to protect the beneficial uses of surface water and groundwater include numeric objectives and narrative objectives, including objectives for chemical constituents, toxicity, and tastes and odors. The toxicity objective requires that surface water and groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, animals, or aquatic life. The chemical constituent objective requires that surface water and groundwater shall

not contain chemical constituents in concentrations that adversely affect any beneficial use or that exceed the MCLs in Title 22, CCR. The tastes and odors objective states that surface water and groundwater shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses. The Basin Plan requires the application of the most stringent objective necessary to ensure that surface water and groundwater do not contain chemical constituents, toxic substances, radionuclides, or taste and odor producing substances in concentrations that adversely affect domestic drinking water supply, agricultural supply, or any other beneficial use.

A. Surface Water

1. CWA section 303(a-c), requires states to adopt water quality standards, including criteria where they are necessary to protect beneficial uses. The Central Valley Water Board adopted water quality criteria as water quality objectives in the Basin Plan. The Basin Plan states that "[t]*he numerical and narrative water quality objectives define the least stringent standards that the Regional Water Board will apply to regional waters in order to protect the beneficial uses.*" The Basin Plan includes numeric and narrative water quality objectives for various beneficial uses and water bodies. This Order contains receiving surface water limitations based on the Basin Plan numerical and narrative water quality objectives for bacteria, biostimulatory substances, color, chemical constituents, dissolved oxygen, floating material, oil and grease, pH, pesticides, radioactivity, suspended sediment, settleable substances, suspended material, tastes and odors, temperature, toxicity, and turbidity.

a. pH. Order R5-2007-0133-01 established a receiving water limitation for pH specifying that discharges from the Facility shall not cause the ambient pH to change by more than 0.5 units based on the water quality objective for pH in the Basin Plan, and allowed a 1-month averaging period for calculating pH change. The Central Valley Water Board adopted Resolution No. R5-2007-0136 on 25 October 2007, amending the Basin Plan to delete the portion of the pH water quality objective that limits the change in pH to 0.5 units and the allowance of averaging periods for pH. The Basin Plan amendment has been approved by the State Water Board, the Office of Administrative Law, and USEPA. Consistent with the revised water quality objective in the Basin Plan, this Order does not require a receiving water limitation for pH change.

In Finding No. 14 of Resolution No. R5-2007-0136, the Central Valley Water Board found that the change in the pH receiving water objective is consistent with the State Water Board Resolution No. 68-16, in that the changes to water quality objectives (i) consider maximum benefit to the people of the State, (ii) will not unreasonably affect present and anticipated beneficial use of waters, and (iii) will not result in water quality less than that prescribed in policies, and is consistent with the federal Antidegradation Policy (40 CFR 131.12).

Ammonia is the only constituent in the discharge regulated by this Order directly related to pH. The fixed ammonia effluent limitations in this Order are based on reasonable worse-case conditions. Although ammonia criteria are based on pH,

and the pH receiving water limitations are more lenient in this Order than in the previous permit, the fixed ammonia limits were developed to protect under worse-case pH conditions. Therefore the relaxation of the pH receiving water limitation will protect aquatic life and other beneficial uses and will not unreasonably affect present and anticipated beneficial uses nor result in water quality less than described in applicable policies. The relaxation of the receiving water limitation is not expected to cause other impacts on water quality. The Central Valley Water Board finds that the relaxation of the pH receiving water limitation (i) is to the maximum benefit to the people of the State, (ii) will not unreasonably affect present and anticipated beneficial use of waters, and (iii) will not result in water quality less than that prescribed in policies, and is consistent with the federal Antidegradation Policy (40 CFR 131.12).

The revised receiving water limitation for pH, which is based on the amendment to the Basin Plan's pH water quality objective, reflects current scientifically supported pH requirements for the protection of aquatic life and other beneficial uses. The revised receiving water limitation for pH is more consistent with the current USEPA recommended criteria and is fully protective of aquatic life and the other beneficial uses listed in the Basin Plan. Changes in pH when pH is maintained within the range of 6.5 to 8.5 are neither beneficial nor adverse and, therefore, are not considered to be degradation in water quality. Attempting to restrict pH changes to 0.5 pH units would incur substantial costs without demonstrable benefits to beneficial uses. Thus, any changes in pH that would occur under the revised pH limitation would not only be protective of beneficial uses, but also would be consistent with maximum benefit to people of the State. Therefore the proposed amendment will not violate antidegradation policies.

b. Turbidity. Order R5-2007-0133-01 established a receiving water limitation for turbidity specifying that discharges from the Facility shall not cause the turbidity to increase more than 1 NTU where natural turbidity is between 0 and 5 NTU based on the water quality objective for turbidity in the Basin Plan. The Central Valley Water Board adopted Resolution R5-2007-0136 on 25 October 2007, amending the Basin Plan to limit turbidity to 2 NTU when the natural turbidity is less than 1 NTU. The Basin Plan amendment has been approved by the State Water Board, the Office of Administrative Law, and USEPA. Consistent with the revised water quality objective in the Basin Plan, this Order limits turbidity to 2 NTU when the natural turbidity is less than 1 NTU.

In Finding No. 14 of Resolution R5-2007-0136 the Central Valley Water Board found that the change in the turbidity receiving water objective is consistent with the State Water Board Resolution No. 68-16, in that the changes to water quality objectives (i) consider maximum benefit to the people of the State, (ii) will not unreasonably affect present and anticipated beneficial use of waters, and (iii) will not result in water quality less than that prescribed in policies, and is consistent with the federal Antidegradation Policy (40 CFR 131.12).

This Order includes operational specifications that require the Discharger to operate the treatment system to insure that turbidity shall not exceed 2 NTU as a

daily average, and 5 NTU more than 5 percent of the time within a 24 hour period, and 10 NTU, at any time. Because this Order limits the average daily discharge of turbidity to 2 NTU, the Order will be protective of the receiving water under all natural background conditions as defined in the Basin Plan's revised water quality objective for turbidity. The relaxation of the turbidity receiving water limitation will protect aquatic life and other beneficial uses and will not unreasonably affect present and anticipated beneficial uses nor result in water quality less than described in applicable policies. The relaxation of the receiving water limitation is not expected to cause other impacts on water quality. The Central Valley Water Board finds that the relaxation of the turbidity receiving water limitation is to the maximum benefit to the people of the State, (ii) will not unreasonably affect present and anticipated beneficial use of waters, and (iii) will not result in water quality less than that prescribed in policies, and is consistent with the federal Antidegradation Policy (40 CFR 131.12).

The revised receiving water limitation for turbidity, which is based on the amendment to the Basin Plan's turbidity water quality objective, reflects current scientifically supported turbidity requirements for the protection of aquatic life and other beneficial uses and, therefore, will be fully protective of aquatic life and the other beneficial uses listed in the Basin Plan. Changes in turbidity allowed by the revised receiving water limitation, when ambient turbidity is below 1 NTU, would not adversely affect beneficial uses and would maintain water quality at a level higher than necessary to protect beneficial uses. Restricting low-level turbidity changes further may require costly upgrades, which would not provide any additional protection of beneficial uses. Thus, any changes in turbidity that would occur under the amended turbidity receiving water limitation would not only be protective of beneficial uses, but also would be consistent with maximum benefit to people of the State. Therefore, the relaxed receiving water limitations for turbidity will not violate antidegradation policies.

B. Groundwater – Not Applicable

VI. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

40 CFR 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. Water Code sections 13267 and 13383 authorize the Regional Water Boards to require technical and monitoring reports. The Monitoring and Reporting Program (Attachment E) of this Order, establishes monitoring and reporting requirements to implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in the Monitoring and Reporting Program for the Facility.

A. Influent Monitoring

1. Influent monitoring is required to collect data on the characteristics of the wastewater and to assess compliance with effluent limitations (e.g., BOD_5 and TSS reduction requirements). The monitoring frequencies for flow (continuous), BOD_5 (weekly), and TSS (weekly) have been retained from Order R5-2007-0133-01.

B. Effluent Monitoring

1. Pursuant to the requirements of 40 CFR 122.44(i)(2) effluent monitoring is required for all constituents with effluent limitations. Effluent monitoring is necessary to assess compliance with effluent limitations, assess the effectiveness of the treatment process, and to assess the impacts of the discharge on the receiving stream and groundwater.

2. Effluent monitoring frequencies and sample types for flow (continuous), BOD_5 (twice per week), pH (twice per week), TSS (twice per week), copper (monthly), cyanide (monthly), dichlorobromomethane (monthly), mercury (quarterly), zinc (monthly), ammonia (twice per week), chlorine residual (continuous), temperature (twice per week), total coliform organisms (three times per week), total dissolved solids (quarterly), and turbidity (continuous) have been retained from Order R5-2007-0133-01 to determine compliance with effluent limitations for these parameters, where applicable, and to characterize the effluent.

3. Monitoring data collected over the term of Order R5-2007-0133-01 for silver, tetrachloroethylene, aluminum, diazinon, iron, manganese, methyl tertiary butyl ether, 2,3,7,8-TCDD and other dioxin and furan congeners and settleable solids did not demonstrate reasonable potential to exceed water quality objectives/criteria. Thus, specific monitoring requirements for these parameters have not been retained from Order R5-2007-0133-01.

4. Section 3 of the SIP states for minor dischargers to *"monitor its effluent for the presence of the 17 [2,3,7,8-TCDD] congeners once during dry weather and once during wet weather for one year during the three-year period."* Section 3 of the SIP further states that *"Based on the monitoring results, the RWQCB may, at its discretion, increase the monitoring requirement (e.g., increase sampling frequency) to further investigate frequent or significant detection of any congener. At the conclusion of the three-year monitoring period, the SWQCB and RWQCBs will assess the data (a total of six samples each from major POTWs and industrial dischargers, and a total of two from each minor POTWs and industrial dischargers), and determine whether further monitoring is necessary."* The Discharger was able to collect a valid sample during both the wet and dry season from the seven samples collected during the last permit term. Plus, the Discharger collected four quarterly 2,3,7,8-TCDD congener samples from the effluent and receiving water in 2002. The Discharger has meet the requirements of SIP section 2.4.5.1 and is not required to further monitor for the 17 2,3,7,8-TCDD congeners.

5. Monitoring data collected over the term of Order R5-2007-0133-01 for chlorodibromomethane and total trihalomethanes indicates that the discharge has reasonable potential to cause or contribute to an exceedance of water quality objectives/criteria and effluent limitations have been established in this Order. Therefore, this Order establishes monthly monitoring for chlorodibromomethane and total trihalomethanes to determine compliance with the applicable effluent limitations.

6. Order R5-2007-0133-01 required monthly monitoring for 1,2-diphenylhydrazine. As described in section IV.C.3.c of this Fact Sheet, since the lowest MLs from the SIP for carbon tetrachloride and 1,2-diphenylhydrazine are greater than the applicable CTR criteria, the SIP requires (Section 1.3, Step 8) additional monitoring for the pollutant in place of a WQBEL. This Order requires monitoring for carbon tetrachloride and 1,2-diphenylhydrazine quarterly during the same year (third year of the permit term) as the priority pollutant monitoring required in Attachment I of this Order.

7. As described in section IV.C.3.c.iii. of this Fact Sheet, since an additional bis (2-ethylhexyl) phthalate sample analyzed by a laboratory specializing in low-level analysis indicated that effluent concentrations were below the applicable CTR criteria, the data collected was determined to be inconclusive and a WQBEL was not established. The SIP requires (Section 1.3, Step 8) additional monitoring for the pollutant in place of a WQBEL. This Order requires monitoring for bis (2-ethylhexyl) phthalate quarterly during the same year (third year of the permit term) as the priority pollutant monitoring required in Attachment I of this Order.

8. This Order reduces the monitoring frequency for electrical conductivity from twice per week to weekly. The Central Valley Water Board finds that this frequency will provide sufficient information to monitor the performance of the Facility.

9. Order R5-2007-0133-01 established an effluent limitation and monthly monitoring requirements for nitrate (as NO_3). This Order replaces the effluent limitation for nitrate (as NO_3) with an equivalent limitation for nitrate plus nitrite (as N). Therefore, this Order discontinues monitoring requirements for nitrate (as NO_3) and establishes monthly monitoring for nitrate and nitrite (as N).

10. This Order establishes monthly monitoring for hardness to ensure that adequate data is available to properly adjust water quality criteria for hardness-based metals.

11. Priority pollutant data for the effluent has been provided by the Discharger over the term of Order R5-2007-0133-01 and was used to conduct an RPA. In accordance with Section 1.3 of the SIP, periodic monitoring for priority pollutants for which criteria or objectives apply and for which no effluent limitations have been established is required. Consistent with Order R5-2007-0133-01, this Order requires monitoring quarterly during the third year of the permit term in order to collect data to conduct an RPA for the next permit renewal. See Attachment I for more detained requirements related to performing priority pollutant monitoring.

12. California Water Code section 13176, subdivision (a), states: "T*he analysis of any material required by [Water Code sections 13000-16104] shall be performed by a laboratory that has accreditation or certification to Article 3 (commencing with Section 100825) of Chapter 4 of Part 1 of Division 101 of the Health and Safety Code*." DPH certifies laboratories through ELAP.

Section 13176 cannot be interpreted in a manner that would violate federal holding time requirements that apply to NPDES permits pursuant to the CWA. (Wat. Code

§§ 13370, subd. (c), 13372, 13377.) Section 13176 is inapplicable to NPDES permits to the extent it is inconsistent with Clean Water Act requirements. (Wat. Code § 13372, subd. (a).) The holding time requirements are 15 minutes for chlorine residual, dissolved oxygen, and pH and immediate analysis is required for temperature. (40 CFR 136.3(e), Table II) Due to the location of the Facility, it is both legally and factually impossible for the Discharger to comply with section 13176 for constituents with short holding times.

C. Whole Effluent Toxicity Testing Requirements

1. **Acute Toxicity.** Consistent with Order R5-2007-0133-01, semi-annual 96-hour bioassay testing is required to demonstrate compliance with the effluent limitation for acute toxicity.

2. **Chronic Toxicity.** Consistent with Order R5-2007-0133-01, semi-annual chronic whole effluent toxicity testing is required in order to demonstrate compliance with the Basin Plan's narrative toxicity objective.

D. Receiving Water Monitoring

1. Surface Water

a. Receiving water monitoring is necessary to assess compliance with receiving water limitations and to assess the impacts of the discharge on the receiving stream.

b. Receiving water monitoring frequencies and sample types for upstream and downstream of Discharge Point No. 001 flow (daily, upstream only), pH (twice per week), dissolved oxygen (twice per week), electrical conductivity (twice per week), fecal coliform organisms (quarterly), hardness (quarterly), temperature (twice per week), and turbidity (twice per week) have been retained from Order R5-2007-0133-01.

c. Monitoring requirements for ammonia, chlorine residual, and radionuclides have not been retained from Order R5-2007-0133-01 as they are not necessary to determine compliance with permit requirements.

d. Priority pollutant data for the receiving water has been provided by the Discharger over the term of Order R5-2007-0133-01, and was used to conduct an RPA. In accordance with Section 1.3 of the SIP, periodic monitoring for priority pollutants for which criteria or objectives apply and for which no effluent limitations have been established. Consistent with Order R5-2007-0133-01, this Order requires monitoring quarterly during the third year of the permit term for priority pollutants and other pollutants of concern, performed concurrently with effluent monitoring, in order to collect data to conduct an RPA for the next permit renewal. See Attachment I for more detailed requirements related to performing priority pollutant monitoring.

2. Groundwater – Not Applicable

E. Other Monitoring Requirements

1. Biosolids Monitoring

Biosolids monitoring is required to ensure compliance with the biosolids disposal requirements contained in the Special Provision contained in section VI.C.6.a. of this Order. Biosolids disposal requirements are imposed pursuant to 40 CFR Part 503 to protect public health and prevent groundwater degradation.

2. Water Supply Monitoring

Water supply monitoring is required to evaluate the source of constituents in the wastewater. Consistent with Order R5-2007-0133-01, this Order requires annual water supply monitoring for electrical conductivity, standard minerals, and total dissolved solids.

3. UV Disinfection System Monitoring

UV system specifications and monitoring and reporting is required when the UV system becomes operational to ensure that adequate UV dosage is applied to the wastewater to inactivate pathogens in the wastewater. UV Disinfection system monitoring is imposed pursuant to requirements established by the California Department of Public Health (CDPH), and the National Water Research Institute (NWRI), and American Water Works Association Research Foundation NWRI/AWWARF's *"Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse."* The Central Valley Water Board recommends that the Discharger contact CDPH for a list of approved UV disinfection systems prior to procuring a UV disinfection system.

4. Effluent and Receiving Water Characterization Study

An effluent and receiving water monitoring study is required to ensure adequate information is available for the next permit renewal. During the third year of this permit term, the Discharger is required to conduct quarterly monitoring of the effluent at Monitoring Location EFF-001 and of the receiving water at Monitoring Location RSW-001 for all priority pollutants and other constituents of concern as described in Attachment I.

VII. RATIONALE FOR PROVISIONS

A. Standard Provisions

Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42, are provided in Attachment D. The discharger must comply with all standard provisions and with those additional conditions that are applicable under 40 CFR 122.42.

40 CFR 122.41(a)(1) and (b) through (n) establish conditions that apply to all State-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in the Order. 40 CFR 123.25(a)(12) allows the state to omit or modify conditions to impose more stringent requirements. In accordance with 40 CFR 123.25, this Order omits federal conditions that address enforcement authority specified in 40 CFR 122.41(j)(5) and (k)(2) because the enforcement authority under the Water Code is more stringent. In lieu of these conditions, this Order incorporates by reference Water Code section 13387(e).

B. Special Provisions

1. Reopener Provisions

a. Mercury. This provision allows the Central Valley Water Board to reopen this Order in the event mercury is found to be causing toxicity based on acute or chronic toxicity test results, or if a TMDL program is adopted. In addition, this Order may be reopened if the Central Valley Water Board determines that a mercury offset program is feasible for dischargers subject to NPDES permits.

b. Whole Effluent Toxicity. This Order requires the Discharger to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity through a TRE. This Order may be reopened to include a chronic toxicity limitation, a new acute toxicity limitation, and/or a limitation for a specific toxicant identified in the TRE. Additionally, if a numeric chronic toxicity water quality objective is adopted by the State Water Board, this Order may be reopened to include a numeric chronic toxicity limitation based on that objective.

c. Water Effects Ratio (WER) and Metal Translators. A default WER of 1.0 has been used in this Order for calculating criteria for applicable inorganic constituents. In addition, default dissolved-to-total metal translators have been used to convert water quality objectives from dissolved to total recoverable when developing effluent limitations for copper and zinc. If the Discharger performs studies to determine site-specific WERs and/or site-specific dissolved-to-total metal translators, this Order may be reopened to modify the effluent limitations for the applicable inorganic constituents.

d. 20:1 Dilution in Lake Amador. This prohibition is based on California Department of Public Health's (CDPH) recommendation that discharges from wastewater treatment plants to municipal water supplies maintain a minimum of 20:1 dilution to ensure the protection of the downstream domestic beneficial use of Jackson Creek and public health. If CDPH determines that the 20:1 dilution is no longer necessary, this Order may be reopened to remove Prohibition III.E.

2. Special Studies and Additional Monitoring Requirements

a. Chronic Whole Effluent Toxicity Requirements. The Basin Plan contains a narrative toxicity objective that states, "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*." (Basin Plan at page III-8.00.) Based on whole effluent chronic toxicity testing performed by the Discharger between January 2008 and May 2012, the discharge does not have reasonable potential to cause or contribute to an in-stream excursion above of the Basin Plan's narrative toxicity objective.

The Monitoring and Reporting Program of this Order requires chronic WET monitoring for demonstration of compliance with the narrative toxicity objective. In addition to WET monitoring, this provision requires the Discharger to submit to the Central Valley Water Board an Initial Investigative TRE Workplan for approval by the Executive Officer, to ensure the Discharger has a plan to immediately move forward with the initial tiers of a TRE, in the event effluent toxicity is encountered in the future. The provision also includes a numeric toxicity monitoring trigger, requirements for accelerated monitoring, and requirements for TRE initiation if toxicity is demonstrated.

Monitoring Trigger. A numeric toxicity monitoring trigger of **> 1** TUc (where TUc = 100/NOEC) is applied in the provision, because this Order does not allow any dilution for the chronic condition. Therefore, a TRE is triggered when the effluent exhibits toxicity at 100% effluent.

Accelerated Monitoring. The provision requires accelerated WET testing when a regular WET test result exceeds the monitoring trigger. The purpose of accelerated monitoring is to determine, in an expedient manner, whether there is toxicity before requiring the implementation of a TRE. Due to possible seasonality of the toxicity, the accelerated monitoring should be performed in a timely manner, preferably taking no more than 2 to 3 months to complete.

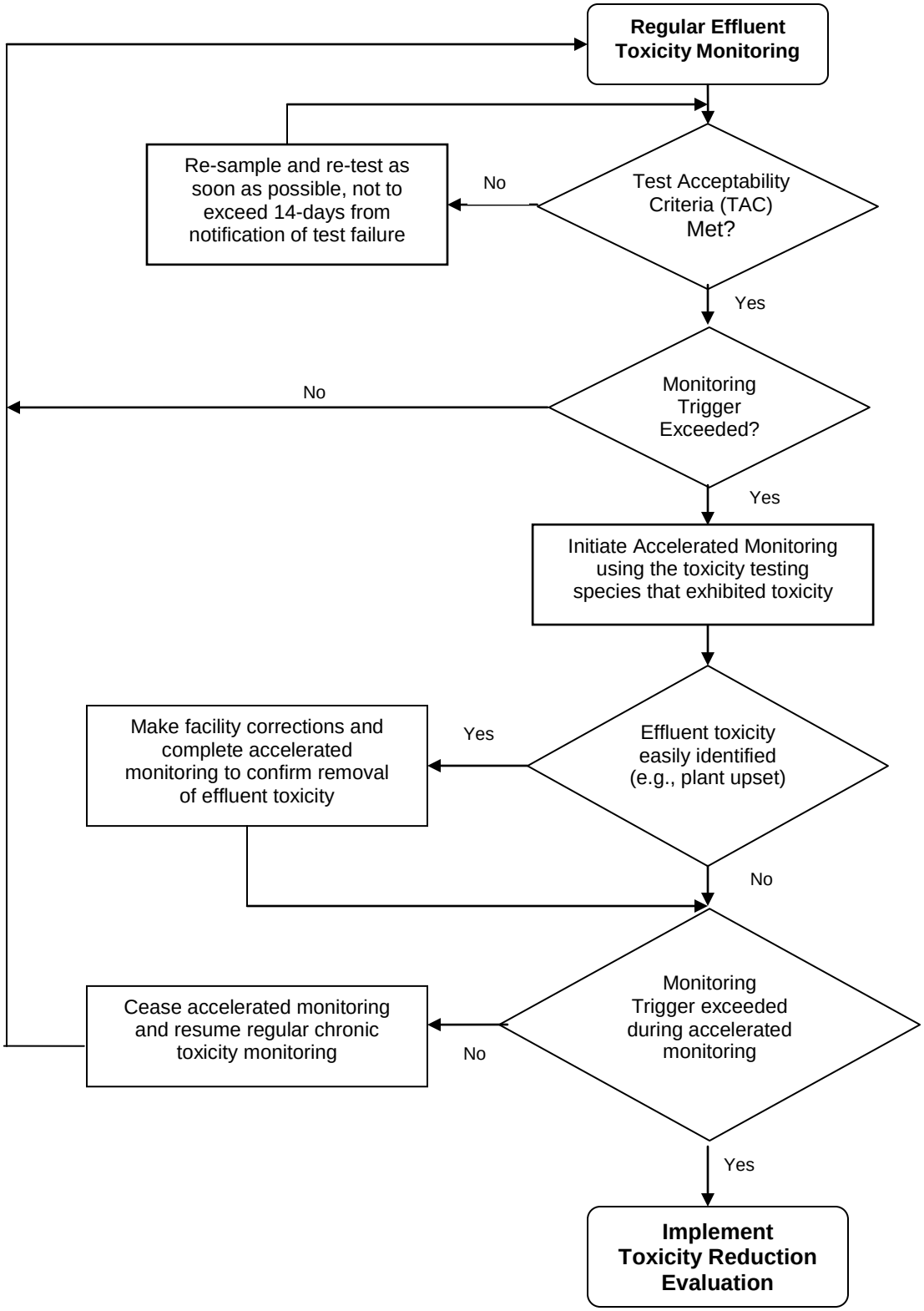
The provision requires accelerated monitoring consisting of four chronic toxicity tests in a six-week period (i.e., one test every two weeks) using the species that exhibited toxicity. Guidance regarding accelerated monitoring and TRE initiation is provided in the *Technical Support Document for Water Quality-based Toxics Control,* EPA/505/2-90-001, March 1991 (TSD). The TSD at page 118 states, "*EPA recommends if toxicity is repeatedly or periodically present at levels above effluent limits more than 20 percent of the time, a TRE should be required.*" Therefore, four accelerated monitoring tests are required in this provision. If no toxicity is demonstrated in the four accelerated tests, then it demonstrates that toxicity is not present at levels above the monitoring trigger more than 20 percent of the time (only 1 of 5 tests are toxic, including the initial test). However, notwithstanding the accelerated monitoring results, if there is adequate evidence of effluent toxicity (i.e. toxicity present exceeding the monitoring trigger more than 20 percent of the time), the Executive Officer may require that the Discharger initiate a TRE.

See the WET Accelerated Monitoring Flow Chart (Figure F-1), below, for further clarification of the accelerated monitoring requirements and for the decision points for determining the need for TRE initiation.

TRE Guidance. The Discharger is required to prepare a TRE Workplan in accordance with USEPA guidance. Numerous guidance documents are available, as identified below:

- Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants, EPA/833-B-99/002, August 1999.
- Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations (TREs), EPA/600/2-88/070, April 1989.
- Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures, Second Edition, EPA 600/6-91/003, February 1991.
- Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I, EPA/600/6-91/005F, May 1992.
- Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity, Second Edition, EPA/600/R-92/080, September 1993.
- Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity, Second Edition, EPA 600/R-92/081, September 1993.
- Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition, EPA-821-R-02-012, October 2002.
- Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, EPA-821-R-02-013, October 2002.
- Technical Support Document for Water Quality-based Toxics Control, EPA/505/2-90-001, March 1991.

Figure F-1
WET Accelerated Monitoring Flow Chart



3. Best Management Practices and Pollution Prevention

a. Salinity Evaluation and Minimization Plan. An Evaluation and Minimization Plan for salinity is required in this Order to ensure adequate measures are developed and implemented by the Discharger to reduce the discharge of salinity to Jackson Creek.

The Discharger indicated during a 23 May 2012 site visit that they are currently planning a compliance project proposing the addition of lime (i.e., calcium hydroxide) to the treatment system to control alkalinity to aid the nitrification and denitrification process. The Central Valley Water Board generally discourages the addition of chemicals when unnecessary for treatment, because it increases the potential for hardness and salinity to be discharged to the receiving water. Therefore, the Plan shall include an evaluation that identifies and quantifies chemical additives necessary for the proper operation and treatment of the Facility (e.g., calcium hydroxide for alkalinity control, polymer addition for filter performance, etc.). The Plan shall evaluate and propose feasible methods or alternatives for reducing the amount of chemical additives that increase the salinity and other constituent concentrations or levels in of the discharge, while still providing adequate treatment. The Central Valley Clean Water Association (CVCWA), working closely with Central Valley Water Board staff, has studied the chemical addition to wastewater for enhancement of nitrogen removal, and developed a white paper titled “Nitrogen Removal and pH Control in Wastewater and its Secondary Effects on Hardness, Metals Toxicity and Salinity,” dated 21 February 2012. To meet the requirements for this Plan regarding addition of operation-enhancing chemicals, the Discharger may certify that its chemical addition is consistent with the premise and conclusions of the above referenced white paper.

4. Construction, Operation, and Maintenance Specifications

a. Turbidity Operational Requirements. Turbidity is included as an operational specification as an indicator of the effectiveness of the treatment process and to assure compliance with effluent limitations for total coliform organisms. The tertiary treatment process utilized at this Facility is capable of reliably meeting a turbidity limitation of 2 NTU as a daily average. Failure of the treatment system such that virus removal is impaired would normally result in increased particles in the effluent, which result in higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance, allowing immediate detection of filter failure and rapid corrective action. The operational specification requires that turbidity shall not exceed 2 NTU as a daily average; 5 NTU, more than 5 percent of the time within a 24-hour period, and an instantaneous maximum of 10 NTU. Turbidity specifications are included as operating criteria in section VI.C.4.a of this Order to ensure that adequate disinfection of wastewater is achieved.

5. Special Provisions for Municipal Facilities (POTWs Only)

a. Pretreatment Requirements. This Order requires the Discharger to implement the necessary legal authorities, programs, and controls to ensure that incompatible wastes are not introduced into the treatment system and to ensure that indirect discharges do not introduce pollutants into the sewerage system.

b. Collection System. The State Water Board issued General Waste Discharge Requirements for Sanitary Sewer Systems, Water Quality Order No. 2006-0003-DWQ (General Order) on 2 May 2006. The General Order requires public agencies that own or operate sanitary sewer systems with greater than one mile of pipes or sewer lines to enroll for coverage under the General Order. The General Order requires agencies to develop sanitary sewer management plans (SSMPs) and report all sanitary sewer overflows (SSOs), among other requirements and prohibitions.

Furthermore, the General Order contains requirements for operation and maintenance of collection systems and for reporting and mitigating sanitary sewer overflows. Inasmuch that the Discharger's collection system is part of the system that is subject to this Order, certain standard provisions are applicable as specified in Provisions, section VI.C.5. For instance, the 24-hour reporting requirements in this Order are not included in the General Order. The Discharger must comply with both the General Order and this Order. The Discharger and public agencies that are discharging wastewater into the Facility were required to obtain enrollment for regulation under the General Order by 1 December 2006.

6. Other Special Provisions

a. Consistent with Order R5-2007-0133-01, this Order requires wastewater to be oxidized, coagulated, filtered, and adequately disinfected pursuant to DPH reclamation criteria, CCR, Title 22, division 4, chapter 3 (Title 22), or equivalent. This Order does not include the requirements for unrestricted beneficial reuse contained in Chapter 3. For wastewater disposal, the Discharger is required to meet Title 22 tertiary numeric effluent quality (hence the use of "or equivalent"), but not the monitoring, alarm, process design, redundancy, and storage requirements for beneficial reuse that is the full suite of Title 22 requirements.

7. Compliance Schedules – Not Applicable

VIII. PUBLIC PARTICIPATION

The Central Valley Water Board is considering the issuance of WDRs that will serve as an NPDES permit for the Facility. As a step in the WDR adoption process, the Central Valley Water Board staff has developed tentative WDRs. The Central Valley Water Board encourages public participation in the WDR adoption process.

A. Notification of Interested Parties

The Central Valley Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations.

B. Written Comments

The staff determinations are tentative. Interested persons are invited to submit written comments concerning these tentative WDRs. Comments must be submitted either in person or by mail to the Executive Office at the Central Valley Water Board at the address above on the cover page of this Order.

To be fully responded to by staff and considered by the Central Valley Water Board, written comments must be received at the Central Valley Water Board offices by 5:00 p.m. on **23 October 2013**.

C. Public Hearing

The Central Valley Water Board will hold a public hearing on the tentative WDRs during its regular Board meeting on the following date and time and at the following location:

Date:	5/6 December 2013
Time:	8:30 a.m.
Location:	Regional Water Quality Control Board, Central Valley Region 11020 Sun Center Dr., Suite #200 Rancho Cordova, CA 95670

Interested persons are invited to attend. At the public hearing, the Central Valley Water Board will hear testimony, if any, pertinent to the discharge, WDRs, and permit. Oral testimony will be heard; however, for accuracy of the record, important testimony should be in writing.

Please be aware that dates and venues may change. Our Web address is www.waterboards.ca.gov/centralvalley where you can access the current agenda for changes in dates and locations.

D. Waste Discharge Requirements Petitions

Any aggrieved person may petition the State Water Board to review the decision of the Central Valley Water Board regarding the final WDRs. The petition must be received by the State Water Board within 30 days of the Central Valley Water Board's action, and must be submitted to the following address:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100, 1001 I Street
Sacramento, CA 95812-0100

E. Information and Copying

The Report of Waste Discharge, related documents, tentative effluent limitations and special provisions, comments received, and other information are on file and may be inspected at the address above at any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents may be arranged through the Central Valley Water Board by calling (916) 464-3291.

F. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the Central Valley Water Board, reference this Facility, and provide a name, address, and phone number.

G. Additional Information

Requests for additional information or questions regarding this order should be directed to Josh Palmer at (916) 464-4674.

ATTACHMENT G – SUMMARY OF REASONABLE POTENTIAL ANALYSIS FOR CONSTITUENTS OF CONCERN

Constituent	Units	MEC	B	C	CMC	CCC	Water & Org	Org. Only	Basin Plan	MCL	Reasonable Potential
Aluminum, Total Recoverable	µg/L	84[1]	--	200	750[2]	--	--	--	--	200	No
Ammonia Nitrogen, Total (as N)	mg/L	10	3.2	2.05	5.62[2]	2.05[3]	--	--	--	--	Yes
Bis (2-Ethylhexyl) Phthalate	µg/L	8.1	<2.3	1.8	--	--	1.8	5.9	--	4	Inconclusive
Carbon Tetrachloride	µg/L	0.28J	<0.15	0.25	--	--	0.25	4.4	--	0.5	Inconclusive
Chlorodibromomethane	µg/L	0.82	<0.37	0.41	--	--	0.41	34	--	80[4]	Yes
Chloroform	µg/L	160	<0.17	80[4]	--	--	5.7b	470	--	80[4]	Yes
Copper, Total Recoverable	µg/L	9.7	1.8	4.4[5]/7.8[6]	6.2[5]/11[6]	4.4[5]/7.8[6]	1,300	--	--	1,000	Yes
Cyanide, Total (as CN)	µg/L	13	1.3	5.2	22	5.2	700	220,000	--	150	Yes
Diazinon	µg/L	0.099J	--	0.10	0.16[7]	0.10[8]	--	--	--	--	No
Dichlorobromomethane	µg/L	10	<0.5	0.56	--	--	0.56	46	--	80[4]	Yes
2,6-Dinitrotoluene	µg/L	<0.36	<1.9	0.5[9]	--	--	--	--	--	--	No
1,2-Diphenylhydrazine	µg/L	0.43J	<1	0.040	--	--	0.040	0.54	--	--	Inconclusive
Electrical Conductivity @ 25°C	µmhos/cm	729	565	900	--	--	--	--	--	900	No
Iron, Total Recoverable	µg/L	108[1]	--	300	--	1,000	--	--	--	300	No
Manganese, Total Recoverable	µg/L	32[1]	--	50	--	--	--	100	--	50	No
Mercury, Total Recoverable	µg/L	0.0061	0.0037	0.050	--	--	0.050	0.051	--	2	Yes
Nitrate Nitrogen, Total (as N)	µg/L	28[10]	--	10	--	--	--	--	--	10	Yes
Silver, Total Recoverable	µg/L	<0.19	<0.1	0.49[5]/2.8[6]	0.49[5]/2.8[6]	--	----	--	--	100	No
Tetrachloroethylene	µg/L	0.1	<0.17	0.8	--	--	0.8	8.5	--	5	No
Total Dissolved Solids	mg/L	411	--	500	--	--	--	--	--	500	No
Zinc, Total Recoverable	µg/L	170	4.4	57[5]/100[6]	57[5]/100[6]	57[5]/100[6]	7,400	26,000	--	5,000	Yes

Constituent	Units	MEC	B	C	CMC	CCC	Water & Org	Org. Only	Basin Plan	MCL	Reasonable Potential

General Note: All inorganic concentrations are given as a total recoverable.
MEC = Maximum Effluent Concentration
B = Maximum Receiving Water Concentration or lowest detection level, if non-detect
C = Criterion used for Reasonable Potential Analysis
CMC = Criterion Maximum Concentration (CTR or NTR)
CCC = Criterion Continuous Concentration (CTR or NTR)
Water & Org = Human Health Criterion for Consumption of Water & Organisms (CTR or NTR)
Org. Only = Human Health Criterion for Consumption of Organisms Only (CTR or NTR)
Basin Plan = Numeric Site-specific Basin Plan Water Quality Objective
MCL = Drinking Water Standards Maximum Contaminant Level
NA = Not Available
ND = Non-detect

Footnotes:
(1) Represents the maximum observed annual average concentration for comparison with the Secondary MCL.
(2) USEPA National Recommended Ambient Water Quality Criteria, Freshwater Aquatic Life Protection, 1-hour Average.
(3) USEPA National Recommended Ambient Water Quality Criteria, Freshwater Aquatic Life Protection, 30-day Average.
(4) Represents the Primary MCL for total trihalomethanes, which includes bromoform, chlorodibromomethane, chloroform, and dichlorobromomethane.
(5) Criterion to be compared to the maximum effluent concentration.
(6) Criterion to be compared to the maximum upstream receiving water concentration.
(7) California Department of Fish and Game Acute Criterion
(8) California Department of Fish and Game Chronic Criterion
(9) USEPA Integrated Risk Information System (IRIS) and USEPA suggested no-adverse-response level (SNARL) for on-in-a-million incremental cancer risk estimates for drinking water
(10) Represents monitoring data for nitrate (as NO_3) converted to nitrate (as N).

ATTACHMENT H – CALCULATION OF WQBELS

Parameter	Units	Most Stringent Criteria			HH Calculations[1]			Aquatic Life Calculations[1]											Final Effluent Limitations	
		HH	CMC	CCC	ECA_{HH} = $AMEL_{HH}$	AMEL/MDEL $Multiplier_{HH}$	$MDEL_{HH}$	ECA_{acute}	ECA $Multiplier_{acute}$	LTA_{acute}	$ECA_{chronic}$	ECA $Multiplier_{chronic}$	$LTA_{chronic}$	Lowest LTA	AMEL $Multiplier_{95}$	$AMEL_{AL}$	MDEL $Multiplier_{99}$	$MDEL_{AL}$	Lowest AMEL	Lowest MDEL
Ammonia Nitrogen, Total (as N)	mg/L	--	5.62	2.05	--	--	--	5.62	0.23	1.29	2.05	0.7	1.44	1.29	1.81	2.3	4.28	5.5	2.3	5.5
Chlorodibromomethane	µg/L	0.41	--	--	0.41	2.01	0.82	--	--	--	--	--	--	--	--	--	--	--	0.41	0.82
Copper, Total Recoverable	µg/L	1,000	6.2	4.4	1,000	1.61	1,608	6.2	0.47	2.9	4.4	0.67	2.95	2.9	1.32	3.9	2.13	6.2	3.9	6.2
Cyanide, Total (as CN)	µg/L	150	22	5.2	150	2.05	308	22	0.29	6.4	5.2	0.49	2.55	2.55	1.63	4.2	3.45	8.8	4.2	8.8
Dichlorobromomethane	µg/L	0.56	--	--	0.56	2.43	1.4	--	--	--	--	--	--	--	--	--	--	--	0.56	1.4
Zinc, Total Recoverable	µg/L	5,000	57	57	5,000	1.35	6,748	57	0.63	36	57	0.78	45	36	1.18	42	1.60	57	42	57

[1] As described in section IV.C.2.c of the Fact Sheet (Attachment F), calculation of effluent limitations for the protection of human health and aquatic life are determined without the allowance of dilution credits.

ATTACHMENT I – EFFLUENT AND RECEIVING WATER CHARACTERIZATION STUDY

I. Background. Sections 2.4.1 through 2.4.4 of the SIP provide minimum standards for analyses and reporting. (Copies of the SIP may be obtained from the State Water Resources Control Board, or downloaded from http://www.waterboards.ca.gov/iswp/index.html). To implement the SIP, effluent and receiving water data are needed for all priority pollutants. Effluent and receiving water pH and hardness are required to evaluate the toxicity of certain priority pollutants (such as heavy metals) where the toxicity of the constituents varies with pH and/or hardness. In addition to specific requirements of the SIP, the Central Valley Water Board is requiring the following monitoring:

A. Drinking water constituents. Constituents for which drinking water Maximum Contaminant Levels (MCLs) have been prescribed in the California Code of Regulation are included in the *Water Quality Control Plan, Fourth Edition, for the Sacramento and San Joaquin River Basins* (Basin Plan). The Basin Plan defines virtually all surface waters within the Central Valley Region as having existing or potential beneficial uses for municipal and domestic supply. The Basin Plan further requires that, at a minimum, water designated for use as domestic or municipal supply shall not contain concentrations of chemical constituents in excess of the MCLs contained in the California Code of Regulations.

B. Effluent and receiving water temperature. This is both a concern for application of certain temperature-sensitive constituents, such as fluoride, and for compliance with the Basin Plan's thermal discharge requirements.

C. Effluent and receiving water hardness and pH. These are necessary because several of the CTR constituents are hardness and pH dependent.

II. Monitoring Requirements.

A. Quarterly Monitoring. Priority pollutant samples shall be collected from the effluent and upstream receiving water (Monitoring Locations EFF-001 and RSW-001) and analyzed for the constituents listed in Table I-1. Quarterly monitoring shall be conducted for 1 year (four consecutive samples, evenly distributed throughout the year) during the third year and the results of such monitoring shall be submitted to the Central Valley Water Board within 6 months following completion of final monitoring event. Each individual monitoring event shall provide representative sample results for the effluent and upstream receiving water.

B. Concurrent Sampling. Effluent and receiving water sampling shall be performed at approximately the same time, on the same date.

C. Sample type. All effluent samples shall be taken as 24-hour flow proportioned composite samples. All receiving water samples shall be taken as grab samples.

D. Additional Monitoring/Reporting Requirements. The Discharger shall conduct the monitoring and reporting in accordance with the General Monitoring Provisions and Reporting Requirements in Attachment E.

Table I-1. Priority Pollutants

CTR #	Constituent	CAS Number	Maximum Reporting Levels µg/L or noted
28	1,1-Dichloroethane	75343	1
30	1,1-Dichloroethene	75354	0.5
41	1,1,1-Trichloroethane	71556	2
42	1,1,2-Trichloroethane	79005	0.5
37	1,1,2,2-Tetrachloroethane	79345	0.5
75	1,2-Dichlorobenzene (volatile)	95501	2
75	1,2-Dichlorobenzene (semivolatile)	95501	2
29	1,2-Dichloroethane	107062	0.5
	cis-1,2-Dichloroethene	156592	--
31	1,2-Dichloropropane	78875	0.5
101	1,2,4-Trichlorobenzene	120821	1
76	1,3-Dichlorobenzene (volatile)	541731	2
76	1,3-Dichlorobenzene (semivolatile)	541731	2
32	1,3-Dichloropropene (volatile)	542756	0.5
77	1,4-Dichlorobenzene (volatile)	106467	2
77	1,4-Dichlorobenzene (semivolatile)	106467	2
17	Acrolein	107028	2
18	Acrylonitrile	107131	2
19	Benzene	71432	0.5
20	Bromoform	75252	2
34	Bromomethane	74839	2
21	Carbon tetrachloride	56235	0.5
22	Chlorobenzene (mono chlorobenzene)	108907	2
24	Chloroethane	75003	2
25	2- Chloroethyl vinyl ether	110758	1
26	Chloroform	67663	2
35	Chloromethane	74873	2
23	Dibromochloromethane	124481	0.5
27	Dichlorobromomethane	75274	0.5
36	Dichloromethane	75092	2
33	Ethylbenzene	100414	2
88	Hexachlorobenzene	118741	1

CTR #	Constituent	CAS Number	Maximum Reporting Levels µg/L or noted
89	Hexachlorobutadiene	87683	1
91	Hexachloroethane	67721	1
94	Naphthalene	91203	10
38	Tetrachloroethene	127184	0.5
39	Toluene	108883	2
40	trans-1,2-Dichloroethylene	156605	1
43	Trichloroethene	79016	2
44	Vinyl chloride	75014	0.5
	Methyl-tert-butyl ether (MTBE)	1634044	--
	Trichlorofluoromethane	75694	--
	1,1,2-Trichloro-1,2,2-Trifluoroethane	76131	--
	Styrene	100425	--
	Xylenes	1330207	--
60	1,2-Benzanthracene	56553	5
85	1,2-Diphenylhydrazine	122667	1
45	2-Chlorophenol	95578	5
46	2,4-Dichlorophenol	120832	5
47	2,4-Dimethylphenol	105679	2
49	2,4-Dinitrophenol	51285	5
82	2,4-Dinitrotoluene	121142	5
55	2,4,6-Trichlorophenol	88062	10
83	2,6-Dinitrotoluene	606202	5
50	2-Nitrophenol	25154557	10
71	2-Chloronaphthalene	91587	10
78	3,3'-Dichlorobenzidine	91941	5
62	3,4-Benzofluoranthene	205992	10
52	4-Chloro-3-methylphenol	59507	5
48	4,6-Dinitro-2-methylphenol	534521	10
51	4-Nitrophenol	100027	10
69	4-Bromophenyl phenyl ether	101553	10
72	4-Chlorophenyl phenyl ether	7005723	5
56	Acenaphthene	83329	1
57	Acenaphthylene	208968	10
58	Anthracene	120127	10
59	Benzidine	92875	5
61	Benzo(a)pyrene (3,4-Benzopyrene)	50328	2

CTR #	Constituent	CAS Number	Maximum Reporting Levels µg/L or noted
63	Benzo(g,h,i)perylene	191242	5
64	Benzo(k)fluoranthene	207089	2
65	Bis(2-chloroethoxy) methane	111911	5
66	Bis(2-chloroethyl) ether	111444	1
67	Bis(2-chloroisopropyl) ether	39638329	10
68	Bis(2-ethylhexyl) phthalate[1]	117817	5
70	Butyl benzyl phthalate	85687	10
73	Chrysene	218019	5
81	Di-n-butylphthalate	84742	10
84	Di-n-octylphthalate	117840	10
74	Dibenzo(a,h)-anthracene	53703	0.1
79	Diethyl phthalate	84662	10
80	Dimethyl phthalate	131113	10
86	Fluoranthene	206440	10
87	Fluorene	86737	10
90	Hexachlorocyclopentadiene	77474	5
92	Indeno(1,2,3-c,d)pyrene	193395	0.05
93	Isophorone	78591	1
98	N-Nitrosodiphenylamine	86306	1
96	N-Nitrosodimethylamine	62759	5
97	N-Nitrosodi-n-propylamine	621647	5
95	Nitrobenzene	98953	10
53	Pentachlorophenol	87865	1
99	Phenanthrene	85018	5
54	Phenol	108952	50
100	Pyrene	129000	10
	Aluminum	7429905	--
1	Antimony	7440360	0.5
2	Arsenic	7440382	1
15	Asbestos	1332214	--
	Barium	7440393	--
3	Beryllium	7440417	0.5
4	Cadmium	7440439	0.25
5a	Chromium (total)	7440473	0.5
5b	Chromium (VI)	18540299	10
6	Copper	7440508	2

CTR #	Constituent	CAS Number	Maximum Reporting Levels µg/L or noted
14	Cyanide	57125	5
	Fluoride	7782414	--
	Iron	7439896	--
7	Lead	7439921	0.5
8	Mercury	7439976	0.2
	Manganese	7439965	--
	Molybdenum	7439987	--
9	Nickel	7440020	1
10	Selenium	7782492	1
11	Silver	7440224	0.25
12	Thallium	7440280	1
	Tributyltin	688733	--
13	Zinc	7440666	1
110	4,4'-DDD	72548	0.05
109	4,4'-DDE	72559	0.05
108	4,4'-DDT	50293	0.01
112	alpha-Endosulfan	959988	0.02
103	alpha-Hexachlorocyclohexane (BHC)	319846	0.01
	Alachlor	15972608	--
102	Aldrin	309002	0.005
113	beta-Endosulfan	33213659	0.01
104	beta-Hexachlorocyclohexane	319857	0.005
107	Chlordane	57749	0.1
106	delta-Hexachlorocyclohexane	319868	0.005
111	Dieldrin	60571	0.01
114	Endosulfan sulfate	1031078	0.05
115	Endrin	72208	0.01
116	Endrin Aldehyde	7421934	0.01
117	Heptachlor	76448	0.01
118	Heptachlor Epoxide	1024573	0.01
105	Lindane (gamma-Hexachlorocyclohexane)	58899	0.02
119	PCB-1016	12674112	0.5
120	PCB-1221	11104282	0.5
121	PCB-1232	11141165	0.5
122	PCB-1242	53469219	0.5
123	PCB-1248	12672296	0.5

CTR #	Constituent	CAS Number	Maximum Reporting Levels µg/L or noted
124	PCB-1254	11097691	0.5
125	PCB-1260	11096825	0.5
126	Toxaphene	8001352	0.5
	Atrazine	1912249	--
	Bentazon	25057890	--
	Carbofuran	1563662	--
	2,4-D	94757	--
	Dalapon	75990	--
	1,2-Dibromo-3-chloropropane (DBCP)	96128	--
	Di(2-ethylhexyl)adipate	103231	--
	Dinoseb	88857	--
	Diquat	85007	--
	Endothal	145733	--
	Ethylene Dibromide	106934	--
	Glyphosate	1071836	--
	Methoxychlor	72435	--
	Methylene Blue Activated Substances (MBAS)	--	--
	Molinate (Ordram)	2212671	--
	Oxamyl	23135220	--
	Picloram	1918021	--
	Simazine (Princep)	122349	--
	Thiobencarb	28249776	--
	2,4,5-TP (Silvex)	93765	--
	Diazinon	333415	--
	Chlorpyrifos	2921882	--
	Ammonia (as N)	7664417	--
	Chloride	16887006	--
	Flow	--	--
	Hardness (as $CaCO_3$)	--	--
	Nitrate (as N)	14797558	--
	Nitrite (as N)	14797650	--
	pH	--	--
	Phosphorus, Total (as P)	7723140	--
	Specific conductance (EC)	--	--
	Sulfate	--	--
	Sulfide (as S)	--	--

CTR #	Constituent	CAS Number	Maximum Reporting Levels µg/L or noted
	Sulfite (as SO_3)	--	--
	Temperature	--	--
	Total Dissolved Solids (TDS)	--	--

[1] Sampling and analysis of bis (2-ethylhexyl) phthalate shall be conducted using ultra-clean techniques that reduce the possibility of sample contamination. The Discharger has agreed to contract a laboratory to analyze bis (2-ethylhexyl) phthalate at levels below the Reporting Level in Appendix 4 of the SIP.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

TIME SCHEDULE ORDER R5-2011-0909-02
(as amended by Order R5-2013-0148)

REQUIRING
THE CITY OF JACKSON
WASTEWATER TREATMENT PLANT
AMADOR COUNTY

TO COMPLY WITH REQUIREMENTS PRESCRIBED IN ORDER R5-2007-0133-01
(NPDES PERMIT CA0079391)

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

1. On 5 December 2013, the Central Valley Water Board adopted Waste Discharge Requirements (WDR) Order R5-2013-0146, for the City of Jackson (Discharger) Wastewater Treatment Plant (Facility), Amador County. The Central Valley Water Board also adopted Time Schedule Order R5-2013-0147 to provide a time schedule and interim limits for chlorodibromomethane and total trihalomethanes. For the purposes of this Order, the City of Jackson is hereafter referred to as "Discharger" and the City of Jackson Wastewater Treatment Plant is hereafter referred to as "Facility".

2. WDR Order R5-2013-0146 section IV.A.1 includes, in part, the following final effluent limitations:

   a. The Discharger shall maintain compliance with the effluent limitations specified in Table 6:

Table 6. Effluent Limitations

Parameter	*Units*	*Effluent Limitations*				
		Average Monthly	*Average Weekly*	*Maximum Daily*	*Instantaneous Minimum*	*Instantaneous Maximum*
Ammonia Nitrogen, Total (as N)	*mg/L*	*2.3*	*--*	*5.5*	*--*	*--*
	lbs/day	*14*	*--*	*33*	*--*	*--*
Copper, Total Recoverable	*µg/L*	*3.9*	*--*	*6.2*	*--*	*--*
Cyanide, Total	*µg/L*	*4.2*	*--*	*8.8*	*--*	*--*
Dichlorobromomethane	*µg/L*	*0.56*	*--*	*1.12*	*--*	*--*
Nitrate (as N)	*mg/L*	*10*	*--*	*--*	*--*	*--*
Zinc, Total Recoverable	*µg/L*	*42*	*--*	*57*	*--*	*--*

   e. Total Coliform Organisms. Effluent total coliform organisms shall not exceed:

      i. 2.2 most probable number (MPN) per 100 mL, as a 7-day median; and
      ii. 23 MPN/100 mL, more than once in any 30-day period; and
      iii. 240 MPN/100 mL, at any time.

3. This amended TSO R5-2011-0909-02 reflects the new WDRs adopted on 5 December 2013 and maintains the compliance schedules for ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, and zinc contained in TSO R5-2011-0909-01 for compliance with the final effluent limits by 1 March 2015.

Need for Time Schedule Extension and Legal Basis

4. On 11 January and 20 May 2010, the Discharger submitted requests for additional time to comply with the final effluent limitations for ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms and zinc.

5. In a report dated 12 August 2011, the Discharger proposed a suite of Facility upgrades with a projected schedule to achieve compliance with the final effluent limitations for ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms and zinc by 1 March 2015.

Mandatory Minimum Penalties

6. California Water Code sections 13385(h) and (i) require the Central Valley Water Board to impose mandatory minimum penalties (MMPs) upon dischargers that violate certain effluent limitations. California Water Code section 13385(j)(3) exempts the discharge from mandatory minimum penalties "*where the waste discharge is in compliance with either a cease and desist order issued pursuant to Section 13301 or a time schedule order issued pursuant to Section 13300 or 13308, if all the* [specified] *requirements are met...for the purposes of this subdivision, the time schedule may not exceed five years in length...*".

7. Per the requirements of California Water Code section 13385(j)(3), the Central Valley Water Board finds that:

   a. This Order specifies the actions that the Discharger is required to take in order to correct the violations that would otherwise be subject to California Water Code section 13385(h) and (i).

   b. To comply with final effluent limitations, the Discharger proposed improvements to the secondary process, filter, and disinfection system. The Discharger also proposed site specific water quality studies to bring forth information for future potential modification of effluent limitations if the proposed improvements do not result in full compliance. The final effluent limitations for ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms and zinc were new, more stringent, or modified regulatory requirements in previous Order R5-2007-0133-01 that became applicable to the waste discharge after the effective date of the waste discharge requirements (14 December 2007) and after 1 July 2000. New or modified control measures are necessary in order to comply with the final effluent limitations. The new or modified control measures cannot be designed, installed, and put into operation within 30 calendar days.

c. This Order establishes a time schedule to bring the waste discharge into compliance with the effluent limitations that is as short as possible, taking into account the technological, operational, and economic factors that affect the design, development, and implementation of the control measures that are necessary to comply with the effluent limitations.

8. By statute, a Cease and Desist Order or Time Schedule Order may provide protection from MMPs for no more than five years.

9. Violations of final effluent limitations in WDR Order R5-2007-0133-01 for ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, and zinc have not previously been protected from mandatory minimum penalties. Compliance with this Order exempts the Discharger from mandatory minimum penalties for violations of the final effluent limitations for ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, and zinc from the date of this Order until 1 March 2015.

10. In accordance with California Water Code section 13385(j)(3)(C), the total length of protection from mandatory minimum penalties for the final effluent limitations listed in Finding 8 above, does not exceed five years.

11. This Order provides a time schedule for completing the actions necessary to ensure compliance with the final effluent limitations for ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, and zinc, contained in WDR Order R5-2013-0146. Since the time schedule for completion of actions necessary to bring the waste discharge into compliance exceeds one year, this Order includes interim effluent limitations and interim requirements and dates for their achievement.

11. This Order includes new, performance-based interim effluent limitations for ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, and zinc. The interim effluent limitations are based on the current treatment plant performance or are carried over from TSO R5-2011-0909-01.

The interim effluent limitations consist of statistically calculated performance-based average monthly and maximum daily effluent limits derived using sample data provided by the Discharger. The interim effluent limitations were developed using the statistical based approach provided in EPA's *Technical Support Document for Water Quality-Based Toxics Control* (TSD). The TSD provides guidance on estimating the projected maximum effluent concentration using a lognormal distribution of the observed effluent concentrations at a desired confidence level, as detailed in Section 3.3 of the TSD. The multipliers in Table 3-1 of the TSD were used to calculate the 99th percent confidence level and 99th percentile of the data set based on the number of effluent samples and the coefficient of variation. The multipliers from the table were multiplied by the highest observed effluent concentration (MEC) to estimate the maximum expected effluent concentration; this value was used as the interim effluent limitations for the average monthly effluent limit (AMEL). The interim performance-based maximum daily effluent limitations (MDELs) were established in accordance with section 1.4 and Table 2 of the *Policy for Implementation of Toxics*

Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP), by multiplying the interim AMEL by the MDEL/AMEL multiplier.

Effluent data from January 2008 through May 2012 was used to calculate the interim effluent limitations in the table below. The following summarizes the calculations of the daily maximum and average monthly interim effluent limitations for these constituents:

Parameter	Units	MEC	Number of Data Points	Mean	Standard Deviation	Coefficient of Variation	MDEL/ AMEL Multiplier[1]	Interim Average Monthly Effluent Limitation[2]	Interim Maximum Daily Effluent Limitation[3]
Copper, Total Recoverable	µg/L	9.7	53	4.36	1.58	0.36	1.60	14	22
Cyanide, Total Recoverable	µg/L	13	54	3.61	2.44	0.68	2.13	23	49
Dichlorobromomethane	µg/L	10	55	2.56	2.35	0.92	2.43	21	51
Zinc, Total Recoverable	µg/L	170	54	95.8	20.5	0.21	1.35	210	285
Ammonia Nitrogen, Total (as N)	mg/L	10[4]	1361	1.90	1.64	0.86	2.36	7.5	18
	lbs/day	--	--	--	--	--	--	44	107
Nitrate (as N)	mg/L	124	230	26.8	22.9	0.85	2.35	151	355

1 Maximum daily/average monthly effluent limit multiplier extrapolated from Table 2 of the SIP.
2 99% confidence level upper limit value from the Technical Support Document for Water Quality-based Toxics Control used to calculate the maximum expected concentration in a dataset.
3 Interim maximum daily effluent limitation calculated from MDEL/AMEL multiplier.
4 MEC was detected before new operational practices were introduced in 2012, in 2012 the MEC for ammonia was 1.3 mg/L.

13. The Central Valley Water Board finds that the Discharger can maintain compliance with the interim effluent limitations included in this Order. Interim effluent limitations are established when compliance with the final effluent limitations cannot be achieved by the existing Facility. Discharge of constituents in concentrations in excess of the final effluent limitations, but in compliance with the interim effluent limitations, can significantly degrade water quality and adversely affect the beneficial uses of the receiving stream on a long-term basis. The interim effluent limitations, however, establish an enforceable ceiling concentration until compliance with the final effluent limitation can be achieved.

14. If an interim effluent limit contained in this Order is exceeded, then the Discharger is subject to MMPs for that particular exceedance as it will no longer meet the exemption in Water Code 13385(j)(3). It is the intent of the Central Valley Water Board that a violation of an interim monthly effluent limitation subjects the Discharger to only one MMP for that monthly averaging period. In addition, a violation of an interim daily maximum effluent limit subjects the Discharger to one MMP for the day in which the sample was collected.

Other Regulatory Requirements

15. California Water Code section 13300 states: "*Whenever a regional board finds that a discharge of waste is taking place or threatening to take place that violates or will violate requirements prescribed by the regional board, or the state board, or that the waste collection, treatment, or disposal facilities of a discharger are approaching capacity, the board may require the discharger to submit for approval of the board, with such modifications*

as it may deem necessary, a detailed time schedule of specific actions the discharger shall take in order to correct or prevent a violation of requirements."

16. This Order was issued in accordance with Section 13300 of the California Water Code and established a time schedule for compliance.

17. Section 13267 of the California Water Code states in part: "*In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report 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.*"

18. The Discharger owns and operates the wastewater treatment plant and sewage collection system which is subject to this Order. The technical and monitoring reports required by this Order are necessary to determine compliance with the WDRs and with this Order.

19. Issuance of this Order is exempt from the provisions of the California Environmental Quality Act (Pub. Resources Code, § 21000 et seq.) ("CEQA") pursuant to Water Code section 13389, since the adoption or modification of a NPDES permit for an existing source is statutorily exempt and this Order only serves to implement a NPDES permit (*Pacific Water Conditioning Ass'n, Inc. v. City Council of City of Riverside* (1977) 73 Cal.App.3d 546, 555-556.).

20. On 10 December 2009, the Central Valley Water Board adopted Resolution No. R5-2009-0114 to provide explicit authority to the Executive Officer to issue or modify time schedule orders, and to make this authority known to the public and regulated community.

21. The Central Valley Water Board has notified the Discharger and interested agencies and persons of its intent to adopt this amended Time Schedule Order for this discharge and has provided them with an opportunity to submit their written views and recommendations.

IT IS HEREBY ORDERED THAT:

1. Pursuant to California Water Code Section 13300, the Discharger shall comply with the following time schedule to ensure completion of the compliance project described in Finding 5, above:

Task	Compliance Date
Submit New or Updated Pollution Prevention Plan for ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, and zinc	Submitted
Move Point of Chlorination to after filtration	Completed
Complete Planning, Design, and Bid Process for pH, DO, SCADA Monitoring, Recording, Controls, and Alarms	Completed
Complete Planning, Design, and Bid Process for Alkalinity Adjustment System, Prefilter Coagulation/Flocculation improvements, and Increase in Chlorine Mixing Energy	30 January 2014
Complete Construction of pH, DO, SCADA Monitoring, Recording, Controls, and Alarms	1 March 2014
Complete Construction of Alkalinity Adjustment System, Prefilter Coagulation/Flocculation improvements, and Increase in Chlorine Mixing Energy	1 December 2014
Comply with Final Effluent Limitations for ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, and zinc	1 March 2015
Submit Progress Reports [1]	Each of the above Compliance Dates

[1] The progress reports shall detail the steps taken to comply with this Order, including documentation showing completion of tasks, construction progress, evaluation of the effectiveness of the implemented measures, and assessment of whether additional measures are necessary to meet the compliance dates.

2. The following interim effluent limitations for ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, and zinc shall be effective upon adoption of this Order, and shall apply in lieu of the corresponding final effluent limitations in WDR Order R5-2013-0146. The Discharger shall maintain compliance with the following interim effluent limitations through **28 February 2015,** or when the Discharger is able to come into compliance with the final effluent limitations shown in Finding 2, whichever is sooner.

   a. **Ammonia, copper, cyanide, dichlorobromomethane, nitrate, and zinc.** Ammonia, copper, cyanide, dichlorobromomethane, nitrate, and zinc in the effluent shall not exceed:

Parameter	Units	Average Monthly	Maximum Daily
Ammonia, as N	mg/L	7.5	18
	lbs/day	44	107
Copper, Total Recoverable	µg/L	14	22
Cyanide, Total	µg/L	23	49
Dichlorobromomethane	µg/L	21	51
Nitrate, as N	mg/L	151	355
Zinc, Total Recoverable	µg/L	210	285

b. **Total Coliform Organisms** [1]. Total coliform organisms in the effluent shall not exceed:

i. 23 MPN/per 100 mL, as a 7-day median; and
ii. 240 MPN/100 mL, more than once in any 30-day period.

3. Any person signing a document submitted under this Order shall make the following certification:

> *"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my knowledge and on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."*

If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement, may issue a complaint for administrative civil liability, or may take other enforcement actions. Failure to comply with this Order or with the WDRs may result in the assessment of Administrative Civil Liability of up to $10,000 per violation, per day, depending on the violation, pursuant to the Water Code, including sections 13268, 13350 and 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:
http://www.waterboards.ca.gov/public_notices/petitions/water_quality
or will be provided upon request.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order signed by the Executive Officer of the California Regional Water Quality Control Board, Central Valley Region, on **3 November 2011 and amended on 13 November 2013, and on 5 December 2013**.

Original Signed by

PAMELA C. CREEDON, Executive Officer

[1] The interim effluent limitations for total coliform organisms are based on the treatment capability of a secondary treatment plant

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

TIME SCHEDULE ORDER R5-2013-0147
REQUIRING
CITY OF JACKSON
WASTEWATER TREATMENT PLANT
AMADOR COUNTY

TO COMPLY WITH REQUIREMENTS PRESCRIBED IN ORDER R5-2013-0146
(NPDES PERMIT NO. CA0079391)

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

1. The City of Jackson (Discharger) owns and operates the City of Jackson Wastewater Treatment Plant (Facility). The treatment system consists of a headworks, two oxidation ditches, two secondary clarifiers, chlorine injection, one train of four sand filters, chlorine contact basin, and sulfur dioxide dechlorination. The Facility discharges up to 0.71 million gallons per day (MGD) of treated wastewater to Jackson Creek, a water of the United States, and a tributary to Amador Lake within the Mokelumne River watershed.

2. On 13 November 2013, the Executive Officer issued Time Schedule Order (TSO) R5-2011-0909-01, which provided a time schedule for complying with final effluent limitations for aluminum, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, turbidity, and zinc. TSO R5-2011-0909-01 requires compliance with the final effluent limitations for these parameters by 1 March 2015. TSO R5-2011-0909, as amended, remains in effect and is not replaced by this TSO.

3. On 5 December 2013, the Central Valley Water Board adopted Waste Discharge Requirements Order R5-2013-0146 (NPDES Permit No. CA0079391) that replaced Order R5-2007-0133-01. Also on 5 December 2013 the Central Valley Water Board amended Time Schedule Order R5-2011-0909-01 (Attachment A to Amending Order R5-2013-0148) to continue a time schedule and interim limits for copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, and zinc to transfer applicability from rescinded Order R5-2007-0133-01 to Order R5-2013-0146.

4. Waste Discharge Requirements Order R5-2013-0146 contains Final Effluent Limitations IV.A.1, which reads, in part, as follows:

Table 6. Effluent Limitations

Parameter	***Units***	***Effluent Limitations***				
		Average Monthly	***Average Weekly***	***Maximum Daily***	***Instantaneous Minimum***	***Instantaneous Maximum***
Priority Pollutants						
Chlorodibromomethane	*µg/L*	*0.41*	*--*	*0.82*	*--*	*--*
Non-Conventional Pollutants						
Total Trihalomethanes[2]	*µg/L*	*80*	*--*	*--*	*--*	*--*

[2] *Applies to the sum of bromoform, chlorodibromomethane, chloroform, and dichlorobromomethane.*

NEED FOR TIME SCHEDULE EXTENSION AND LEGAL BASIS

5. Order R5-2007-0133-01 contains Discharge Prohibition E, which states the following

   Beginning 1 March 2015, the Discharger is prohibited from discharging wastewater into Jackson Creek in amounts that cause the downstream Lake Amador water to exceed greater than five percent volume of wastewater in Lake Amador (one part wastewater in 20 parts of Lake water, or 20:1 dilution).

   Discharge Prohibition E was included in Order R5-2007-0133-01 because the California Department of Public Health (CPDH) submitted a 13 July 2007 letter recommending Title 22 tertiary treatment of the wastewater plus a 20:1 dilution ratio to address municipal water use from Lake Amador for drinking purposes.

6. In order to meet the Discharge Prohibition E compliance date of 1 March 2015, the Discharger was in the process of completing the necessary milestones to cease discharge to Jackson Creek when effluent dilution in Lake Amador was less than 20:1. A Jackson Creek Beneficial Use Attainment Study (BUAS) was submitted to and approved by the Central Valley Water Board and the Department of Fish and Wildlife. The BUAS concluded that removal of the effluent from Jackson Creek would not have adverse effects on biological and non-biological beneficial uses. Following the approval of the BUAS, the Discharger conducted an Environmental Impact Report (EIR) for treatment system upgrades to the existing Facility and development of a new effluent disposal process that consists of seasonal disposal to Jackson Creek and reclamation/land disposal for the remainder of the year. On 11 March 2013 the Jackson City Council approved the final draft of the EIR. The Discharger has also requested a determination from the State Water Resource Control Board's Division of Water Rights if the effluent discharge can be removed from Jackson Creek without violating downstream user's water rights.

7. In an e-mail dated 29 April 2013 the California Department of Public Health (CDPH) indicated that a new surface water treatment plant has been constructed by Jackson Valley Irrigation District (JVID) that treats raw water from Pardee Reservoir to replace drinking water provided from Lake Amador. Lake Amador, which receives water from

Jackson Creek including tertiary treated effluent from the Facility, was the drinking water source for the JVID's Lake Amador Recreation Area and the Oaks Mobile Home Park. The Lake Amador Recreation Area drinking water source was replaced by the newly constructed JVID treatment plant in September 2013 as part of the Phase I JVID drinking water replacement project. JVID is waiting for funding to begin work on Phase II of the drinking water replacement project that will replace the Oaks Mobile Home Park drinking water supply with treated Pardee Reservoir water by approximately 2016. The e-mail states that, "Given that the City of Jackson's current wastewater treatment plant provides disinfected tertiary treatment and the City usually provides 20:1 dilution in Lake Amador, our Department believes that adequate public health protection is being provided until both domestic water supply intakes are removed from Lake Amador." The CDPH e-mail further states, "In regard to recreation and irrigation uses of Lake Amador, provided the City's wastewater treatment plant's disinfected tertiary effluent meets the requirements specified in our Recycled Water Regulations for body contact and food crop irrigation, we have no objection to continued discharge into Jackson Creek."

8. With the determination by CDPH that the City can continue discharging to Jackson Creek because they usually provide 20:1 dilution in Lake Amador and they met the requirements in CDPH's Recycled Water Regulations, the Discharger has changed its compliance strategy to pursue more substantial facility upgrades to focus on meeting final effluent limitations year round. Proposed major upgrades under the revised compliance strategy include conversion to UV disinfection from chlorination/dechlorination disinfection, addition of filter cells and improvements to coagulation/flocculation, addition of anoxic basins, and upgrades to the pH control system.

9. On 20 August 2013, the Discharger submitted an infeasibility analysis indicating that they cannot comply with the final effluent limits from Order R5-2013-0146 for ammonia, copper, cyanide, chlorodibromomethane, dichlorobromomethane, nitrate, total coliform organisms, total trihalomethanes, and zinc. The infeasibility analysis meets the requirements of the State Water Resources Control Board's Compliance Schedule Policy (Resolution No. 2008-0025, *Policy for Compliance Schedules in National Pollutant Discharge Elimination System Permits*). The Discharger's 20 August 2013 submittal included: (a) documentation that diligent efforts have been made to quantify pollutant levels in the discharge and the sources of the pollutant in the waste stream and (b) a proposal for facility upgrades with projected time schedules to achieve compliance with final effluent limitations.

10. The Discharger cannot consistently comply with the chlorodibromomethane and total trihalomethanes effluent limitations in WDRs Order R5-2013-0146 and must implement additional actions to reach compliance. Therefore, this Order contains a schedule for compliance with the final effluent limitations and interim limitations for chlorodibromomethane and total trihalomethanes.

MANDATORY MINIMUM PENALTIES

11. California Water Code section 13385, subdivisions (h) and (i) require the Regional Water Board to impose mandatory minimum penalties (MMPs) upon dischargers that violate certain effluent limitations. California Water Code section 13385(j) exempts certain violations from the MMPs. California Water Code section 13385(j)(3) exempts the discharge from MMPs "*where the waste discharge is in compliance with either a cease and desist order issued pursuant to Section 13301 or a time schedule order issued pursuant to Section 13300 or 13308, if all the [specified] requirements are met … for the purposes of this subdivision, the time schedule may not exceed five years in length...*"

12. Per the requirements of California Water Code section 13385(j)(3), the Central Valley Water Board finds that:

    a. This Order specifies the actions that the Discharger is required to take in order to correct the violations that would otherwise be subject to California Water Code sections 13385(h) and (i).

    b. New or modified control measures are necessary in order to comply with the effluent limitations for chlorodibromomethane and total trihalomethanes. The new or modified control measures cannot be designed, installed, and put into operation within 30 calendar days.

    c. This Order establishes a time schedule to bring the waste discharge into compliance with the effluent limitations that is as short as possible, taking into account the technological, operational, and economic factors that affect the design, development, and implementation of the control measures that are necessary to comply with the effluent limitations.

13. By statute, a Cease and Desist Order or Time Schedule Order may provide protection from MMPs for no more than five years.

14. Compliance with this Order exempts the Discharger from MMPs for violations of the final effluent limitations found in WDR Order R5-2013-0146 for chlorodibromomethane and total trihalomethanes because they are newly adopted effluent limits in Order R5-2013-0146 on 5 December 2013 that have not previously been provided protection from MMPs.

    a. Therefore, this Order provides protection for chlorodibromomethane and total trihalomethanes from MMPs from the 5 December 2013 until 1 March 2018.

15. If the interim effluent limits in this Order for chlorodibromomethane and total trihalomethanes are exceeded, then the Discharger is subject to an MMP for each particular exceedance as it will no longer meet the exemption in California Water Code 13385(j)(3). It is the intent of the Board that a violation of an interim chlorodibromomethane and total trihalomethanes average monthly effluent limitation subjects the Discharger to only one MMP for that monthly averaging period[1]. In addition, a violation of the interim maximum daily chlorodibromomethane and total trihalomethanes effluent limitation subjects the Discharger to one MMP for the day the sample was collected.

16. In accordance with Water Code section 13385(j)(3), the total length of protection from MMPs for chlorodibromomethane and total trihalomethanes does not exceed five years.

17. This Order provides a time schedule for completing the actions necessary to ensure compliance with the final effluent limitations for chlorodibromomethane and total trihalomethanes contained in Order R5-2013-0146. Since the time schedule for completion of actions necessary to bring the waste discharge into compliance exceeds 1-year, this Order includes interim effluent limitations and interim requirements and dates for their achievement.

18. This Order includes performance-based interim effluent limitations for chlorodibromomethane and total trihalomethanes. The interim effluent limitations are based on the current treatment plant performance.

    The interim effluent limitations consist of statistically calculated performance-based average monthly and maximum daily effluent limits derived using sample data provided by the Discharger. The interim effluent limitations were developed using the statistical based approach provided in EPA's *Technical Support Document for Water Quality-Based Toxics Control* or TSD. The TSD provides guidance on estimating the projected maximum effluent concentration using a lognormal distribution of the observed effluent concentrations at a desired confidence level, as detailed in Section 3.3 of the TSD. The multipliers in Table 3-1 of the TSD were used to calculate the 99th percent confidence level and 99th percentile of the data set based on the number of effluent samples and the coefficient of variation. The multipliers from the table were multiplied by the highest observed effluent concentration (MEC) to estimate the maximum expected effluent concentration; this value was used as the interim effluent limitations for the average monthly effluent limit (AMEL). The interim performance-based maximum daily effluent limitations (MDELs) were established in accordance with section 1.4 and Table 2 of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SIP), by multiplying the interim AMEL by the MDEL/AMEL multiplier.

[1] In accordance with Questions 39 and 40 of the 17 April 2001 State Water Board *SB 709 and SB 2165 Questions and Answers* document.

Effluent data from January 2008 through May 2012 was used to calculate the interim effluent limitations in the table below. The following summarizes the calculations of the daily maximum and average monthly interim effluent limitations for these constituents:

Parameter	Units	MEC	Number of Data Points	Mean	Standard Deviation	Coefficient of Variation[1]	MDEL/ AMEL Multiplier[2]	Interim Average Monthly Effluent Limitation[3]	Interim Maximum Daily Effluent Limitation[4]
Chlorodibromomethane	µg/L	0.82	5	--	--	0.60	2.01	3.4	6.8
Total Trihalomethanes	µg/L	171	5	--	--	0.60	2.01	720	1450

[1] For a dataset with less than 10 data points, the coefficient of variation is estimated to equal 0.6.
[2] Maximum daily/average monthly effluent limit multiplier extrapolated from Table 2 of the SIP.
[3] 99% confidence level upper limit value from the Technical Support Document for Water Quality-based Toxics Control used to calculate the maximum expected concentration in a dataset.
[4] Interim maximum daily effluent limitation calculated from MDEL/AMEL multiplier.

19. The Central Valley Water Board finds that the Discharger can maintain compliance with the interim effluent limitations included in this Order. Interim effluent limitations are established when compliance with the final effluent limitations cannot be achieved by the existing Facility. Discharge of constituents in concentrations in excess of the final effluent limitations, but in compliance with the interim effluent limitations, can significantly degrade water quality and adversely affect the beneficial uses of the receiving stream on a long-term basis. The interim effluent limitations, however, establish an enforceable ceiling concentration until compliance with the final effluent limitation can be achieved.

REGULATORY BASIS

20. Section 13300 of the California Water Code states in part: "*Whenever a regional board finds that a discharge of waste is taking place or threatening to take place that violates or will violate requirements prescribed by the regional board, or the state board, or that the waste collection, treatment, or disposal facilities of a discharger are approaching capacity, the board may require the discharger to submit for approval of the board, with such modifications as it may deem necessary, a detailed time schedule of specific actions the discharger shall take in order to correct or prevent a violation of requirements*. "

21. Water Code section 13267 states in part: *In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of*

perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report 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.

22. The Discharger owns and operates the wastewater treatment plant and sewage collection system which is subject to this Order. The technical and monitoring reports required by this Order are necessary to determine compliance with the WDRs and with this Order.

23. Issuance of this Order is exempt from the provisions of the California Environmental Quality Act (Pub. Resources Code, § 21000 et seq.) ("CEQA") pursuant to Water Code section 13389, since the adoption or modification of an NPDES permit for an existing source is statutorily exempt and this Order only serves to implement a NPDES permit. (*Pacific Water Conditioning Ass'n, Inc. v. City Council of City of Riverside* (1977) 73 Cal.App.3d 546, 555-556.).

24. On 5 December 2013, in Rancho Cordova, California, after due notice to the Discharger and all other affected persons, the Central Valley Water Board conducted a public hearing at which evidence was received to consider Time Schedule Order R5-2013-0147 under Water Code section 13301 to establish a time schedule to achieve compliance with waste discharge requirements.

IT IS HEREBY ORDERED THAT pursuant to California Water Code Sections 13300 and 13267, to ensure compliance with the requirements of Order R5-2013-0146, or subsequently adopted order, the Discharger shall comply with the following:

1. The Discharger shall comply with the following time schedule to ensure completion of the compliance projects:

Task	**Compliance Date**
Submit Project Report/Preliminary Engineering Report	28 February 2014
Submit documentation of public education and outreach and initiate 45-day Proposition 218 protest period	31 August 2014
Submit documentation of Proposition 218 protest period and hearing completion and adoption of new rate structure by the City Council	31 December 2014
Submit Progress Reports [1]	31 January, annually
Submit documentation that the design of required treatment plant improvements have been initiated	31 March 2015

Submit documentation that the design is complete and bids have been requested	30 November 2015
Submit documentation that bid has been awarded	28 February 2016
Submit documentation that construction has initiated	30 June 2016
Submit documentation that construction has completed	30 November 2017
Submit documentation of project startup	28 February 2018
Submit documentation showing that the discharge fully complies with the final effluent limitations for chlorodibromomethane and total trihalomethanes	1 March 2018
[1] The progress reports shall detail the steps taken to comply with this Order, including documentation showing completion of tasks, construction progress, evaluation of the effectiveness of the implemented measures, and assessment of whether additional measures are necessary to meet the compliance dates.	

2. The following interim effluent limitations for chlorodibromomethane and total trihalomethanes shall be effective upon adoption of this Order, and shall apply in lieu of the corresponding final effluent limitations in Order R5-2013-0146. The Discharger shall maintain compliance with the following interim effluent limitations through **28 February 2018**, or when the Discharger is able to come into compliance with the final effluent limitations, whichever is sooner.

   Chlorodibromomethane and total trihalomethanes. Chlorodibromomethane and total trihalomethanes in the effluent shall not exceed:

Parameter	Units	Interim Effluent Limitations	
		Average Monthly	Maximum Daily
Chlorodibromomethane	µg/L	3.4	6.8
Total Trihalomethanes	µg/L	720	1450

3. Any person signing a document submitted under this Order shall make the following certification:

   "I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my knowledge and on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

4. 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 work plans 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 contain the professional's signature and/or stamp of the seal.

If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement, may issue a complaint for administrative civil liability, or may take other enforcement actions. Failure to comply with this Order or with the WDRs may result in the assessment of Administrative Civil Liability of up to $10,000 per violation, per day, depending on the violation, pursuant to the Water Code, including sections 13268, 13350 and 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order signed by the Executive Officer of the California Regional Water Quality Control Board, Central Valley Region, on **5 December 2013**.

Original Signed by

PAMELA C. CREEDON, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ADMINISTRATIVE CIVIL LIABILITY ORDER R5-2012-0560

MANDATORY PENALTY
IN THE MATTER OF

CITY OF JACKSON
WASTEWATER TREATMENT PLANT
AMADOR COUNTY

This Order is issued to the City of Jackson (hereafter Discharger) pursuant to California Water Code (CWC) section 13385, which authorizes the imposition of Administrative Civil Liability (ACL). This Order is based on findings that the Discharger violated provisions of Waste Discharge Requirements (WDRs) Order R5-2007-0133 (NPDES No. CA0079391).

The Assistant Executive Officer of the California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board or Board) finds the following:

1. The Discharger owns and operates the City of Jackson Wastewater Treatment Plant (WWTP), which provides sewerage service to the City of Jackson in Amador County. Treated domestic, commercial and industrial wastewater is discharged to Jackson Creek, a water of the United States, and tributary to Lake Amador.

2. On 25 October 2007, the Central Valley Water Board issued WDRs Order R5-2007-0133, effective 14 December 2007, which contained new requirements and rescinded Order 5-00-173, except for enforcement purposes. The WDRs include effluent limitations and other requirements.

3. On 1 July 2010, the Assistant Executive Officer of the Central Valley Water Board issued Administrative Civil Liability Order (ACLO) R5-2010-0531 for $147,000 in mandatory minimum penalties for effluent violations from 1 January 2008 through 31 December 2009. The Order allowed $135,000 of the penalty to be applied to an effluent filter upgrade project. The Discharger paid $12,000 and completed the compliance project. The Board considers the matter settled for the violations specifically listed in Attachment A of ACLO-R5-2010-0531.

4. On 3 November 2011, the Central Valley Water Board adopted Time Schedule Order (TSO) R5-2011-0909. The TSO provides interim effluent limitations for aluminum, ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, turbidity, and zinc. Compliance with the TSO exempts the Discharger from MMPs for these constituents. This Order considers the protection from MMPs granted by TSO R5-2011-0909.

5. On 28 March 2011, Central Valley Water Board staff issued the Discharger a draft Record of Violations and Notice of Violation for effluent limitation violations that occurred at the wastewater treatment plant from 1 January 2010 through 31 January 2011. On 13 April 2011, the Discharger agreed that the violations occurred and requested that the Board allow the penalties to be applied to a compliance project. On 11 August 2011, the

Discharger submitted a compliance project, project schedules, projected project costs, and a statement that funding is available in the wastewater fund (Attachment B). The final listing of violations has been extended by 15 months and additional violations have been added.

6. CWC Sections 13385(h) and (i) require assessment of mandatory penalties and state, in part, the following:

CWC section 13385(h)(1) states,

> Notwithstanding any other provision of this division, and except as provided in subdivisions (j), (k), and (l), a mandatory minimum penalty of three thousand dollars ($3,000) shall be assessed for each serious violation.

CWC section 13385 (h)(2) states,

> For the purposes of this section, a "serious violation" means any waste discharge that violates the effluent limitations contained in the applicable waste discharge requirements for a Group II pollutant, as specified in Appendix A to Section 123.45 of Title 40 of the Code of Federal Regulations, by 20 percent or more or for a Group I pollutant, as specified in Appendix A to Section 123.45 of Title 40 of the Code of Federal Regulations, by 40 percent or more.

CWC section 13385(i)(1) states,

> Notwithstanding any other provision of this division, and except as provided in subdivisions (j), (k), and (l), a mandatory minimum penalty of three thousand dollars ($3,000) shall be assessed for each violation whenever the person does any of the following four or more times in any period of six consecutive months, except that the requirement to assess the mandatory minimum penalty shall not be applicable to the first three violations:
>
> A) Violates a waste discharge requirement effluent limitation.
> B) Fails to file a report pursuant to Section 13260.
> C) Files an incomplete report pursuant to Section 13260.
> D) Violates a toxicity effluent limitation contained in the applicable waste discharge requirements where the waste discharge requirements do not contain pollutant-specific effluent limitations for toxic pollutants.

7. WDRs Order R5-2007-0133 Effluent Limitations IV.A.1.a. includes, in part:

The Discharger shall maintain compliance with the effluent limitations specified in Table 6:

Table 6. Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
INORGANICS						
Copper, Total Recoverable	µg/L	3.22	--	6.46	--	--
Cyanide, Total	µg/L	4.26	--	8.54	--	--
Zinc, Total Recoverable	µg/L	30.00	--	60.00	--	--
ORGANICS						
Dichlorobromomethane	µg/L	0.56	--	1.12	--	--
NON-CONVENTIONALS						
Nitrate (as NO_3)	mg/L	45	--	--	--	--
Total Coliform Organisms	MPN/100 mL					240
Turbidity	NTU	--	--	--	--	10

8. WDRs Order R5-2007-0133 Effluent Limitations IV.A.1.f., ammonia, states:

   f. Ammonia. The following effluent limitations for ammonia are effective from 18 May 2010 until 5 years following the date of adoption of this Order:

      i. 1.2 mg/L, as an Average Monthly Effluent Limitation; and
      ii. 4.2 mg/L, as a Maximum Daily Effluent Limitation.

9. WDRs Order R5-2007-0133 Effluent Limitations IV.A.1.i., Turbidity, states:

   Effluent turbidity shall not exceed:

   i. 2 NTU, as a daily average;
   ii. 5 NTU, more than 5% of the time within a 24-hour period; and
   iii. 10 NTU, at any time.

10. WDRs Order R5-2007-0133 Effluent Limitations IV.A.1.j., Total Coliform Organisms, states:

    Effluent total coliform organisms shall not exceed:

    i. 2.2 most probable number (MPN) per 100 mL, as a 7-day median; and
    ii. 23 MPN/100 mL, more than once in any 30-day period.

11. TSO Order R5-2011-0909 Provision No. 2 includes in part, the following effluent limitations:

Parameter	Units	Maximum Daily [1]	Average Monthly [2]
Cyanide, Total	µg/L	8	6
Zinc, Total Recoverable	µg/L	145	124

1 Mean + (3.3) x (Standard Deviation)
2 Mean + (2.0) x (Standard Deviation)

12. According to the Discharger's self-monitoring reports, the Discharger committed seven (7) serious Group I violations of the above effluent limitations contained in WDRs Order R5-2007-0133 during the period beginning 1 January 2010 and ending 31 May 2012. The violations are defined as serious because the measured concentrations of Group I constituents exceeded maximum prescribed levels by more than 40 percent on these

occasions. The mandatory minimum penalty for these serious violations is **twenty-one thousand dollars ($21,000)**.

13. According to the Discharger's self-monitoring reports, the Discharger committed eighty-four (84) serious Group II violation of the above effluent limitations contained in WDRs Order R5-2007-0133 during the period beginning 1 January 2010 and ending 31 May 2012. These violations are defined as serious because the measured concentration of a Group II constituent exceeded the maximum prescribed level by more than 20 percent on these occasions. The mandatory minimum penalty for these serious violations is **two hundred fifty-two thousand dollars ($252,000)**.

14. According to the Discharger's self-monitoring reports, the Discharger committed forty-six (46) non-serious violations of the effluent limitations contained in WDRs Order R5-2007-0133 during the period beginning 1 January 2010 and ending 31 May 2012. All of the non-serious violations are subject to mandatory penalties under CWC Section 13385(i)(1) because these violations were preceded by three or more similar violations within a six-month period. The mandatory minimum penalty for these non-serious violations is **one hundred thirty-eight thousand dollars ($138,000)**.

15. The total amount of the mandatory penalties assessed for the cited effluent violations is **four hundred eleven thousand dollars ($411,000).** A detailed list of all the effluent violations is included in Attachment A, a part of this Order.

16. CWC section 13385 (k)(1) states, in part:

> In lieu of assessing all or a portion of the mandatory minimum penalties pursuant to subdivisions (h) and (i) against a publicly owned treatment works serving a small community, the state board or the regional board may elect to require the publicly owned treatment works to spend an equivalent amount towards the completion of a compliance project proposed by the publicly owned treatment works…

17. CWC section 13385 (k)(2) states, in part:

> For the purposes of this subdivision, "a publicly owned treatment works serving a small community" means a publicly owned treatment works serving a population of 10,000 persons or fewer or a rural county, with a financial hardship as determined by the state board after considering such factors as median income of the residents, rate of unemployment, or low population density in the service area of the publicly owned treatment works.

18. The City of Jackson Wastewater Treatment Plant is a publicly owned treatment works, depends primarily on residential fees to fund its wastewater treatment facility, and is serving a small community with financial hardship as defined by the Water Quality Enforcement Policy and within the meaning of CWC section 13385(k)(2).

19. On 11 August 2011, the Discharger proposed a $464,000 secondary process improvements compliance project as found in Attachment B to this Order. The project is consistent with the project required by TSO R5-2011-0909 and consists of updating the

nitrification/denitrification in the oxidation ditches, introducing pH control, modifying the disinfection system including the injection point, replacing the coagulation system with a flow-paced control system, stream dilution studies, and submitted the project outline and project schedule. Other improvements to the effluent filters are part of the compliance project set forth in ACLO R5-2010-0531. The Discharger proposes to complete the work by 1 December 2014, evaluate performance through 28 February 2015, and has provided assurance that it has funds on hand to complete the project as presented in Attachment B.

20. The Central Valley Water Board finds that the Compliance Project has been designed to correct these violations within five years, that the timeline for the Compliance Project is as short as possible, and that the Compliance Project has been designed in accordance with the Enforcement Policy of the State Water Board. The amount that the Discharger plans to expend on the Compliance Project is in excess of the mandatory minimum penalty that the Board is required to assess under CWC sections 13385(h) and (i) for the violations that are to be addressed by the Compliance Project.

21. On 23 April 2009, the Central Valley Water Board delegated the authority to issue Administrative Civil Liability Orders, where the matter is not contested by the Discharger, to the Executive Officer, or to an Assistant Executive Officer when the Executive Officer is serving as head of the Board's Prosecution Team (Resolution R5-2009-0027). Pamela Creedon is serving as the head of the Board's Prosecution Team for this matter, and therefore Assistant Executive Officer Kenneth Landau has the authority to issue this Order.

22. This Order constitutes a settlement of the violations herein mentioned. Notice of this settlement was published on the Central Valley Water Board's website and was provided to all interested parties. The 30-day public notice and comment period mandated by Federal regulations (40 C.F.R. § 123.27) has expired.

23. Issuance of this Administrative Civil Liability Order to enforce CWC Division 7, Chapter 5.5 is exempt from the provisions of the California Environmental Quality Act (Pub. Resources Code § 21000 et seq.), in accordance with California Code of Regulations, title 14, section 15321(a)(2).

IT IS HEREBY ORDERED THAT:

1. The City of Jackson, its agents, successors and assigns, shall be assessed Administrative Civil Liability in the amount of **four hundred eleven thousand dollars ($411,000)**.

2. The **four hundred eleven thousand dollar ($411,000)** penalty shall be suspended if the Discharger complies with the following time schedule to complete its compliance project:

Task	Compliance Date
Complete Planning, Design, and Bid Process for pH, DO, SCADA Monitoring, Recording, Controls, and Alarms	1 February 2013
Complete Planning, Design, and Bid Process for Lime Storage and Dosing System, Prefilter Coagulation/Flocculation improvements, and Increase in Chlorine Mixing Energy	1 November 2013
Complete Construction of pH, DO, SCADA Monitoring, Recording, Controls, and Alarms	1 March 2014
Complete Construction of Lime Storage and Dosing System, Prefilter Coagulation/Flocculation improvements, and Increase in Chlorine Mixing Energy	1 December 2014
Comply with Final Effluent Limitations for aluminum, ammonia, copper, cyanide, dichlorobromomethane, nitrate, total coliform organisms, turbidity, and zinc	1 March 2015
Submit final project report describing whether the project goals, costs, milestones, and completion dated have been met. The final accounting shall detail the funds spent for this particular project.	1 May 2015

3. A progress report shall be submitted on or before each of the above compliance dates. The progress reports shall detail the steps taken to comply with this Order, including documentation showing completion of tasks, construction progress, evaluation of the effectiveness of the implemented measures, and assessment of whether additional measures are necessary to meet the compliance dates.

4. In addition, beginning with the third quarter of 2012, the Discharger shall submit quarterly progress reports detailing the progress toward compliance with the above schedule, the funds expended to date, and how those expenditures relate to the specific compliance project. Quarterly progress reports are due on the first day of the second month after the end of the quarter (i.e., 1 February, 1 May, 1 August, and 1 November) and shall be submitted through the first quarter of 2015.

5. The Assistant Executive Officer may extend the abovementioned deadlines if the Discharger demonstrates that unforeseeable contingencies have created delays, provided that the Discharger continues to undertake all appropriate measures to meet the deadlines. The Discharger shall make any deadline extension request in writing. Under no circumstances may the completion of the Compliance Project extend past five (5) years from the issuance of this Order.

6. If, in the judgment of the Assistant Executive Officer, the Discharger fails to complete the Compliance Project in accordance with the specified time schedule or fails to construct the Compliance Project in accordance with the 11 August 2011 Compliance Project Proposal without obtaining Central Valley Water Board approval, the suspended mandatory minimum penalty ($411,000) must be paid within 30 days of notification by the Assistant Executive Officer of such failure.

7. The Discharger must obtain explicit approval from the Assistant Executive Officer for any significant departures from the project outline submitted on 11 August 2011 (as found in Attachment B). Failure to obtain approval for any significant departures will result in the assessment of the full amount of the suspended mandatory minimum penalty.

8. Should the Discharger fail to take any of the above actions, the Assistant Executive Officer may refer the matter to the State Attorney General for enforcement of the terms of this Order.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with CWC section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date that this Order becomes final, except that if the thirtieth day following the date that this Order becomes final falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

or will be provided upon request.

Original signed by Richard Loncarovich for

KENNETH D. LANDAU, Assistant Executive Officer

7 September 2012
DATE

Attachment A: Record of Violations

ATTACHMENT A
ADMINISTRATIVE CIVIL LIABILITY ORDER NO. R5-2012-0560

City of Jackson
Wastewater Treatment Plant

RECORD OF VIOLATIONS (1 January 2010 – 31 May 2012) MANDATORY PENALTIES
(Data reported under Monitoring and Reporting Program R5-2007-0133.)

	Date	Parameter	Units	Limit	Measured	Period Type	Remarks	CIWQS
1	29-Mar-10	Coliform	MPN/100mL	23	30	> once/30 days	4	874239
2	29-Mar-10	Coliform	MPN/100mL	2.2	17	7-Day Median	4	874240
3	31-Mar-10	Coliform	MPN/100mL	2.2	17	7-Day Median	4	874241
4	2-Apr-10	Coliform	MPN/100mL	2.2	17	7-Day Median	4	874242
5	5-Apr-10	Coliform	MPN/100mL	2.2	22	7-Day Median	4	874243
6	7-Apr-10	Coliform	MPN/100mL	2.2	23	7-Day Median	4	874244
7	9-Apr-10	Coliform	MPN/100mL	2.2	23	7-Day Median	4	874245
8	12-Apr-10	Coliform	MPN/100mL	2.2	23	7-Day Median	4	874246
9	14-Apr-10	Coliform	MPN/100mL	2.2	17	7-Day Median	4	874247
10	16-Apr-10	Coliform	MPN/100mL	2.2	17	7-Day Median	4	874248
11	20-May-10	Turbidity	NTU	2	3	Daily Average	4	879673
12	21-May-10	Turbidity	NTU	2	3	Daily Average	4	879674
13	22-May-10	Turbidity	NTU	2	5	Daily Average	4	879675
14	23-May-10	Turbidity	NTU	2	6	Daily Average	4	879688
15	23-May-10	Turbidity	NTU	5	6	≤5% of the time	4	879689
16	24-May-10	Turbidity	NTU	2	6	Daily Average	4	879690
17	24-May-10	Turbidity	NTU	5	6	≤5% of the time	4	879691
18	25-May-10	Turbidity	NTU	2	5	Daily Average	4	879692
19	26-May-10	Turbidity	NTU	2	5	Daily Average	4	879693
20	26-May-10	Ammonia	mg/L	4.2	5.2	Daily Max	4	879694
21	27-May-10	Turbidity	NTU	2	6	Daily Average	4	879695
22	27-May-10	Turbidity	NTU	5	6	≤5% of the time	4	879696
23	27-May-10	Ammonia	mg/L	4.2	7.6	Daily Max	1	879697
24	28-May-10	Turbidity	NTU	2	3	Daily Average	4	879698
25	28-May-10	Ammonia	mg/L	4.2	10.0	Daily Max	1	879699
26	29-May-10	Turbidity	NTU	2	3	Daily Average	4	879700
27	29-May-10	Ammonia	mg/L	4.2	6.3	Daily Max	1	879701
28	30-May-10	Turbidity	NTU	2	3	Daily Average	4	879704
29	31-May-10	Ammonia	mg/L	1.2	2.5	Monthly Ave	1	879705
30	31-May-10	Nitrate	mg/L	45	52	Monthly	4	879706
31	1-Jun-10	Ammonia	mg/L	4.2	4.4	Daily Max	4	879707
32	2-Jun-10	Ammonia	mg/L	4.2	4.6	Daily Max	4	879708
33	2-Jun-10	Coliform	MPN/100mL	240	900	Maximum	4	879709
34	3-Jun-10	Ammonia	mg/L	4.2	6.8	Daily Max	1	879710
35	4-Jun-10	Ammonia	mg/L	4.2	7.3	Daily Max	1	879711
36	9-Jun-10	Ammonia	mg/L	4.2	5.4	Daily Max	4	879712
37	15-Jun-10	Zinc	µg/L	60	90	Daily Max	2	879713
38	16-Jun-10	Ammonia	mg/L	4.2	5.3	Daily Max	4	879714
39	30-Jun-10	Ammonia	mg/L	1.2	2.3	Monthly Ave	1	879715
40	30-Jun-10	DCBM	µg/L	0.56	0.8	Monthly Ave	2	879716
41	30-Jun-10	Copper	µg/L	3.22	3.5	Monthly Ave	4	879717

	Date	Parameter	Units	Limit	Measured	Period Type	Remarks	CIWQS
42	30-Jun-10	Zinc	µg/L	30	90	Monthly Ave	2	879718
43	13-Jul-10	DCBM	µg/L	1.12	3.5	Daily Max	2	881566
44	13-Jul-10	Zinc	µg/L	60	96	Daily Max	2	881567
45	31-Jul-10	DCBM	µg/L	0.56	3.5	Monthly Ave	2	881568
46	31-Jul-10	Zinc	µg/L	30	96	Monthly Ave	2	881569
47	10-Aug-10	DCBM	µg/L	1.12	10	Daily Max	2	883810
48	10-Aug-10	Zinc	µg/L	60	110	Daily Max	2	883812
49	31-Aug-10	DCBM	µg/L	0.56	10	Monthly Ave	2	883811
50	31-Aug-10	Copper	µg/L	3.22	3.5	Monthly Ave	4	883815
51	31-Aug-10	Cyanide	µg/L	4.26	6.0	Monthly Ave	2	883814
52	31-Aug-10	Zinc	µg/L	30	110	Monthly Ave	2	883813
53	7-Sep-10	DCBM	µg/L	1.12	7.7	Daily Max	2	887854
54	7-Sep-10	Zinc	µg/L	60	84	Daily Max	2	887855
55	30-Sep-10	DCBM	µg/L	0.56	7.7	Monthly Ave	2	887857
56	30-Sep-10	Zinc	µg/L	30	84	Monthly Ave	2	887859
57	5-Oct-10	DCBM	µg/L	1.12	6.9	Daily Max	2	889712
58	5-Oct-10	Zinc	µg/L	60	100	Daily Max	2	889707
59	31-Oct-10	DCBM	µg/L	0.56	6.9	Monthly Ave	2	889713
60	31-Oct-10	Cyanide	µg/L	4.26	5.0	Monthly Ave	4	889714
61	31-Oct-10	Zinc	µg/L	30	100	Monthly Ave	2	889710
62	9-Nov-10	DCBM	µg/L	1.12	3.1	Daily Max	2	893189
63	9-Nov-10	Zinc	µg/L	60	97	Daily Max	2	893190
64	26-Nov-10	Coliform	MPN/100mL	240	2400	Maximum	4	893193
65	30-Nov-10	DCBM	µg/L	0.56	3.1	Monthly Ave	2	893196
66	30-Nov-10	Cyanide	µg/L	4.26	8.2	Monthly Ave	2	893197
67	30-Nov-10	Zinc	µg/L	30	97	Monthly Ave	2	893198
68	7-Dec-10	DCBM	µg/L	1.12	2.9	Daily Max	2	893199
69	7-Dec-10	Zinc	µg/L	60	99	Daily Max	2	893202
70	31-Dec-10	Nitrate	mg/L	45	46	Monthly	4	893203
71	31-Dec-10	DCBM	µg/L	0.56	2.9	Monthly Ave	2	893204
72	31-Dec-10	Copper	µg/L	3.22	4.9	Monthly Ave	2	893206
73	31-Dec-10	Zinc	µg/L	30	99	Monthly Ave	2	893207
74	4-Jan-11	DCBM	µg/L	1.12	3.1	Daily Max	2	893208
75	31-Jan-11	DCBM	µg/L	0.56	3.1	Monthly Ave	2	893275
76	31-Jan-11	Nitrate	mg/L	45	49.8	Monthly Ave	4	893277
77	31-Jan-11	Zinc	µg/L	30	50	Monthly Ave	2	893278
78	15-Feb-11	DCBM	µg/L	1.12	5.3	Daily Max	2	899414
79	15-Feb-11	Zinc	µg/L	60	110	Daily Max	2	899415
80	28-Feb-11	Cyanide	µg/L	4.26	5.0	Monthly Ave	4	899416
81	28-Feb-11	Zinc	µg/L	30	110	Monthly Ave	2	899417
82	28-Feb-11	DCBM	µg/L	0.56	5.3	Monthly Ave	2	899418
83	15-Mar-11	DCBM	µg/L	1.12	2.2	Daily Max	2	899426
84	15-Mar-11	Zinc	µg/L	60	110	Daily Max	2	899427
85	20-Mar-11	Turbidity	NTU	5	17.5	≤5% of time	4	899430
86	20-Mar-11	Turbidity	NTU	2	3.4	Daily Ave	4	899442
87	31-Mar-11	Cyanide	µg/L	4.26	5	Monthly Ave	4	899443

	Date	Parameter	Units	Limit	Measured	Period Type	Remarks	CIWQS
88	31-Mar-11	DCBM	µg/L	0.56	2.2	Monthly Ave	2	899452
89	31-Mar-11	Zinc	µg/L	30	110	Monthly Ave	2	899454
90	12-Apr-11	DCBM	µg/L	1.12	3.4	Daily Max	2	902029
91	12-Apr-11	Zinc	µg/L	60	70	Daily Max	4	902030
92	30-Apr-11	DCBM	µg/L	0.56	3.4	Monthly Ave	2	902031
93	30-Apr-11	Copper	µg/L	3.22	5	Monthly Ave	2	902032
94	30-Apr-11	Zinc	µg/L	30	70	Monthly Ave	2	902033
95	10-May-11	DCBM	µg/L	1.12	3	Daily Max	2	904748
96	10-May-11	Copper	µg/L	3.22	4.8	Monthly Ave	2	904749
97	10-May-11	Cyanide	µg/L	8.54	9	Daily Max	4	904752
98	10-May-11	Zinc	µg/L	60	100	Daily Max	2	904753
99	31-May-11	DCBM	µg/L	0.56	3	Monthly Ave	2	904754
100	31-May-11	Cyanide	µg/L	4.26	9	Monthly Ave	2	904755
101	31-May-11	Zinc	µg/L	30	100	Monthly Ave	2	904756
102	6-Jun-11	Turbidity	NTU	2	3.5	Daily Ave	4	906076
103	6-Jun-11	Turbidity	NTU	5	8.4	≤5% of time	4	906077
104	14-Jun-11	DCBM	µg/L	1.12	6.8	Daily Max	2	906072
105	14-Jun-11	Zinc	µg/L	60	75	Daily Max	2	906074
106	30-Jun-11	DCBM	µg/L	0.56	6.8	Monthly Ave	2	906073
107	30-Jun-11	Zinc	µg/L	30	75	Monthly Ave	2	906075
108	12-Jul-11	DCBM	µg/L	1.12	6.9	Daily Max	2	909266
109	12-Jul-11	Zinc	µg/L	60	100	Daily Max	2	909271
110	31-Jul-11	DCBM	µg/L	0.56	6.9	Monthly Ave	2	909267
111	31-Jul-11	Zinc	µg/L	30	100	Monthly Ave	2	909277
112	31-Jul-11	Copper	µg/L	3.22	5.7	Monthly Ave	2	909280
113	31-Jul-11	Cyanide	µg/L	4.26	6	Monthly Ave	2	909284
114	9-Aug-11	DCBM	µg/L	1.12	4	Daily Max	2	910809
115	9-Aug-11	Zinc	µg/L	60	110	Daily Max	2	910811
116	31-Aug-11	DCBM	µg/L	0.56	4	Monthly Ave	2	910810
117	31-Aug-11	Zinc	µg/L	30	110	Monthly Ave	2	910812
118	31-Aug-11	Cyanide	µg/L	4.26	5.3	Monthly Ave	2	910813
119	13-Sep-11	DCBM	µg/L	1.12	5.9	Daily Max	2	914221
120	13-Sep-11	Zinc	µg/L	60	110	Daily Max	2	914223
121	30-Sep-11	DCBM	µg/L	0.56	5.9	Monthly Ave	2	914222
122	30-Sep-11	Zinc	µg/L	30	110	Monthly Ave	2	914224
123	30-Sep-11	Cyanide	µg/L	4.26	7.4	Monthly Ave	2	914225
124	30-Sep-11	Copper	µg/L	3.22	3.6	Monthly Ave	4	914226
125	11-Oct-11	DCBM	µg/L	1.12	5.9	Daily Max	2	914232
126	11-Oct-11	Zinc	µg/L	60	110	Daily Max	2	914234
127	31-Oct-11	DCBM	µg/L	0.56	5.9	Monthly Ave	2	914233
128	31-Oct-11	Zinc	µg/L	30	110	Monthly Ave	2	914236
Time Schedule Order R5-2011-0909 adopted 3 November 2011								
129	30-Nov-11	Zinc	µg/L	30	130*	Monthly Ave	2	917453
130	31-Dec-11	Zinc	µg/L	30	130*	Monthly Ave	2	917844
131	10-Jan-12	Cyanide	µg/L	8.54	13*	Daily Max	2	925205
132	31-Jan-12	Cyanide	µg/L	4.26	13*	Monthly Ave	2	925206

	Date	Parameter	Units	Limit	Measured	Period Type	Remarks	CIWQS
133	29-Feb-12	Cyanide	µg/L	4.26	7.7*	Monthly Ave	2	921637
134	29-Feb-12	Zinc	µg/L	30	140*	Monthly Ave	2	921638
135	31-Mar-12	Cyanide	µg/L	4.26	6.7*	Monthly Ave	2	924344
136	30-Apr-12	Cyanide	µg/L	4.26	7.2*	Monthly Ave	2	926312
137	31-May-12	Cyanide	µg/L	4.26	6.6*	Monthly Ave	2	928644

* - Measured concentration exceeded the TSO effluent limitation; therefore, the WDRs effluent violation is subject to MMPs.

DCBM: dichlorobromomethane

Remarks:

1. Serious Violation: For Group I pollutants that exceed the effluent limitation by 40 percent or more.
2. Serious Violation: For Group II pollutants that exceed the effluent limitation by 20 percent or more.
3. Non-serious violation falls within the first three violations in a six-month period, thus is exempt.
4. Non-serious violation subject to mandatory penalties.

VIOLATIONS AS OF:	**5/31/2012**
Group I Serious Violations:	7
Group II Serious Violations:	84
Non-Serious Exempt from MMPs:	0
Non-serious Violations Subject to MMPs:	46
Total Violations Subject to MMPs:	**137**

Mandatory Minimum Penalty = (91 serious Violation + 46 Non-Serious Violations) x $3,000 = $411,000

CITY OF
JACKSON
CALIFORNIA

"Preserving Our Past, Enriching Our Present, Building Our Future"
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August 11, 2011

California Regional Water Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670

Attention: Wendy Wyels

Regarding: City of Jackson WWTP Compliance Projects and Schedules

Per the Regional Water Board's request, the City of Jackson has prepared a suite of projects that can be implemented essentially immediately (i.e., funding is available in the wastewater fund as the projects are timed for completion in FY 2014/15, and CEQA documents and permits are not needed), that are designed to improve compliance with effluent limitations on nitrate (NO_3) ammonia (NH_3), turbidity (Turb), coliform (Coli), dichlorobromomethane (DCBM), cyanide (CN), aluminum (Al), copper (Cu), and zinc (Zn). These Project Elements are presented in Attachment A, along with estimated costs and a breakdown of how we have assigned those costs to each of the specific areas where compliance improvements are needed. As presented in Attachment A, the Project Elements cover general types of improvements: Secondary Process Improvements, Filter Improvements, Disinfection System Improvements, and Field Studies Facilitating Compliance.

Secondary Process Improvements. The core of the City's proposed compliance project is the Secondary Process Improvements Project. This is because if the current 25-year old secondary treatment process is improved to align with more contemporary processes designed to address contemporary effluent limitations, then improvements in effluent concentrations for all of the aforementioned constituents of concern will be achieved:

- NO_3 and NH_3. When treating wastewaters of high Sierra surface water origins, it has been demonstrated time and time again (Auburn, Nevada City, Grass Valley, Colfax, etc.) that the pH must be stabilized to allow the autotrophic nitrifying bacteria to co-exist with the more robust heterotrophic denitrifying bacteria in a simultaneous nitrification/denitrification process. Wastewater Engineering (4th Edition, 2003, p.615 and 623) suggests a process pH of 7.0 to 7.2 to maintain a simultaneous nitrification/denitrification process. As will be discussed under "Metals" the upper 7.2 value is the target of the City's Secondary Process Improvement project.

DO must also be monitored and controlled very carefully to achieve simultaneous nitrification/ denitrification because nitrifiers are strict aerobes and denitrification occurs only under anoxic to anaerobic conditions. Thus, a careful and "real-time" control on DO levels in the activated sludge process is necessary to maintain barely aerobic conditions in the bulk fluid of the wastewater (allowing nitrifiers to metabolize ammonia) while concurrently fostering anoxic conditions in micro-sites within the activated sludge microbial particles (allowing denitrifiers in the particles to metabolize nitrate). Wastewater Engineering (4th Edition, 2003, p.615 and 623) suggests an oxidation DO concentration less than about 0.5 mg/L if sludge ages and hydraulic residence times are maximized to foster nitrifier activity under such hostile environmental conditions.

Turbidity and Coliform. If the secondary treatment process is not stable biologically because of pH loss, diurnal swings in DO concentrations, and nitrification occurring to varying extents, then compliance with turbidity and coliform limitations is difficult, even with effluent filters. Unstable biological processes have poorly settling sludge which escapes the secondary clarification process and can easily overwhelm the solids removal capacity of effluent filters, particularly effluent filters that do not have the benefit of a functional coagulation process, such as is the case with the City's system. This results in turbidity violations as well as coliform violations stemming from the difficulty of disinfecting effluent containing particulates, i.e., turbidity. Additionally, unstable nitrification/denitrification processes produce NO_2 (nitrite) from time-to-time which has a very high chlorine demand (4 parts chlorine for every part of N in the NO_2 form, see Wastewater Engineering, 4th Edition, 2003, p.615). When NO_2 may be in the secondary process effluent, chlorination is unreliable (i.e., coliform violations will occur) unless excessive chlorination doses are used (which cause DCBM and CN violations).

DCBM and CN. As noted above, if the nitrification/denitrification process can be stabilized with real-time pH and DO monitoring and control features, then effluent turbidity and the potential for NO_2 production by the treatment process are reduced. This reduces the need for excessive chlorination, and thereby reduces the potential formation of DCBM and CN because DCBM and CN formation are both a direct function of chlorine dose and the amount of organics (particulate or dissolved) present in the effluent.

Metals. In "The Fate of Metals in Wastewater Treated by the Activated Sludge Process and Membrane Bioreactors: A Brief Review" (Journal of Environmental Monitoring, 12 (1), January 2010), Santos and Judd report that "the only consistent trend in metals removal is that it is most effectively achieved through effluent solids separation". In "Study of Various Parameters in the Biosorption of Heavy Metals on Activated Sludge" (World Applied Science Journal 5, 2009, pp.32-40), Ajay Kumar et al report: "activated sludge presents a negative net charge at surface level which facilitates its binding with positive cations. The metals are in competition with the

protons in the solution at low pH". They go on to show that in general metals adsorption to activated sludge increases materially as pH concentrations increase above 7.0.

In these contexts, the City's metals compliance plan is in complete agreement with and complementary to the NO_3 and NH_3 compliance plan: Increase the activated sludge process pH reliably to about 7.2 via an automated lime addition to maximize both the nitrification system denitrification process and metals adsorption to the activated sludge particles . The metals-laden activated sludge particles from a stable process will experience better effluent solids separation in the secondary clarification process, as well as in the more lightly loaded effluent filters with the benefit of a functional coagulation system. As will be discussed, the City is also proposing to add a functional coagulation system in front of the existing effluent filters to further enhance effluent solids separation, and therefore effluent metals removals.

As to the City's expectations with these improvements, Santos and Judd report a metals removal range for activated sludge of 51 to 87% and for MBR (membrane filtered activated sludge) of 64 to 92%. Between stabilizing the treatment process, increasing the process pH to 7.2, and enhancing effluent filtration, the City expects to improve its metals removal percentages within these reported ranges. The biochemistry and adsorption kinetics are sufficiently complex that the degree of success with these measures with specific regards to metals removal will have to be determined and optimized under field conditions, hopefully with protection under an appropriate CDO or TSO adopted by the Regional Water Board.

Allocation of Costs to Specific Contaminants. As noted, these important upgrades to the existing secondary treatment process are of general benefit to all of the constituents of concern. There is no known credible way to scientifically apportion, say the cost of pH control, to nitrogen compounds versus metals removal versus general effluent quality improvements that reduce turbidity, coliform, DCBM, and CN violations. As such, the total Secondary Process Improvements cost was split equally among nine constituents of concern. Thus 2/9ths of the total cost were assigned to reducing NO_3 and NH_3 violations, 2/9ths were assigned to reducing Turbidity and Coliform violations, 2/9ths were assigned to reducing DCBM and CN violations, and 3/9ths were assigned to reducing Cu, Zn, and Al violations.

Filter Improvements. This project consists of two distinct components. The first is the replacement of the old filter media with new media meeting the original design specification. The second is essentially replacing all existing 25-year old coagulation equipment with modern flow-paced equipment. Once the foregoing Secondary Process Improvements are in place and functioning, the replacement of the existing coagulation equipment with a modern system is driven primarily by the need to absolutely maximize effluent solids separation for the purpose of maximizing metals removal. As such, the total cost of these Filter Improvements is assigned to reducing Cu, Zn, and Al violations.

Disinfection System Improvements. As noted in Attachment A, these improvements consist of two specific projects:

- Moving the point of chlorination from before filtration (with the associated interference from particles and residual organics), to after filtration.
- Increasing the chlorine input mixing energy at the new post-filter chlorination point.

The benefit of moving the chlorination point from pre-filter to post-filter on reducing chlorine dose and therefore on reducing DCBM and CN formation is obvious. Accordingly the entire cost of moving the effluent chlorination point is assigned to reducing DCBM and CN violations.

It is noteworthy to comment on why pre-filter chlorination was practiced. Pre-filter chlorination helped to improve filter performance under the high loads of solids that episodically escaped the secondary clarification process because the current treatment process is relatively unstable in a simultaneous nitrification/denitrification mode of operation. With the Secondary Process Improvements, pre-filter chlorination should no longer be necessary because of reduced solids loads to the filters as discussed above.

Increasing the mixing energy at the chlorination point is a widely recognized means to increase the disinfection efficiency of a given chlorine dose, or alternatively, a means to decrease the chlorine dose to achieve a given level of effluent disinfection. The exact means of this improvement in disinfectant efficacy is not understood fully, but is believed to include:

- Forcing (by hydraulic pressure gradient) initial mix free chlorine deeply and quickly into the interiors of any residual effluent particles such that the interiors of these particles are disinfected by highly toxic free chorine rather than by any less toxic combined that may diffuse into the interiors of the particles over time.
- Disrupting (by hydraulic pressure gradient, i.e., shear) larger particles into smaller particles which are easier to disinfect.

Even with the proposed Secondary Process Improvements and Filter Improvements, there will be particles in the effluent from time to time. High mixing energy reduces the chlorine dose needed to disinfect the effluent during these eventualities. Wastewater Engineering (4th Edition, 2003, p.1244) notes:

> "The importance of initial mixing on the disinfection process cannot be overstressed. It has been shown that application of chlorine in a highly turbulent regime ($N_R \geq 10^4$) will

result in kills two orders of magnitude greater than when chlorine is added separately to a conventional rapid-mix reactor under similar conditions".

Because the objective of rapid mix for the City is reduced chlorine doses to reduce DCBM and CN formation, the total cost of rapid mix is assigned to reducing DCBM and CN violations.

Field Studies Facilitating Compliance. The City's existing WDR Order No. R5-2007-0133 requires 20:1 effluent dilution in Lake Amador by 25 October 2012 (Order III.E, page 9). This effectively limits the long-term average effluent dilution requirement in Jackson Creek (the sole major tributary to Lake Amador) to 20:1. However, on any given day, the effluent discharge to Jackson Creek may receive as little as 5:1 dilution. Under the City's plan to comply with Order III.E, the City has no plan to ever discharge to a dry streambed under Basin Plan objectives calling for avoidance of effluent-dominated stream conditions.

Considering that 1) the City has demonstrated that Jackson Creek has assimilative capacity for the constituents of concern; 2) the City is working with Amador Water Agency (the water utility) in the area of source-control efforts (particularly for metals); 3) effluent metals reduction beyond what is being proposed requires a completely new process in the form of either chemical precipitation or reverse osmosis (RO) treatment; and 4) the City is an economically disadvantaged community, the City's compliance plan includes conducting a mixing and dilution study as described in the State Implementation Policy, and as successfully completed and permitted for the City of Angels (aka, Angels Camp). The mixing zone and dilution study will address seven constituents of concern: NO_3, NH_3, DCBM, CN, Cu, Zn, and Al. As such, the cost of completing the study is divided equally among the seven constituents being studied, as shown in Attachment A. If the City can fund this important compliance project, now, the results may be available by mid 2012 for inclusion in the City's NPDES permit renewal Report of Waste Discharge. This should assist in minimizing the chance of a 2012/13 adopted Order being reopened in 2013/14.

The foregoing represents the City's proposed compliance projects to reduce violations of effluent limitations on NO_3, NH_3, Turbidity, Coliform, DCBM, CN, AL, Cu, and Zn. The City has funds on-hand to implement all of these proposed compliance projects. A schedule for implementing these proposed projects is provided as Attachment B.

The total cost estimate of $464,000 is believed to be sufficient to cover the mandatory minimum penalties that may accumulate prior to the implementation of a Time Schedule Order going back to the date of the City's previous Administrative Civil Liability Order No. R5-2010-0531. The projects have been planned to ensure that the City will have sufficient time to complete the projects within the given time periods and equally importantly, to fund the projects with operating and capital outlay funds to be programmed in the City's wastewater fund budget.

If you need any further information, please feel free to call me immediately. City staff and our consultants are at your service in developing equitable solutions to these complex problems. Thank you very much for facilitating the meeting to get this important matter of business for the City back on track.

Sincerely,

City of Jackson

Michael Daly, City Manager

/attachments

cc: Jackson City Council
Eric Neuschmid, Chief Wastewater Treatment Plant Operator
Harold Welborn, Stantec
Diana Messina, RWQCB

ATTACHMENT A: CITY OF JACKSON - WASTEWATER COMPLIANCE PROJECTS

Project Elements	Costs x $1,000 Assigned To Compliance Issue Targeted				
	NO3, NH3	Turb, Coli	DCBM, CN	Cu, Zn, Al	Totals
I. Secondary Process Improvement					
A. Lime Storage and Dosing System to provide stable pH in the simultaneous Nitrification/Denitrification Activated Sludge Process	22	22	22	30	96
B. pH Monitoring, Recording and Controls on Lime Dosing System	9	9	9	15	42
C. DO Monitoring, Recording and Controls to avoid over or under-aerating	9	9	9	15	42
D. SCADA Monitoring for improved Nit/Denit Activated Sludge Process Control	16	16	16	24	72
II. Filter Imporvements					
A. Existing Filters Enhancements (ACL Order -0531 Project for $135,000), ongoing					
C. Improve pre-filter coagulation/flocculation				30	30
III. Disinfection System Improvements					
A. Change Chlorine addition point			30		30
B. Increase initial Chlorine mixing energy			72		72
IV. Field Studies Facilitating Compliance					
A. Stream Dilution Studies	18	18	18	26	80
TOTAL ESTIMATED COSTS, X $1,000	74	74	176	140	464

Job No. 184030218

August 11, 2011

ATTACHMENT B
City of Jackson NPDES Permit (WDR R5-2007-0133)
Compliance Projects Schedules

Compliance Project	2011							2012												2013												2014												2015					
	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
I. Secondary Process Improvement																																																	
A. Lime Storage and Dosing System															planning & predesign							design & bid																						Evaluate					
B. pH Monitoring, Recording and Controls						planning & predesign										design & bid									Construction									Evaluate														
C. DO Monitoring, Recording and Controls						planning & predesign										design & bid									Construction									Evaluate														
D. SCADA Monitoring, Control and Alarm						planning & predesign										design & bid									Construction									Evaluate														
II. Filter Imporvements																																																	
A. Existing Filters Enhancements (ACLO 10-0531)																																																	
B. Improve pre-filter coagulation/flocculation															planning & predesign							design & bid																						Evaluate					
III. Disinfection System Improvements																																																	
A. Change Chlorine addition point						study				evaluate results																																							
B. Increase initial Chlorine mixing energy															planning & predesign							design & bid																						Evaluate					
IV Field Studies Facilitating Compliance																																																	
A. Stream Dilution Studies						Stream Dilution Studies																																											

Job No. 184030218

August 11, 2011